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(54) ROTATING CYLINDER TYPE COMPRESSOR

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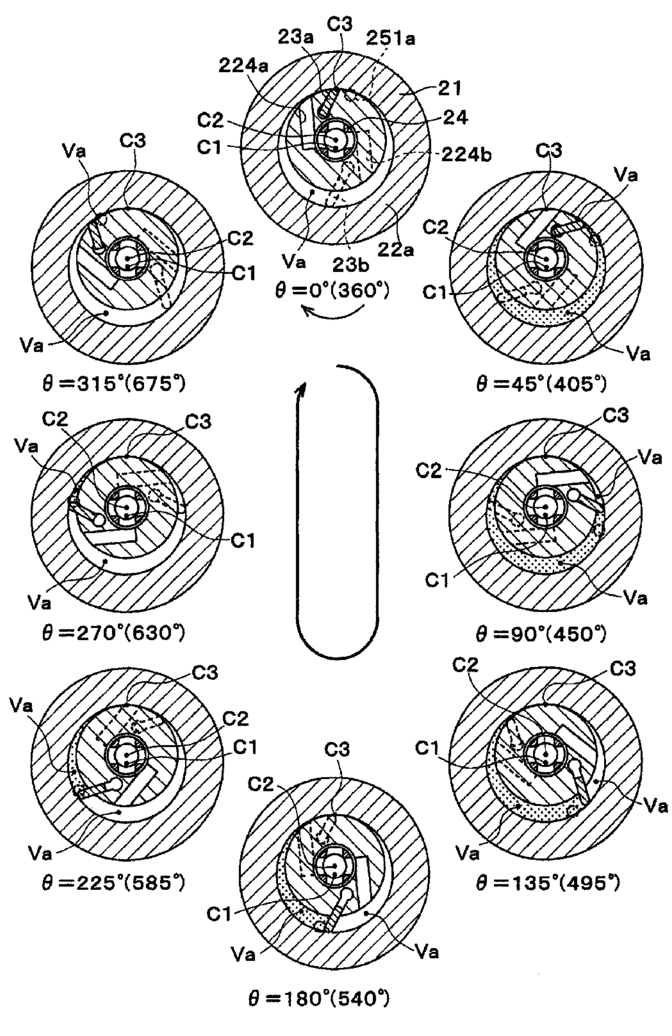
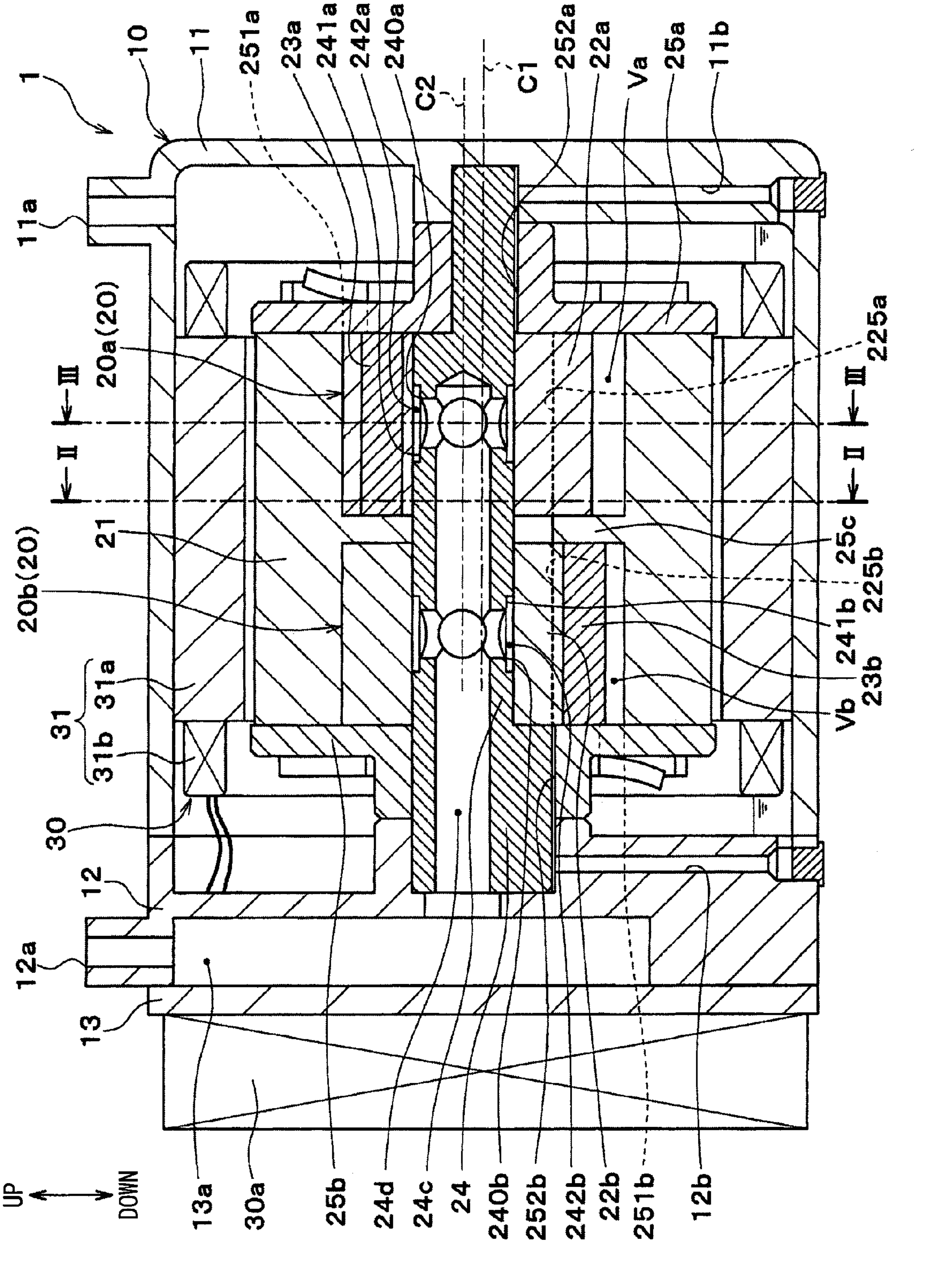
(57) ABSTRACT

A rotating cylinder type compressor includes: a cylinder having a cylindrical shape and rotating about a central axis; a first rotor and a second rotor each having a cylindrical shape and rotating about an eccentric axis eccentric to the central axis of the cylinder; a shaft; a first vane; and a second vane. The first vane is slidably fitted to a first groove portion defined in the first rotor to define a first compression chamber. The second vane is slidably fitted to a second groove portion defined in the second rotor to define a second compression chamber. The first rotor and the second rotor are arranged in an extending direction of the central axis of the cylinder.




1
10
11
11a
11b
12
12a
12b
13
13a
20a(20)
20b(20)
21
22a
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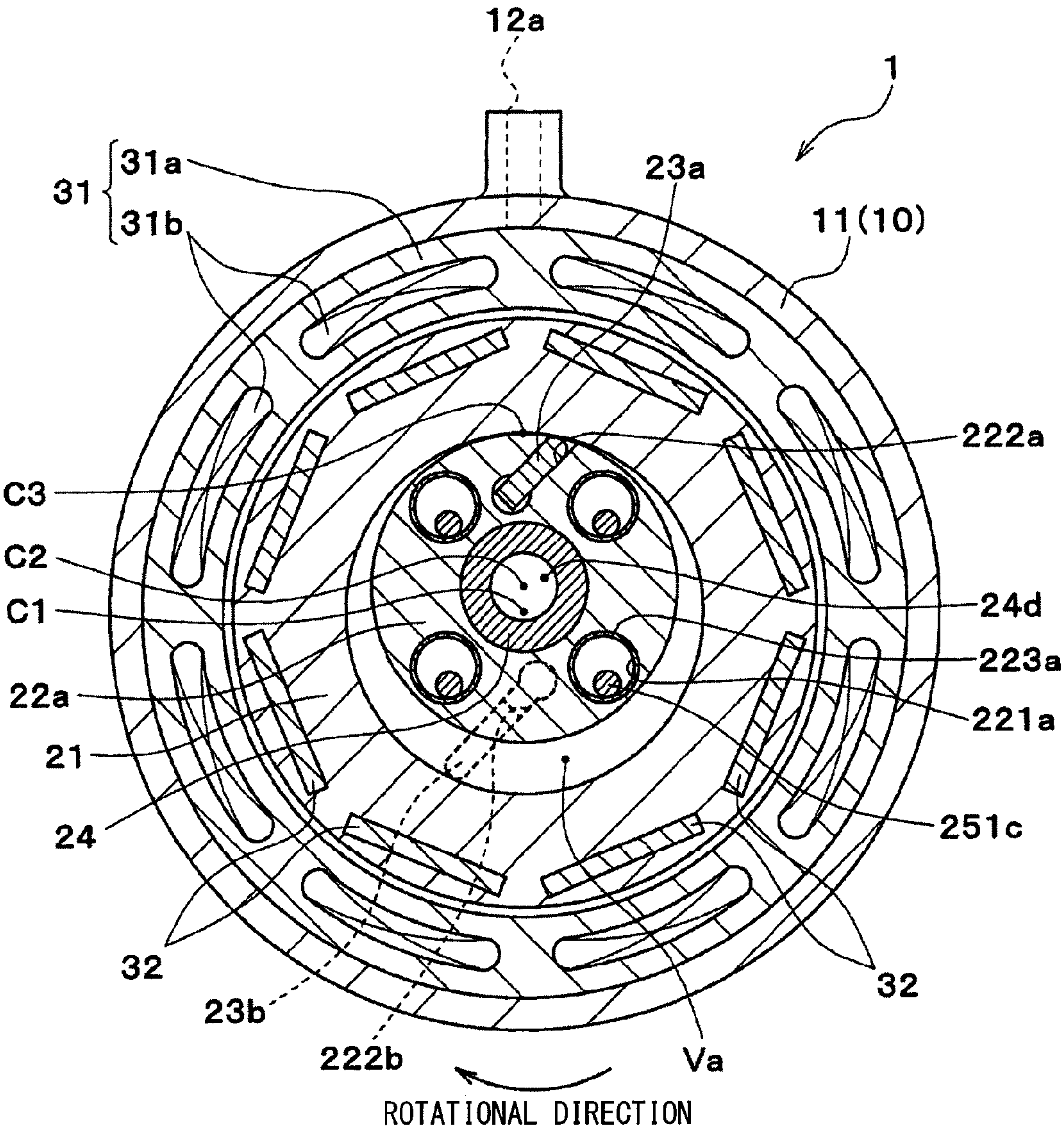
23a
23b
24
24c
24d
25a
25b
25c
30
30a
31
31a
31b
225a
225b
240a
240b
241a
241b
242a
242b
251a
251b
252a
252b
C1
C2
Va
Vb
III
II
UP
DOWN

