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(54) **AIR CONDITIONER SYSTEM AND AIR CONDITIONER HAVING SAME**

KLIMAANLAGENSYSTEM UND KLIMAANLAGE DAMIT

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Description

TECHNICAL FIELD

[0001] The present invention relates to the technical field of air-conditioning equipment, and in particular, to an air-conditioning system and an air conditioner having the same.

BACKGROUND

[0002] As the requirements of scientific research and production for low temperature are becoming higher, the lowest evaporating temperature obtained by the double-stage compression refrigeration device employing medium-temperature refrigerant is also limited by a series of problems caused by too low evaporation pressure. For example, when the pressure difference between the evaporator pressure and the outside pressure increases, the possibility that the air infiltrates into the system increases, which will affect the normal operation of the system. The suction specific volume is large, and the gas actually sucked into the cylinder is reduced, which causes an increase of the size of the cylinder. Therefore, when a low evaporation temperature is required, a low-temperature refrigerant should be used. However, the condensation temperature of the low-temperature refrigerant is required to be lower, and the refrigerant cannot be condensed into liquid by ordinary water cooling and air cooling. A kind of artificial cold source is required to condense the low-temperature refrigerant, accordingly, a cascaded refrigeration cycle adopting two kinds of refrigerants occurs. However, multiple compressors are employed to realize the cascaded refrigeration cycle in the existing technology, which causes a problem of an increase of the cost of implementing a cascade refrigeration cycle in the existing technology.

[0003] JP2013181513 (A) discloses an air-conditioning system according to the preamble of claim 1, and comprises a compressor adapted to prevent refrigerant combustion. The compressor comprises a high temperature side compressor of a binary refrigerating cycle device.

SUMMARY

[0004] The main objective of the present invention is to provide an air-conditioning system and an air conditioner having the same, so as to solve a problem of a high cost of manufacturing the air-conditioning system in the prior art.

[0005] In order to achieve the above objective, according to one aspect of the present invention, an air-conditioning system is provided as set out in claim 1 below.

[0006] Further, the air-conditioning system further includes a condenser; the condenser is arranged in the first pipeline; an inlet of the condenser is in communication with the discharge port of the first cylinder; an outlet of the condenser is in communication with a first inlet of the

evaporative condenser; and a first outlet of the evaporative condenser is in communication with the inlet of the first liquid separator.

[0007] Further, the air-conditioning system further includes a first throttle valve; the first throttle valve is arranged in the first pipeline and located between the evaporative condenser and the condenser.

[0008] Further, the air-conditioning system further includes an evaporator; the evaporator is arranged in the second pipeline; an inlet of the evaporator is in communication with a second outlet of the evaporative condenser; and an outlet of the evaporator is in communication with the inlet of the second liquid separator.

[0009] Further, the air-conditioning system further includes a second throttle valve; the second throttle valve is arranged in the second pipeline and is located between the evaporative condenser and the evaporator.

[0010] Further, a height ratio of the second cylinder to the first cylinder is $T3$, wherein $0.75 \leq T3 \leq 0.95$. Further, an effective volume ratio of the first liquid separator to the second liquid separator is $T4$, wherein $2.5 \leq T4 \leq 6$.

[0011] According to another aspect of the present invention, the present invention provides an air conditioner including the air-conditioning system above.

[0012] In the technical solution of the air-conditioning system of the present disclosure, the first pipeline and the second pipeline are provided independently; the first pipeline and the second pipeline are respectively in communication with the same one compressor; and a first liquid separator and a second liquid separator are arranged in the first pipeline respectively. The air-conditioning system can realize a cascade refrigeration cycle. Since only one compressor is employed in the system, the cost of manufacturing the air-conditioning system is effectively saved.

BRIEF DESCRIPTION OF DRAWINGS

[0013] The accompanying drawings attached to the specification form a part of the disclosure and are intended to provide a further understanding of the present disclosure. The illustrative embodiments of the present disclosure and the description thereof are used for explanations of the present disclosure, but not intended to limit the present disclosure improperly. In the accompanying drawings:

FIG. 1 is a structural schematic diagram illustrating an air-conditioning system according to an embodiment of the present invention;

FIG. 2 is a structural schematic diagram of a compressor according to a first embodiment of the present invention;

FIG. 3 is a schematic structural diagram of a compressor according to a second embodiment of the present invention.

[0014] Wherein, the drawings include following reference signs:

1. low-temperature discharge pipe; 2. high-temperature discharge pipe;
10. compressor; 11. first cylinder; 12. second cylinder;
20. first pipeline; 30. second pipeline; 40. evaporative condenser; 51. first liquid separator; 52. second liquid separator; 61. condenser; 62. first throttle valve; 63. evaporator; 64. second throttle valve.

DETAILED DESCRIPTION OF DISCLOSED EMBODIMENTS

[0015] It should be noted that the embodiments in the present disclosure and the features in the embodiments can be combined with each other if no conflicts occur. The disclosure will be described in detail below with reference to the accompanying drawings in combination with the embodiments.

[0016] It should be noted that terms used herein are only for the purpose of describing specific embodiments and not intended to limit the exemplary embodiments of the disclosure. The singular of a term used herein is intended to include the plural of the term unless the context otherwise specifies. In addition, it should also be appreciated that when terms "include" and/or "comprise" are used in the description, they indicate the presence of features, steps, operations, devices, components and/or their combination.

