



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
08.06.2022 Bulletin 2022/23

(21) Application number: **20849279.3**

(22) Date of filing: **09.06.2020**

(51) International Patent Classification (IPC):
F24F 1/0014 ^(2019.01) **F24F 1/0018** ^(2019.01)
F24F 1/0063 ^(2019.01) **F24F 11/67** ^(2018.01)
F24F 11/65 ^(2018.01) **F24F 13/30** ^(2006.01)
F24F 13/22 ^(2006.01) **F24F 13/10** ^(2006.01)

(52) Cooperative Patent Classification (CPC):
F24F 1/0014; F24F 1/0018; F24F 1/0063;
F24F 11/65; F24F 11/67; F24F 13/10; F24F 13/22;
F24F 13/30

(86) International application number:
PCT/CN2020/095224

(87) International publication number:
WO 2021/022897 (11.02.2021 Gazette 2021/06)

(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
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **02.08.2019 CN 201910713842**

(71) Applicant: **Gree Electric Appliances, Inc. of Zhuhai**
Zhuhai, Guangdong 519070 (CN)

(72) Inventors:
• **DONG, Mingzhu**
Zhuhai, Guangdong 519070 (CN)
• **CHEN, Cheng**
Zhuhai, Guangdong 519070 (CN)
• **HE, Zhenjian**
Zhuhai, Guangdong 519070 (CN)
• **WANG, Qianqian**
Zhuhai, Guangdong 519070 (CN)
• **DAI, Zhiwei**
Zhuhai, Guangdong 519070 (CN)

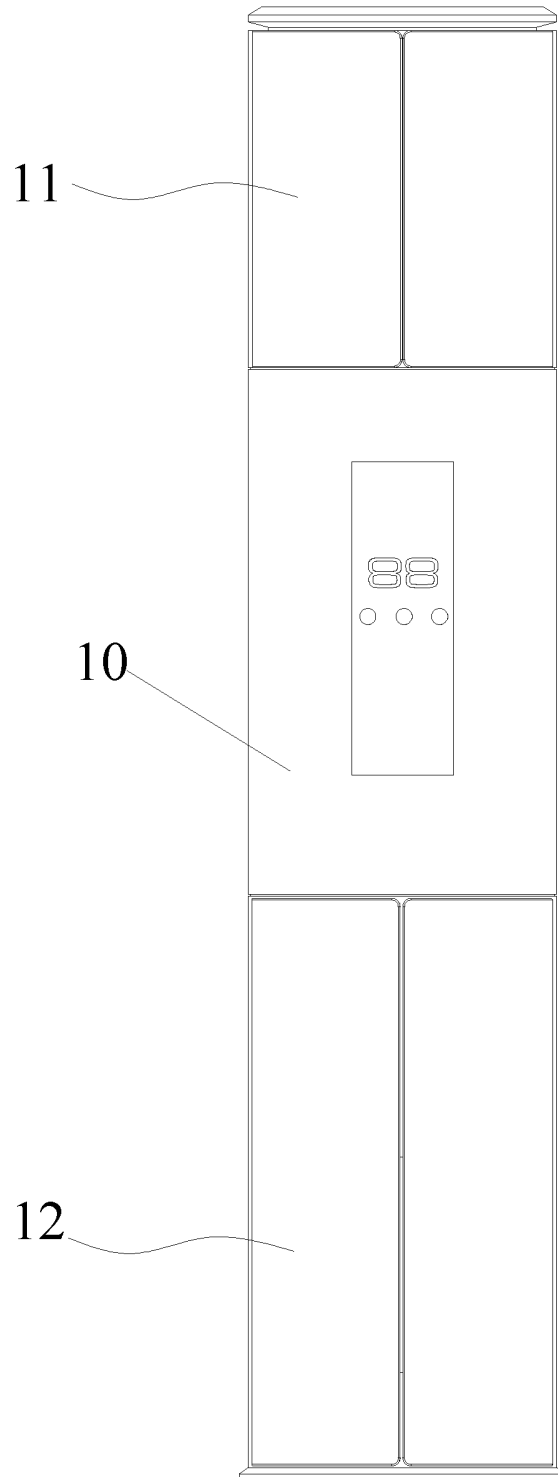
(74) Representative: **V.O.**
P.O. Box 87930
2508 DH Den Haag (NL)