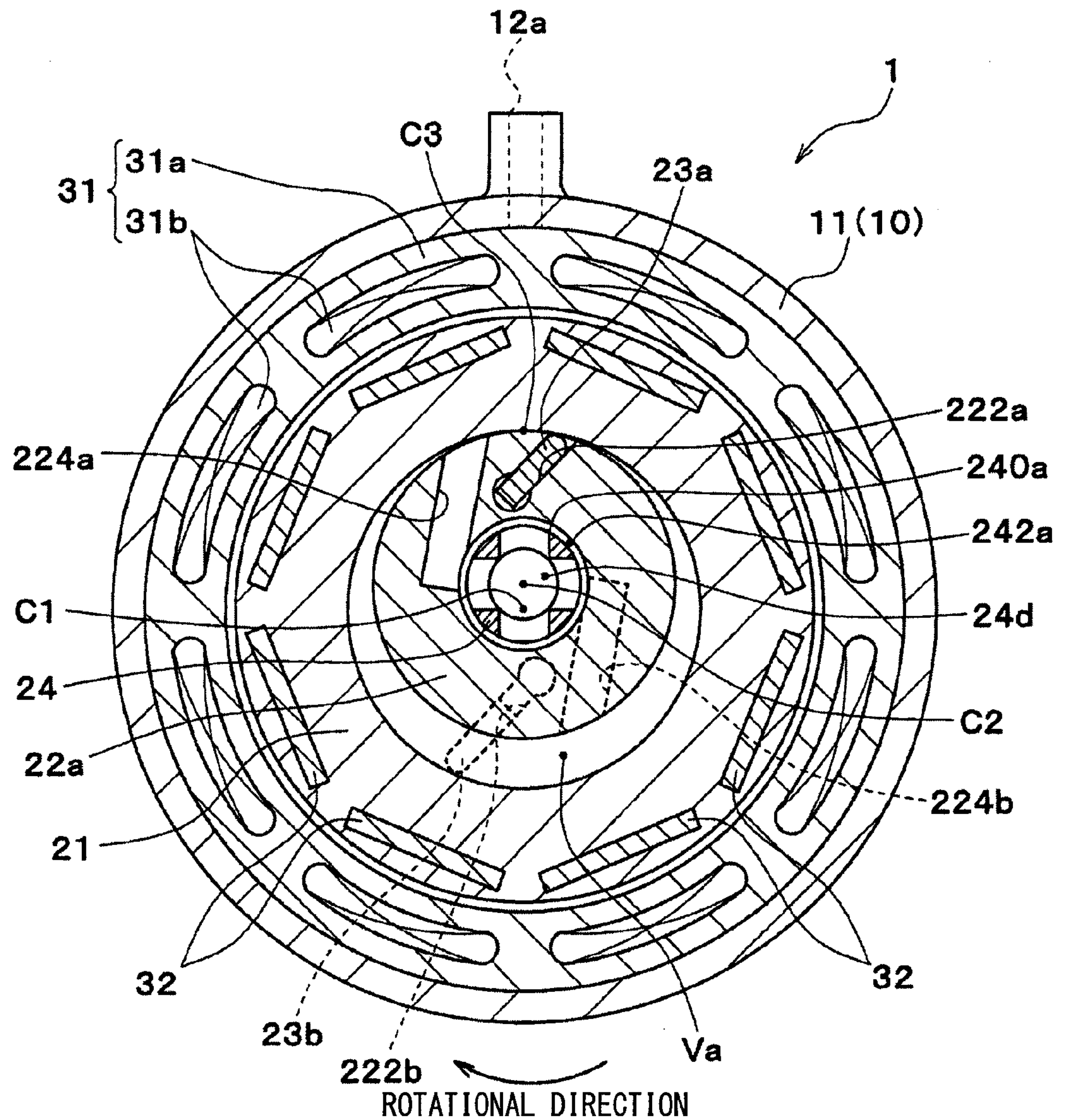
FIG. 1

FIG. 2


12a
1
31
31a
31b
23a
11(10)
222a
C3
C2
C1
24d
223a
22a
221a
21
24
251c
32
32
23b
222b
Va
ROTATIONAL DIRECTION

II－II

FIG. 3



12a
1
C3
31
31a
31b
23a
11(10)
222a
224a
240a
242a
C1
24d
24
C2
22a
224b
21
32
32
23b
222b
Va
ROTATIONAL DIRECTION

III-III

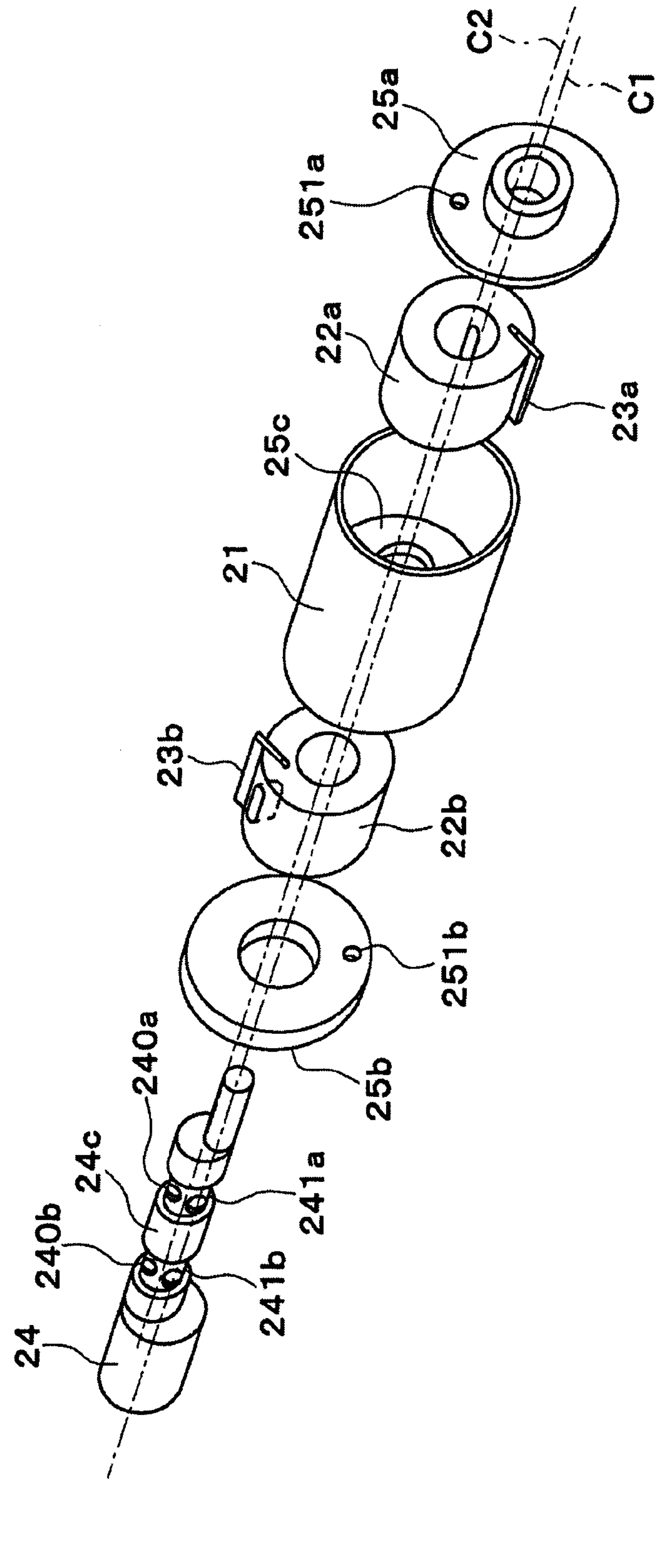
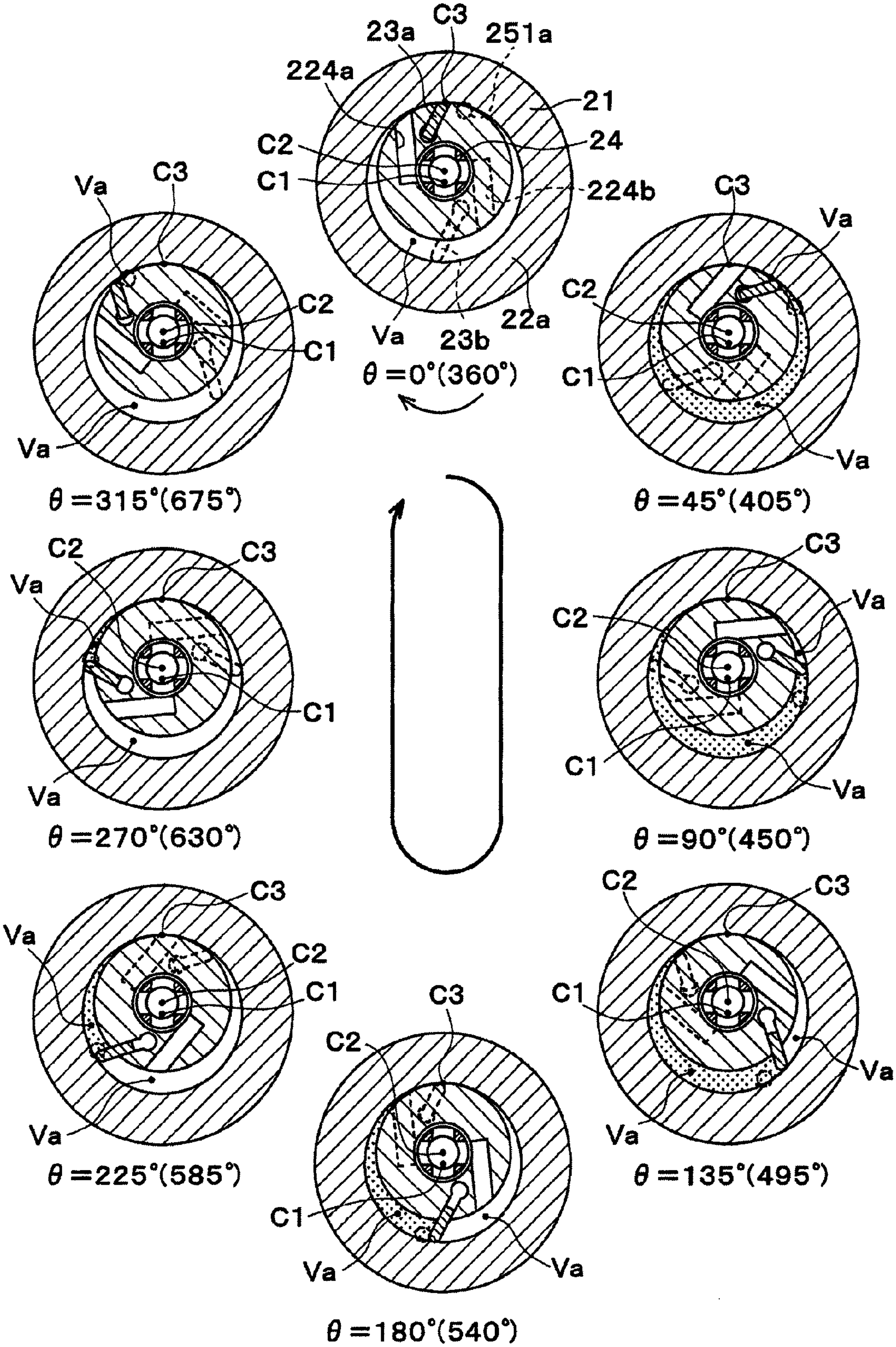