[0017] It should be noted that the terms "first", "second", and the like in the description, claims and drawings of the present disclosure are used to distinguish similar objects, and are not necessarily used to describe a specific order or sequence. It should be appreciated that such terms can be interchangeable if appropriate, so that the embodiments of the disclosure described herein can be implemented, for example, in an order other than those illustrated or described herein. In addition, the terms "comprise", "have" and any variations thereof, are intended to cover a non-exclusive inclusion, for example, a process, a method, a system, a product, or a device that includes a series of steps or units, which is not necessarily limited to those steps or units explicitly listed, but can include other steps or units that are not explicitly listed or inherent to such a process, a method, a product or a device.

[0018] For convenience of description, spatially relative terms such as "above", "over", "on a surface of", "upper", etc., may be used herein to describe the spatial position relationships between one device or feature and other devices or features as shown in the drawings. It should be appreciated that the spatially relative term is intended to include different directions during using or operating the device other than the directions described in the drawings. For example, if the device in the drawings is inverted, the device is described as the device "above

other devices or structures" or "on other devices or structures" will be positioned "below other devices or structures" or "under other devices or structures". Thus, the exemplary term "above" can include both "above" and "under". The device can also be positioned in other different ways (rotating 90 degrees or at other orientations), and the corresponding description of the space used herein is interpreted accordingly.

[0019] Now, the exemplary embodiments of the disclosure will be further described in detail with reference to the accompanying drawings. However, these exemplary embodiments can be implemented in many different forms and should not be construed as only limited to the embodiments described herein. It should be appreciated that the embodiments are provided to make the present disclosure disclosed thoroughly and completely, and to fully convey the concepts of the exemplary embodiments to those skilled in the art. In the accompanying drawings, for the sake of clarity, the thicknesses of layers and regions may be enlarged, and a same reference sign is used to indicate a same device, thus the description thereof will be omitted.

[0020] With reference to FIGS. 1-3, according to an embodiment of the present invention, an air-conditioning system is provided.

[0021] As shown in Fig.1, the air-conditioning system includes a compressor 10, a first pipeline 20, a second pipeline 30, an evaporative condenser 40, a first liquid separator 51 and a second liquid separator 52. The first pipeline 20 is in communication with the compressor 10, and the second pipeline 30 is in communication with the same compressor 10. The first pipeline 20 and the second pipeline 30 are arranged independently, and the evaporative condenser 40 is provided in the first pipeline 20 and the second pipeline 30. The refrigerant in the first pipeline 20 and the refrigerant in the second pipeline 30 can perform heat exchange with the evaporative condenser 40 respectively. The first liquid separator 51 is arranged in the first pipeline 20, and an outlet of the first liquid separator 51 is in communication with the compressor 10. The second liquid separator 52 is arranged in the second pipeline 30, and an outlet of the second liquid separator 52 is in communication with the compressor 10. The first liquid separator 51 is disposed adjacent to the second liquid separator 52.

[0022] In this embodiment of the air-conditioning system, the first pipeline and the second pipeline are provided independently; the first pipeline and the second pipeline are respectively in communication with the same one compressor; and the first liquid separator and the second liquid separator are arranged in the first pipeline respectively. The air-conditioning system can realize a cascade refrigeration cycle. Since only one compressor is employed in the system, the cost of manufacturing the air-conditioning system is effectively saved.

[0023] The compressor 10 includes multiple cylinders, and the multiple cylinders work independently. Such an arrangement enables the air-conditioning system to be

adaptive for compressing different refrigerants, thereby improving practicability and reliability of the compressor.

[0024] Specifically, the multiple cylinders include a first cylinder 11. An outlet of the first liquid separator 51 is in communication with a suction port of the first cylinder 11. The first end of the first pipeline 20 is in communication with the discharge port of the first cylinder 11, and the second end of the first pipeline 20 is in communication with the inlet of the first liquid separator 51. Such an arrangement enables the first pipeline 20, the first cylinder 11 and the first liquid separator 51 to form a complete circulation loop, thereby effectively improving the reliability and the stability of the pipeline system.

[0025] The air-conditioning system further includes a condenser 61 and a first throttle valve 62. The condenser 61 is arranged in the first pipeline 20. The inlet of the condenser 61 is in communication with the discharge port of the first cylinder 11. The outlet of the condenser 61 is in communication with the first inlet of the evaporative condenser 40, and the first outlet of the evaporative condenser 40 is in communication with the inlet of the first liquid separator 51. The first throttle valve 62 is arranged in the first pipeline 20 and located between the evaporative condenser 40 and the condenser 61. Such an arrangement can effectively improve the reliability of the air-conditioning system.

[0026] Further, the multiple cylinders further include a second cylinder 12. The outlet of the second liquid separator 52 is in communication with the suction port of the second cylinder 12, the first end of the second pipeline 30 is in communication with the discharge port of the second cylinder 12; and the second end of the second pipeline 30 is in communication with the inlet of the second liquid separator 52. Such an arrangement enables the second pipeline 30, the second cylinder 12 and the second liquid separator 52 to form an enclosed circulation loop, and makes the circulation loop formed by the second pipeline 30 and the circulation loop formed by the first pipeline 20 independent of each other, thereby improving the practicality and the reliability of the air-conditioning system.

[0027] Further, the air-conditioning system further includes an evaporator 63 and a second throttle valve 64. The evaporator 63 is arranged in the second pipeline 30. The inlet of the evaporator 63 is in communication with the second outlet of the evaporative condenser 40. The outlet of the evaporator 63 is in communication with the inlet of the second liquid separator 52. The second throttle valve 64 is arranged in the second pipeline 30 and is located between the evaporative condenser 40 and the evaporator 63. According to the invention, the volume ratio of the second cylinder 12 to the first cylinder 11 is T_1 , where $0.15 \leq T_1 \leq 0.4$. The diameter ratio of the suction port of the second cylinder 12 and the suction port of the first cylinder 11 is T_2 , where $0.7 \leq T_2 \leq 0.9$.

