(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 956 244 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
24.02.2010 Bulletin 2010/08

(51) Int Cl.:
F04C 18/02 *(2006.01)* ***F04C 29/02*** *(2006.01)*

(21) Application number: **08001720.5**

(22) Date of filing: **30.01.2008**

(54) **Scroll fluid machine**

Spiralfluidmaschine

Machine à spirale pour fluides

(84) Designated Contracting States:
DE FR

(30) Priority: **06.02.2007 JP 2007026620**

(43) Date of publication of application:
13.08.2008 Bulletin 2008/33

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EP 1 956 244 B1

Printed by Jouve, 75001 PARIS (FR)

Description

BACKGROUND OF THE INVENTION

Field of the invention

[0001] The present invention relates to a fluid machine, and, particularly, to a fluid machine which reserves a lubrication oil below a closed container.

Description of the Related Art

[0002] A closed type compressor which is one example of this type of fluid machine is used in a refrigeration air conditioner or the like to compress a coolant as a working fluid. This coolant normally includes a lubrication oil. This lubrication oil serves to seal a slide surface in the compressor as well as lubricate the slide surface, a bearing and so forth.

[0003] When the lubrication oil is not supplied to the slide surface or the like, however, a failure occurs in the compressor. There is known a compressor which overcomes a problem originating from exhaustion of the lubrication oil (see Japanese Patent Application Laid-Open No. HIO-47269).

[0004] According to the foregoing related art, a pipe which bypasses an electric motor and connects a scroll unit to a reservoir for lubrication oil is provided, and is laid out on the outer surface side of the electric motor.

[0005] Patent abstracts of Japan JP2000205157, considered to represent the closest prior art, shows a scroll compressor which reduces the oil rising quantity by dividing the space formed between a compression mechanism part and an electric motor by a demister. The demister separates lubrication oil from the discharged gas. The coolant gas without lubrication oil from the space on one side of the demister is carried out through a discharge pipe, and the lubrication oil is returned to the space on the other side of the demister by centrifugal force.

[0006] To overcome the problem originating from exhaustion of the lubrication oil, attention needs to be paid to avoidance of increases in the weight, thickness, length and size of a compressor. This is because there is a demand for making smaller and lighter a compressor which is used in a refrigeration air conditioner or the like and reserve a lubrication oil below a closed container so that the compressor can easily be disposed in general houses.

SUMMARY OF THE INVENTION

[0007] The present invention has been made in view of such a problem, and it is an object of the invention to provide a fluid machine which can be made smaller and lighter while improving the reliability of the lubrication performance with a simple mechanism.

[0008] To achieve the object, a fluid machine of the present invention comprises a closed container having a cylindrical body part, a discharge chamber formed above the cylindrical body part, and a reservoir for lubrication oil, formed below the cylindrical body part, a discharge pressure acting in the cylindrical body part; a rotating shaft extending in the cylindrical body part and rotatably supported via a bearing; an electric motor that is accommodated in the cylindrical body part, drives the rotating shaft by energization thereof, and has a rotor around the rotating shaft, the rotor being rotated together with the rotating shaft, and a stator around the rotor, the stator rotating the rotor; a scroll unit that is accommodated in the cylindrical body part above the electric motor and is driven by the rotating shaft to execute a sequence of processes from intake of a working fluid to discharge thereof; a frame member that is disposed between the scroll unit and the electric motor, fixes the scroll unit and supports the rotating shaft via the bearing; and flow-direction restricting means that restricts a direction of lubrication oil flowing downward toward the electric motor from the scroll unit to inhibit the lubrication oil supplied from the reservoir to the bearing from flowing toward the stator,

the flow-direction restricting means including a guide member fixed to a top surface of the rotor and guiding the downward-flowing lubrication oil to the top surface, and a discharge passage for causing the lubrication oil guided to the top surface to flow to the reservoir.

[0009] According to the fluid machine, a lubrication oil in the reservoir is supplied to the bearing to lubricate and cool the bearing, and the flow-direction restricting means restricts the direction of the lubrication oil flowing downward toward the electric motor from the scroll unit to inhibit the flow of the lubrication oil toward the stator. The flow-direction restricting means is configured to include the guide member which is fixed to the top surface of the rotor and guides the downward-flowing lubrication oil to the top surface of the rotor, and the discharge passage which causes the lubrication oil guided to the top surface of the rotor to flow to the reservoir. Accordingly, the lubrication oil is all led to the reservoir promptly without being scattered in the body part. As a result, the lubrication oil can be collected efficiently, and a failure of the fluid machine originating from insufficient supply of the lubrication oil can surely be prevented with a simple mechanism having the guide member provided, thus making it possible to improve the reliability of the fluid machine.

