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

(11) **EP 3 336 359 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
19.07.2023 Bulletin 2023/29

(21) Application number: **16834490.1**

(22) Date of filing: **01.06.2016**

(51) International Patent Classification (IPC):
F04C 28/06 *(2006.01)* ***F04C 18/356*** *(2006.01)*
F04C 23/00 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
F04C 18/356; F01C 21/108; F04C 18/3564; F04C 23/00; F04C 23/008; F04C 28/00; F04C 28/065; F04C 29/00

(86) International application number:
PCT/CN2016/084328

(87) International publication number:
WO 2017/024865 (16.02.2017 Gazette 2017/07)

(54) COMPRESSOR WITH CAPACITY VARIATION SWITCHING MECHANISM

VERDICHTER MIT SCHALTMECHANISMUS ZUR VERÄNDERUNG DER FÖRDERMENGE

COMPRESSEUR AVEC MÉCANISME DE COMMUTATION DE VARIATION DE CAPACITÉ

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **10.08.2015 CN 201510486407**

(43) Date of publication of application:
20.06.2018 Bulletin 2018/25

(73) Proprietor: **Gree Green Refrigeration Technology Center Co.,Ltd**
Zhuhai, Guangdong 519070 (CN)

(72) Inventors:
- **HU, Yusheng**
  Zhuhai,
  Guangdong 519070 (CN)
- **WEI, Huijun**
  Zhuhai,
  Guangdong 519070 (CN)
- **WU, Jian**
  Zhuhai,
  Guangdong 519070 (CN)
- **YANG, Ouxiang**
  Zhuhai,
  Guangdong 519070 (CN)
- **CHEN, Sheng**
  Zhuhai,
  Guangdong 519070 (CN)
- **LUO, Huifang**
  Zhuhai,
  Guangdong 519070 (CN)
- **LIAO, Liping**
  Zhuhai,
  Guangdong 519070 (CN)
- **ZOU, Peng**
  Zhuhai,
  Guangdong 519070 (CN)

(74) Representative: **Modiano, Gabriella Diana**
Modiano & Partners (DE)
Thierschstrasse 11
80538 München (DE)

(56) References cited:
CN-A- 101 012 833
CN-A- 103 423 164
CN-A- 103 953 544
CN-U- 202 954 971
CN-U- 203 962 391
CN-U- 204 100 662
CN-U- 204 851 640
CN-U- 204 851 640
CN-Y- 2 911 259
JP-A- 2005 171 847
JP-A- 2010 156 499

EP 3 336 359 B1

Description

Technical Field

[0001] The present disclosure relates to the technical field of compressors, and more particularly to a compressor with a variable capacity switching mechanism.

Background

[0002] In the conventional art, the heating capacity of a compressor is improved by electric auxiliary heating usually, or by using a compressor with a two-stage enthalpy-increasing function, the problem of poor low-temperature heating capacity of the compressor is solved, but the problem of different degrees exists.

1. The method of improving the heating capacity of the compressor by using electric auxiliary heating has the problem of low energy efficiency.
2. The compressor with the two-stage enthalpy-increasing function has the problem of reduction of energy efficiency of the compressor operating under common working conditions due to the fact that the displacement of the compressor cannot be adjusted and the adaptability of the compressor to operating conditions is poor on the premise of ensuring the heating capacity and energy efficiency of the compressor under low-temperature working conditions.

[0003] CN204100662U is a utility model. The utility model provides a refrigeration cycle device which comprises a rotary compressor, a first heat exchanger, a first throttling mechanism and a second heat exchanger, and the rotary compressor, the first heat exchanger, the first throttling mechanism and the second heat exchanger are sequentially connected to form a refrigeration cycle loop. The rotary compressor comprises at least two sets of low-pressure cylinders and at least one set of high-pressure cylinders, the low-pressure cylinders are used as first-stage compressing cylinders, the high-pressure cylinders are used as second-stage compressing cylinders, one of the at least two sets of low-pressure cylinders is provided with a pressure switching mechanism, the pressure switching mechanism comprises switch pieces, and the switch pieces are used for guiding low-pressure refrigerants or high-pressure refrigerants of the refrigeration cycle device to a control cavity arranged on the rear surface of a sliding piece in a switching mode; the pressure switching mechanism further comprises a sliding piece limiting element, and a back pressure chamber at the lower end of the sliding piece limiting element is always communicated with the low-pressure refrigerants. According to the refrigeration cycle device, a certain low-pressure cylinder is smoothly switched between non-compression operation and normal-compression operation to achieve improvement of energy efficiency of the refrigeration cycle device, and different displacements and different high-low-pressure-level displacement ratios are selected according to requirements for comfortableness of an air conditioner.

Summary

[0004] A main objective of the present disclosure is to provide a compressor used to solve the problems in the conventional art of poor heating capacity and low energy efficiency of a compressor due to the fact that the compressor cannot operate with capacity variation.

[0005] To this end, a compressor as defined in independent claim 1 is provided. The compressor comprises a crankshaft, and a first cylinder, a second cylinder and a third cylinder arranged sequentially in an axial direction of the crankshaft. The first cylinder is a high-pressure cylinder, and the second cylinder and the third cylinder are low-pressure cylinders. The compressor also comprises a capacity variation switching mechanism for controlling unloading or loading of the third cylinder. The compressor has a full operation mode and a partial operation mode. When the compressor is in the full operation mode, the capacity variation switching mechanism loads the third cylinder under the action of the discharge pressure of the compressor, and when the compressor is in the partial operation mode, the capacity variation switching mechanism unloads the third cylinder under the action of the inlet pressure of the compressor.

[0006] Further, the capacity variation switching mechanism comprises: a pressure control portion, the pressure control portion being selectively communicated with an air outlet of the compressor or an air inlet of the compressor; and a locking member, the pressure control portion controlling a cooperative relationship between the locking member and a sliding sheet of the third cylinder, wherein when the pressure control portion is communicated with the air inlet of the compressor, the locking member is locked to the sliding sheet of the third cylinder to make the third cylinder unloaded, and when the pressure control portion is communicated with the air outlet of the compressor, the locking member is unlocked with the sliding sheet of the third cylinder to make the third cylinder loaded.

[0007] Further, the capacity variation switching mechanism further comprises an elastic reset element, a first end of the locking member is unlocked with or locked to the sliding sheet, the elastic reset element is provided at a second end, opposite to the first end, of the locking member, and the pressure control portion controls the pressure on the first end of the locking member.

[0008] Further, the capacity variation switching mechanism further comprises a pressure stabilizing branch, the first end of the pressure stabilizing branch is communicated with the air inlet of the compressor, and a second end of the pressure stabilizing branch supplies pressure to the second end of the locking member.

[0009] Further, the pressure control portion comprises: a first branch, a first end of the first branch being com-

municated with the air inlet of the compressor, and a second end of the first branch controlling the pressure on the first end of the locking member; a first on-off valve for controlling on-off of the first branch, the first on-off valve being provided on the first branch; a second branch, a first end of the second branch being communicated with the air outlet of the compressor, and a second end of the second branch controlling the pressure on the first end of the locking member; and a second on-off valve for controlling on-off of the second branch, the second on-off valve being provided on the second branch.

[0010] Further, the compressor further comprises a mixer, a first air inlet of the mixer is communicated with an air outlet of the second cylinder, a mixer air outlet of the mixer is communicated with an air inlet of the first cylinder, and a second air inlet of the mixer is an air supply port.

[0011] Further, the compressor further comprises a first partition board, the first partition board being provided between the second cylinder and the third cylinder.

[0012] Further, the first partition board is provided with a first partition board cavity communicated with the air outlet of the second cylinder, the second cylinder is further provided with an external communication port communicated with the first partition board cavity, the first air inlet of the mixer is communicated with the first partition board cavity via the external communication port, and when the compressor is in the partial operation mode, an air inlet of the second cylinder, the air outlet of the second cylinder, the first partition board cavity, the external communication port of the second cylinder, the mixer, the air inlet of the first cylinder and an air outlet of the first cylinder are communicated sequentially.

[0013] Further, the third cylinder is provided with a first middle flow channel isolated from a compression chamber of the third cylinder. The compressor further comprises: a second partition board, the second partition board being provided between the first partition board and the third cylinder, and the second partition board being further provided with a second partition board communication hole communicating the first middle flow channel of the third cylinder with the first partition board cavity; and a first flange, the first flange being provided on one side, away from the second cylinder, of the third cylinder, the first flange being provided with a first flange cavity, and the first flange cavity being communicated with an air outlet of the third cylinder and the first middle flow channel separately, wherein when the compressor is in the full operation mode, the air inlet of the second cylinder, the air outlet of the second cylinder, the first partition board cavity, the external communication port of the second cylinder, the mixer, the air inlet of the first cylinder and the air outlet of the first cylinder are communicated sequentially, and the air inlet of the third cylinder is communicated with the first partition board cavity via the air outlet of the third cylinder, the first flange cavity, the first middle flow channel and the second partition board communication hole.

[0014] According to the technical solution of the present disclosure, by means of the capacity variation switching mechanism provided in the compressor, at least one cylinder is allowed to be put into use or unloaded under the action of the capacity variation switching mechanism, thus enabling a capacity variation switching function of the compressor to meet operational requirements of different operating conditions, to improve the heating capacity of the compressor under different working conditions, and to effectively improve the comprehensive energy efficiency of the compressor.

Brief Description of the Drawings

[0015] The drawings of the specification, forming a part of the present application, are used to provide further understanding of the present disclosure. The schematic embodiments and illustrations of the present disclosure are used to explain the present disclosure, and do not form improper limits to the present disclosure. In the drawings:

Fig. 1 shows an operation schematic diagram of a heat exchange system comprising a compressor in a full operation mode in the present disclosure;

Fig. 2 shows an operation schematic diagram of the heat exchange system comprising the compressor in a partial operation mode in the present disclosure;

Fig. 3 shows a diagram of a working state where a capacity variation switching mechanism is locked to a third cylinder in the present disclosure;

Fig. 4 shows a diagram of a working state where the capacity variation switching mechanism is unlocked with the third cylinder in the present disclosure;

Fig. 5 shows a diagram of an appearance structure of a compressor in a first embodiment of the present disclosure;

Fig. 6 shows a diagram of an internal structure of the compressor in Fig. 5;

Fig. 7 shows a flowing diagram of a refrigerant for the compressor in Fig. 6 in the partial operation mode;

Fig. 8 shows a flowing diagram of a refrigerant for the compressor in Fig. 6 in the full operation mode;

Fig. 9 shows a structure diagram of a first partition board of the compressor in Fig. 6;

Fig. 10 shows a structure diagram of a second cylinder of the compressor in Fig. 6;

Fig. 11 shows a structure diagram of a third cylinder of the compressor in Fig. 6;

Fig. 12 shows a structure diagram of a first flange of the compressor in Fig. 6;

Fig. 13 shows a structure diagram of a first flange cover board of the compressor in Fig. 6;

Fig. 14 shows a diagram of a channel relationship formed by combining the first flange, the third cylinder and the first flange cover board of the compressor in Fig. 6;

Fig. 15 shows a diagram of an appearance structure of a compressor in an example that does not form part of the claimed invention.