[0028] Preferably, the height ratio of the second cylinder 12 to the first cylinder 11 is T_3 , where $0.75 \leq T_3 \leq 0.95$. The effective volume ratio of the first liquid separator 51 to the second liquid separator 52 is T_4 , where $2.5 \leq T_4 \leq 6$.

Such an arrangement can effectively improve the performance the air-conditioning system.

[0029] The air-conditioning system of the above embodiment can also be applied in the field of air conditioner technology, that is, an air conditioner is provided. The air conditioner includes an air-conditioning system, and the air-conditioning system is one of the air-conditioning systems disclosed in the foregoing embodiments. The air-conditioning system includes a compressor 10, a first pipeline 20, a second pipeline 30, an evaporative condenser 40, a first liquid separator 51 and a second liquid separator 52. The first pipeline 20 is in communication with compressor 10, and the second pipeline 30 is in communication with the same compressor 10. The first pipeline 20 and the second pipeline 30 are arranged independently, and the evaporative condenser 40 is provided in the first pipeline 20 and in the second pipeline 30. The refrigerant in the first pipeline 20 and the refrigerant in the second pipeline 30 can perform heat exchange with the evaporative condenser 40 respectively. The liquid separator 51 is arranged in the first pipeline 20, and the outlet of the first liquid separator 51 is in communication with the compressor 10. The second liquid separator 52 is disposed in the second pipeline 30, and the outlet of the second liquid separator 52 is in communication with the compressor 10. The first liquid separator 51 is disposed adjacent to the second liquid separator 52.

[0030] According to this embodiment, in the air-conditioning system, the first pipeline and the second pipeline are provided independently; the first pipeline and the second pipeline are respectively in communication with the same one compressor; and the first liquid separator and the second liquid separator are arranged in the first pipeline respectively. The air-conditioning system can realize a cascade refrigeration cycle. Since only one compressor is employed in the system, the cost of manufacturing the air-conditioning system is effectively saved.

[0031] Specifically, the cascaded refrigeration cycle generally includes two or three independent refrigeration circulations, which are referred to as a high temperature portion and a low temperature portion respectively. Each of these independent refrigeration circulations is a complete single-stage or two-stage compression refrigeration system, and the two portions are related by the same one evaporative condenser. Conventionally the independent systems of the two portions respectively use two compressors, which results in a complicated structure of the whole system. In this disclosure, a compressor with one unit and double refrigerants is provided. The upper cylinder and the lower cylinder of the compressor can participate in two refrigeration circulations respectively, and function as two compressors. In this embodiment, the second cylinder is disposed above the first cylinder.

[0032] The upper cylinder and the lower cylinder of the twin cylinder compressor independently complete the compression processes of the two refrigeration circulations respectively, and the compressor with one unit and

double refrigerants simplifies the cascaded circulation system. In order to prevent the sucked gas from carrying liquid, the two cylinders need to be connected to the liquid separator component separately. The first cylinder is a high-temperature refrigerant cylinder. After flowing through the first liquid separator and entering the first cylinder, the high-temperature refrigerant is compressed, and then discharged into an intermediate cavity of the upper flange, and finally discharged out of the high-temperature refrigerant discharge pipe 2. The second cylinder is a low-temperature refrigerant cylinder. After flowing through the first liquid separator and entering the second cylinder, the low-temperature refrigerant is compressed, and then discharged into the housing of the compressor directly through the lower flange, and finally discharged out of the low-temperature refrigerant discharge pipe 1. The discharge temperature of the low-temperature refrigerant is lower, which takes an effect on lowering the temperature of the motor.

[0033] The volume ratio of the second cylinder to the first cylinder ranges from 0.15 to 0.4. In order to prevent the volumetric efficiency being affected by too large suction ports, the high ratio of the second cylinder to the first cylinder ranges from 0.75 to 0.95. It can be further determined that the diameter ratio of the suction port of the second cylinder to the suction port of the first cylinder ranges from 0.7 to 0.9. Such an arrangement can further improve the reliability of the sealing inside the pump body.

[0034] When operating in the system with double refrigerants, the evaporative condenser acts as an evaporator of the high-temperature refrigerant; after flowing through the first liquid separator and entering the high-temperature refrigerant cylinder, the high-temperature refrigerant at a low-temperature and low-pressure state is compressed and discharged into the inner cavity of the lower flange, then is discharged from the high-temperature discharge pipe into the condenser and then the throttle valve, and finally flows back to the evaporative condenser, thereby completing a circulation cycle of the high-temperature refrigerant. After the high-temperature refrigerant circulates for a period of time, the low-temperature refrigerant begins to circulate. After the low-temperature refrigerant from the evaporator flows through the second liquid separator and enters the low-temperature refrigerant cylinder, the refrigerant is compressed and discharged from the discharge port of the upper flange into the inner cavity of the compressor. The effective volume ratio of the first liquid separator to the second liquid separator ranges from 2.5 to 6.0. The discharge temperature of the low-temperature refrigerant is lower, which takes an effect on lowering the temperature of the compressor motor. The low-temperature refrigerant flows through the low-temperature refrigerant discharge pipe and enters the evaporative condenser, then enter the throttle valve, and finally flows back to the evaporator, thereby completing a circulation cycle of the low-temperature refrigerant.