(54) **CABINET AIR CONDITIONER AND CONTROL METHOD**

(57) Some embodiments of the present invention provide an air conditioner cabinet and a control method. The air conditioner cabinet includes a housing (10), wherein the housing (10) is provided with an upper air port (11) and a lower air port (12); a heat exchanger (20), wherein the heat exchanger (20) is disposed in the housing (10) and is located between the upper air port (11) and the lower air port (12); a mixed flow fan portion (30), wherein the mixed flow fan portion (30) is disposed in the housing (10); and a regulating mechanism (40), wherein the regulating mechanism (40) is disposed in the housing (10), the regulating mechanism (40) is located between the mixed flow fan portion (30) and the heat exchanger (20), the regulating mechanism (40) has a necking posi-

tion where the regulating mechanism contracts toward the axis of the housing (10), the regulating mechanism (40) has a flaring position where the regulating mechanism gradually expands away from the axis of the housing (10), and when the regulating mechanism (40) is located at the necking position, the mixed flow fan portion (30) can suck an external airflow into the housing (10) from the upper air port (11), so as to perform heat exchange with the heat exchanger (20), and then discharges the external airflow from the housing (10) by the lower air port (12). The temperature difference of the indoor temperature in the longitudinal direction can be very small, and the utilization rate of the energy generated by the air conditioner cabinet can be effectively improved.

Fig. 1



Description

Technical Field

[0001] The present application relates to a technical field of air conditioner equipment, and in particular to a cabinet air conditioner and a control method. The present application claims a priority of Chinese Application No. 201910713842.4, filed in the Chinese Patent Office on August 2, 2019, and entitled "Air Conditioner Cabinet and Control Method", the entire contents of which are herein incorporated by reference.

Background

[0002] At present, vertical cabinet air conditioners mainly include square upper air outlet cabinets, circular long air outlet cabinets, and distributed air supply cabinets that simultaneously discharge air up and down. Due to characteristics of cold and hot air that cold air sinks and hot air floats, a problem of heat layering of indoor air can be caused during refrigerating and heating air supply processes, and since an air return position of a air conditioner cabinet is not changed, the heat distribution will not change. An air conditioner exchanges heat according to the indoor temperature, a problem of heat layering of the distributed air supply cabinet is relatively small, a difference between upper and lower temperatures is relatively small, but a problem of low energy utilization efficiency caused by the characteristics of cold and hot air cannot be overcome yet.

Summary

[0003] The main purpose of the present application is to provide an air conditioner cabinet and a control method, so as to solve a problem of low refrigerating capacity utilization rate in the prior art.

[0004] In order to achieve the above purpose, according to one aspect of the present application, a air conditioner cabinet is provided, including: a housing, wherein the housing is provided with an upper air port and a lower air port; a mixed flow fan portion, wherein the mixed flow fan portion is disposed in the housing; and a regulating mechanism, wherein the regulating mechanism is disposed in the housing, the regulating mechanism has a necking position and a flaring position, and when the regulating mechanism is located at the necking position, the mixed flow fan portion sucks an external airflow into the housing from the upper air port, and then discharges the external airflow from the housing by the lower air port.

[0005] In some embodiments, the air conditioner cabinet includes: a heat exchanger, wherein the heat exchanger is disposed in the housing and is located between the upper air port and the lower air port, the regulating mechanism is located between the mixed flow fan portion and the heat exchanger, the regulating mechanism has the necking position where the regulating mechanism contracts toward an axis of the housing, the regulating mechanism has the flaring position where the regulating mechanism gradually expands away from the axis of the housing, and when the regulating mechanism is located at the necking position, the mixed flow fan portion sucks the external airflow into the housing from the upper air port, so as to perform heat exchange with the heat exchanger, and then discharges the external airflow from the housing by the lower air port.

[0006] In some embodiments, when the regulating mechanism is located at the flaring position, the mixed flow fan portion sucks the external airflow into the housing from the lower air port, so as to perform heat exchange with the heat exchanger, and then discharges the external airflow from the housing by the upper air port.

[0007] In some embodiments, the air conditioner cabinet includes an air duct, the air duct includes a first air duct and a second air duct, the first air duct is disposed in the housing, a first end of the first air duct is communicated with the lower air port, a second end of the first air duct is connected with the regulating mechanism, the regulating mechanism and the first air duct are enclosed to form the second air duct, and the mixed flow fan portion is disposed in the first air duct.

[0008] In some embodiments, the air duct further includes a third air duct and a fourth air duct, the air conditioner cabinet includes a supporting portion, wherein the supporting portion is connected with an inner wall of the housing, the regulating mechanism is located below the supporting portion, an overflow channel is disposed on the supporting portion, and the heat exchanger is connected with the supporting portion.