Fig. 16 shows a diagram of an internal structure of the compressor in Fig. 15;

Fig. 17 shows a flowing diagram of a refrigerant for the compressor in Fig. 16 in the partial operation mode;

Fig. 18 shows a flowing diagram of a refrigerant for the compressor in Fig. 16 in the full operation mode;

Fig. 19 shows a structure diagram of a first cylinder of the compressor in Fig. 16;

Fig. 20 shows a structure diagram of a first partition board of the compressor in Fig. 16; and

Fig. 21 shows a structure diagram of a second cylinder of the compressor in Fig. 16.

[0016] Where, the drawings comprise the following drawing marks:

10, crankshaft; 11, housing; 12, upper cover assembly; 13, lower cover; 14, stator assembly; 15, rotor assembly; 16, third partition board; 20, first cylinder; 21, first roller; 30, second cylinder; 31, external communication port; 32, second middle flow channel; 33, second roller; 40, third cylinder; 41, sliding sheet; 42, first middle flow channel; 43, third roller; 44, capacity variation pressure control channel; 50, capacity variation switching mechanism; 511, first branch; 512, first on-off valve; 513, second branch; 514, second on-off valve; 52, locking member; 53, elastic reset element; 54, pressure stabilizing branch; 60, mixer; 61, first air inlet; 62, mixer air outlet; 63, second air inlet; 70, first partition board; 71, first partition board cavity; 80, second partition board; 90, first flange; 91, first flange cavity; 92, first flange cover board; 100, enthalpy-increasing component; 200, a four-way valve; 300, first heat exchanger; 400, first throttling valve; 500, flash evaporator; 600, second throttling valve; 700, second heat exchanger; 800, dispenser; and 900, second flange.

Detailed Description of the Embodiments

[0017] present disclosure will be illustrated herein below with reference to the drawings and in conjunction with embodiments in detail.

[0018] It should be pointed out that the following detailed descriptions are exemplary and intended to provide a further illustration for the present application. Unless specified otherwise, all technical and scientific terms used herein have the same meanings as those usually understood by a person of ordinary skill in the art of the present application.

[0019] In the present disclosure, in case of no contrary illustrations, used nouns of locality such as "interior and exterior" refer to the interior and exterior of a profile of each component, but the above nouns of locality are not used to limit the present disclosure.

[0020] In order to solve the problems in the conventional art of poor heating capacity and low energy efficiency of a compressor due to the fact that the compressor cannot operate with capacity variation, the present disclosure provides a compressor and a heat exchange system. The heat exchange system comprises a compressor, and the compressor is the following compressor.

[0021] As shown in Fig. 1 and Fig. 2, the heat exchange system further comprises a four-way valve 200, a first heat exchanger 300, a first throttling valve 400, a flash evaporator 500, a second throttling valve 600, a second heat exchanger 700, a dispenser 800 and the following enthalpy-increasing component 100 or mixer 60, wherein an air outlet of the compressor is communicated with the four-way valve 200 via the four-way valve 200, the first heat exchanger 300, the first throttling valve 400, the flash evaporator 500, the second throttling valve 600 and the second heat exchanger 700, and the four-way valve 200 is also communicated with an air inlet of the compressor via the dispenser 800. The flash evaporator 500 is communicated with a cylinder of the compressor via the enthalpy-increasing component 100 or the mixer 60.

[0022] As shown in Fig. 1 and Fig. 2, the compressor comprises a crankshaft 10, and a first cylinder 20, a second cylinder 30 and a third cylinder 40 arranged sequentially in an axial direction of the crankshaft 10. The first cylinder 20 is a high-pressure cylinder, and the second cylinder 30 and the third cylinder 40 are low-pressure cylinders. The compressor is characterized by further comprising a capacity variation switching mechanism 50, the capacity variation switching mechanism 50 controlling unloading or loading of the third cylinder 40. The compressor has a full operation mode and a partial operation mode. When the compressor is in the full operation mode, the capacity variation switching mechanism 50 loads the third cylinder 40 under the action of the discharge pressure of the compressor, and when the compressor is in the partial operation mode, the capacity variation switching mechanism 50 unloads the third cylinder 40 under the action of the inlet pressure of the compressor.

[0023] It is important to note that the high-pressure cylinder mentioned above is a cylinder of which the inner pressure is higher than the pressure of the low-pressure cylinders, that is, air supplied by the low-pressure cylinders is compressed again in the high-pressure cylinder to generate secondarily-compressed air. Likewise, the low-pressure cylinders refer to cylinders of which the inner pressure is lower than the pressure of the high-pressure cylinder. The high pressure or low pressure here are relative to each other, and are irrelevant to value ranges of the high pressure and the low pressure.

[0024] By means of the capacity variation switching mechanism provided in the compressor, at least one cylinder is allowed to be put into use or unloaded under the action of the capacity variation switching mechanism 50, thus enabling a capacity variation switching function of the compressor to meet operational requirements of different operating conditions, to improve the heating capacity of the compressor under different working condi-

tions, and to effectively improve the comprehensive energy efficiency of the compressor. In a capacity variation switching mode, the compressor operates with different capacity and volume ratios under the working conditions of the full operation mode and the partial operation mode, so the compressor has the advantages of high adaptability to different working conditions and high comprehensive energy efficiency.

[0025] In preferable implementation manners as shown in Fig. 1 and Fig. 2, the capacity variation switching mechanism 50 is used to control loading or unloading of the third cylinder 40. Certainly, the capacity variation switching mechanism 50 may be alternatively used to control the second cylinder 30 (not shown in the figure).

[0026] As shown in Fig. 1 to Fig. 4, the capacity variation switching mechanism 50 comprises a pressure control portion and a locking member 52. The pressure control portion is selectively communicated with the air outlet of the compressor or the air inlet of the compressor; and the pressure control portion controls a cooperative relationship between the locking member 52 and a sliding sheet 41 of the third cylinder 40, when the pressure control portion is communicated with the air inlet of the compressor, the locking member 52 is locked to the sliding sheet 41 of the third cylinder 40 to make the third cylinder 40 unloaded, and when the pressure control portion is communicated with the air outlet of the compressor, the locking member 52 is unlocked with the sliding sheet 41 of the third cylinder 40 to make the third cylinder 40 loaded. Since the discharge pressure of the compressor is high whilst the inlet pressure of the compressor is low, the discharge pressure of the compressor makes the locking member 52 unlocked with the sliding sheet 41 of the third cylinder 40 under a state shown in Fig. 1, so that the third cylinder 40 is loaded, i.e., put into use, and in this case, the compressor achieves the full operation mode characterized by large displacement, small volume ratio and two-stage compression. Under a state shown in Fig. 2, the inlet pressure of the compressor makes the locking member 52 locked to the sliding sheet 41 of the third cylinder 40, so that the third cylinder 40 is unloaded, i.e., only idled without compression, and in this case, the compressor achieves the partial operation mode characterized by small displacement, large volume ratio and two-stage compression.

[0027] In preferable implementation manners as shown in Fig. 3 and Fig. 4, the capacity variation switching mechanism 50 further comprises an elastic reset element 53, a first end of the locking member 52 is unlocked with or locked to the sliding sheet 41, the elastic reset element 53 is provided at a second end, opposite to the first end, of the locking member 52, and the pressure control portion controls the pressure on the first end of the locking member 52. Due to the elastic reset element 53, a supporting force will be provided for the locking member 52 to make it move to one side of the sliding sheet 41 under the action of the elastic reset element 53. When the discharge pressure of the compressor applies work after overcoming the elastic reset element 53, the locking member 52 will be unlocked with the sliding sheet 41, so the compressor enters the full operation mode.

[0028] Preferably, the elastic reset element 53 is a spring.

[0029] The locking member 52 in the present disclosure is a pin with a head. When the head of the pin is clamped with a clamping groove of the sliding sheet 41, the two components are locked.

[0030] In order to further improve the pressure control over the locking member 52, the capacity variation switching mechanism 50 in the present disclosure further comprises a pressure stabilizing branch 54, the first end of the pressure stabilizing branch 54 is communicated with the air inlet of the compressor, and a second end of the pressure stabilizing branch 54 supplies pressure to the second end of the locking member 52 (see Fig. 1 and Fig. 2). Since the pressure stabilizing branch 54 always supplies the inlet pressure of the compressor to the second end of the locking member 52, it is ensured that the first end of the locking member 52 will be unlocked with the sliding sheet 41 under the action of the discharge pressure of the compressor, so the capacity variation switching mechanism 50 has the advantage of good controllability.

[0031] In preferable implementation manners as shown in Fig. 1 and Fig. 2, the pressure control portion comprises a first branch 511, a first on-off valve 512 for controlling on-off of the first branch 511, a second branch 513, and a second on-off valve 514 for controlling on-off of the second branch 513, wherein a first end of the first branch 511 is communicated with the air inlet of the compressor, and a second end of the first branch 511 controls the pressure on the first end of the locking member 52; the first on-off valve 512 is provided on the first branch 511; a first end of the second branch 513 is communicated with the air outlet of the compressor, and a second end of the second branch 513 controls the pressure on the first end of the locking member 52; and the second on-off valve 514 is provided on the second branch 513. The first branch 511 is configured to supply the discharge pressure of the compressor to the locking member 52, and the second branch 513 is configured to supply the discharge pressure of the compressor to the locking member 52, thus switching unlocking or locking of the locking member 52 and the sliding sheet 41.

[0032] It is important to note that dotted lines in the figures represent that the on-off valve corresponding to the branch is in an off state and the branch is not communicated.

[0033] According to difference between air supply components, there are two specific implementation manners. According to the invention, the compressor adopts the mixer 60, and according to an example not forming part of the claimed invention, the compressor adopts the enthalpy-increasing component 100. The two specific implementation manners will be introduced herein below respectively. According to the invention, as shown in Fig.

5 to Fig. 14, the compressor further comprises the mixer 600, a first air inlet 61 of the mixer 60 is communicated with an air outlet of the second cylinder 30, a mixer air outlet 62 of the mixer 60 is communicated with an air inlet of the first cylinder 20, and a second air inlet 63 of the mixer 60 is an air supply port. As above, the flash evaporator 500 is connected to the second air inlet 63 of the mixer 60.

[0034] As shown in Fig. 5, the mixer 60 is provided outside a housing 11 of the compressor. Thus, the mixer 60 is prevented from occupying an internal space of the compressor to achieve a reasonable layout there between.