C2
C1
25a
251a
22a
23a
25c
21
23b
22b
251b
25b
240a
24c
241a
240b
241b
24

FIG. 4

FIG. 5



C3
23a
251a
224a
21
24
C2
C1
224b
Va
23b
22a
θ =0°(360°)
Va
C3
C2
C1
Va
θ =315°(675°)
C3
Va
C2
C1
Va
θ =45°(405°)
C2
C3
Va
C1
Va
θ =270°(630°)
C3
Va
C2
C1
Va
θ =90°(450°)
C3
Va
C2
C1
Va
θ =225°(585°)
C2
C3
C1
Va
Va
θ =135°(495°)
C3
C2
C1
Va
Va
θ =180°(540°)

FIG. 6

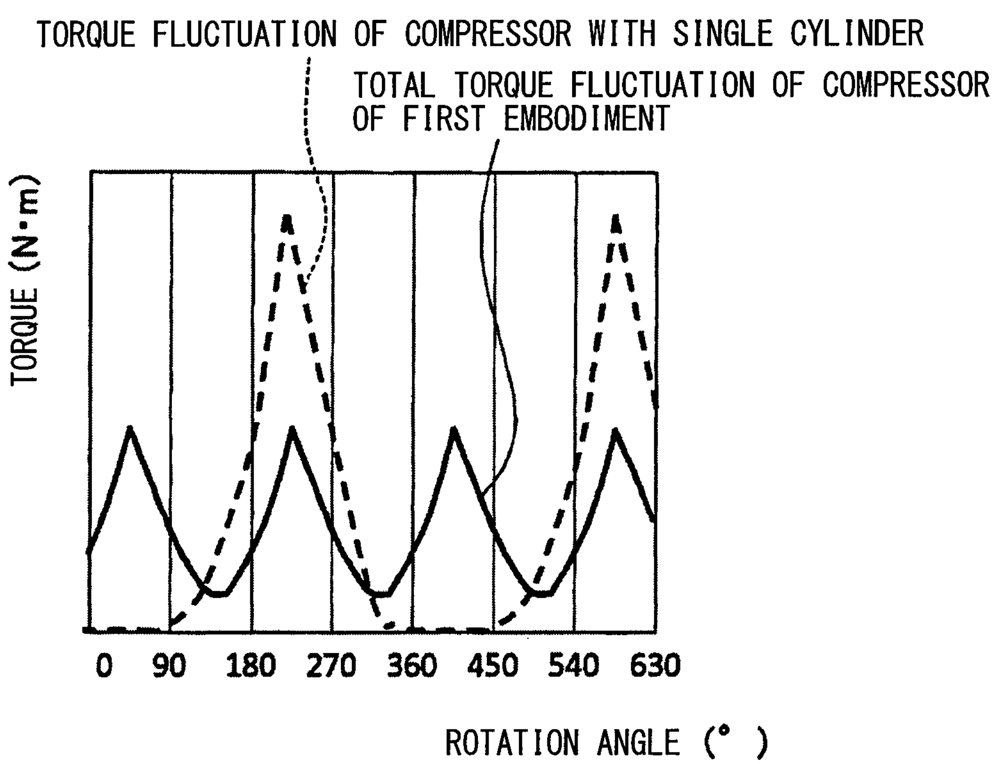
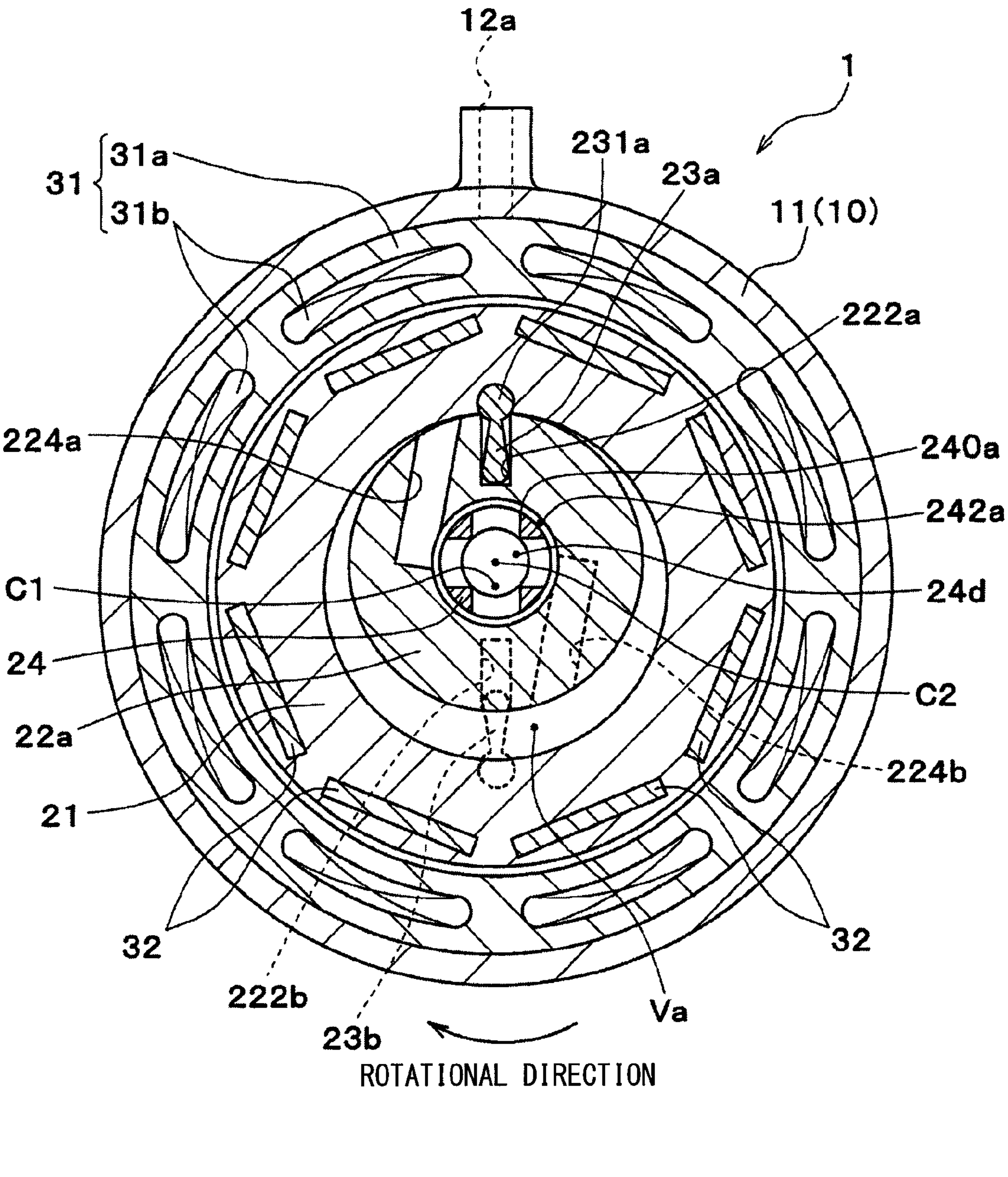

TORQUE FLUCTUATION OF COMPRESSOR WITH SINGLE CYLINDER
TOTAL TORQUE FLUCTUATION OF COMPRESSOR OF FIRST EMBODIMENT
TORQUE (N·m)
0
90
180
270
360
450
540
630
ROTATION ANGLE (°)