[0035] A second liquid separator is provided indepen-

dently at the suction inlet of the low-temperature refrigerant cylinder. The inner cavity of the lower flange is used as a high-temperature refrigerant discharge cavity. A high-temperature refrigerant discharge port is independently disposed in the lower flange and is in communication with the high-temperature refrigerant discharge pipe. The sealing distances between the parts inside the pump body are ensured to be sufficient, and the first cylinder and the second cylinder can be independently compressed. FIG.3 is a top view of the compressor with one unit and double refrigerants. As far as the appearance is concerned, the compressor is provided with two liquid separators with different specifications corresponding to the high-temperature refrigerant discharge pipe and the low-temperature refrigerant discharge pipe. The low-temperature refrigerant is discharged into the housing of the compressor first, which takes an effect on lowering the temperature of the compressor motor.

[0036] FIG.1 is a principle diagram of the system using the compressor with one unit and double refrigerants. Compared with the traditional cascaded refrigeration system, two independent refrigeration circulations are related through the evaporative condenser, and also through the compressor with double refrigerants; the evaporative condenser acts as an evaporator of the high-temperature refrigerant; after flowing through the first liquid separator and entering the high-temperature refrigerant cylinder, the high-temperature refrigerant at the low-temperature and low-pressure state is compressed and discharged into the inner cavity of the lower flange, then is discharged from the high-temperature discharge pipe into the condenser and the throttle valve, and finally flows back to the evaporative condenser, thereby completing a circulation cycle of the high-temperature refrigerant. After the high-temperature refrigerant circulates for a period of time, the low-temperature refrigerant begins to circulate. After the low-temperature refrigerant from the evaporator flows through the second liquid separator and enters the low-temperature refrigerant cylinder, the refrigerant is compressed, and discharged from the discharge port of the upper flange into the inner cavity of the compressor. The discharge temperature of the low-temperature refrigerant is lower, which takes an effect on lowering the temperature of the compressor motor. The low-temperature refrigerant flows through the low-temperature refrigerant discharge pipe, and enters the evaporative condenser and the throttle valve, and finally flows back to the evaporator, thereby completing a circulation cycle of the low-temperature refrigerant.

[0037] In addition to the above description, it also should be noted that "one embodiment", "another embodiment", "an embodiment" and the like in the description refer to that a specific feature, a structure or a characteristic described in combination with the embodiment is included in at least one embodiment generally described in the present disclosure. The same expression in various locations in the specification does not necessarily

refer to the same embodiment. Furthermore, when a specific feature, a structure, or a characteristic is described in combination with any embodiments, what is claimed is that other embodiments which are combined to implement such a feature, a structure, or a characteristic are also included in the scope of the present disclosure.

[0038] In the above embodiments, the descriptions of the various embodiments have different emphases, and any portions that are not detailed in a certain embodiment can be seen in the related descriptions of other embodiments.

Claims

1. An air-conditioning system, wherein the air-conditioning system comprises:

a compressor (10), a first pipeline (20), a second pipeline (30), an evaporative condenser (40), a first liquid separator (51), and a second liquid separator (52); wherein,

the first pipeline (20) is in communication with the compressor (10);

the second pipeline (30) is in communication with a same compressor (10), and the first pipeline (20) and the second pipeline (30) are arranged independently;

the evaporative condenser (40) is provided in the first pipeline (20) and the second pipeline (30), and refrigerant in the first pipeline (20) and refrigerant in the second pipeline (30) perform heat exchange with the evaporative condenser (40) respectively;

the first liquid separator (51) is arranged in the first pipeline (20), and an outlet of the first liquid separator (51) is in communication with the compressor (10);

the second liquid separator (52) is arranged in the second pipeline (30), and an outlet of the second liquid separator (52) is in communication with the compressor (10); the first liquid separator (51) is disposed adjacent to the second liquid separator (52);

the compressor (10) comprises multiple cylinders, and the multiple cylinders are configured to work independently;

the multiple cylinders comprise a first cylinder (11); the outlet of the first liquid separator (51) is in communication with a suction port of the first cylinder (11); a first end of the first pipeline (20) is in communication with a discharge port of the first cylinder (11); and a second end of the first pipeline (20) is in communication with an inlet of the first liquid separator (51);

the multiple cylinders further comprise a second cylinder (12); the outlet of the second liquid

separator (52) is in communication with a suction port of the second cylinder (12); a first end of the second pipeline (30) is in communication with a discharge port of the second cylinder (12); a second end of the second pipeline (30) is in communication with an inlet of the second liquid separator (52);

characterized in that: a volume ratio of the second cylinder (12) to the first cylinder (11) is $T1$, wherein $0.15 \leq T1 \leq 0.4$; and

a diameter ratio of the suction port of the second cylinder (12) and the suction port of the first cylinder (11) is $T2$, wherein $0.7 \leq T2 \leq 0.9$.

2. The air-conditioning system according to claim 1, **characterized by** further comprising a condenser (61); wherein the condenser (61) is arranged in the first pipeline (20); an inlet of the condenser (61) is in communication with the discharge port of the first cylinder (11); an outlet of the condenser (61) is in communication with a first inlet of the evaporative condenser (40); and a first outlet of the evaporative condenser (40) is in communication with the inlet of the first liquid separator (51).
3. The air-conditioning system according to claim 2, **characterized by** further comprising a first throttle valve (62), wherein the first throttle valve (62) is arranged in the first pipeline (20) and located between the evaporative condenser (40) and the condenser (61).
4. The air-conditioning system according to claim 1, **characterized by** further comprising an evaporator (63), wherein the evaporator (63) is arranged in the second pipeline (30); an inlet of the evaporator (63) is in communication with a second outlet of the evaporative condenser (40); and an outlet of the evaporator (63) is in communication with the inlet of the second liquid separator (52).
5. The air-conditioning system according to claim 4, **characterized by** further comprising a second throttle valve (64), wherein the second throttle valve (64) is arranged in the second pipeline (30) and is located between the evaporative condenser (40) and the evaporator (63).
6. The air-conditioning system according to claim 1, **characterized in that**, a height ratio of the second cylinder (12) to the first cylinder (11) is $T3$, wherein $0.75 \leq T3 \leq 0.95$.
7. The air-conditioning system according to claim 1, **characterized in that**, an effective volume ratio of the first liquid separator (51) to the second liquid

separator (52) is T4, wherein $2.5 \leq T4 \leq 6$.