[0010] What is more, scattering of the lubrication oil in the body part can be prevented, suppressing contact of the downward-flowing lubrication oil with the working fluid and inclusion of the lubrication oil therein so that the oil circulation rate (OCR) of the lubrication oil flowing outside the fluid machine can be suppressed. This suppression of the oil circulation rate improves the efficiency of each heat exchanger of the refrigeration system, enabling achievement of energy reduction of the refrigeration system.

[0011] As a preferable mode, in the fluid machine, the

guide member is formed into a bottomed cylindrical shape having a bottom portion caulked to the top surface and an opening opened toward the frame member.

[0012] With this configuration, the guide member is formed into a bottomed cylindrical shape whose opening is opened toward the frame member and whose bottom portion is caulked to the top surface of the rotor, so that the oil circulation rate can be suppressed with a simple mechanism of having the guide member and the rotor integrally assembled, thus making it possible to achieve a smaller and lighter fluid machine and reduction of the manufacture cost thereof.

[0013] As a preferable mode, the fluid machine further comprises a partition mechanism that encloses the guide member to separate a working fluid discharged from the scroll unit and the downward-flowing lubrication oil in order to inhibit flow of the working fluid into the guide member.

[0014] As this configuration has the partition mechanism that prevents flow of a working fluid into a guide member, the downward-flowing lubrication oil is prevented from coming into contact with the working fluid to be included therein, so that the oil circulation rate can be reduced surely, thus ensuring more reliable prevention of a failure of the fluid machine originating from exhaustion of the lubrication oil.

[0015] As a preferable mode, in the fluid machine, the discharge passage is formed penetrating the bottom portion and the rotor.

[0016] With this configuration, the downward-flowing lubrication oil is smoothly discharged to the reservoir via the discharge passage formed penetrating the bottom portion of the guide member and the rotor, making it possible to collect the lubrication oil more efficiently and prevent a failure of the fluid machine originating from exhaustion of the lubrication oil more reliably.

[0017] As a preferable mode, in the fluid machine, the working fluid is a coolant comprised of carbon dioxide.

[0018] With this configuration, a coolant comprised of carbon dioxide which is compressed under high pressure is used as the working fluid, so that even when the plate thickness or the like of the closed container is increased, a sufficient amount of lubrication oil can be secured without increasing the weight, thickness, length and size of the fluid machine.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

FIG. 1 is a longitudinal cross-sectional view showing a closed type compressor according to one embodiment of the present invention;

FIG. 2 is a plan view showing a rotor cover as viewed from a direction of A-A in FIG. 1; and

FIG. 3 is a cross-sectional view showing connection of only the rotor cover, a rotor and a rotating shaft as viewed from a direction of B-B in FIG. 2.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0020] A preferred embodiment of the present invention will now be described with reference to the accompanying drawings.

[0021] FIG. 1 shows a closed type compressor as one example of a fluid machine according to the embodiment. This compressor 1 is installed in a refrigeration air conditioner or a refrigeration circuit of a heat-pump type water heater or the like. This circuit has a passage where a carbon dioxide coolant (hereinafter called coolant) which is one example of a working fluid, and the compressor 1 sucks the coolant from the passage, compresses and supplies it to the passage.

[0022] The compressor 1 has a housing (closed container) 2 whose body part 3 has its upper side and lower side fitted air-tightly by an upper lid 4 and a lower lid 5 respectively, and the interior of the body part 3 is sealed with a discharge pressure acting therein.

[0023] An electric motor (electromotor) 6 is accommodated in the body part 3, and a rotating shaft 12 is disposed in the motor 6. Particularly, in the motor 6, a rotor 7 with a permanent magnet is fixed to the outer surface side of the rotating shaft 12, a stator 8 having an armature winding 9 is disposed on the outer surface side of the rotor 7, and an outer-surface side part of the stator 8 is securely press-fitted in the body part 3. When the armature winding 9 is excited, the rotor 7 rotates with the rotation of a magnetic field generated by the armature winding 9, and rotates together with the rotating shaft 12. An upper end side of the rotating shaft 12 is rotatably supported on a main shaft frame (frame member) 14 via a bearing 16.