[0035] As shown in Fig. 6, an upper cover assembly 12 and a lower cover 13 are further provided at two ends of the housing 11. The compressor further comprises a stator assembly 14, a rotor assembly 15 provided in the stator assembly 14, a first roller 21 provided in the first cylinder 20, a second roller 33 provided in the second cylinder 30, a third roller 43 provided in the third cylinder 40, and a third partition board 16 provided between the second cylinder 30 and the first cylinder 20.

[0036] As shown in Fig. 6, the compressor further comprises a second flange 900, the second flange 900 being provided on one side, away from the second cylinder 30, of the first cylinder 20.

[0037] As shown in Fig. 6, the compressor further comprises a first partition board 70, the first partition board 70 being provided between the second cylinder 30 and the third cylinder 40. The compressor in the present embodiment adopts a structure that air is discharged under the second cylinder 30 and the mixer 60 (filled with a medium pressure refrigerant) is external, and a flow channel for the medium pressure refrigerant, discharged from the low-pressure cylinder, to absorb air from the high-pressure cylinder consists of external pipelines.

[0038] As shown in Fig. 7, Fig. 9 and Fig. 10, the first partition board 70 is provided with a first partition board cavity 71 communicated with the exhaust port of the second cylinder 30, the second cylinder 30 is further provided with an external communication port 31 communicated with the first partition board cavity 71, the first air inlet 61 of the mixer 60 is communicated with the first partition board cavity 71 via the external communication port 31.

[0039] As shown in Fig. 8 to Fig. 14, the third cylinder 40 is provided with a first middle flow channel 42 isolated from a compression chamber of the third cylinder 40. The compressor further comprises a second partition board 80 and a first flange 90, wherein the second partition board 80 is provided between the first partition board 70 and the third cylinder 40, and the second partition board 80 is further provided with a second partition board communication hole communicating the first middle flow channel 42 of the third cylinder 40 with the first partition board cavity 71; and the first flange 90 is provided on one side, away from the second cylinder 30, of the third cylinder 40, the first flange 90 is provided with a first flange cavity 91, and the first flange cavity 91 is communicated with the exhaust port of the third cylinder 40 and the first middle flow channel 42 separately.

[0040] Herein, the second partition board 80, the first partition board 70 and the second cylinder 30 enable the first partition board cavity 71 to form a refrigerant accommodating cavity for accommodating air discharged from the second cylinder 30.

[0041] As shown in Fig. 6, the compressor further comprises a first flange cover board 92, the first flange 90 being sandwiched between the third cylinder 40 and the first flange cover board 92, such that the first flange cavity 91 forms a refrigerant accommodating cavity for accommodating air discharged from the third cylinder 40.

[0042] Besides, an internal flow channel of the refrigerant is provided on the third cylinder 40, the first flange 90, the second partition board 80, the second cylinder 30 and the first partition board 70. A capacity variation pressure control channel 44 of the capacity variation switching mechanism 50 of the compressor is provided on the third cylinder 40, the first flange 90 and the first flange cover board 92.

[0043] As shown in Fig. 14, the third cylinder 40, the first flange 90 and the first flange cover board 92 are provided with the capacity variation pressure control channel 44 (controlling the pressures on the first end and the second end of the locking member 52) separately.

[0044] When the compressor is in the partial operation mode, the air inlet of the second cylinder 30, the exhaust port of the second cylinder 30, the first partition board cavity 71, the external communication hole 31 of the second cylinder 30, the mixer 60, the air inlet of the first cylinder 20 and the exhaust port of the first cylinder 20 are communicated sequentially. In this case, the first on-off valve 512 is switched on, the second on-off valve 514 is switched off, and the compressor operates in a small-displacement large-volume-ratio dual-cylinder two-stage mode. Refrigerant air supplied by the dispenser 800 is fed into the second cylinder 30, and the refrigerant air compressed for the first time is discharged out to the first partition board cavity 71, and then enters the mixer 60 through the external communication hole 31 of the second cylinder 30. Meanwhile, air supplied from one side of the flash evaporator 500 is charged into the second air inlet 63 of the mixer 60, mixed with the air in the mixer 60, fed into the first cylinder 20 together for second-time compression, discharged out to an upper space of the housing 11, and then discharged from a discharge pipe of the upper cover assembly 12, and thus far, the compressor completes the whole compressor process of the refrigerant.

[0045] When the compressor is in the full operation mode, the air inlet of the second cylinder 30, the exhaust port of the second cylinder 30, the first partition board cavity 71, the external communication port 31 of the second cylinder 30, the mixer 60, the air inlet of the first cylinder 20 and the exhaust port of the first cylinder 20 are communicated sequentially, and the air inlet of the third cylinder 40 is communicated with the first partition

board cavity 71 via the exhaust port of the third cylinder 40, the first flange cavity 91, the first middle flow channel 42 and the second partition board communication hole. In this case, the second on-off valve 514 is switched on, the first on-off valve 512 is switched off, and the compressor operates in a large-displacement small-volume-ratio three-cylinder two-stage mode. Refrigerant air supplied by the dispenser 800 is fed into the second cylinder 30, and the refrigerant air compressed for the first time is discharged out to the first partition board cavity 71. Meanwhile, a refrigerant supplied by the dispenser 800 is fed into the third cylinder 40, the refrigerant air compressed for the first time is discharged out to the flange cavity 91, and the refrigerant air in the first flange cavity 91 enters the mixer 60 through the first flange 90, the second partition board 80, the first partition board cavity 71 and the external communication port 31 of the second cylinder 30. Meanwhile, air supplied from one side of the flash evaporator 500 is charged into the second air inlet 63 of the mixer 60, mixed with the air in the mixer 60, fed into the first cylinder 20 together for second-time compression, discharged out to an upper space of the housing 11, and then discharged from a discharge pipe of the upper cover assembly 12, and thus far, the compressor completes the whole compressor process of the refrigerant. According to an example not forming part of the claimed invention, as shown in Fig. 15 to Fig. 21, the compressor further comprises an enthalpy-increasing component 100, the enthalpy-increasing component 100 being communicated with the air inlet of the first cylinder 20. As above, the flash evaporator 500 is connected to the enthalpy-increasing component 100. As shown in Fig. 16, an upper cover assembly 12 and a lower cover 13 are further provided at two ends of the housing 11. The compressor further comprises a stator assembly 14, a rotor assembly 15 provided in the stator assembly 14, a first roller 21 provided in the first cylinder 20, a second roller 33 provided in the second cylinder 30, and a third roller 43 provided in the third cylinder 40.

[0046] As shown in Fig. 16, the compressor further comprises a first partition board 70 and a third partition board 16, wherein the first partition board 70 is provided between the second cylinder 30 and the first cylinder 20; and the third partition board 16 is provided between the first cylinder 20 and the first partition board 70. The compressor in the present embodiment adopts a structure that air is discharged on the second cylinder 30, medium pressure refrigerant flow channels are provided inside the housing 11 and are located on the third cylinder 40, the first flange 90, the second partition board 80, the second cylinder 30, the first partition board 70 and the third partition board 16 respectively. A capacity variation pressure control channel 44 (controlling the pressures on the first end and the second end of the locking member 52) are provided on the third cylinder 40, the first flange 90 and the first flange cover board 92 separately.

[0047] As shown in Fig. 16, the compressor further comprises a second flange 900, the second flange 900 being provided on one side, away from the second cylinder 30, of the first cylinder 20.

[0048] As shown in Fig. 16, Fig. 19 and Fig. 20, the third partition board 16 is provided with a third partition board communication hole, the first partition board 70 is provided with a first partition board cavity 71 communicated with the air outlet of the second cylinder 30, the first partition board cavity 71 is communicated with the air inlet of the first cylinder 20 via the third partition board communication hole

[0049] As shown in Fig. 17 to Fig. 21, the third cylinder 40 is provided with a first middle flow channel 42 isolated from a compression chamber of the third cylinder 40, the second cylinder 30 is further provided with a second middle flow channel 32 isolated from a compression chamber of the second cylinder 30, and the second middle flow channel 32 is communicated with the first partition board cavity 71. The compressor further comprises a second partition board 80 and a first flange 90, wherein the second partition board 80 is provided between the second cylinder 30 and the third cylinder 40, and the second partition board 80 is further provided with a second partition board communication hole communicating the first middle flow channel 42 of the third cylinder 40 with the second middle flow channel 32 of the second cylinder 30; and the first flange 90 is provided on one side, away from the second cylinder 30, of the third cylinder 40, the first flange 90 is provided with a first flange cavity 91, and the first flange cavity 91 is communicated with the air outlet of the third cylinder 40 and the first middle flow channel 42 separately

[0050] Herein, the first partition board 70, the third partition board 16 and the second cylinder 30 enable the first partition board cavity 71 to form a refrigerant accommodating cavity for accommodating air discharged from the second cylinder 30. The first flange 90, the third cylinder 40 and the first flange cover board 92 enable the first flange cavity 91 to form a refrigerant accommodating cavity for accommodating air discharged from the third cylinder 40.

[0051] When the compressor is in the partial operation mode, the air inlet of the second cylinder 30, the exhaust port of the second cylinder 30, the first partition board cavity 71, the third partition board communication hole, the air inlet of the first cylinder 20 and the exhaust port of the first cylinder 20 are communicated sequentially. In this case, the second on-off valve 514 is switched off, the first on-off valve 512 is switched on, and the compressor operates in a small-displacement large-volume-ratio dual-cylinder two-stage mode. Refrigerant air supplied by the dispenser 800 is fed into the second cylinder 30, and the refrigerant air compressed for the first time is discharged out to the first partition board cavity 71, fed into the first cylinder 20 together with air supplied from one side of the enthalpy-increasing component 100 for second-time compression, discharged out to an upper space of the housing 11, and then discharged from a discharge pipe of the upper cover assembly 12, and thus

far, the compressor completes the whole compressor process of the refrigerant.

[0052] When the compressor is in the full operation mode, the air inlet of the second cylinder 30, the exhaust port of the second cylinder 30, the first partition board cavity 71, the air inlet of the first cylinder 20 and the exhaust port of the first cylinder 20 are communicated sequentially, and the air inlet of the third cylinder 40 is communicated with the first partition board cavity 71 via the exhaust port of the third cylinder 40, the first flange cavity 91, the first middle flow channel 42, the second partition board communication hole and the second middle flow channel 32. In this case, the second on-off valve 514 is switched on, the first on-off valve 512 is switched off, and the compressor operates in a large-displacement small-volume-ratio three-cylinder two-stage mode. Refrigerant air supplied by the dispenser 800 is fed into the second cylinder 30, and the refrigerant air compressed for the first time is discharged out to the first partition board cavity 71. Meanwhile, a refrigerant supplied by the dispenser 800 is fed into the third cylinder 40, the refrigerant air compressed for the first time is discharged out to the flange cavity 91, and the refrigerant air in the first flange cavity 91 is fed into the first partition board cavity 71 through the first flange 90 and the second partition board 80. In this case, the air in the first partition board cavity 71 and the air supplied from one side of the enthalpy-increasing component 100 are fed together into the first cylinder 20 for second-time compression, discharged out to an upper space of the housing 11, and then discharged from a discharge pipe of the upper cover assembly 12, and thus far, the compressor completes the whole compressor process of the refrigerant.