8. An air conditioner, **characterized by** comprising the air-conditioning system of any of claims 1-7.

Patentansprüche

1. Klimaanlage, wobei das Klimasystem Folgendes umfasst:

einen Verdichter (10), eine erste Rohrleitung (20), eine zweite Rohrleitung (30), einen Verdunstungskondensator (40), einen ersten Flüssigkeitsabscheider (51) und einen zweiten Flüssigkeitsabscheider (52); wobei die erste Rohrleitung (20) mit dem Verdichter (10) in Austausch ist; die zweite Rohrleitung (30) mit einem gleichen Verdichter (10) in Austausch ist und die erste Rohrleitung (20) und die zweite Rohrleitung (30) unabhängig voneinander angeordnet sind; der Verdunstungskondensator (40) in der ersten Rohrleitung (20) und der zweiten Rohrleitung (30) bereitgestellt ist und ein Kühlmittel in der ersten Rohrleitung (20) und ein Kühlmittel in der zweiten Rohrleitung (30) jeweils einen Wärmeaustausch mit dem Verdunstungskondensator (40) durchführen; der erste Flüssigkeitsabscheider (51) in der ersten Rohrleitung (20) angeordnet ist und ein Auslass des ersten Flüssigkeitsabscheiders (51) mit dem Verdichter (10) in Austausch ist; der zweite Flüssigkeitsabscheider (52) in der zweiten Rohrleitung (30) angeordnet ist und ein Auslass des zweiten Flüssigkeitsabscheiders (52) mit dem Verdichter (10) in Austausch ist; der erste Flüssigkeitsabscheider (51) benachbart zu dem zweiten Flüssigkeitsabscheider (52) angeordnet ist; der Verdichter (10) mehrere Zylinder umfasst und die mehreren Zylinder so konfiguriert sind, dass sie unabhängig voneinander arbeiten; die mehreren Zylinder einen ersten Zylinder (11) umfassen; der Auslass des ersten Flüssigkeitsabscheiders (51) in Austausch mit einem Saugstutzen des ersten Zylinders (11) ist; ein erstes Ende der ersten Rohrleitung (20) in Austausch mit einem Ablassstutzen des ersten Zylinders (11) ist; und ein zweites Ende der ersten Rohrleitung (20) in Austausch mit einem Einlass des ersten Flüssigkeitsabscheiders (51) ist; die mehreren Zylinder ferner einen zweiten Zylinder (12) umfassen; der Auslass des zweiten Flüssigkeitsabscheiders (52) in Austausch mit einem Saugstutzen des zweiten Zylinders (12) ist; ein erstes Ende der zweiten Rohrleitung (30) in Austausch mit einem Ablassstutzen des zwei-

ten Zylinders (12) ist; ein zweites Ende der zweiten Rohrleitung (30) in Austausch mit einem Einlass des zweiten Flüssigkeitsabscheiders (52) ist;

dadurch gekennzeichnet, dass: ein Volumenverhältnis des zweiten Zylinders (12) zu dem ersten Zylinder (11) $T1$ ist, wobei $0,15 \leq T1 \leq 0,4$; und

ein Durchmesser Verhältnis des Saugstutzens des zweiten Zylinders (12) und des Saugstutzens des ersten Zylinders (11) $T2$ ist, wobei $0,7 \leq T2 \leq 0,9$.

2. Klimaanlage nach Anspruch 1, **dadurch gekennzeichnet, dass** es ferner einen Kondensator (61) umfasst;

wobei der Kondensator (61) in der ersten Rohrleitung (20) angeordnet ist; ein Einlass des Kondensators (61) in Austausch mit dem Ablassstutzen des ersten Zylinders (11) ist; ein Auslass des Kondensators (61) in Austausch mit einem ersten Einlass des Verdunstungskondensators (40) ist; und ein erster Auslass des Verdunstungskondensators (40) in Austausch mit dem Einlass des ersten Flüssigkeitsabscheiders (51) ist.

3. Klimaanlage nach Anspruch 2, **dadurch gekennzeichnet, dass** es ferner ein erstes Drosselventil (62) umfasst,

wobei das erste Drosselventil (62) in der ersten Rohrleitung (20) angeordnet und zwischen dem Verdunstungskondensator (40) und dem Kondensator (61) lokalisiert ist.

4. Klimaanlage nach Anspruch 1, **dadurch gekennzeichnet, dass** es ferner einen Verdunster (63) umfasst,

wobei der Verdunster (63) in der zweiten Rohrleitung (30) angeordnet ist; ein Einlass des Verdunsters (63) mit einem zweiten Auslass des Verdunstungskondensators (40) in Austausch ist; und ein Auslass des Verdunsters (63) mit dem Einlass des zweiten Flüssigkeitsabscheiders (52) in Austausch ist.

5. Klimaanlage nach Anspruch 4, **dadurch gekennzeichnet, dass** es ferner ein zweites Drosselventil (64) umfasst,

wobei das zweite Drosselventil (64) in der zweiten Rohrleitung (30) angeordnet und zwischen dem Verdunstungskondensator (40) und dem Verdunster (63) lokalisiert ist.

6. Klimaanlage nach Anspruch 1, **dadurch gekennzeichnet, dass** ein Höhenverhältnis des zweiten Zylinders (12) zu dem ersten Zylinder (11) $T3$ ist, wobei $0,75 \leq T3 \leq 0,95$.