FIG. 7


12a
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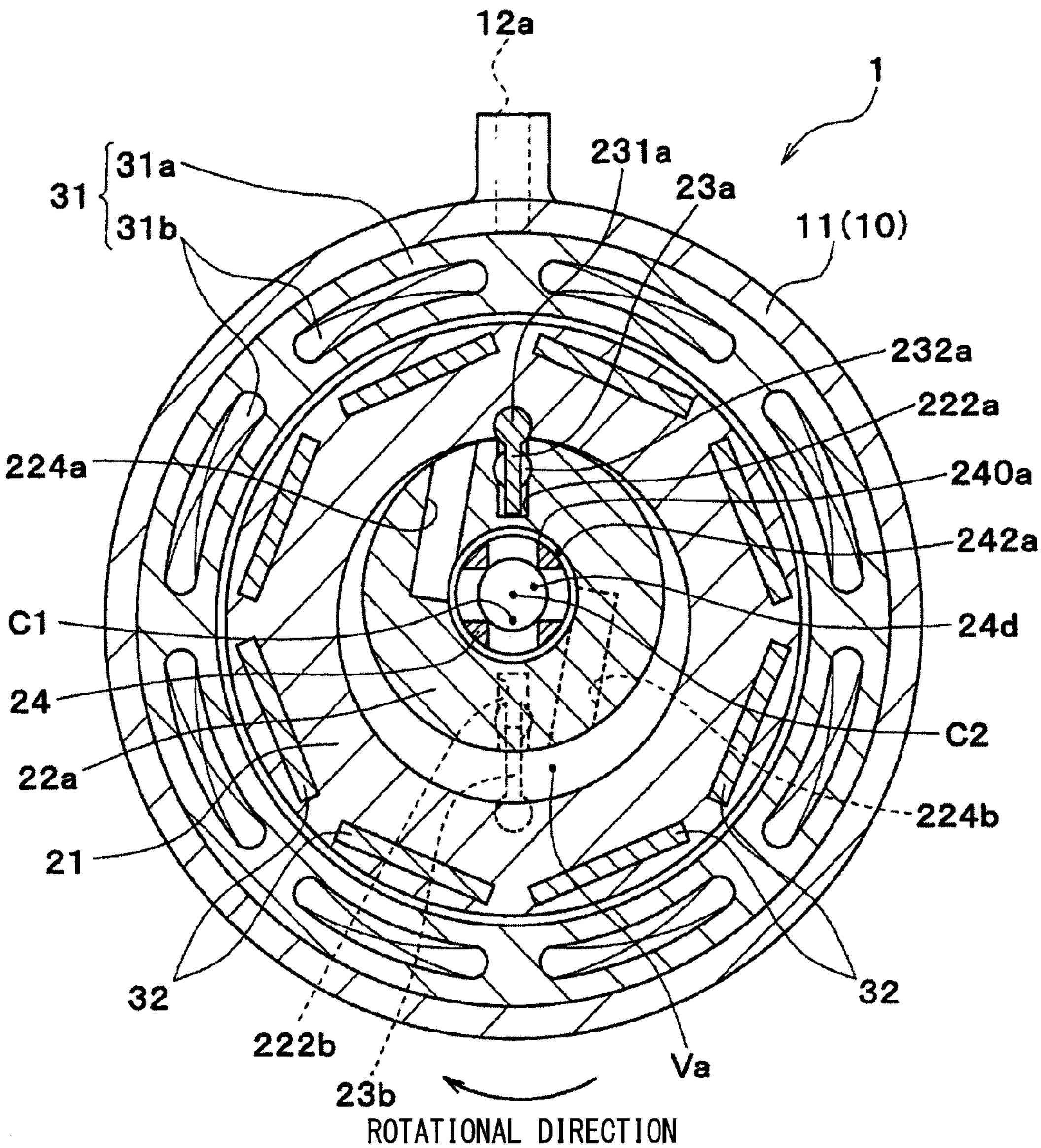
31
31a
31b
231a
23a
11(10)
222a
224a
240a
242a
24d
C1
24
C2
22a
224b
21
32
32
222b
23b
Va
ROTATIONAL DIRECTION

FIG. 8


12a
1
31
31a
31b
231a
23a
11(10)
232a
222a
224a
240a
242a
24d
C1
24
C2
22a
224b
21
32
32
222b
Va
23b
ROTATIONAL DIRECTION

ROTATING CYLINDER TYPE COMPRESSOR

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application is based on Japanese Patent Application No. 2015-66056 filed on Mar. 27, 2015, the disclosure of which is incorporated herein by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to a rotating cylinder type compressor, in which a cylinder is rotated, and a compression chamber is defined in the cylinder.

BACKGROUND ART

[0003] A rotating cylinder type compressor is conventionally known, in which a cylinder is rotated and a compression chamber is defined in the cylinder. Specifically, a volume of the compression chamber is changed to compress and discharge fluid.

[0004] For example, Patent Literature 1 discloses a rotating cylinder type compressor including a cylinder, a rotor, and a vane. The cylinder is formed integrally with a rotor of an electric motor part (electric motor part). The rotor has a cylindrical shape and is arranged inside the cylinder. The vane has a tabular shape, and is slidably fitted to a groove portion (slit part) formed in the rotor to partition a compression chamber.

[0005] In this kind of rotating cylinder type compressor, the vane is displaced by rotating the cylinder and the rotor about rotation axes different from each other in the interlocked manner, so as to change the volume of the compression chamber. Furthermore, in the rotating cylinder type compressor of Patent Literature 1, a compression mechanism part is arranged on the inner circumference side of the electric motor part to downsize the compressor as a whole.

PRIOR ART LITERATURES

Patent Literature

Patent Literature 1: JP 2012-67735 A

SUMMARY OF INVENTION

[0006] In order to increase the discharge capability of the rotating cylinder type compressor of Patent Literature 1, the outer diameter of the compression chamber (the inner diameter of the cylinder) may be increased to increase the volume of the compression chamber (discharge capacity).

[0007] However, if the inner diameter of the cylinder is made larger to increase the discharge capability, the outer diameter of the electric motor part arranged on the outer circumference side of the cylinder is also made larger. In this case, it becomes difficult to acquire the above-mentioned downsizing effect as a whole compressor. Moreover, if the discharge capacity is increased, the torque fluctuations at a time of operating the compressor will also increase. As a result, noise and vibration may increase as the whole compressor.

[0008] The present disclosure is aimed to provide a rotating cylinder type compressor in which a volume of a compression chamber can be increased without size increase in the radial direction.

[0009] According to an aspect of the present disclosure, a rotating cylinder type compressor includes: a cylinder having a cylindrical shape and rotating about a central axis; a first rotor and a second rotor arranged inside the cylinder, each of the first rotor and the second rotor having a cylindrical shape and rotating about an eccentric axis eccentric to the central axis of the cylinder; a shaft that rotatably supports the first rotor and the second rotor; a first vane slidably fitted to a first groove portion defined in the first rotor to define a first compression chamber between an outer circumference surface of the first rotor and an inner circumference surface of the cylinder; and a second vane slidably fitted to a second groove portion defined in the second rotor to define a second compression chamber between an outer circumference surface of the second rotor and an inner circumference surface of the cylinder. The first rotor and the second rotor are arranged in an extending direction of the central axis of the cylinder.

[0010] Due to the first rotor and the second rotor, the first compression chamber and the second compression chamber can be formed. Therefore, the total volume of the first compression chamber and the second compression chamber (the sum of discharge capacities) can be easily increased. Furthermore, since the first rotor and the second rotor are arranged side by side in the center axial direction of the cylinder, the total discharge capacity can be increased without increase in the outer diameter of the cylinder.

[0011] As a result, a rotating cylinder type compressor can be provided, in which the capacity of the compression chamber can be increased without causing enlargement in the radial direction.

[0012] Moreover, the eccentric axis of the first rotor and the eccentric axis of the second rotor may be arranged on the same axis. In this case, the shaft can be formed easily, because it is not necessary to form portions corresponding to eccentric axes different from each other in the shaft.

[0013] Furthermore, a rotation angle of the cylinder where the fluid pressure of the first compression chamber reaches the maximum pressure and a rotation angle of the cylinder where the fluid pressure of the second compression chamber reaches the maximum pressure may be shifted from each other by 180 degrees. Accordingly, the torque fluctuations can be restricted from increasing, while the volume of the compression chamber is increased. Thus, noise and vibration can be effectively restricted from increasing as the whole compressor.

[0014] In addition, "shifted from each other by 180 degrees" does not only mean a shift by just 180 degrees, but also means a shift by 180 degrees with a slight tolerance in the manufacturing or the assembling.

BRIEF DESCRIPTION OF DRAWINGS

[0015] The above and other objects, features and advantages of the present disclosure will become more apparent from the following detailed description made with reference to the accompanying drawings.

[0016] FIG. **1** is an axial cross-sectional view illustrating a compressor of a first embodiment.

[0017] FIG. **2** is a sectional view taken along a line II-II of FIG. **1**.

[0018] FIG. **3** is a sectional view taken along a line III-III of FIG. **1**.

[0019] FIG. **4** is an exploded perspective view illustrating a compression mechanism part of the compressor of the first embodiment.

[0020] FIG. **5** is a diagram explaining operation states of the compressor of the first embodiment.

[0021] FIG. **6** is a graph illustrating torque fluctuations of the compressor of the first embodiment.

[0022] FIG. **7** is a sectional view illustrating a compressor of a second embodiment, and corresponds to FIG. **3**.

[0023] FIG. **8** is a sectional view illustrating a compressor of a third embodiment, and corresponds to FIG. **3**.

DESCRIPTION OF EMBODIMENTS

First Embodiment

[0024] Hereafter, a first embodiment is described with reference to the drawings. A rotating cylinder type compressor **1** of this embodiment (hereafter referred as the compressor **1**) is applied to a vapor-compression refrigeration cycle apparatus which cools air to be sent to a cabin in an air-conditioner for a vehicle. The compressor **1** compresses and discharges refrigerant which is a fluid to be compressed in the refrigeration cycle apparatus.

[0025] The refrigeration cycle apparatus adopts HFC base refrigerant (specifically, R134a) as a refrigerant, and defines a sub-critical refrigeration cycle in which the high-pressure side refrigerant pressure does not exceed the critical pressure of refrigerant. Furthermore, the refrigerant slightly contains a lubricating oil lubricating the sliding part of the compressor **11**, and a part of the oil circulates through the cycle with the refrigerant.

[0026] As shown in FIG. **1**, the compressor **1** is an electric compressor including a compression mechanism part **20** that compresses and discharges the refrigerant, and an electric motor part (electric motor part) **30** that drives the compression mechanism part **20**, which are housed in a housing **10** which forms the outer shape. In addition, each arrow of up and down in FIG. **1** indicates each direction of up and down in the state where the compressor **1** is mounted in the air-conditioner for a vehicle.

[0027] The housing **10** is configured by combining plural metal components, and has a tightly-closed container structure in which an approximately pillar-shaped space is defined.

[0028] More specifically, as shown in FIG. **1**, the housing **10** includes a main housing **11** having a based cylindrical shape (the shape of a cup), a sub housing **12** having a based cylindrical shape arranged to close the opening of the main housing **11**, and a disk-shaped lid component **13** arranged to close the opening of the sub housing **12**.

[0029] A non-illustrated seal component such as O ring is disposed at contact parts among the main housing **11**, the sub housing **12**, and the lid component **13**, such that refrigerant does not leak from each contact part.

[0030] A discharge port **11***a* is formed in the cylindrical side surface of the main housing **11** to discharge the high-pressure refrigerant pressurized by the compression mechanism part **20** to the exterior of the housing **10** (specifically to the refrigerant inlet side of a condenser of the refrigeration cycle apparatus). An inlet port **12***a* is formed in the cylindrical side surface of the sub housing **12** to draw low-pressure refrigerant (specifically, low-pressure refrigerant flowed out of an evaporator of the refrigeration cycle apparatus) from the exterior of the housing **10**.

[0031] A housing side inlet passage **13***a* is defined between the sub housing **12** and the lid component **13** to introduce the low-pressure refrigerant drawn from the inlet port **12***a* to a first compression chamber Va and a second compression chamber Vb of the compression mechanism part **20**. Furthermore, a drive circuit (inverter) **30***a* which supplies electric power to the electric motor part **30** is attached to a surface of the lid component **13** opposite from the sub housing **12**.