[0009] In some embodiments, the heat exchanger is of a hollow structure, the hollow structure is communicated with the second air duct through the overflow channel, so as to form the third air duct, an outer surface of the heat exchanger is disposed at a distance from the housing, so as to form the fourth air duct, and the fourth air duct is communicated with the upper air port and the third air duct.

[0010] In some embodiments, the supporting portion includes a water pan, wherein the water pan is connected with the housing, the overflow channel is formed on the water pan, and the water pan is used for collecting condensed water generated by the heat exchanger.

[0011] In some embodiments, the heat exchanger is of a barrel-shaped structure with an end opening at one end, an open end of the heat exchanger is connected with the water pan, an inner diameter of the open end of the heat exchanger is greater than an inner diameter of the overflow channel, and an airflow in the third air duct exchanges heat through a side wall of the heat exchanger and then flows into the fourth air duct, or, an airflow in the fourth air duct exchanges heat through a side wall of the heat exchanger and then flows into the third air duct.

[0012] In some embodiments, the regulating mechanism includes: a first regulating mechanism, wherein a first end of the first regulating mechanism is movably connected with the housing, a second end of the first regulating mechanism is connected with the mixed flow fan portion, and the first regulating mechanism has a necking position where the first regulating mechanism contracts toward an axis of the housing, and a flaring position where the first regulating mechanism gradually expands away from the axis of the housing.

[0013] In some embodiments, the regulating mechanism includes: a second regulating mechanism, wherein a first end of the second regulating mechanism is connected with the housing, a second end of the second regulating mechanism is connected with the mixed flow fan portion, and the second regulating mechanism has a necking position where the second regulating mechanism contracts toward an axis of the housing, and a flaring position where the second regulating mechanism gradually expands away from the axis of the housing.

nected with the second end of the first air duct, a second end of the first regulating mechanism is disposed away from the first air duct, the second end of the first regulating mechanism has the necking position close to the axis of the housing, and the second end of the first regulating mechanism has the flaring position away from the axis of the housing; and a second regulating mechanism, wherein a first end of the second regulating mechanism is movably connected with the water pan, a second end of the second regulating mechanism has the necking position close to the axis of the housing, and the second end of the second regulating mechanism has the flaring position away from the axis of the housing, when the first regulating mechanism and the second regulating mechanism are both located at the necking positions, the first end of the first regulating mechanism is in contact with the second end of the second regulating mechanism, and the first regulating mechanism and the second regulating mechanism are enclosed to form a sealed second air duct.

[0013] In some embodiments, when the first regulating mechanism and the second regulating mechanism are both located at the flaring positions, the first regulating mechanism is enclosed with at least one of the second regulating mechanism, the housing, the supporting portion and the water pan, so as to form the second air duct.

[0014] In some embodiments, when the first regulating mechanism and the second regulating mechanism are both located at the necking positions, a cross sectional area of the second air duct is configured to gradually decrease along a direction away from the mixed flow fan portion.

[0015] In some embodiments, when the first regulating mechanism and the second regulating mechanism are both located at the flaring positions, a cross sectional area of the air duct structure enclosed by the second regulating mechanism is configured to gradually increase along a direction toward the mixed flow fan portion.

[0016] In some embodiments, the first regulating mechanism includes: a plurality of a first arc-shaped regulating plate, a first end of each of the plurality of first arc-shaped regulating plate is hinged with an end side wall of the first air duct, a second end of each of the plurality of first arc-shaped regulating plate is disposed far away from the first air duct, the plurality of first arc-shaped regulating plates are disposed along a circumferential direction of the first air duct, and when each of the plurality of first arc-shaped regulating plates is located at the necking position, the plurality of first arc-shaped regulating plates are enclosed to form an annular air duct structure.

[0017] In some embodiments, the second end of the first arc-shaped regulating plate is provided with a folded edge, and the folded edge is bent toward a side of the housing.

[0018] In some embodiments, the second regulating mechanism includes: a plurality of second arc-shaped regulating plates, a first end of each of the plurality of second arc-shaped regulating plates is hinged with a bot-

tom of the water pan, a second end of each of the plurality of second arc-shaped regulating plate is disposed to be able to rotate around a hinge point of the first end of the second arc-shaped regulating plate and the water pan, the plurality of second arc-shaped regulating plates are disposed along a circumferential direction of the overflow channel, and when each of the plurality of second arc-shaped regulating plate located at the necking positions, the plurality of second arc-shaped regulating plates are enclosed to form an annular air duct structure.