[0024] Meanwhile, the lower end side of the rotating shaft 12 is rotatably supported on a sub shaft frame 18 via a bearing 20. An oil pump 22 is attached to the lower end side of the rotating shaft 12 and drains a lubrication oil in a reservoir 23 formed inward of the lower lid 5. The lubrication oil is supplied to the motor 6, a scroll unit 30, etc. from the upper end of the rotating shaft 12 via a fluid passage 24 of the rotating shaft 12, and serves to lubricate individual slide portions, bearings and so forth and seal a slide surface in the compressor. Further, an inlet port 19 for the lubrication oil is formed in the frame 18 at an adequate position, and the lubrication oil supplied to the individual slide portions in the compressor 1 is reserved in the reservoir 23 via the inlet port 19 as will be described later.

[0025] The unit 30 is disposed in the body part 3 above the motor 6 to execute a sequence of processes of intake, compression and discharge of a coolant. Particularly, the unit 30 comprises a movable scroll body 52 and a fixed scroll body 32, and the movable scroll body 52 has a end plate 54 with which a scroll lap extending toward a end plate 34 of the fixed scroll body 32 is formed integral. By way of contrast, a scroll lap extending toward the end plate 54 is formed integral with the end plate 34 of the

fixed scroll body 32. Those scroll laps cooperate to form a pressure chamber, which moves toward the center from the radial outer peripheral side of the scroll laps according to the revolution and turning motion of the movable scroll body 52 with respect to the fixed scroll body 32, and the volume is reduced at that time.

[0026] To apply a revolution and turning motion to the movable scroll body 52, a boss 66 is formed on the lower surface side of the end plate 54, and is rotatably supported on an eccentric shaft 26 via a bearing 28. The eccentric shaft 26 is formed integral with the upper end side of the rotating shaft 12. Note that the rotation of the movable scroll body 52 is inhibited by a rotation inhibiting pin 68.

[0027] The fixed scroll body 32 is fixed to the main shaft frame 14, and the end plate 34 partitions between the compression chamber and a discharge chamber 60. A discharge hole which communicates with the compression chamber is bored through the end plate 34 at an adequate position of the center portion of the fixed scroll body 32. This discharge hole is opened and closed by a discharge valve 62 disposed on the anti-scroll side of the fixed scroll body 32. The anti-scroll side of the fixed scroll body 32 including the discharge valve 62 is covered with a discharge head 64 which suppresses sounds at the time of opening the discharge valve 62.

[0028] After the lubrication oil in the reservoir 23 is supplied to the unit 30, the bearings 16, 28, etc. via the oil pump 22 and the fluid passage 24, the flow direction of the lubrication oil is restricted by flow-direction restricting means 80 at the time the lubrication oil flows downward toward the motor 6 from the unit 30.

[0029] Specifically, the flow-direction restricting means 80 is configured to include a rotor cover (guide member) 82 which is fixed to a top surface 7a of the rotor 7 and guides the lubrication oil flowing downward toward the motor 6 from the unit 30, and oil discharge passages (discharge passages) 84 which cause the lubrication oil guided to the top surface 7a to flow to the reservoir 23, so that the flow direction of the lubrication oil supplied to the unit 30 and the bearings 16, 28, etc. is restricted to be collected in the reservoir 23 to prohibit the flow-in of the lubrication oil toward the stator 8.

[0030] Referring also to a diagram-shown in FIG. 2 in which the rotor cover 82 is viewed from-an A-A direction in FIG. 1, the rotor cover 82 is formed like a cup or a bottomed cylinder having a bottom portion 82a, an opening 82b and a cylinder portion 82c.

[0031] Formed in the bottom portion 82a approximately at a center thereof are a shaft hole where the rotating shaft 12 is to be inserted, four holes which constitute parts of the oil discharge passages 84, and four holes which constitute parts of insertion holes 88 for caulking pins 86, which will be described later.

[0032] Referring to the cross-sectional view shown in FIG. 3 showing connection of only the rotor cover 82, a rotor 7 and a rotating shaft 12 as viewed from a direction of B-B in FIG. 2, the rotor cover 82 surrounds the rotating shaft 12 and the bottom portion 82a is caulked to the top surface 7a by the caulking pin 86.

[0033] The caulking pins 86 are inserted into the insertion holes 88 penetrating the bottom portion 82a and the rotor 7 approximately in parallel to the rotating shaft 12, and are caulked, so that the rotor cover 82 is fixed to the rotor 7. The opening 82b is opened toward the main shaft frame 14, and the cylinder portion 82c extends at least until it encloses the lower end of the main shaft frame 14. Further, the outside diameter of the cylinder portion 82c is set smaller than the outside diameter of the rotor 7.