[0032] The electric motor part **30** has a stator **31**. The stator **31** includes a stator core **31***a* formed with a metal magnetic material, and a stator coil **31***b* wound around the stator core **31***a*. The stator **31** is fixed to the inner circumference surface of the cylindrical portion of the main housing **11** by means such as press fitting, shrinkage fitting or bolt tightening.

[0033] When electric power is supplied to the stator coil **31***b* from the drive circuit **30***a* through a non-illustrated sealed terminal (hermetic seal terminal), a revolving magnetic field occurs to rotate the cylinder **21** arranged at the inner circumference side of the stator **31**. The cylinder **21** is formed of a cylindrical metal magnetic material, and defines the first and second compression chambers Va and Vb of the compression mechanism part **20** to be mentioned later.

[0034] As shown in the sectional view such as FIG. **2** and FIG. **3**, a magnet (permanent magnet) **32** is fixed to the cylinder **21**. Thereby, the cylinder **21** functions as a rotor of the electric motor part **30**. The cylinder **21** rotates about a central axis C**1** by the revolving magnetic field produced by the stator **31**.

[0035] That is, the rotor of the electric motor part **30** and the cylinder **21** of the compression mechanism part **20** are integrally formed with each other in the compressors **1** of this embodiment. The rotor of the electric motor part **30** and the cylinder **21** of the compression mechanism part **20** may be formed separately from each other, and are unified into one component by means of press fitting or the like. Furthermore, the stator (the stator core **31***a* and the stator coil **31***b*) of the electric motor part **30** is arranged at the outer circumference side of the cylinder **21**.

[0036] Next, the compression mechanism part **20** is explained. In this embodiment, a first compression mechanism part **20***a* and a second compression mechanism part **20***b* are provided as two of the compression mechanism parts **20**. The fundamental configuration is the same between the first and second compression mechanism parts **20***a* and **20***b*. Moreover, the first and second compression mechanism parts **20***a* and **20***b* are connected in parallel to a flow of the refrigerant inside the housing **10**.

[0037] As shown in FIG. **1**, the first and second compression mechanism parts **20***a* and **20***b* are arranged in the center axial direction of the cylinder **21**. In this embodiment, of the two compression mechanism parts, the first compression mechanism part **20***a* is arranged adjacent to the bottom of the main housing **11**, and the second compression mechanism part **20***b* is arranged adjacent to the sub housing **12**.

[0038] In FIG. **1** and FIG. **4**, the second compression mechanism part **20***b* has components corresponding to components of the first compression mechanism part **20***a*, and the alphabet at the end of the reference number is changed from "a" to "b". For example, the second compression mechanism part **20***b* has the second rotor "**22***b*" that is a component corresponding to the first rotor **22***a* of the first compression mechanism part **20***a*.

[0039] The first compression mechanism part **20***a* includes the cylinder **21**, the first rotor **22***a*, the first vane **23***a*, and the shaft **24**. The second compression mechanism part **20***b* includes the cylinder **21**, the second rotor **22***b*, the second vane **23***b*, and the shaft **24**. That is, as shown in FIG. **1**, a part of the cylinder **21** and the shaft **24** adjacent to the bottom of the main housing **11** configures the first compression mechanism part **20***a*, and another part of the cylinder **21** and the shaft **24** adjacent to the sub housing **12** configures the second compression mechanism part **20***b*.

[0040] The cylinder **21** rotates about the central axis C**1** as a rotor of the electric motor part **30**, and is a cylindrical component which forms the first compression chamber Va of the first compression mechanism part **20***a* and the second compression chamber Vb of the second compression mechanism part **20***b* inside. A first side plate **25***a* which is a component for closing the open end of the cylinder **21** is fixed to one end of the cylinder **21** in the axial direction by means such as bolt tightening. Moreover, a second side plate **25***b* is similarly fixed to the other end of the cylinder **21** in the axial direction.

[0041] Each of the first and second side plates **25***a* and **25***b* has a disk-shaped part spreading in a direction approximately perpendicular to the rotational axis of the cylinder **21**, and a boss part projected in the axial direction at the central part of the disk-shaped part. Furthermore, the boss part has a through hole passing through the first and second side plates **25***a* and **25***b*.

[0042] A non-illustrated bearing mechanism is arranged in the respective through hole. The shaft **24** is inserted in the bearing mechanism, and the cylinder **21** is supported to be rotatable relative to the shaft **24**. The both ends of the shaft **24** are fixed to the housing **10** (specifically, the main housing **11** and the sub housing **12**). Therefore, the shaft **24** does not rotate relative to the housing **10**.

[0043] The cylinder **21** of this embodiment forms inside the first compression chamber Va and the second compression chamber Vb separated from each other. A middle side plate **25***c* having a disk shape is arranged between the first rotor **22***a* and the second rotor **22***b* inside the cylinder **21** to partition the first compression chamber Va and the second compression chamber Vb. The middle side plate **25***c* has the same function as the first and second side plates **25***a* and **25***b*.

[0044] That is, in the cylinder **21** of this embodiment, the both ends of the first compression mechanism part **20***a* in the axial direction are closed with the first side plate **25***a* and the middle side plate **25***c*. Moreover, in the cylinder **21**, the both ends of the second compression mechanism part **20***b* in the axial direction are closed with the second side plate **25***b* and the middle side plate **25***c*.

[0045] In other words, the first compression chamber Va is defined by the first side plate **25***a*, the middle side plate **25***c*, and the first rotor **22***a*, and the second compression chamber Vb is defined by the second side plate **25***b*, the middle side plate **25***c*, and the second rotor **22***b*. Furthermore, the middle side plate **25***c* is arranged between the first rotor **22***a* and the second rotor **22***b* to define the first compression chamber Va and the second compression chamber Vb.

[0046] In this embodiment, the cylinder **21** and the middle side plate **25***c* are integrally formed as one-piece component. Alternatively, the cylinder **21** and the middle side plate **25***c* may be produced separately and connected by means of press fit. Moreover, in this embodiment, the axial length of the first rotor **22***a* and the axial length of the second rotor **22***b* are equal to each other, and the first compression chamber Va and the second compression chamber Vb are partitioned in a manner that the maximum capacity is approximately the same therebetween.

[0047] The shaft **24** is an approximately cylindrical component which rotatably supports the cylinder **21** (specifically, each side plate **25***a*, **25***b*, **25***c* fixed to the cylinder **21**), the first rotor **22***a*, and the second rotor **22***b*.

[0048] An eccentric part **24***c* is defined at the central area of the shaft **24** in the axial direction, and the outer diameter of the eccentric part **24***c* is smaller than that of the end portion adjacent to the sub housing **12**. The central axis of the eccentric part **24***c* is an eccentric axis C**2** eccentric to the central axis C**1** of the cylinder **21**. Furthermore, the first and second rotors **22***a* and **22***b* are rotatably supported by the eccentric part **24***c* through non-illustrated bearing mechanism.

[0049] The first and second compression mechanism parts **20***a* and **20***b* of this embodiment are arranged in the central axial direction of the cylinder **21**. For this reason, as shown in FIG. **1** and FIG. **4**, the first rotor **22***a* and the second rotor **22***b* are arranged in the central axial direction of the cylinder **21**. Furthermore, the first and second rotors **22***a* and **22***b* rotate about the common eccentric axis C**2** eccentric to the central axis C**1** of the cylinder **21**. That is, in this embodiment, the eccentric axis of the first rotor **22***a* and the eccentric axis of the second rotor **22***b* are arranged on the same axis.

[0050] As shown in FIG. **1**, a shaft side inlet passage **24***d* is defined in the shaft **24**, and is communicated to the housing side inlet passage **13***a*, for leading the low-pressure refrigerant flowed from the outside toward the first and second compression chambers Va and Vb. Plural (four in this embodiment) first shaft side exit holes **240***a* and plural (four in this embodiment) second shaft side exit holes **240***b* are opened in the outer circumference surface of the shaft **24** to discharge the low-pressure refrigerant from the shaft side inlet passage **24***d*.

[0051] As shown in FIG. **1** and FIG. **4**, a first shaft side concave portion **241***a* and a second shaft side concave portion **241***b* are formed on the outer circumference surface of the shaft **24**, and are recessed inward from the outer circumference surface of the shaft **24**. The first and second shaft side exit holes **240***a* and **240***b* are respectively communicated to the formation parts of the first and second shaft side concave portions **241***a* and **241***b*. For this reason, the first and second shaft side exit holes **240***a* and **240***b* are communicated to circular first and second shaft side communication spaces **242***a* and **242***b* defined in the first and second shaft side concave portions **241***a* and **241***b*, respectively.

[0052] The first rotor **22***a* is a cylindrical component arranged inside the cylinder **21** and extending in the central axial direction of the cylinder **21**. As shown in FIG. **1**, the length of the first rotor **22***a* in the axial direction is approximately the same as the length of a portion of the shaft **24** and the cylinder **21** which defines the first compression mechanism part **20***a* in the axial direction.

[0053] Furthermore, the outer diameter of the first rotor **22***a* is smaller than the inside diameter of the cylindrical space formed inside of the cylinder **21**. In detail, as shown in FIG. **2** and FIG. **3**, the outer diameter of the first rotor **22***a* is set such that the outer circumference surface of the first rotor **22***a* and the inner circumference surface of the cylinder **21** are in contact with each other at one junction point C**3** when seen from the axial direction of the eccentric axis C**2**.

[0054] A motion transmitting mechanism is arranged between the first rotor **22***a* and the middle side plate **25***c* and between the first rotor **22***a* and the first side plate **25***a*. The motion transmitting mechanism transmits the rotation power from the cylinder **21** (specifically, the middle side plate **25***c* and the first side plate **25***a* which rotate with the cylinder **21**) to the first rotor **22***a*, such that the first rotor **22***a* has synchronous rotation with the cylinder **21**.

[0055] The motion transmitting mechanism, which is arranged between the first rotor **22***a* and the middle side plate **25***c*, is explained. As shown in FIG. **2**, the motion transmitting mechanism includes plural (four in this embodiment) first hole parts **221***a* having round form and formed on a surface of the first rotor **22***a* adjacent to the middle side plate **25***c*, and plural (four in this embodiment) drive pins **251***c* projected from the middle side plate **25***c* toward the first rotor **22***a* in the central axial direction.