7. Klimaanlage nach Anspruch 1, **dadurch**

gekennzeichnet, dass ein effektives Volumenverhältnis des ersten Flüssigkeitsabscheiders (51) zu dem zweiten Flüssigkeitsabscheider (52) $T4$ ist, wobei $2,5 \leq T4 \leq 6$.

8. Klimaanlage, **dadurch gekennzeichnet, dass** sie das Klimaanlage-System von einem der Ansprüche 1 bis 7 umfasst.

Revendications

1. Système de climatisation, dans lequel le système de climatisation comprend :

un compresseur (10), une première canalisation (20), une seconde canalisation (30), un condenseur évaporatif (40), un premier séparateur de liquide (51) et un second séparateur de liquide (52) ; dans lequel,
la première canalisation (20) est en communication avec le compresseur (10) ;
la seconde canalisation (30) est en communication avec un même compresseur (10), et la première canalisation (20) et la seconde canalisation (30) sont agencées de manière indépendante ;
le condenseur évaporatif (40) est disposé dans la première canalisation (20) et la seconde canalisation (30), et le réfrigérant dans la première canalisation (20) ainsi que le réfrigérant dans la seconde canalisation (30) effectuent respectivement un échange de chaleur avec le condenseur évaporatif (40) ;
le premier séparateur de liquide (51) est agencé dans la première canalisation (20), et une sortie du premier séparateur de liquide (51) est en communication avec le compresseur (10) ;
le second séparateur de liquide (52) est agencé dans la seconde canalisation (30), et une sortie du second séparateur de liquide (52) est en communication avec le compresseur (10) ; le premier séparateur de liquide (51) est disposé à côté du second séparateur de liquide (52) ;
le compresseur (10) comprend de multiples cylindres, et les multiples cylindres sont configurés pour fonctionner de manière indépendante ;
les multiples cylindres comprennent un premier cylindre (11) ;
la sortie du premier séparateur de liquide (51) est en communication avec un orifice d'aspiration du premier cylindre (11) ; une première extrémité de la première canalisation (20) est en communication avec un orifice d'évacuation du premier cylindre (11) ; et une seconde extrémité de la première canalisation (20) est en communication avec une entrée du premier séparateur de liquide (51) ;

les multiples cylindres comprennent en outre un second cylindre (12) ; la sortie du second séparateur de liquide (52) est en communication avec un orifice d'aspiration du second cylindre (12) ; une première extrémité de la seconde canalisation (30) est en communication avec un orifice d'évacuation du second cylindre (12) ; une seconde extrémité de la seconde canalisation (30) est en communication avec une entrée du second séparateur de liquide (52) ;

caractérisé en ce que : $T1$ désigne le rapport volumique du second cylindre (12) au premier cylindre (11), dans lequel $0,15 \leq T1 \leq 0,4$; et $T2$ désigne un rapport de diamètres de l'orifice d'aspiration du second cylindre (12) et de l'orifice d'aspiration du premier cylindre (11), dans lequel $0,7 \leq T2 \leq 0,9$.

2. Système de climatisation selon la revendication 1, **caractérisé en ce qu'il** comprend en outre un condenseur (61) ; dans lequel le condenseur (61) est agencé dans la première canalisation (20) ; une entrée du condenseur (61) est en communication avec l'orifice d'évacuation du premier cylindre (11) ; une sortie du condenseur (61) est en communication avec une première entrée du condenseur évaporatif (40) ; et une première sortie du condenseur évaporatif (40) est en communication avec l'entrée du premier séparateur de liquide (51).
3. Système de climatisation selon la revendication 2, **caractérisé en ce qu'il** comprend en outre un premier papillon des gaz (62), dans lequel le premier papillon des gaz (62) est agencé dans la première canalisation (20) et situé entre le condenseur évaporatif (40) et le condenseur (61).
4. Système de climatisation selon la revendication 1, **caractérisé en ce qu'il** comprend en outre un évaporateur (63), dans lequel l'évaporateur (63) est agencé dans la seconde canalisation (30) ; une entrée de l'évaporateur (63) est en communication avec une seconde sortie du condenseur évaporatif (40) ; et une sortie de l'évaporateur (63) est en communication avec l'entrée du second séparateur de liquide (52).
5. Système de climatisation selon la revendication 4, **caractérisé en ce qu'il** comprend en outre un second papillon des gaz (64), dans lequel le second papillon des gaz (64) est agencé dans la seconde canalisation (30) et est situé entre le condenseur évaporatif (40) et l'évaporateur (63).
6. Système de climatisation selon la revendication 1,

caractérisé en ce que T3 désigne le rapport de hauteurs du second cylindre (12) au premier cylindre (11), dans lequel $0,75 \leq T3 \leq 0,95$.

7. Système de climatisation selon la revendication 1, **caractérisé en ce que** T4 désigne le rapport volumique effectif du premier séparateur de liquide (51) au second séparateur de liquide (52), dans lequel $2,5 \leq T4 \leq 6$.
8. Climatiseur, **caractérisé en ce qu'il** comprend le système de climatisation selon l'une quelconque des revendications 1 à 7.