[0053] It is important to note that terms used herein only aim to describe specific implementation manners, and are not intended to limit exemplar implementation manners of the present application. For example, unless otherwise directed by the context, singular forms of terms used herein are intended to comprise plural forms. Besides, it will be also appreciated that when terms 'contain' and/or 'comprise' are used in the description, it is pointed out that features, steps, operations, devices, assemblies and/or a combination thereof exist.

[0054] It is important to note that the specification and claims of the present application and terms 'first', 'second', etc. in the foregoing drawings are used for distinguishing similar objects rather than describing a specific sequence or a precedence order. It will be appreciated that the terms used in such a way may be exchanged under appropriate conditions, in order that the implementation manner of the present disclosure described here can be implemented in a sequence other than sequences graphically shown or described here.

Claims

1. A compressor, comprising a crankshaft (10), and a first cylinder (20), a second cylinder (30) and a third cylinder (40) arranged sequentially in an axial direction of the crankshaft (10), the first cylinder (20) being a high-pressure cylinder, and the second cylinder (30) and the third cylinder (40) being low-pressure cylinders, wherein the compressor also comprises a capacity variation switching mechanism (50), the capacity variation switching mechanism (50) controls unloading or loading of the third cylinder (30), and the compressor has a full operation mode and a partial operation mode;

when the compressor is in the full operation mode, the capacity variation switching mechanism (50) loads the third cylinder (40) under the action of the discharge pressure of the compressor; and

when the compressor is in the partial operation mode, the capacity variation switching mechanism (50) unloads the third cylinder (40) under the action of the inlet pressure of the compressor;

the compressor further comprising a mixer (60), wherein a first air inlet (61) of the mixer (60) is communicated with an air outlet of the second cylinder (30), a mixer air outlet (62) of the mixer (60) is communicated with an air inlet of the first cylinder (20), and a second air inlet (63) of the mixer (60) is an air supply port;

the compressor further comprising a first partition board (70), the first partition board (70) being provided between the second cylinder (30) and the third cylinder (40);

characterised in that

the first partition board (70) is provided with a first partition board cavity (71) communicated with the air outlet of the second cylinder (30), the second cylinder (30) is further provided with an external communication port (31) communicated with the first partition board cavity (71), the first air inlet (61) of the mixer (60) is communicated with the first partition board cavity (71) via the external communication port (31), and when the compressor is in the partial operation mode, an air inlet of the second cylinder (30), the air outlet of the second cylinder (30), the first partition board cavity (71), the external communication port (31) of the second cylinder (30), the mixer (60), the air inlet of the first cylinder (20) and an air outlet of the first cylinder (20) are communicated sequentially, the third cylinder (40) is provided with a first middle flow channel (42) isolated from a compression chamber of the third cylinder (40), and the compressor further comprises:

a second partition board (80), the second partition board (80) being provided between the first partition board (70) and the third cylinder (40), and the second partition board (80) being further provided with a second partition board communication hole communicating the first middle flow channel (42) of the third cylinder (40) with the first partition board cavity (71); and
a first flange (90), the first flange (90) being provided on one side, away from the second cylinder (30), of the third cylinder (40), the first flange (90) being provided with a first flange cavity (91), and the first flange cavity (91) being communicated with an air outlet of the third cylinder (40) and the first middle flow channel (42) separately, wherein when the compressor is in the full operation mode, the air inlet of the second cylinder (30), the air outlet of the second cylinder (30), the first partition board cavity (71), the external communication port (31) of the second cylinder (30), the mixer (60), the air inlet of the first cylinder (20) and the air outlet of the first cylinder (20) are communicated sequentially, and the air inlet of the third cylinder (40) is communicated with the first partition board cavity (71) via the air outlet of the third cylinder (40), the first flange cavity (91), the first middle flow channel (42) and the second partition board communication hole.

2. The compressor as claimed in claim 1, wherein the capacity variation switching mechanism (50) comprises:

a pressure control portion, the pressure control portion being selectively communicated with an air outlet of the compressor or an air inlet of the compressor; and
a locking member (52), the pressure control portion controlling a cooperative relationship between the locking member (52) and a sliding sheet (41) of the third cylinder (40), wherein when the pressure control portion is communicated with the air inlet of the compressor, the locking member (52) is locked to the sliding sheet (41) of the third cylinder (40) to make the third cylinder (40) unloaded, and when the pressure control portion is communicated with the air outlet of the compressor, the locking member (52) is unlocked with the sliding sheet (41) of the third cylinder (40) to make the third cylinder (40) loaded.

3. The compressor as claimed in claim 2, wherein the capacity variation switching mechanism (50) further comprises an elastic reset element (53), a first end of the locking member (52) is unlocked with or locked to the sliding sheet (41), the elastic reset element (53) is provided at a second end, opposite to the first end, of the locking member (52), and the pressure control portion controls the pressure on the first end of the locking member (52).

4. The compressor as claimed in claim 3, wherein the capacity variation switching mechanism (50) further comprises a pressure stabilizing branch (54), the first end of the pressure stabilizing branch (54) is communicated with the air inlet of the compressor, and a second end of the pressure stabilizing branch (54) supplies pressure to the second end of the locking member (52).

5. The compressor as claimed in claim 3, wherein the pressure control portion comprises:

a first branch (511), a first end of the first branch (511) being communicated with the air inlet of the compressor, and a second end of the first branch (511) controlling the pressure on the first end of the locking member (52);
a first on-off valve (512) for controlling on-off of the first branch (511), the first on-off valve (512) being provided on the first branch (511);
a second branch (513), a first end of the second branch (513) being communicated with the air outlet of the compressor, and a second end of the second branch (513) controlling the pressure on the first end of the locking member (52); and
a second on-off valve (514) for controlling on-off of the second branch (513), the second on-off valve (514) being provided on the second branch (513).

Patentansprüche

1. Ein Verdichter, der eine Kurbelwelle (10) und einen ersten Zylinder (20), einen zweiten Zylinder (30) und einen dritten Zylinder (40) umfasst, sequentiell in einer axialen Richtung der Kurbelwelle (10) angeordnet; wobei der erste Zylinder (20) ein Hochdruckzylinder ist und der zweite (30) und der dritte Zylinder (40) Niederdruckzylinder sind, wobei der Verdichter außerdem einen Schaltmechanismus (50) zur Veränderung der Fördermenge umfasst; der Schaltmechanismus (50) zur Veränderung der Fördermenge steuert die Belastung oder Entlastung des dritten Zylinders (30), und der Verdichter hat einen Vollbetriebsmodus und einen Teilbetriebsmodus;

wenn der Verdichter im Vollbetriebsmodus ist, belastet der Schaltmechanismus (50) zur Veränderung der Fördermenge den dritten Zylinder (40) unter der Wirkung des Verdichtungsdrucks des Verdichters; und
wenn der Verdichter im Teilbetriebsmodus ist,

entlastet der Schaltmechanismus (50) zur Veränderung der Fördermenge den dritten Zylinder (40) unter der Wirkung des Primärdrucks des Verdichters;

wobei der Verdichter weiter einen Mischer (60) umfasst, wobei ein erster Lufteinlass (61) des Mischers (60) mit einem Luftauslass des zweiten Zylinders (30) in Austausch steht, ein Mischer-Luftauslass (62) des Mischers (60) mit einem Lufteinlass des ersten Zylinders (20) in Austausch steht und ein zweiter Lufteinlass (63) des Mischers (60) ein Luftversorgungsanschluss ist;

wobei der Verdichter weiter eine erste Trennscheibe (70) umfasst, wobei die erste Trennscheibe (70) zwischen dem zweiten Zylinder (30) und dem dritten Zylinder (40) angebracht ist;

dadurch gekennzeichnet, dass

die erste Trennscheibe (70) mit einer ersten Trennscheibenvertiefung (71) versehen ist, die mit dem Luftauslass des zweiten Zylinders (30) in Austausch steht, wobei der zweite Zylinder (30) weiter mit einer äußeren Austauschöffnung (31) versehen ist, die mit der ersten Trennscheibenvertiefung (71) in Austausch steht, der erste Lufteinlass (61) des Mischers (60) über die äußere Austauschöffnung (31) mit der ersten Trennscheibenvertiefung (71) in Austausch steht und, wenn der Verdichter im Teilbetriebsmodus ist, Austausch nacheinander mit einem Lufteinlass des zweiten Zylinders (30), dem Luftauslass des zweiten Zylinders (30), der ersten Trennscheibenvertiefung (71), der äußeren Austauschöffnung (31) des zweiten Zylinders (30), dem Mischer (60), dem Lufteinlass des ersten Zylinders (20) und einem Luftauslass des ersten Zylinders (20) hergestellt wird, der dritte Zylinder (40) mit einem ersten mittleren Strömungskanal (42) ausgestattet ist, der von einer Kompressionskammer des dritten Zylinders (40) isoliert ist, und der Verdichter weiter Folgendes umfasst:

eine zweite Trennscheibe (80), wobei die zweite Trennscheibe (80) zwischen der ersten Trennscheibe (70) und dem dritten Zylinder (40) angebracht ist und die zweite Trennscheibe (80) weiter mit einem zweiten Trennscheibenaustauschloch versehen ist, welches den ersten mittleren Strömungskanal (42) des dritten Zylinders (40) mit der ersten Trennscheibenvertiefung (71) verbindet; und

einen ersten Flansch (90), wobei der erste Flansch (90) an einer dem zweiten Zylinder (30) abgewandten Seite des dritten Zylinders (40) angebracht ist, wobei der erste Flansch (90) mit einer ersten Flanschvertiefung (91) versehen ist und die erste Flanschvertiefung (91) separat mit einem Luftauslass des dritten Zylinders (40) und dem ersten mittleren Strömungskanal (42) in Austausch steht; wobei, wenn der Verdichter im Vollbetriebsmodus ist, sequentiell ein Austausch mit dem Lufteinlass des zweiten Zylinders (30), dem Luftauslass des zweiten Zylinders (30), der ersten Trennscheibenvertiefung (71), der äußeren Austauschöffnung (31) des zweiten Zylinders (30), dem Mischer (60), dem Lufteinlass des ersten Zylinders (20) und dem Luftauslass des ersten Zylinders (20) hergestellt wird und ein Austausch zwischen dem Lufteinlass des dritten Zylinders (40) und der ersten Trennscheibenvertiefung (71) über den Luftauslass des dritten Zylinders (40), die erste Flanschvertiefung (91), den ersten mittleren Strömungskanal (42) und das zweite Trennscheibenaustauschloch hergestellt wird.