[0034] Accordingly, the rotor cover 82 restricts the flow of the lubrication oil flowing downward toward the motor 6 from the unit 30 toward the interior of the rotor cover 82 while integrally rotating with the rotor 7, thereby prohibiting the flow of the lubrication oil into the stator 8. Although four sets of insertion holes 88 and caulking pins 86 are provided, a plurality of sets thereof have only to be provided and the number of sets is not restrictive. One set of the insertion holes 88 and the caulking pins 86 may be used to secure an unillustrated counter weight which adjusts the rotational balance of the rotor 7.

[0035] The oil discharge passages 84, like the insertion holes 88, are formed penetrating the bottom portion 82a and the rotor 7 approximately in parallel to the rotating shaft 12, so that the lubrication oil passing through the oil discharge passages 84 is collected in the reservoir 23 via the inlet port 19. It is preferable that a plurality of sets of oil discharge passages 84 should be provided.

[0036] Referring to FIG. 1 again, an oil/coolant partition mechanism (partition mechanism) 90 which partitions between a passage Fo (indicated by a solid-line arrow in the diagram) for the lubrication oil flowing downward toward the motor 6 from the unit 30 and a passage Fr (indicated by a broken-line arrow in the diagram) for the coolant discharged from the motor 6 is disposed between the main shaft frame 14 and the stator 8.

[0037] The partition mechanism 90 is formed to have a vertical cylindrical part 90a protrusively provided on the main shaft frame 14 side, and communication holes 90b which constitute a part of the coolant passage Fr, and the lower end side of the partition mechanism 90 is fixed to the stator 8.

[0038] The vertical cylindrical part 90a encloses the rotor cover 82 from the stator 8 side and is fitted in the lower end side of the main shaft frame 14, so that the flow of the coolant circulating in the housing 2 through the passage Fr is prohibited from flowing into the rotor cover 82, thus separating the passage Fr from the passage Fo. The communication holes 90b are a plurality of small holes bored in the outer surface side of the vertical cylindrical part 90a along the circumferential direction thereof.

[0039] The lower end side of a rectifying member 92 which performs rectification while separating a coolant downward passage and a coolant upward passage constituting the passage Fr is fitted over the partition mechanism 90, and the upper end side of a rectifying member 92 is fixed to the main shaft frame 14.

[0040] According to the above-described compressor 1, the movable scroll body 52 makes revolving motion without rotating in accordance with the rotation of the rotating shaft 12. The revolving motion of the movable scroll body 52 allows the coolant taken into the body part 3 via a suction pipe 70 to be sucked into the scroll unit 30 from the outer surface side thereof.

[0041] Then, when the volume of the compression chamber is reduced, the high-pressure compressed coolant reaches the discharge chamber 60 through the discharge hole, and sequentially passes through the clearance between the outer surface side of the vertical cylindrical part 90a of the partition mechanism 90 and the inner surface side of the rectifying member 92, and the communication holes 90b through an unillustrated through hole penetrating the unit 30. Then, the coolant flows downward passing through clearances in the armature winding 9 in the stator 8, flows upward in the clearance between the outer surface side of the stator 8 and the inner surface side of the housing 2, and then is fed out to the compressor 1 through a discharge pipe 72.

[0042] The passage Fo for the lubrication oil flowing downward toward the motor 6 after being supplied to the unit 30, the bearings 16, 28, etc. is restricted approximately in the vertical direction by the rotor cover 82 and the oil discharge passages 84, and does not cross the coolant passage Fr, so that the lubrication oil flowing downward toward the motor 6 from the unit 30 is led to the reservoir 23 through the inlet port 19.

[0043] According to the embodiment, as described above, the lubrication oil in the reservoir 23 is supplied to the slide portions of the unit 30 and the bearings 16, 28 via the oil pump 22 and the fluid passage 24, and serve to seal the slide surface in addition to their lubrication and cooling, and the direction of the lubrication oil flowing downward toward the motor 6 from the unit 30 is restricted by the flow-direction restricting means 80, which comprises the rotor cover 82 and the oil discharge passages 84, thus inhibiting the flow of the lubrication oil toward the stator 8. Therefore, the lubrication oil flowing downward toward the motor 6 from the unit 30 is all promptly led to the reservoir 23 and stored therein without being scattered in the body part 3.

[0044] As a result, the collection of the lubrication oil can be carried out efficiently, so that a failure of the compressor 1 originating from insufficient supply of the lubrication oil, e.g., a deficiency, such as burning of the slide portions and the bearings 16, 28 originating from insufficient supply of the lubrication oil, can surely be prevented while achieving further size reduction and weight reduction of the compressor 1 and reduction of the manufacture cost of the compressor 1 with a simple mechanism of having the cup-like rotor cover 82 caulked to the top surface 7a of the rotor 7, thereby improving the reliability of the compressor 1.