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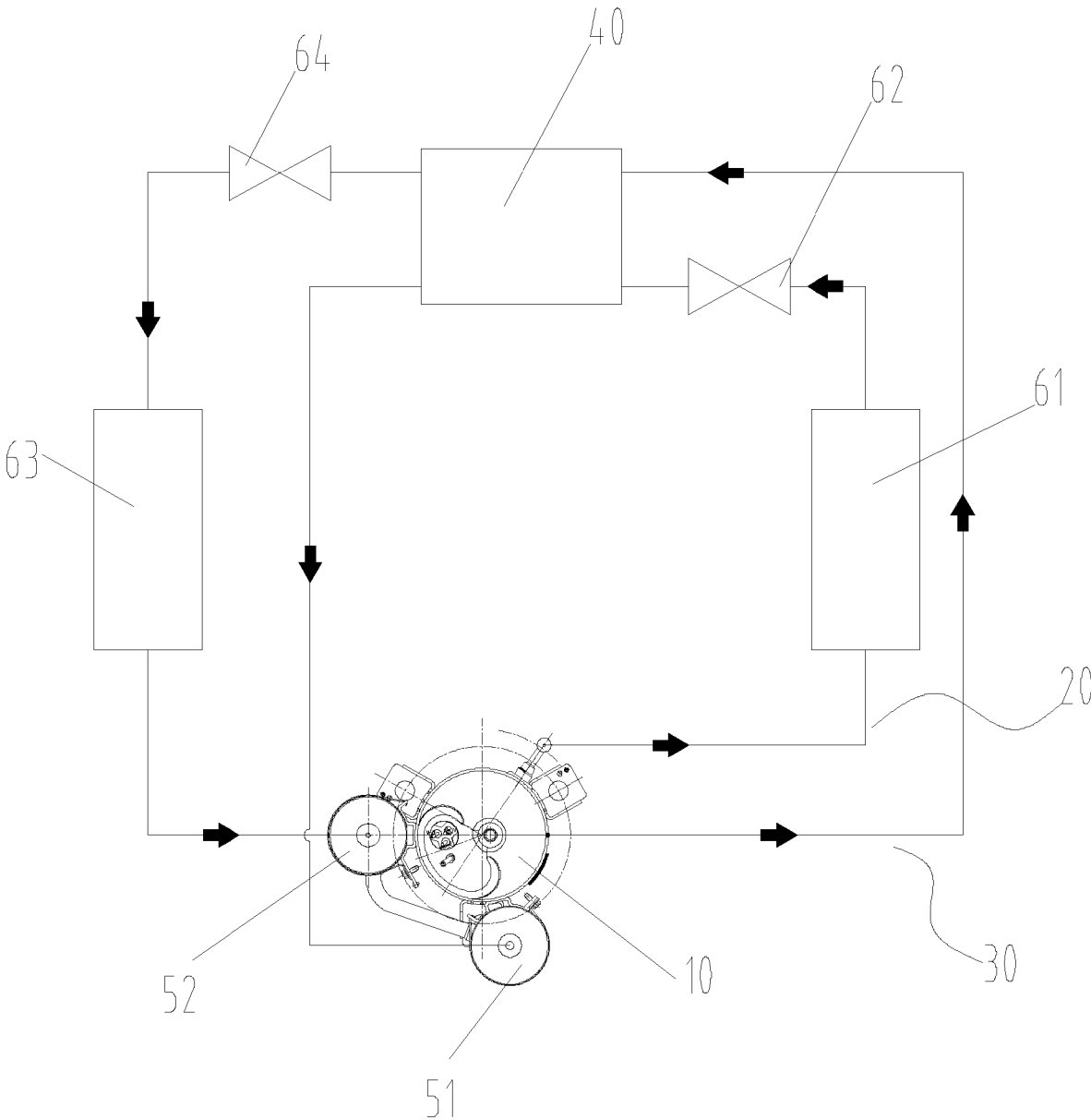
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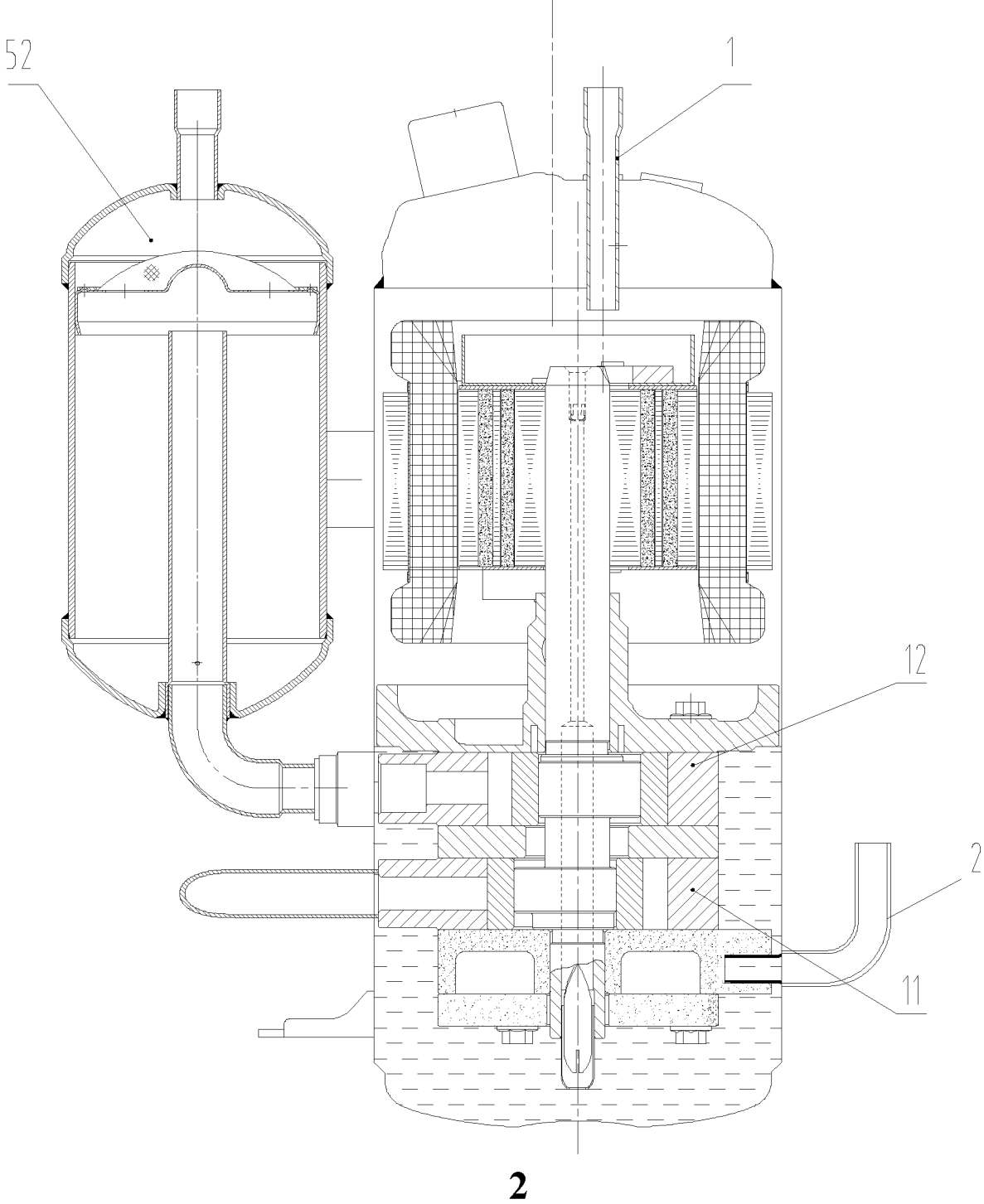