2. Der Verdichter gemäß Anspruch 1, wobei der Schaltmechanismus (50) zur Veränderung der Fördermenge Folgendes umfasst:

einen Druckkontrollbereich, der wahlweise in Austausch mit einem Luftauslass des Verdichters oder einem Lufteinlass des Verdichters gebracht wird; und

ein Arretierglied (52), wobei der Druckkontrollbereich eine Zusammenwirkungsbeziehung zwischen dem Arretierglied (52) und einer Gleitschicht (41) des dritten Zylinders (40) steuert, wobei, wenn der Druckkontrollbereich mit dem Lufteinlass des Verdichters in Austausch steht, das Arretierglied (52) mit der Gleitschicht (41) des dritten Zylinders (40) verblockt ist, um die Belastung vom dritten Zylinder (40) zu nehmen, und wenn der Druckkontrollbereich mit dem Luftauslass des Verdichters in Austausch steht, das Arretierglied (52) mit der Gleitschicht (41) des dritten Zylinders (40) nicht verblockt ist, um den dritten Zylinder (40) zu belasten.

3. Der Verdichter gemäß Anspruch 2, wobei der Schaltmechanismus (50) zur Veränderung der Fördermenge weiter ein elastisches Rückstellelement (53) umfasst, ein erstes Ende des Arretierglieds (52) mit der Gleitschicht (41) verblockt oder nicht verblockt ist, das elastische Rückstellelement (53) an einem zweiten Ende, gegenüber dem ersten Ende, des Arretierglieds (52) angebracht ist und der Druckkontrollbereich den Druck auf das erste Ende des Arretierglieds (52) steuert.

4. Der Verdichter gemäß Anspruch 3, wobei der Schaltmechanismus (50) zur Veränderung der Fördermenge weiter einen Druckstabilisierungszweig (54) umfasst, das erste Ende des Druckstabilisierungszweigs (54) mit dem Lufteinlass des Verdichters in Austausch steht und ein zweites Ende des Druckstabilisierungszweigs (54) das zweite Ende des Arretierglieds (52) mit Druck beaufschlagt.

5. Der Verdichter gemäß Anspruch 3, wobei der Druckkontrollbereich Folgendes umfasst:
einen ersten Zweig (511), wobei ein erstes Ende des ersten Zweigs (511) mit dem Lufteinlass des Verdichters in Austausch steht und ein zweites Ende des ersten Zweigs (511) den Druck auf das erste Ende des Arretierglieds (52) steuert;

ein erstes Schaltventil (512) zum Steuern des Ein- /Ausschaltens des ersten Zweigs (511), wobei das erste Schaltventil (512) an dem ersten Zweig (511) angebracht ist;
einen zweiten Zweig (513), wobei ein erstes Ende des zweiten Zweigs (513) mit dem Luftauslass des Verdichters in Austausch steht und ein zweites Ende des zweiten Zweigs (513) den Druck auf das erste Ende des Arretierglieds (52) steuert; und
ein zweites Schaltventil (514) zum Steuern des Ein- /Ausschaltens des zweiten Zweigs (513), wobei das zweite Schaltventil (514) am zweiten Zweig (513) angebracht ist.

Revendications

1. Compresseur comprenant un vilebrequin (10) et un premier cylindre (20), un deuxième cylindre (30) et un troisième cylindre (40) disposés séquentiellement dans une direction axiale du vilebrequin (10), le premier cylindre (20) étant un cylindre à haute pression, et le deuxième cylindre (30) et le troisième cylindre (40) étant des cylindres à basse pression, dans lequel le compresseur comprend aussi un mécanisme de commutation de variation de la capacité (50), le mécanisme de commutation de variation de la capacité (50) commande la décharge ou la charge du troisième cylindre (30), et le compresseur a un mode de fonctionnement complet et un mode de fonctionnement partiel ;

quand le compresseur est dans le mode de fonctionnement complet, le mécanisme de commutation de variation de la capacité (50) charge le troisième cylindre (40) sous l'action de la pression de décharge du compresseur ; et
quand le compresseur est dans le mode de fonctionnement partiel, le mécanisme de commutation de variation de la capacité (50) décharge le troisième cylindre (40) sous l'action de la pression d'entrée du compresseur ;
le compresseur comprenant en outre un mélangeur (60), dans lequel une première entrée d'air (61) du mélangeur (60) est mise en communication avec une sortie d'air du deuxième cylindre (30), une sortie d'air de mélangeur (62) du mélangeur (60) est mise en communication avec une entrée d'air du premier cylindre (20), et une deuxième entrée d'air (63) du mélangeur (60) est un orifice d'alimentation en air ;
le compresseur comprenant en outre une première cloison de séparation (70), la première cloison de séparation (70) étant placée entre le deuxième cylindre (30) et le troisième cylindre (40) ;
caractérisé en ce que :
la première cloison de séparation (70) est pourvue d'une cavité de première cloison de séparation (71) mise en communication avec la sortie d'air du deuxième cylindre (30), le deuxième cylindre (30) est en outre pourvu d'un orifice de communication externe (31) qui communique avec la cavité de première cloison de séparation (71), la première entrée d'air (61) du mélangeur (60) est mise en communication avec la cavité de première cloison de séparation (71) via l'orifice de communication externe (31), et quand le compresseur est dans le mode de fonctionnement partiel, une entrée d'air du deuxième cylindre (30), la sortie d'air du deuxième cylindre (30), la cavité de première cloison de séparation (71), l'orifice de communication externe (31) du deuxième cylindre (30), le mélangeur (60), l'entrée d'air du premier cylindre (20) et une sortie d'air du premier cylindre (20) sont mis en communication séquentiellement, le troisième cylindre (40) est pourvu d'un premier canal d'écoulement médian (42) isolé par rapport à une chambre de compression du troisième cylindre (40), et le compresseur comprend en outre :

une deuxième cloison de séparation (80), la deuxième cloison de séparation (80) étant placée entre la première cloison de séparation (70) et le troisième cylindre (40), et la deuxième cloison de séparation (80) étant en outre pourvue d'un trou de communication de deuxième cloison de séparation qui fait communiquer le premier canal d'écoulement médian (42) du troisième cylindre (40) avec la cavité de première cloison de séparation (71) ; et
une première bride (90), la première bride (90) étant placée sur un côté, distant du deuxième cylindre (30), du troisième cylindre (40), la première bride (90) étant pourvue d'une cavité de première bride (91), et

la cavité de première bride (91) étant mise en communication avec une sortie d'air du troisième cylindre (40) et le premier canal d'écoulement médian (42) séparément, dans lequel quand le compresseur est dans le mode de fonctionnement complet, l'entrée d'air du deuxième cylindre (30), la sortie d'air du deuxième cylindre (30), la cavité de première cloison de séparation (71), l'orifice de communication externe (31) du deuxième cylindre (30), le mélangeur (60), l'entrée d'air du premier cylindre (20) et la sortie d'air du premier cylindre (20) sont mis en communication séquentiellement, et l'entrée d'air du troisième cylindre (40) est mise en communication avec la cavité de première cloison de séparation (71) via la sortie d'air du troisième cylindre (40), la cavité de première bride (91), le premier canal d'écoulement médian (42) et le trou de communication de deuxième cloison de séparation.

2. Compresseur selon la revendication 1, dans lequel le mécanisme de commutation de variation de la capacité (50) comprend :

une partie commande de pression, la partie commande de pression étant sélectivement mise en communication avec une sortie d'air du compresseur ou une entrée d'air du compresseur ; et
un élément de blocage (52), la partie commande de pression comandant une relation de coopération entre l'élément de blocage (52) et une feuille coulissante (41) du troisième cylindre (40), dans lequel quand la partie commande de pression est mise en communication avec l'entrée d'air du compresseur, l'élément de blocage (52) est bloqué sur la feuille coulissante (41) du troisième cylindre (40) pour décharger le troisième cylindre (40), et quand la partie commande de pression est mise en communication avec la sortie d'air du compresseur, l'élément de blocage (52) est débloqué avec la feuille coulissante (41) du troisième cylindre (40) pour que le troisième cylindre (40) soit chargé.

3. Compresseur selon la revendication 2, dans lequel le mécanisme de commutation de variation de la capacité (50) comprend en outre un élément de réinitialisation élastique (53), une première extrémité de l'élément de blocage (52) est débloquée ou bloquée sur la feuille coulissante (41), l'élément de réinitialisation élastique (53) est placé à une deuxième extrémité, à l'opposé de la première extrémité, de l'élément de blocage (52), et la partie commande de pression règle la pression sur la première extrémité de l'élément de blocage (52).

4. Compresseur selon la revendication 3, dans lequel le mécanisme de commutation de variation de la capacité (50) comprend en outre une branche de stabilisation de la pression (54), la première extrémité de la branche de stabilisation de la pression (54) est mise en communication avec l'entrée d'air du compresseur, et une deuxième extrémité de la branche de stabilisation de la pression (54) fournit de la pression à la deuxième extrémité de l'élément de blocage (52).

5. Compresseur selon la revendication 3, dans lequel la partie commande de pression comprend :

une première branche (511), une première extrémité de la première branche (511) étant mise en communication avec l'entrée d'air du compresseur, et une deuxième extrémité de la première branche (511) réglant la pression sur la première extrémité de l'élément de blocage (52) ;
une première vanne de marche-arrêt (512) pour commander la marche et l'arrêt de la première branche (511), la première vanne de marche-arrêt (512) étant placée sur la première branche (511) ;
une deuxième branche (513), une première extrémité de la deuxième branche (513) étant mise en communication avec la sortie d'air du compresseur, et une deuxième extrémité de la deuxième branche (513) réglant la pression sur la première extrémité de l'élément de blocage (52) ; et
une deuxième vanne de marche-arrêt (514) pour commander la marche et l'arrêt de la deuxième branche (513), la deuxième vanne de marche-arrêt (514) étant placée sur la deuxième branche (513).