[0056] The drive pin **251***c* has a diameter smaller than that of the first hole part **221***a*, and is projected toward the rotor **22** in the axial direction and inserted in the first hole part **221***a*. The drive pin **251***c* and the first hole part **221***a* define a mechanism equivalent to the so-called pin-hole type rotation prevention mechanism. The motion transmitting mechanism located between the first rotor **22***a* and the first side plate **25***a* has the similar structure as the above.

[0057] When the cylinder **21** rotates about the central axis C**1**, according to the motion transmitting mechanism of this embodiment, the relative position (relative distance) between the drive pin **251***c* and the eccentric part **24***c* of the shaft **24** changes. The side wall surface of the first hole part **221***a* of the first rotor **22***a* receives a load from the drive pin **251***c* in the rotational direction, which is caused by the change in the relative position (relative distance). As a result, the first rotor **22***a* rotates about the eccentric axis C**2**, synchronizing with rotation of the cylinder **21**.

[0058] The motion transmitting mechanism of this embodiment transmits the power to the rotor **22** sequentially through the drive pins **251***c* and the first hole parts **221***a*. Therefore, it is desirable that the drive pins **251***c* and the first hole parts **221***a* are arranged around the eccentric axis C**2** at equal angle interval. Furthermore, a metal ring component **223***a* is inserted in each of the first hole parts **221***a* to restrict wear of the outer circumference surface to which the drive pin **251***c* contacts.

[0059] Moreover, as shown in a dashed line of FIG. **1**, a first oil passage **225***a* is defined inside the first rotor **22** to extend in the axial direction of the eccentric axis C**2**. The first oil passage **225***a* penetrates the first rotor **22** from one end to the other end in the axial direction.

[0060] The first oil passage **225***a* is a lubricating oil passage for the lubricating oil supplied through a first oil return passage **11***b* defined in the bottom of the main housing **11** and an oil passage **252***a* defined by a clearance between the shaft **24** and the boss part of the first side plate **25***a*. The first oil return passage **11***b* is a lubricating oil passage which introduces lubricating oil toward the first oil passage **225***a* from the lower side of the interior space of the housing **10**.

[0061] Furthermore, the first hole parts **221***a* of the motion transmitting mechanism between the first rotor **22***a* and the middle side plate **25***c* and between the first rotor **22***a* and the first side plate **25***a* are formed by ends of the first oil passage **225***a* in the axial direction.

[0062] In other words, at least one first hole part of the motion transmitting mechanism between the first rotor **22***a* and the first side plate **25***a*, and at least one first hole part **221***a* of the motion transmitting mechanism between the first rotor **22***a* and the middle side plate **25***c* communicate mutually through the first oil passage **225***a*.

[0063] Moreover, as shown in FIG. **2** and FIG. **3**, a first groove portion (a first slit part) **222***a* is formed in the outer circumference surface of the first rotor **22***a*, and is recessed radially inward and extends within the all area in the axial direction. The first vane **23***a* to be mentioned later is slidably inserted in the first groove portion **222***a*.

[0064] When seen from the axial direction of the eccentric axis C**2**, a surface of the first groove portion **222***a* on which the first vane **23***a* slides (the friction surface with the first vane **23***a*) is inclined relative to the radial direction of the first rotor **22***a*. In detail, the surface of the first groove portion **222***a* on which the first vane **23***a* slides is inclined from the inner circumference side to the outer circumference side in the rotational direction. For this reason, the first vane **23***a* inserted in the first groove portion **222***a* is also displaced in the direction inclined to the radial direction of the first rotor **22***a*.

[0065] As shown in FIG. **3**, a first rotor side inlet passage **224***a* is formed inside of the first rotor **22***a*, at the central part in the axial direction, similarly to the first groove portion **222***a*, and extends in the inclined manner relative to the radial direction. The inner circumference side (adjacent to the first shaft side communication space **242***a*) and the outer circumference side (adjacent to the first compression chamber Va) of the first rotor **22***a* are communicated with each other by the first rotor side inlet passage **224***a*. Thereby, the refrigerant flowing in the shaft side inlet passage **24***d* from the exterior is led toward the first rotor side inlet passage **224***a*.

[0066] Furthermore, as shown in FIG. **3**, the exit of the first rotor side inlet passage **224***a* is opened in the outer circumference surface of the first rotor **22***a* on the rear side of the first groove portion **222***a* in the rotational direction. Moreover, the first rotor side inlet passage **224***a* and the first groove portion **222***a* are separated from each other, and formed not to communicate with each other.

[0067] The first vane **23***a* is a tabular partition component that defines the first compression chamber Va formed between the outer circumference surface of the first rotor **22***a* and the inner circumference surface of the cylinder **21**. The axial length of the first vane **23***a* is approximately the same as the axial length of the first rotor **22***a*. Furthermore, the outer circumference side tip part of the first vane **23***a* is slidable on the inner circumference surface of the cylinder **21**.

[0068] Therefore, in the first compression mechanism part **20***a* of this embodiment, the first compression chamber Va is formed of a space surrounded by the inner wall surface of the cylinder **21**, the outer circumference surface of the first rotor **22***a*, the board surface of the first vane **23***a*, the first side plate **25***a*, and the middle side plate **25***c*. That is, the first vane **23***a* defines the first compression chamber Va formed between the inner circumference surface of the cylinder **21** and the outer circumference surface of the first rotor **22***a*.

[0069] Moreover, the first side plate **25***a* has a first discharge hole **251***a* to discharge the refrigerant compressed by the first compression chamber Va to the interior space of the housing **10**. Furthermore, a first discharge valve such as a reed valve is arranged in the first side plate **25***a* to restrict the refrigerant flowing out of the first discharge hole **251***a* into the interior space of the housing **10** from flowing backwards to the first compression chamber Va through the first discharge hole **251***a*.

[0070] Next, the second compression mechanism part **20** is explained. The fundamental configuration of the second compression mechanism part **20***b* is the same as that of the first compression mechanism part **20***a*. As shown in FIG. **1**, the second rotor **22***b* includes a cylindrical component with a dimension approximately equal to the axial length of a portion of the shaft **24** and the cylinder **21** which defines the second compression mechanism part **20***b*.

[0071] Furthermore, since the eccentric axis C**2** of the second rotor **22***b* and the eccentric axis C**2** of the first rotor **22***a* are arranged on the same axis, when seen from the axial direction of the eccentric axis C**2**, the outer circumference surface of the second rotor **22***b* and the inner circumference surface of the cylinder **21** are in contact with each other, like the first rotor **22***a*, at the junction point C**3** shown in FIG. **2** and FIG. **3**.

[0072] A motion transmitting mechanism is disposed between the second rotor **22***b* and the middle side plate **25***c* and between the second rotor **22***b* and the first side plate **25***a*, similarly to the motion transmitting mechanism which transmits the rotation power to the first rotor **22***a*. The second rotor **22***b* has plural second round hole parts into which the plural drive pins **251***c* are inserted. A ring component is inserted also in this second hole part, similarly to the first hole part **221***a*.

[0073] Furthermore, the drive pin **251***c* projected from the middle side plate **25***c* toward the second rotor **22***b* is formed by the same component as the drive pin **251***c* projected from the middle side plate **25***c* toward the first rotor **22***b*. That is, the drive pin **251***c* fixed to the middle side plate **25***c* is projected toward both of the first rotor **22***a* and the second rotor **22***b* in the central axial direction.

[0074] As shown in FIG. **1**, a second oil passage **225***b* is formed in the second rotor **22***b*, similarly to the first oil passage **225***a* of the first rotor **22***a*, to extend in the axial direction of the eccentric axis C**2**, and penetrates the second rotor **22***b* from one end to the other end in the axial direction.

[0075] The second oil passage **225***b* is a lubricating oil passage for the lubricating oil supplied through a second oil return passage **12***b* defined in the sub housing **12** and an oil passage **252***b* formed by a clearance between the shaft **24** and the boss part of the second side plate **25***b*. The second oil return passage **12***b* is a lubricating oil passage which introduces the lubricating oil collected on the lower side of the interior space of the housing **10** toward the second oil passage **225***b*.

[0076] Furthermore, like the first oil passage **225***a*, the both ends of the second oil passage **225***b* in the axial direction form the second hole parts of the motion transmitting mechanism.

[0077] Moreover, as shown in a dashed line of FIG. **2** and FIG. **3**, a second groove portion (a second slit part) **222***b* is formed in the outer circumference surface of the second rotor **22***b*, and is recessed radially inward and extends in all the area in the axial direction. The second vane **23***b* is slidably inserted in the second groove portion **222***b*, like the first vane **23***a* of the first groove portion **222***a*.

[0078] As shown in a dashed line of FIG. **3**, a second rotor side inlet passage **224***b* is defined inside the second rotor **22***b* at the central part in the axial direction, and extends in the inclined manner relative to the radial direction, like the second groove portion **222***b*, to communicate the inner circumference side and the outer circumference side (adjacent to the second compression chamber Vb) of the second rotor **22***b* with each other.

[0079] Therefore, in the second compression mechanism part **20***b* of this embodiment, the second compression chamber Vb is formed of a space surrounded by the inner wall surface of the cylinder **21**, the outer circumference surface of the second rotor **22***b*, the board surface of the second vane **23***b*, the second side plate **25***b*, and the middle side plate **25***c*. That is, the second vane **23***b* defines the second compression chamber Vb formed between the inner circumference surface of the cylinder **21** and the outer circumference surface of the second rotor **22***b*.

[0080] Moreover, a second discharge hole **251***b* is formed in the second side plate **25***b* to discharge the refrigerant compressed by the second compression chamber Vb to the interior space of the housing **10**. Furthermore, a second discharge valve such as a reed valve is arranged in the second side plate **25***b* to restrict the refrigerant flowing out of the second discharge hole **251***b* into the interior space of the housing **10** from flowing backwards to the second compression chamber Vb through the second discharge hole **251***b*.

[0081] Furthermore, as shown in a dashed line of FIG. **2** and FIG. **3**, in the second compression mechanism part **20***b* of this embodiment, the second vane **23***b*, the second rotor side inlet passage **224***b*, the second discharge hole **251***b* of the second side plate **25***b*, and the like are arranged at positions shifted by about 180 degrees in the phase, relative to the first vane **23***a*, the first rotor side inlet passage **224***a*, the first discharge hole **251***a* of the first side plate **25***a*, and the like of the first compression mechanism part **20***a*.

[0082] Next, the operations of the compressor **1** of this embodiment are explained with reference to FIG. **5**. FIG. **5** is a diagram showing sequential change of the first compression chamber Va in response to the rotation of the cylinder **21**, in order to explain the operation state of the compressor **1**.