[0045] In addition, as scattering of the lubrication oil in the body part 3 can be prevented, contact of the lubrication oil flowing downward toward the motor 6 from the unit 30 with the coolant to be included therein is suppressed, making it possible to suppress the oil circulation rate (OCR) of the lubrication oil flowing outside the compressor 1, and the suppression of the oil circulation rate improves the efficiency of each heat exchanger of the refrigeration system, enabling achievement of energy reduction of the refrigeration system.

[0046] The provision of the partition mechanism 90 which inhibits flow of the coolant into the rotor cover 82 prevents contact of the downward-flowing lubrication oil with the coolant to be included therein, thus making it possible to surely reduce the oil circulation rate and more surely prevent a failure of the compressor 1 originating from insufficient supply of the lubrication oil.

[0047] Further, the downward-flowing lubrication oil is smoothly discharged to the reservoir 23 via the oil discharge passages 84 formed penetrating the bottom portion 82a of the rotor cover 82 and the rotor 7, making it possible to collect the lubrication oil more efficiently and prevent a failure of the fluid machine originating from insufficient supply of the lubrication oil more reliably.

[0048] While the foregoing is the explanation of one embodiment of the present invention, the present invention is not limited to the embodiment, and can be modified in various forms without departing from the scope of the invention as defined by the appended claims.

[0049] Although the scroll unit 30 to be used in a close type compressor is used in the embodiment, for example, other compressing mechanisms, expansion units or the like may be used as long as they execute a sequence of processes from intake of a coolant to discharge thereof in the closed type housing.

Although a carbon dioxide coolant is used as a working fluid in the embodiment, another working fluid may be used. It is to be noted however that when a carbon dioxide coolant which is compressed under high pressure is used, the plate thickness or the like of the closed container should be increased, but the use of the flow-direction restricting means 80 of the embodiment can secure a sufficient amount of lubrication oil without further increases in the weight, thickness, length and size of the compressor 1.

Claims

1. A fluid machine (1) comprising:

a closed container (2) having a cylindrical body part (3), a discharge chamber (60) formed above the cylindrical body part (3), and a reservoir (23) for lubrication oil, formed below the cylindrical body part (3), a discharge pressure acting in the cylindrical body part (3);

a rotating shaft (12) extending in the cylindrical body part (3) and rotatably supported via a bearing (16);

an electric motor (6) that is accommodated in

the cylindrical body part (3), drives the rotating shaft (12) by energization thereof, and has a rotor (7) around the rotating shaft (12), the rotor (7) being rotated together with the rotating shaft (12), and a stator (8) around the rotor (7), the stator (8) rotating the rotor (7);
a scroll unit (30) that is accommodated in the cylindrical body part (3) above the electric motor (6) and is driven by the rotating shaft (12) to execute a sequence of processes from intake of a working fluid to discharge thereof;
a frame member (14) that is disposed between the scroll unit (30) and the electric motor (6), fixes the scroll unit (30) and supports the rotating shaft (12) via the bearing (16); and
flow-direction restricting means (80) that restricts a direction of lubrication oil flowing downward toward the electric motor (6) from the scroll unit (30) to inhibit the lubrication oil supplied from the reservoir (23) to the bearing (16) from flowing toward the stator (8),

characterized in that:

the flow-direction restricting means (80) includes a guide member (82) fixed to a top surface (7a) of the rotor (7) and guiding the downward-flowing lubrication oil to the top surface (7a), and a discharge passage (84) for causing the lubrication oil guided to the top surface (7a) to flow to the reservoir (23).

2. The fluid machine (1) according to claim 1, **characterized in that**:

the guide member (82) is formed into a bottomed cylindrical shape having a bottom portion (82a) caulked to the top surface (7a) and an opening (82b) opened toward the frame member (14).

3. The fluid machine (1) according to claim 1 or 2, **characterized in that**:

further comprising a partition mechanism (90) that encloses the guide member (82) to separate a working fluid discharged from the scroll unit (30) and the downward-flowing lubrication oil in order to inhibit flow of the working fluid into the guide member (82).

4. The fluid machine (1) according to any one of claims 1 to 3, **characterized in that**:

the discharge passage (84) is formed penetrating the bottom portion (82a) and the rotor (7).

5. The fluid machine (1) according to any one of claims 1 to 4, **characterized in that**:

the working fluid is a coolant comprised of carbon dioxide.