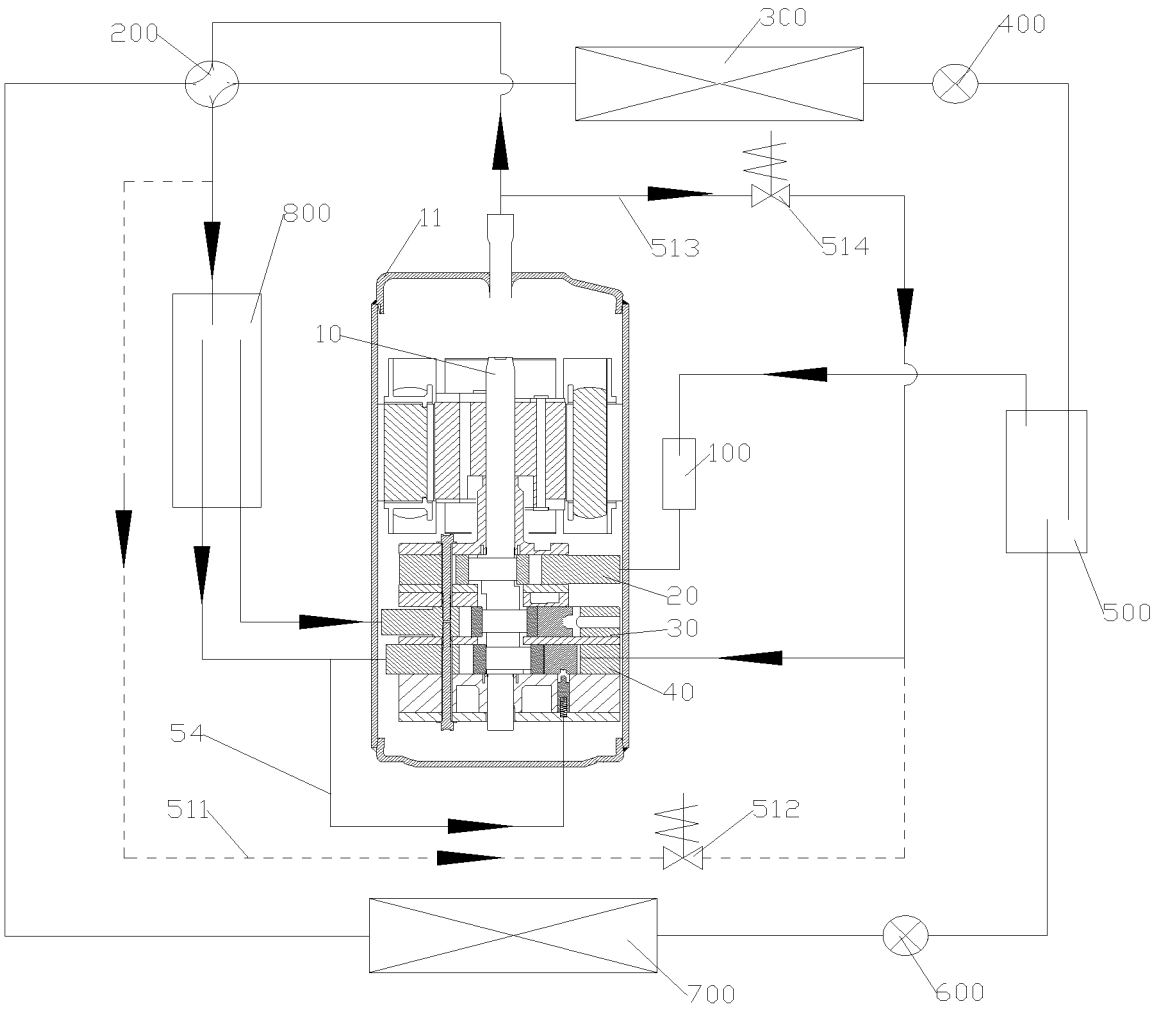

Fig.1

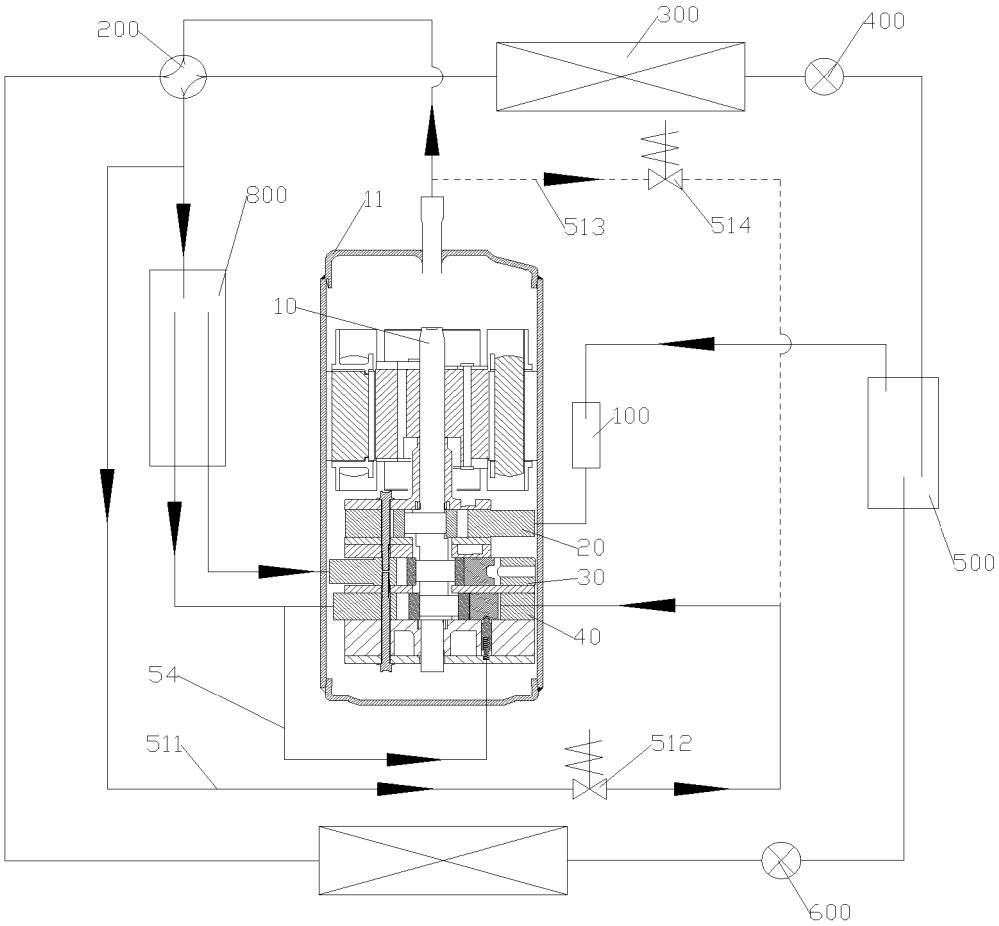
200
300
400
800
11
513
514
10
100
20
30
40
500
54
511
512
600