[0083] In the sectional views of FIG. **5**, in response to change in the rotation angle θ of the cylinder **21**, the solid line shows positions of the first rotor side inlet passage **224***a* and the first vane **23***a*, similarly to FIG. **3**. Moreover, in FIG. **5**, the dashed line shows positions of the second rotor side inlet passage **224***b* and the second vane **23***b* in response to change in the rotation angle θ. Furthermore, in FIG. **5**, the reference number is given only to the sectional view in which the rotation angle θ of the cylinder **21** is 0 degree, for clarification in the illustration.

[0084] First, when the rotation angle θ is 0 degree, the outer circumference side tip part of the first vane **23***a* overlaps with the junction point C**3**. In this state, the first compression chamber Va having the maximum capacity is formed on the front side of the first vane **23***a* in the rotational direction, and the first compression chamber Va having the minimum capacity (that is, capacity is zero) of an admission stroke is formed on the rear side of the first vane **23***a* in the rotational direction.

[0085] Here, the first compression chamber Va of an admission stroke means the first compression chamber Va in a stroke to increase the capacity, and the first compression chamber Va of a compression stroke means the first compression chamber Va in a process to reduce the capacity.

[0086] In response to an increase in the rotation angle θ from 0 degree, as shown from 45 degrees to 315 degrees in the rotation angle θ of FIG. **5**, the cylinder **21**, the first rotor **22***a*, and the first vane **23***a* are displaced, such that the capacity of the first compression chamber Va of an admission stroke formed on the rear side of the first vane **23***a* in the rotational direction increases.

[0087] Thereby, the low-pressure refrigerant drawn from the inlet port **12***a* of the sub housing **12** flows in order of the housing side inlet passage **13***a*, the first shaft side exit hole **240***a* of the shaft side inlet passages **24***d*, and the first rotor side inlet passage **224***a* into the first compression chamber Va of an admission stroke.

[0088] At this time, since the centrifugal force acts on the first vane **23***a* in response to the rotation of the rotor **22**, the outer circumference side tip part of the first vane **23***a* is forced onto the inner circumference surface of the cylinder **21**. Thereby, the first vane **23***a* divides the first compression chamber Va of an admission stroke and the first compression chamber Va of a compression stroke from each other.

[0089] When the rotation angle θ becomes 360 degrees (namely, when the rotation angle θ returns to 0 degree), the first compression chamber Va of an admission stroke has the maximum capacity. Furthermore, when the rotation angle θ increases from 360 degrees, the communication between the first compression chamber Va of an admission stroke where the capacity is increased when the rotation angle θ increases from 0 degree to 360 degrees and the first rotor side inlet passage **224***a* is intercepted. Thereby, the first compression chamber Va of a compression stroke is formed on the front side of the first vane **23***a* in the rotational direction.

[0090] Furthermore, while the rotation angle θ increases from 360 degrees, as shown in point hatching of FIG. **5** where the rotation angle θ increases from 405 degrees to 675 degrees, the capacity of the first compression chamber Va of a compression stroke formed on the front side of the first vane **23***a* in the rotational direction reduces.

[0091] Thereby, the refrigerant pressure in the first compression chamber Va of a compression stroke rises. When the refrigerant pressure in the first compression chamber Va exceeds a valve open pressure of the first discharge valve (namely, the maximum pressure of the first compression chamber Va) determined based on the refrigerant pressure in the interior space of the housing **10**, the refrigerant in the first compression chamber Va is discharged to the interior space of the housing **10** through the first discharge hole **251***a*.

[0092] The change in the first compression chamber Va is explained, in response to the change in the rotation angle θ from 0 degree to 720 degrees, for clarifying the operation mode of the first compression mechanism part **20***a*. However, in actual, an admission stroke of the refrigerant explained when the rotation angle θ changes from 0 degree to 360 degrees, and a compression stroke of the refrigerant explained when the rotation angle θ changes from 360 degrees to 720 degrees are simultaneously carried out while the cylinder **21** has one rotation.

[0093] Moreover, the second compression mechanism part **20***b* operates similarly, and compression and admission of refrigerant are performed. At this time, in the second compression mechanism part **20***b*, the second vane **23***b* is arranged at the position shifted by 180 degrees in phase relative to the first vane **23***a* of the first compression mechanism part **20***a*. Therefore, in the second compression chamber Vb of a compression stroke, compression and admission of refrigerant are performed at the rotation angle shifted from the first compression chamber Va by 180 degrees in phase.

[0094] For this reason, in this embodiment, the rotation angle θ of the cylinder **21** where the refrigerant pressure in the first compression chamber Va reaches the maximum pressure, and the rotation angle θ of the cylinder **21** where the refrigerant pressure in the second compression chamber Vb reaches the maximum pressure are shifted from each other by 180 degrees.

[0095] When the refrigerant pressure in the second compression chamber Vb of a compression stroke rises, and when the refrigerant pressure in the second compression chamber Vb exceeds a valve open pressure of the second discharge valve arranged at the second side plate **25***b* (namely, the maximum pressure of the second compression chamber Vb), the refrigerant in the second compression chamber Vb is discharged through the second discharge hole **251***b* to the interior space of the housing **10**. The refrigerant discharged from the second compression mechanism part **20***b* to the interior space of the housing **10** joins the refrigerant discharged from the first compression mechanism part **20***a*.

[0096] The refrigerant mixed of the high-pressure gas phase refrigerant discharged from the first compression mechanism part **20***a* and the high-pressure gas phase refrigerant discharged from the second compression mechanism part **20***b* reduces the flow velocity in the interior space of the housing **10**. Thereby, the lubricating oil discharged from the first and second discharge holes **251***a* and **251***b* with the high-pressure gas phase refrigerant is separated from the mixed refrigerant, due to the gravity, by falling downward.

[0097] The mixed refrigerant from which the lubricating oil is separated is discharged from the discharge port **11***a* of the housing **10**. Meanwhile, the lubricating oil separated from the refrigerant can be stored on the lower side of the interior space of the housing **10**. The lubricating oil stored on the lower side of the interior space of the housing **10** flows into the first and second oil passages **225***a* and **225***b* through the first and second oil return passages **11***b* and **12***b*, so as to be supplied to each sliding part of the shaft **24**, the first and second rotors **22***a* and **22***b*, and the side plates **25***a*-**25***c*.

[0098] Thus, the compressor **1** of this embodiment draws, compresses, and discharges the refrigerant (fluid) in the refrigeration cycle apparatus. Moreover, since the compression mechanism part **20** is arranged in the inner circumference side of the electric motor part **30**, the compressor **1** of this embodiment can be downsized as the whole.

[0099] Furthermore, since the compressor **1** of this embodiment has the first rotor **22***a* (the first compression mechanism part **20***a*) and the second rotor **22***b* (the second compression mechanism part **20***b*), the first compression chamber Va and the second compression chamber Vb can be formed. Therefore, the total discharge capacity of the first compression chamber Va and the second compression chamber Vb can be easily increased in accordance with the system (the refrigeration cycle apparatus in this embodiment) to which the compressor is applied.

[0100] Meanwhile, since the first rotor **22***a* and the second rotor **22***b* are arranged along the central axial direction of the cylinder **21**, the outer diameter of the cylinder **21** is not increased to increase the sum of the discharge capacity. Therefore, the outer diameter of the stator **31** of the electric motor part **30** is restricted from increasing, and the outer diameter of the main housing **11** which accommodates the stator **31** is restricted from increasing.

[0101] As a result, according to the compressor **1** of this embodiment, the capacity of the compression chamber (Va, Vb) can be increased without causing enlargement in the radial direction.

[0102] Moreover, since the eccentric axis C2 of the first rotor **22***a* and the eccentric axis C2 of the second rotor **22***b* are arranged on the same axis in the compressor **1** of this embodiment, it is not necessary to form portions corresponding to eccentric axes different from each other in the shaft **24**. Therefore, the shaft **24** can be formed easily.

[0103] Moreover, in the compressor **1** of this embodiment, the maximum capacity is approximately the same between the first compression chamber Va and the second compression chamber Vb. Furthermore, the rotation angle θ of the cylinder **21** where the refrigerant in the first compression chamber Va reaches the maximum pressure, and the rotation angle θ of the cylinder **21** where the refrigerant in the second compression chamber Vb reaches the maximum pressure are shifted from each other by 180 degrees.

[0104] Thereby, as shown in FIG. **6**, the torque fluctuations caused by increase in the capacity of the compression chamber can be restricted from increasing. Therefore, the noise and vibration can be effectively restricted from increasing as the whole compressor.

[0105] FIG. **6** is a graph comparing the total torque fluctuation of the compressor **1** of this embodiment with torque fluctuation of a rotating cylinder type compressor (compressor with a single cylinder) having a single compression mechanism part similar to the first compression mechanism part **20***a*. In addition, the total torque fluctuation is the sum of the torque fluctuations produced by the pressure fluctuation of the refrigerant in the first compression chamber Va of the first compression mechanism part **20***a* and the torque fluctuations produced by the pressure fluctuation of the refrigerant in the second compression chamber Vb of the second compression mechanism part **20***b*.

[0106] Furthermore, the discharge capacity of the compressor with the single cylinder shown in FIG. **6** is in agreement with the total discharge capacity of the first compression chamber Va and the second compression chamber Vb of the compressor **1** of this embodiment. Furthermore, the suction refrigerant pressure and the discharge refrigerant pressure of the compressor with the single cylinder shown in FIG. **6** are respectively set similar with the suction refrigerant pressure and the discharge refrigerant pressure of the compressor **1** of this embodiment.

[0107] Moreover, since the first and second oil passages **225***a* and **225***b* are formed in the first and second rotors **22***a* and **22***b* in the compressor **1** of this embodiment, each sliding part of the shaft **24**, the first and second rotors **22***a* and **22***b*, and the side plates **25***a*-**25***c* can be lubricated. As a result, the durability of the compressor **1** can be raised as a whole.

[0108] The lubricating oil can be effectively introduced into the sliding part between the first and second rotors **22***a*, **22***b* and the middle side plate **25***c*, positioned at the central part of the cylinder **21** in the central axial direction, due to the first and second oil passages **225***a* and **225***b*.

[0109] Since a structure similar to the so-called pin-hole type rotation prevention mechanism is adopted as a motion transmitting mechanism in the compressor **1** of this embodiment, the motion transmitting mechanism can be realized with simple structure. Furthermore, since the ring component **223***a* is inserted in the hole part of the motion transmitting mechanism, the wear resistance of the hole part can be raised. As a result, the durability can be raised as the whole compressor **1**.