Patentansprüche

1. Fluidmaschine (1) aufweisend:

einen geschlossenen Behälter (2) mit einem zylindrischen Körperabschnitt (3), eine über dem zylindrischen Körperabschnitt (3) gebildete Ausstoßkammer (60), und ein unterhalb des zylindrischen Körperabschnitts (3) gebildetes Reservoir (23) für Schmieröl, einen Ausstoßdruck, der in dem zylindrischen Körperabschnitt (3) wirksam ist;
eine sich in den zylindrischen Körperabschnitt (3) erstreckende und über ein Lager (16) drehbar gelagerte rotierende Welle (12);
wobei ein Elektromotor (6), der in dem zylindrischen Körperabschnitt (3) aufgenommen ist, durch Energiezuführung davon die rotierende Welle (12) antreibt, und einen Rotor (7) um die rotierende Welle (12) herum hat, wobei der Rotor (7) zusammen mit der rotierenden Welle (12) gedreht wird, und einen Stator (8) um den Rotor (7) herum, wobei der Stator (8) den Rotor (7) dreht;
eine Spiraleinheit (30), die in dem zylindrischen Körperabschnitt (3) über dem Elektromotor (6) aufgenommen ist und durch die rotierende Welle (12) angetrieben wird, um eine Abfolge von Prozessen von einem Einlass eines Arbeitsfluids zu einem Ausstoßen davon auszuführen;
wobei ein Rahmenelement (14), das zwischen der Spiraleinheit (30) und dem Elektromotor (6) angeordnet ist, die Spiraleinheit (30) befestigt und die rotierende Welle (12) über das Lager (16) lagert; und
ein Flussrichtungsbeschränkungsmittel (80), das eine Richtung von Schmieröl, das von der Spiraleinheit (30) abwärts zu dem Elektromotor (6) fließt, beschränkt, um das von dem Reservoir (23) zu dem Lager (16) gelieferte Schmieröl daran zu hindern zum Stator (8) zu fließen,
dadurch gekennzeichnet, dass:

das Flussrichtungsbeschränkungsmittel (80) ein an einer oberen Oberfläche (7a) des Rotors (7) befestigtes und das abwärtsfließende Schmieröl zu der oberen Oberfläche (7a) leitende Führungselement (82) und eine Ausstoßpassage (84) enthält, um das zu der oberen Oberfläche (7a) geleitete Schmieröl zu veranlassen, zu dem Reservoir (23) zu fließen.

2. Fluidmaschine (1) gemäß Anspruch 1,

dadurch gekennzeichnet, dass:

das Führungselement (82) in eine zylindrische Form mit Boden geformt ist mit einem Bodenabschnitt (82a), der mit der oberen Oberfläche (7a) verstemmt ist, und einer Öffnung (82b), die zu dem Rahmenelement (14) hin geöffnet ist.

3. Fluidmaschine (1) gemäß Anspruch 1 oder 2, **dadurch gekennzeichnet, dass**:

sie weiterhin einen Trennmechanismus (90) aufweist, der das Führungselement (82) umgibt, um ein von der Spiraleinheit (30) ausgestoßenes Arbeitsfluid und das abwärts fließende Schmieröl zu trennen, um einen Fluss des Arbeitsfluids in das Führungselement (82) zu verhindern.

4. Fluidmaschine (1) gemäß einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass**:

die Ausstoßpassage (84) den Bodenabschnitt (82a) und den Rotor (7) durchdringend geformt ist.

5. Fluidmaschine (1) gemäß einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass**:

das Arbeitsfluid ein Kohlendioxid aufweisendes Kältemittel ist.

Revendications

1. Machine pour fluides (1) comprenant :

- un boîtier fermé (2) ayant un corps cylindrique (3), une chambre de sortie (60) réalisée au-dessus du corps cylindrique (3), et un réservoir (23) pour de l'huile de lubrification sous le corps cylindrique (3) ainsi qu'une sortie de pression, appliquée au corps cylindrique (3),
- un arbre (12) passant dans le corps cylindrique (3) et monté à rotation dans un palier (16),
- un moteur électrique (6) logé dans le corps cylindrique (3) et entraînant l'arbre (12) lorsqu'il est alimenté, ainsi qu'un rotor (7) entourant l'arbre (12), le rotor (7) tournant avec l'arbre (12), et un stator (8) entourant le rotor (7), le stator (8) entraînant le rotor (7),
- un module à spirales (30) logé dans le corps cylindrique (3) au-dessus du moteur électrique (6) et entraîné par l'arbre (12) pour exécuter une séquence d'opérations pour prendre le fluide de travail et le refouler,
- un support (14) placé entre le module à spirales (30) et le moteur électrique (6) portant le module à spirales (30) et recevant l'arbre (12) par le palier (16), et
- un moyen de limitation de passage de flux (80) qui limite le sens de passage d'huile de lubrification descendant vers le moteur électrique (6), à partir du module à spirales (30) pour interdire à l'huile fournie à partir du réservoir (23) au palier (16), de couler vers le stator (8),

caractérisée en ce que
le moyen de limitation de sens d'écoulement (80), comporte