Fig.2

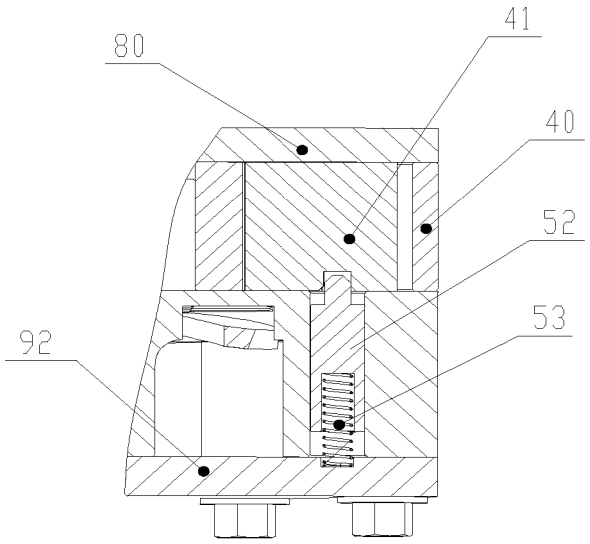
41
80
40
52
53
92

Fig.3

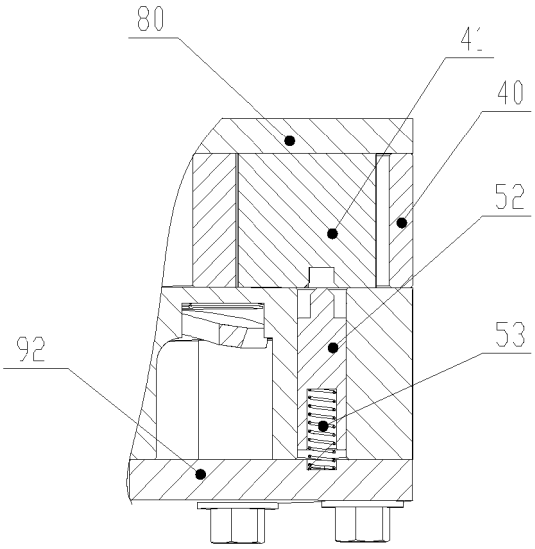

Fig.4

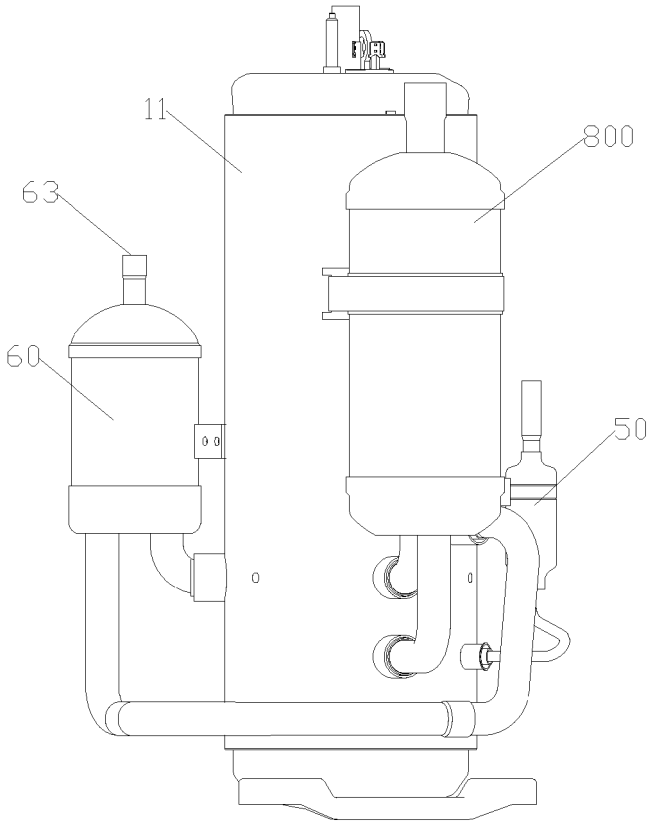

Fig.5

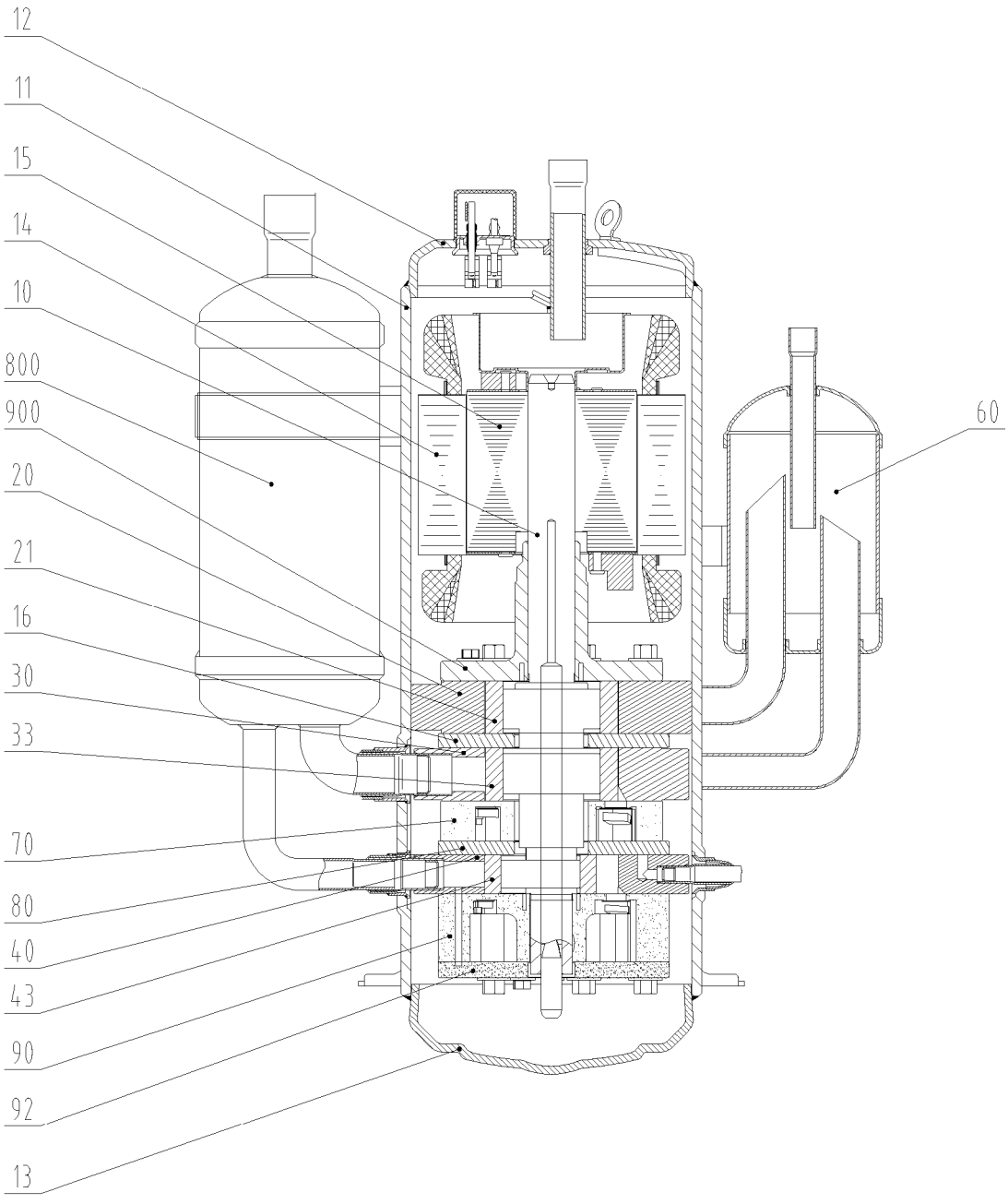

Fig.6

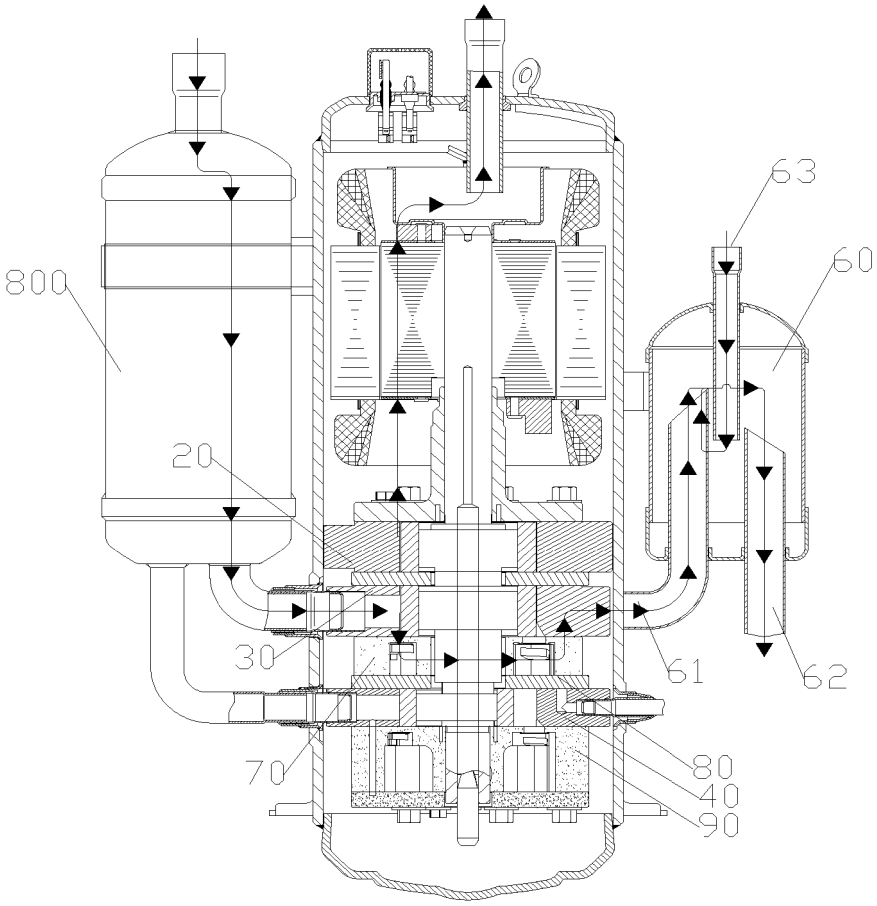

Fig.7

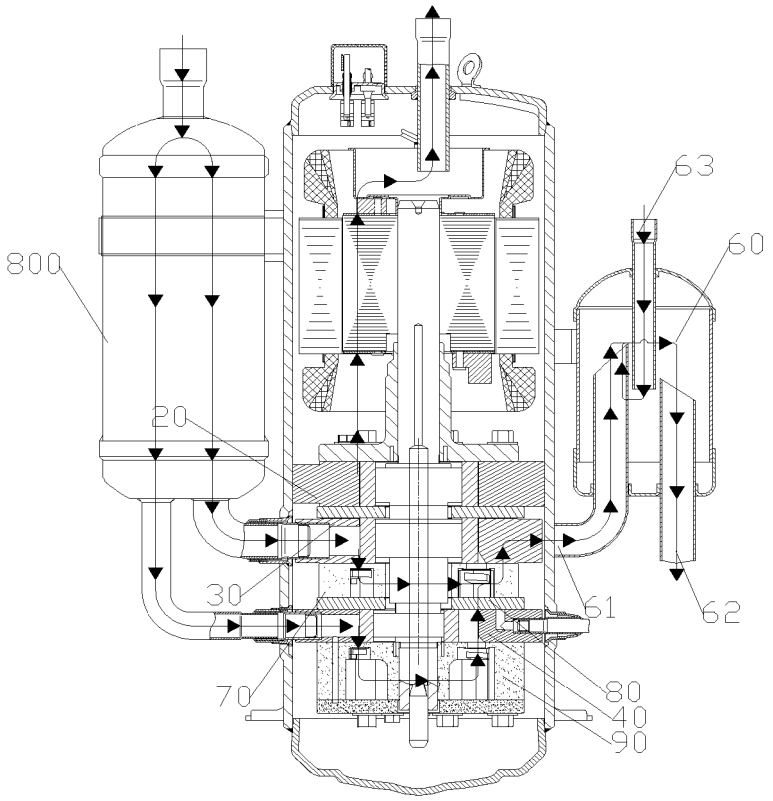

Fig.8

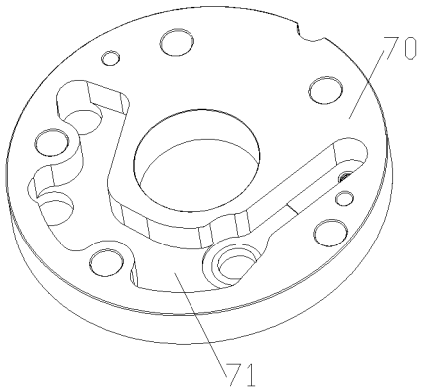

Fig.9

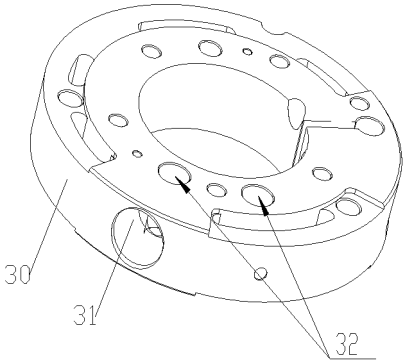

Fig.10

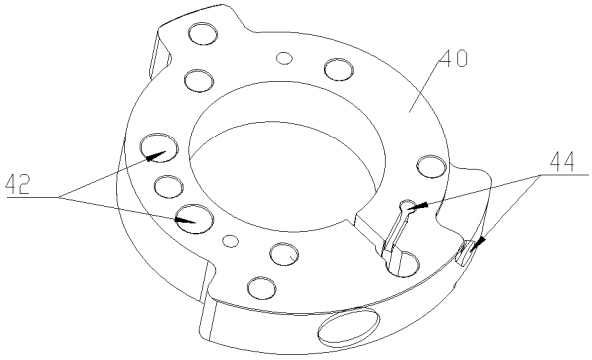

Fig.11

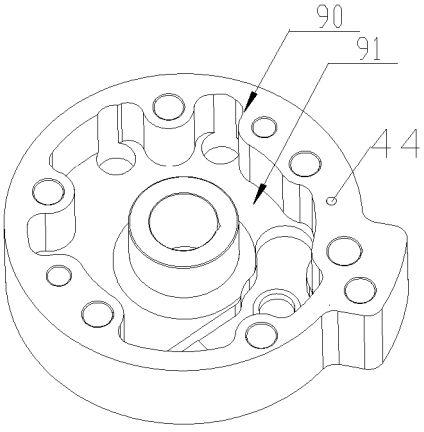

Fig.12