[0110] In addition, the first and second hole parts **221***a* are defined at the axial ends of the first and second oil passages **225***a* and **225***b*. Therefore, a space for arranging the motion transmitting mechanism can be reduced. Thus, the compressor **1** can be further downsized as the whole.

[0111] According to the compressor **1** of this embodiment, the inlet passage introducing the refrigerant drawn from the outside to the first and second compression chambers Va and Va is defined by the shaft side inlet passage **24***d*, the first and second rotor side inlet passages **224***a* and **224***b*, and the like. Therefore, the passage structure and the sealing structure of the inlet passage are restricted from becoming complicated, compared with a case where a part of the inlet passage is formed in the first and second side plates **25***a* and **25***b* which rotate with the cylinder **21**.

[0112] Furthermore, since the first and second discharge holes **251***a* and **251***b* are respectively formed in the first and second side plates **25***a* and **25***b*, the first and second compression mechanism parts **20***a* and **20***b* can be easily connected with each other in parallel to a flow of the refrigerant, inside the housing **10**.

Second Embodiment

[0113] As shown in FIG. **7**, in the present embodiment, the compression mechanism part **20** is modified relative to the first embodiment. In addition, FIG. **7** is a sectional view corresponding to FIG. **3** which is explained in the first embodiment, and shows a sectional view of the first compression mechanism part **20***a* perpendicular to the axial direction. In FIG. **7**, the same or equivalent portion as the first embodiment is attached with the same reference number. This is the same also in FIG. **8** to be explained below.

[0114] More specifically, a first hinge part **231***a* is formed at the outer circumference side end portion of the first vane **23***a*, in the first compression mechanism part **20***a* of this embodiment. The first hinge part **231***a* is supported by a groove portion formed in the inner circumference surface of the cylinder **21**, and is swingable in the circumferential direction. For this reason, the vane **23** does not separate from the cylinder **21**, and the inner circumference side of the first vane **23***a* is displaced inside of the first groove portion **222***a* in the sliding manner.

[0115] Furthermore, a circular part with a diameter equivalent to the width dimension of the first groove portion **222***a* is formed at the inner circumference side end portion of the first vane **23***a*. Therefore, when the first vane **23***a* swings in response to rotation of the cylinder **21**, the inner circumference side end portion of the first vane **23***a* is securely made in contact with the inner wall surface of the first groove portion **222***a*, namely, the sealing property between the inner circumference side end portion of the first vane **23***a* and the inner wall surface of the first groove portion **222***a* is raised.

[0116] The fundamental configuration of the second compression mechanism part **20***b* is the same as that of the first compression mechanism part **20***a*. Therefore, as shown in a dashed line of FIG. **7**, the outer circumference side end portion of the second vane **23***b* is also swingably supported by the cylinder.

[0117] The other configurations and operations are the same as those of the first embodiment. Therefore, when the compressor **1** of this embodiment is operated, the compressor operates similarly to the first embodiment. Specifically, refrigerant (fluid) can be drawn, compressed and discharged in the refrigeration cycle apparatus. Furthermore, like the first embodiment, the capacity of the compression chamber (Va, Vb) can be increased without causing enlargement in the radial direction, and noise and vibration can be restricted from increasing as the whole compressor.

Third Embodiment

[0118] As shown in FIG. **8**, the compression mechanism part **20** is modified in this embodiment, relative to the second embodiment. More specifically, in the first compression mechanism part **20***a* of this embodiment, the inner circumference side of the first vane **23***a* on the radially inner side of the first hinge part **231***a* is formed into a plate shape.

[0119] Furthermore, a first shoe **232***a* is arranged in the first groove portion **222***a*, and has a cross-sectional form (approximately semi-circle shape) in which a part of the circle is cut off, when seen from the axial direction of the central axis C**1**. The first vane **23***a* is interposed between the first shoes **232***a*. The length of the first shoe **232***a* in the axial direction is approximately the same as the first rotor **22***a* and the first vane **23***a*. The fundamental configuration of the second compression mechanism part **20***b* is the same as that of the first compression mechanism part **20***a*.

[0120] The other configuration and operations are the same as those of the second embodiment. Therefore, when the compressor **1** of this embodiment is operated, the compressor operates like the second embodiment. Specifically, in the refrigeration cycle apparatus, the refrigerant (fluid) can be drawn, compressed and discharged. Furthermore, like the first embodiment, the capacity of the compression chamber (Va, Vb) can be increased without causing enlargement in the radial direction. The noise and vibration can be restricted from increasing as the whole compressor.

[0121] Furthermore, in the compressor **1** of this embodiment, the shoe **232***a* effectively raises the sealing property between the first and second vane **23***a*, **23***b* and the inner wall surface of the first and second groove portion **222***a*, **222***b*. Thereby, the compression efficiency of the compressor **1** can be raised.

Other Embodiment

[0122] The contents of the present disclosure can variously be modified within the range not deviated from the scope of present disclosure without being limited to the above-mentioned embodiments.

[0123] In the above-mentioned embodiments, the rotating cylinder type compressor **1** is applied to the refrigeration cycle of the air-conditioner for a vehicle, but the rotating cylinder type compressor **1** is not limited to be applied to this. That is, the rotating cylinder type compressor **1** may be widely applied to a compressor which compresses various fluid.

[0124] In the above-mentioned embodiments, a structure similar to a pin-hole type rotation prevention mechanism is adopted as the power transmitting device of the rotating cylinder type compressor **1**, but is not limited to this. For example, a structure similar to an Oldham ring type rotation prevention mechanism may be adopted.

[0125] In the above-mentioned embodiments, the stator of the electric motor part **30** is arranged at the outer circumference side of the cylinder **21** formed integrally with the rotor, but the electric motor part **30** is not limited to this. For example, the electric motor part and the cylinder **21** may be arranged side by side in the extending direction of the central axis C**1** of the cylinder **21**, and the electric motor part and the cylinder **21** may be connected with each other. Moreover, the rotation power of the electric motor part may be transmitted to the cylinder **21** through a belt, without arranging the rotation center of the electric motor part and the central axis C**1** of the cylinder **21** on the same axis.

What is claimed is:

1. A rotating cylinder type compressor comprising:

a cylinder having a cylindrical shape and rotating about a central axis;

a first rotor and a second rotor arranged inside the cylinder, each of the first rotor and the second rotor having a cylindrical shape and rotating about an eccentric axis eccentric to the central axis of the cylinder;

a shaft that rotatably supports the first rotor and the second rotor;

a first vane slidably fitted to a first groove portion defined in the first rotor and defining a first compression chamber between an outer circumference surface of the first rotor and an inner circumference surface of the cylinder; and

a second vane slidably fitted to a second groove portion defined in the second rotor and defining a second compression chamber between an outer circumference surface of the second rotor and an inner circumference surface of the cylinder, wherein

the first rotor and the second rotor are arranged in an extending direction of the central axis of the cylinder,

a shaft side inlet passage is defined inside the shaft to introduce fluid drawn from outside to be compressed into the first compression chamber and the second compression chamber,

a first shaft side exit hole through which the fluid flows from the shaft side inlet passage to the first compression chamber and a second shaft side exit holes through which the fluid flows from the shaft side inlet passage to the second compression chamber are defined in an outer circumference surface of the shaft, and

the first compression chamber and the second compression chamber are connected in parallel to a flow of the fluid.

2. The rotating cylinder type compressor according to claim **1**, wherein

the eccentric axis of the first rotor and the eccentric axis of the second rotor are arranged on the same axis.

3. The rotating cylinder type compressor according to claim **1**, wherein

a rotation angle of the cylinder where a fluid pressure in the first compression chamber reaches the maximum pressure, and a rotation angle of the cylinder where a fluid pressure in the second compression chamber reaches the maximum pressure are shifted from each other by 180 degrees.

4. The rotating cylinder type compressor according to claim **1**, wherein

the first rotor has a first oil passage extending in the axial direction of the shaft, lubricating oil flowing through the first oil passage lubricating a sliding part, and

the second rotor has a second oil passage extending in the axial direction of the shaft, lubricating oil flowing through the second oil passage lubricating a sliding part.

5. The rotating cylinder type compressor according to claim **1**, further comprising:

a motion transmitting mechanism that transmits rotation power from the cylinder to the first rotor and the second rotor so that the first rotor and the second rotor carry out synchronous rotation with the cylinder; and

a middle side plate arranged between the first rotor and the second rotor to define the first compression chamber and the second compression chamber, the middle side plate rotating with the cylinder, wherein

the motion transmitting mechanism includes a drive pin projected from the middle side plate toward the first rotor and the second rotor in the extending direction of the central axis, and a first hole part and a second hole part respectively formed in the first rotor and the second rotor, to which the drive pin is fitted.

6. The rotating cylinder type compressor according to claim **5**, further comprising:

a ring component fitted in each of the first hole part and the second hole part to restrict wear of an outer circumference side wall surface where the drive pin contacts.

7. The rotating cylinder type compressor according to claim **5**, wherein

the first rotor has a first oil passage extending in the axial direction of the eccentric axis, lubricating oil lubricating a sliding part flowing through the first oil passage,

the first hole part is formed at an end of the first oil passage in the axial direction,

the second rotor has a second oil passage extending in the axial direction of the eccentric axis, lubricating oil lubricating a sliding part flowing through the second oil passage, and

the second hole part is formed at an end of the second oil passage in the axial direction.

8. The rotating cylinder type compressor according to claim **1**, further comprising:

a middle side plate arranged between the first rotor and the second rotor to define the first compression chamber and the second compression chamber, the middle side plate rotating with the cylinder;

a first side plate fixed to one end of the cylinder in the axial direction to define the first compression chamber with the middle side plate;

a second side plate fixed to the other end of the cylinder in the axial direction to define the second compression chamber with the middle side plate, wherein

the first rotor has a first rotor side inlet passage, fluid to be compressed flowing into the first compression chamber through the first rotor side inlet passage,

the first side plate has a first discharge hole, fluid to be compressed flowing out of the first compression chamber through the first discharge hole,

the second rotor has a second rotor side inlet passage, fluid to be compressed flowing into the second compression chamber through the second rotor side inlet passage, and

the second side plate has a second discharge hole, fluid to be compressed flowing out of the second compression chamber through the second discharge hole.

9. The rotating cylinder type compressor according to claim **1**, further comprising:

an electric motor part that rotates the cylinder, wherein

the cylinder is formed integrally with a rotor of the electric motor part, and

a stator of the electric motor part is arranged at an outer circumference side of the cylinder.

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