- un organe de guidage (82) fixé à la surface supérieure (7a) du rotor (7) et guidant la descente de l'huile de lubrification vers la surface supérieure (7a),
- ainsi qu'un passage de sortie (84) pour faire couler l'huile de lubrification guidée vers la surface supérieure (7a) jusqu'au réservoir (23).

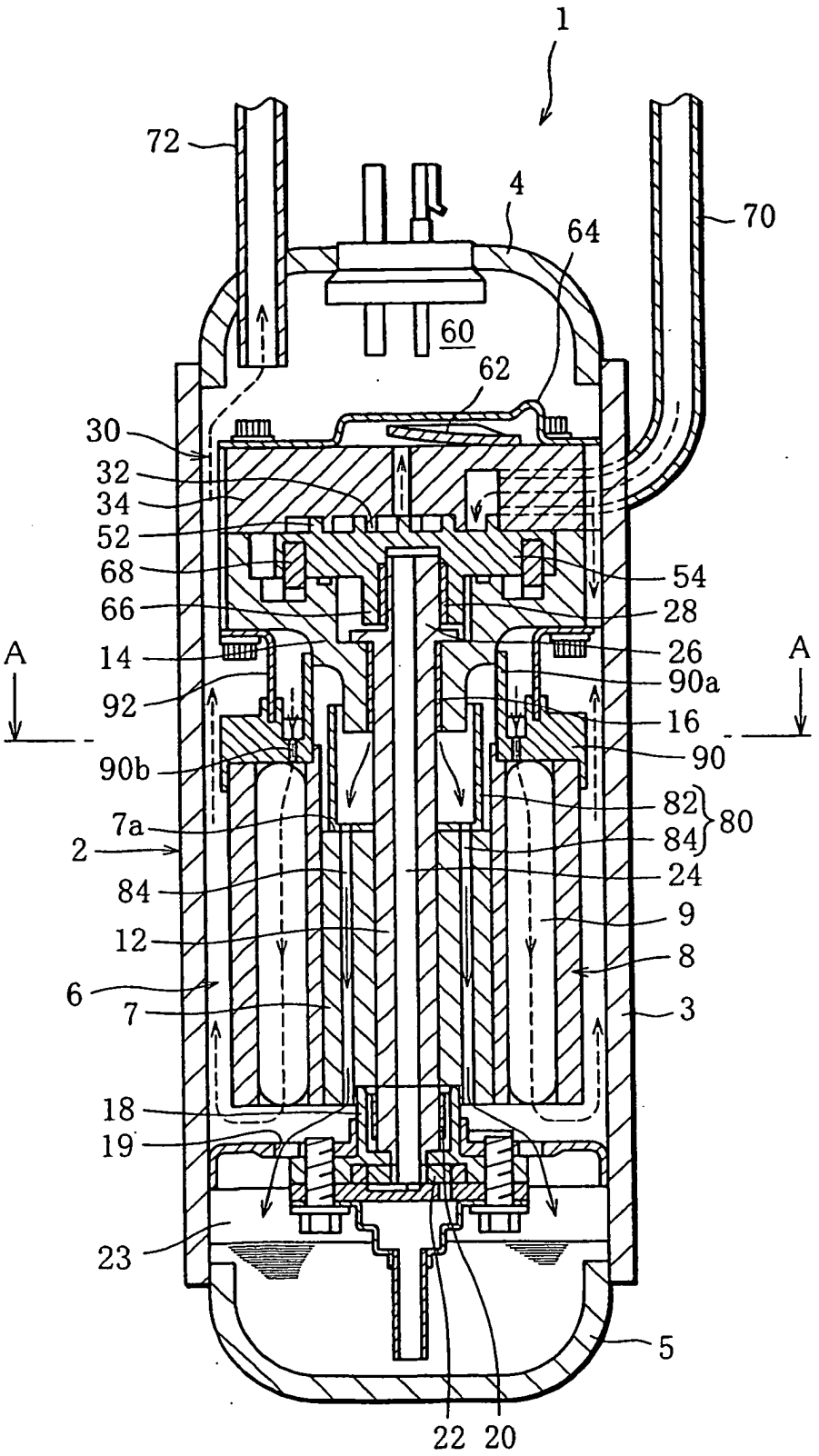
2. Machine pour fluides (1) selon la revendication 1, **caractérisée en ce que**
l'organe de guidage (82) a une forme de cylindre muni d'un fond (82a), maté contre la surface supérieure (7a), et une ouverture (82b) en direction du support (14).