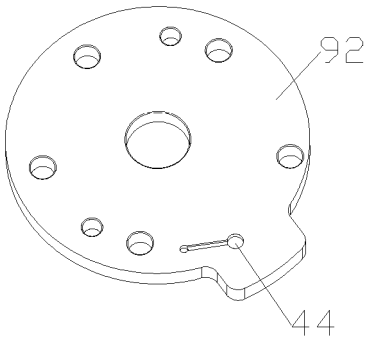

Fig.13

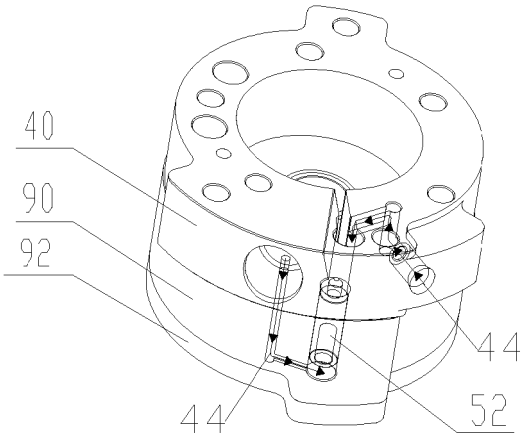

Fig.14

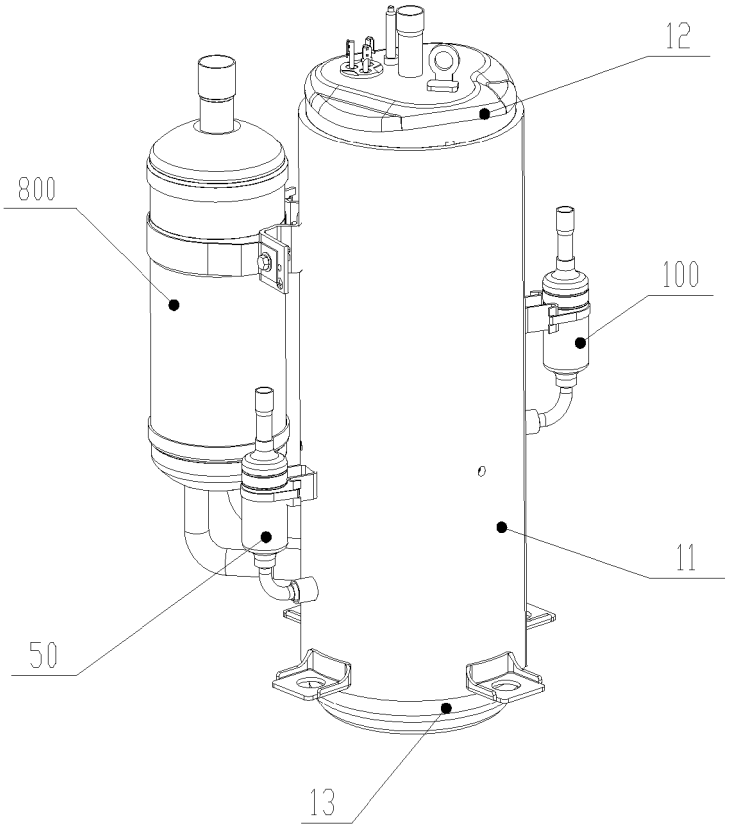

Fig.15

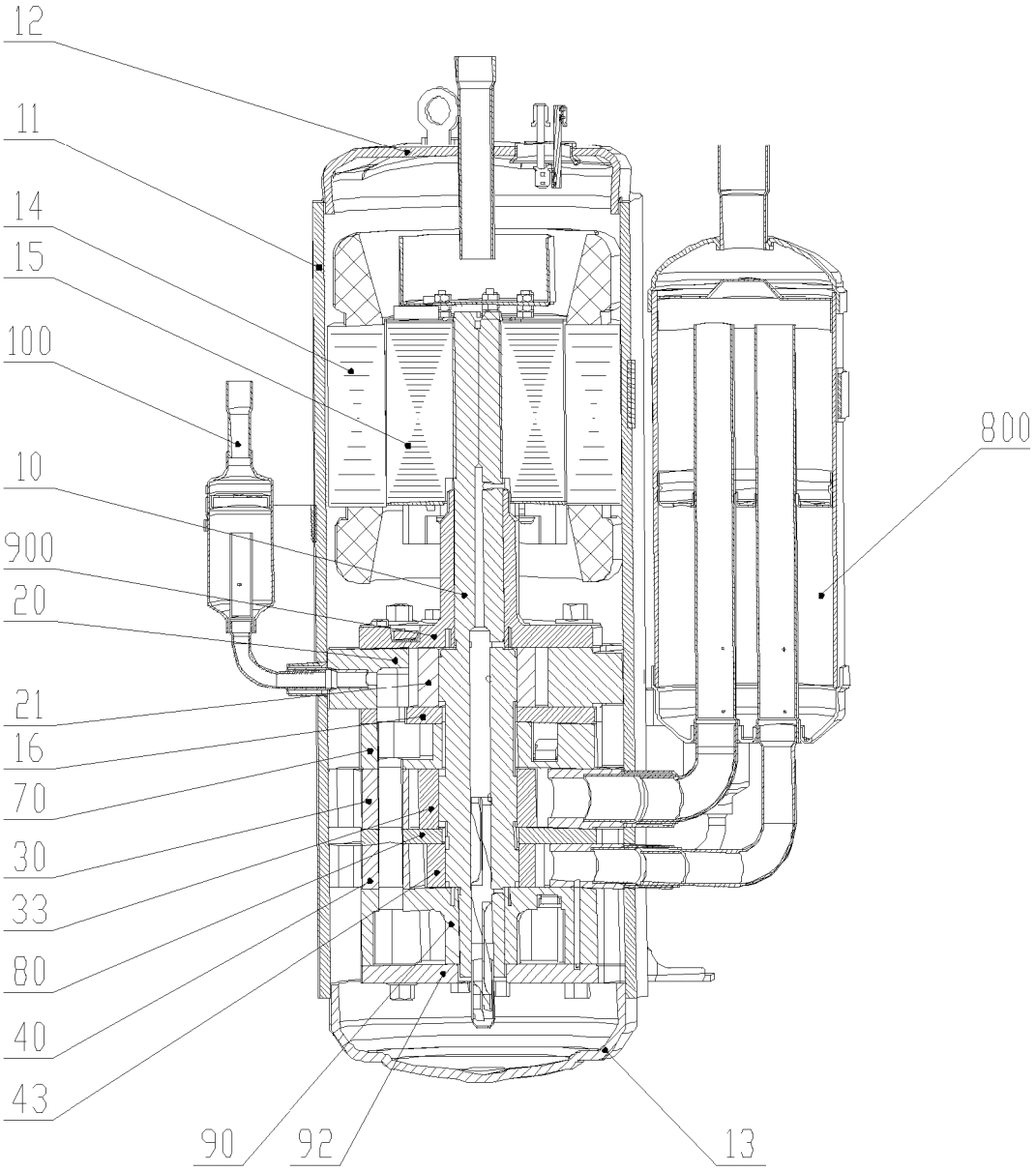

Fig.16

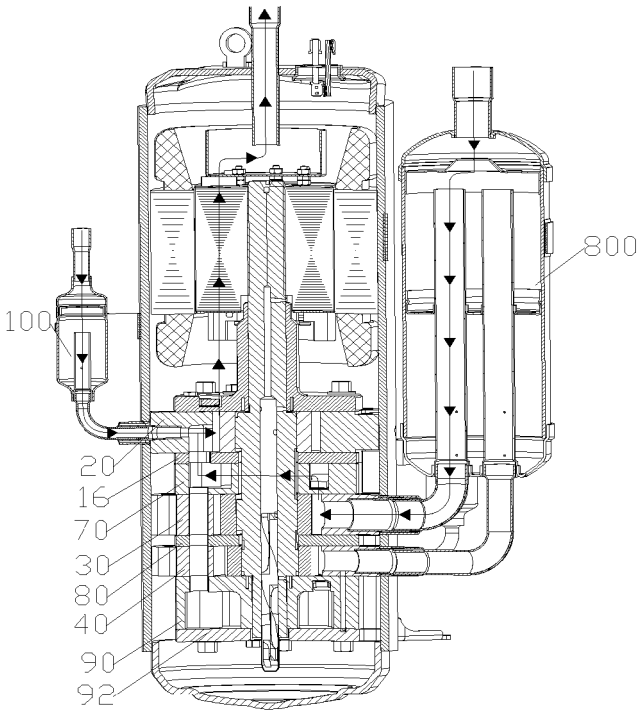

Fig.17

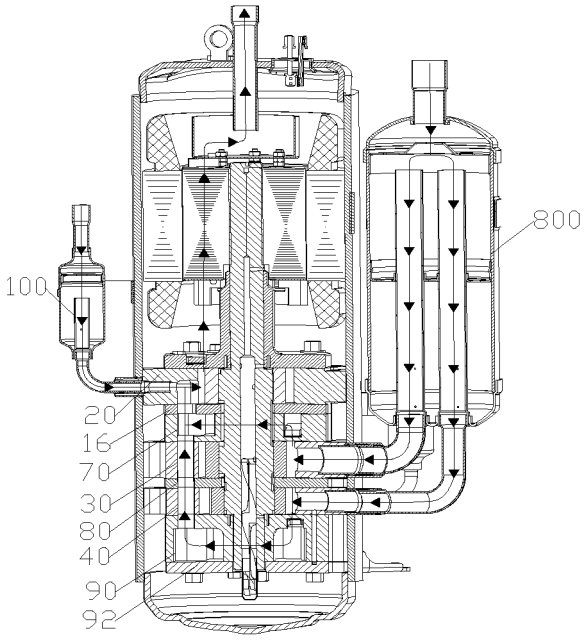

Fig.18

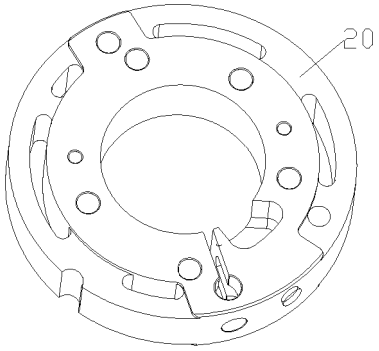

Fig.19

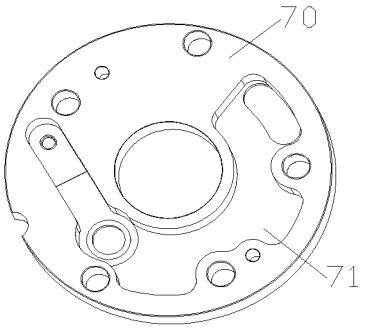

Fig.20

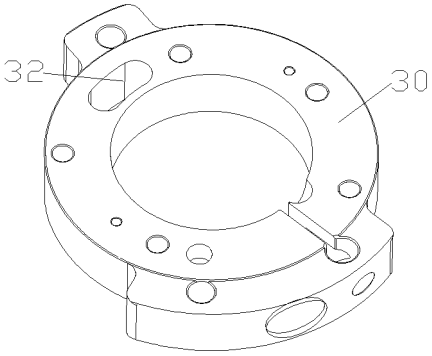

Fig.21

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 204100662 U **[0003]**