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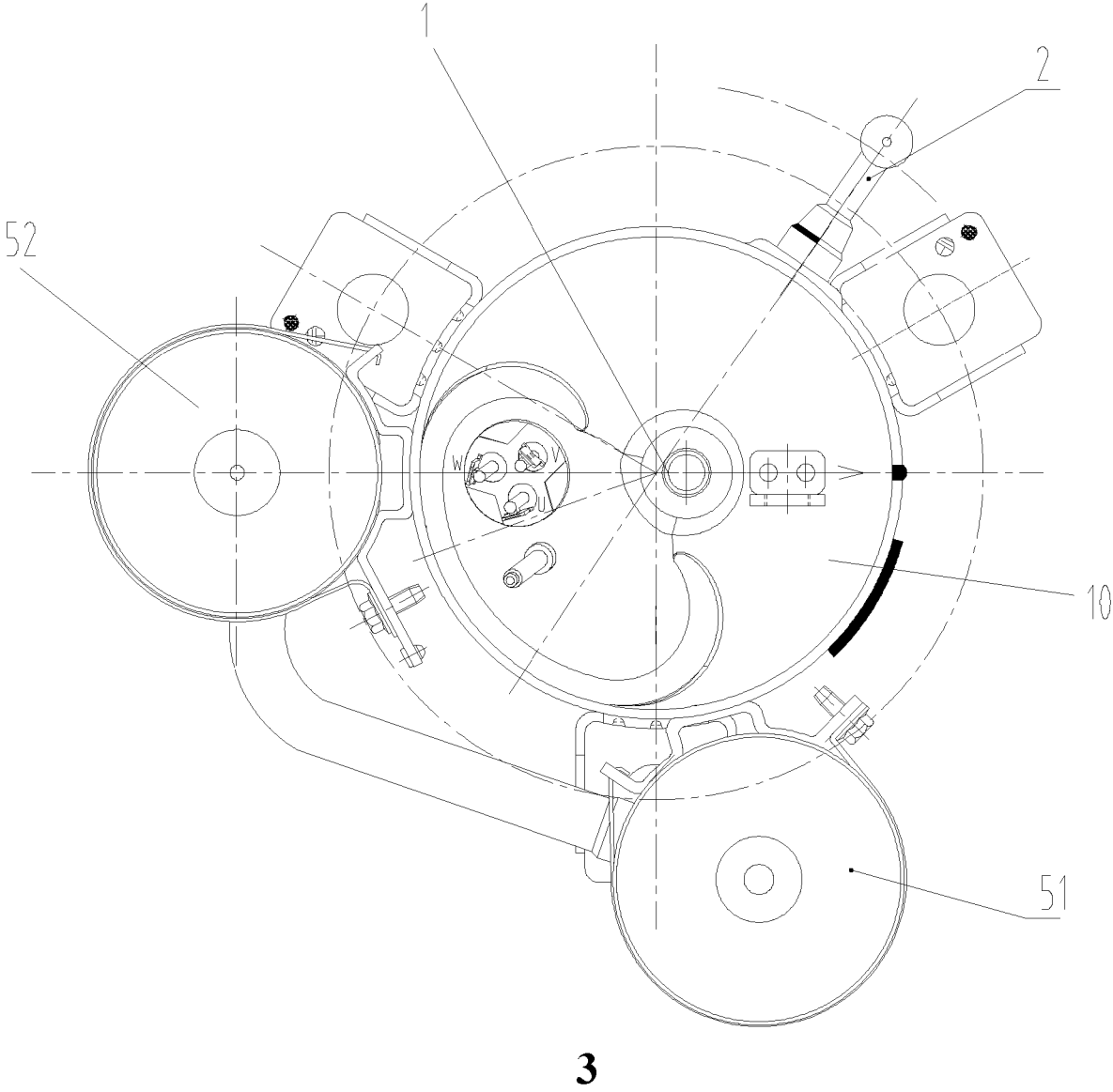
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REFERENCES CITED IN THE DESCRIPTION

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