3. Machine pour fluides (1) selon la revendication 1 ou 2,
caractérisée en ce qu'
elle comprend en outre un mécanisme de cloisonnement (90) qui entoure l'organe de guidage (82) pour séparer le fluide de travail sortant du module à spirales (30) et l'écoulement de l'huile de lubrification pour interdire au fluide de travail de couler dans l'organe de guidage (82).

4. Machine pour fluides (1) selon l'une des revendications 1 à 3,
caractérisée en ce que
le passage de sortie (84) est réalisé de façon à pénétrer dans le fond (82a) et dans le rotor (7).

5. Machine pour fluides (1) selon l'une des revendications 1 à 4,
caractérisée en ce que
le fluide de travail est un fluide réfrigérant contenant du dioxyde de carbone.

FIG. 1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72
4
64
70
60
62
30
32
34
52
68
66
14
92
90b
7a
2
84
12
6
7
18
19
23
54
28
26
90a
16
90
82
84
80
24
9
8
3
5
22
20
A
A

FIG. 2

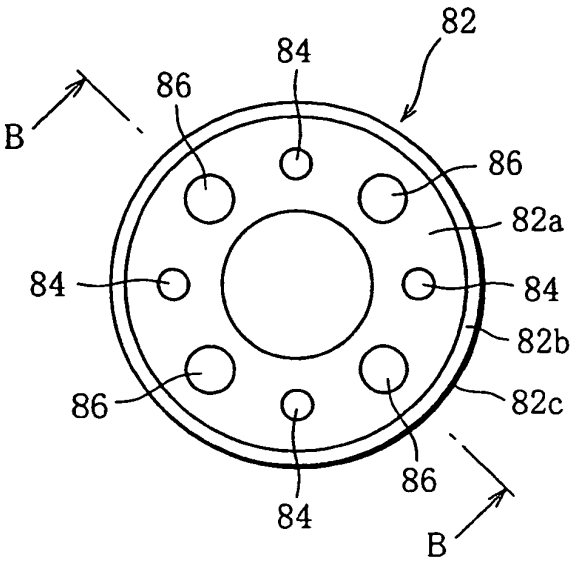
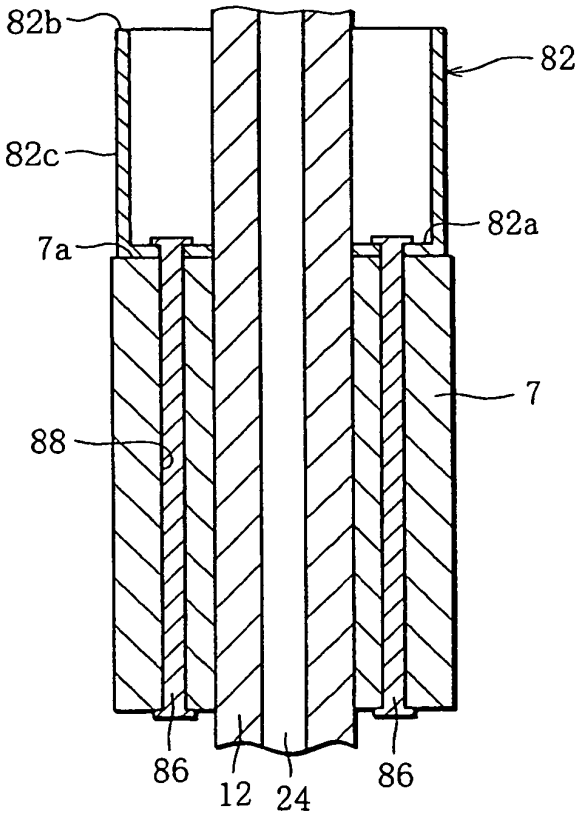

82
84
86
B
86
82a
84
84
82b
86
82c
86
84
B

FIG. 3


82b
82
82c
82a
7a
7
88
86
12
24
86

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP HIO47269 B **[0003]**
- JP 2000205157 B **[0005]**