[0019] In some embodiments, the supporting portion further includes: an annular supporting platform, wherein the annular supporting platform is connected with an inner wall of the housing, the water pan is connected with the annular supporting platform and is located above the annular supporting platform, and when the second arc-shaped regulating plate is located at the flaring position, the second end of the second arc-shaped regulating plate is in sealing connection with an inner circumferential surface of the annular supporting platform.

[0020] In some embodiments, a bottom of the annular supporting platform is provided with an inclined plane, and when the second arc-shaped regulating plate is located at the flaring position, a lower surface of the second arc-shaped regulating plate is parallel to the inclined plane.

[0021] In some embodiments, the heat exchanger is of a cylindrical structure, an axis of the heat exchanger is disposed along a vertical direction, and an end of the heat exchanger close to the upper air port is provided with a top plate.

[0022] According to another aspect of the present application, a method for controlling an air conditioner cabinet is provided. The method is used for controlling the above-mentioned air conditioner cabinet, and the method includes following steps: when a heating mode is selected by a controller of the air conditioner cabinet, the regulating mechanism is located at the necking position, the mixed flow fan portion sucks the external airflow into the housing from the upper air port, so as to perform heat exchange with the heat exchanger, and then discharges the external airflow from the housing through the lower air port; and when a refrigeration mode is selected by the controller, the regulating mechanism is located at the flaring position, the mixed flow fan portion sucks the external airflow into the housing from the lower air port, so as to perform heat exchange with the heat exchanger, and then discharges the external airflow from the housing through the upper air port.

[0023] In some embodiments, the air conditioner cabinet further includes an air supply mode, when the air supply mode is selected by the controller, the regulating mechanism is located at the necking position, the mixed flow fan portion sucks the external airflow into the housing from the upper air port, and then discharges the external airflow from the housing through the lower air port, or, when the air supply mode is selected by the controller, the regulating mechanism is located at the flaring posi-

tion, the mixed flow fan portion sucks the external airflow into the housing from the lower air port, and then discharges the external airflow from the housing through the upper air port, wherein the heat exchanger is in a non-working state in the air supply mode.

[0024] According to the technical solution of the present application, by disposing the regulating mechanism in the housing, and controlling the regulating mechanism to be located at the flaring position or the necking position, the air conditioner cabinet with the mixed flow fan portion can realize a mode of air inflow at the upper air port and air outflow at the lower air port, or, the air conditioner cabinet realizes a mode of air outflow at the upper air port and air inflow at the lower air port. Especially when the air conditioner cabinet is in the refrigeration mode, the mode of air outflow at the upper air port and air inflow at the lower air port is utilized, and when the air conditioner cabinet is in the heating mode, the mode of air inflow at the upper air port and air outflow at the lower air port is utilized, the problem of indoor heat layering can be effectively avoided, the temperature difference of the indoor temperature can be very small in the longitudinal direction, and the utilization rate of the energy generated by the air conditioner cabinet can be effectively improved.

Brief Description of the Drawings

[0025] The drawings constituting a part of the present application are used for providing a further understanding of the present application, and the exemplary embodiments of the present application and descriptions thereof are used for explaining the present application, but do not constitute improper limitations of the present application. In the drawings:

Fig. 1 illustrates a schematic structural diagram of an embodiment of an air conditioner cabinet according to the present application when an upper air port and a lower air port are closed;

Fig. 2 illustrates a schematic structural diagram of a first embodiment of the air conditioner cabinet according to the present application when the upper air port and the lower air port are open;

Fig. 3 illustrates a schematic structural diagram of an embodiment of the air conditioner cabinet according to the present application in the case of air inflow at the upper air port and air outflow at the lower air port;

Fig. 4 illustrates a schematic structural diagram of a second embodiment of the air conditioner cabinet according to the present application when the upper air port and the lower air port are open;

Fig. 5 illustrates a schematic structural diagram of

an embodiment of the air conditioner cabinet according to the present application in the case of air outflow at the upper air port and air inflow at the lower air port;

Fig. 6 illustrates a schematic diagram of a sectional structure of an embodiment of the air conditioner cabinet according to the present application in the case of air outflow at the upper air port and air inflow at the lower air port; and

Fig. 7 illustrates a schematic diagram of a sectional structure of an embodiment of the air conditioner cabinet according to the present application in the case of air inflow at the upper air port and air outflow at the lower air port.

[0026] The above drawings include the following reference signs:

10. housing; 11. upper air port; 12. lower air port;

20. heat exchanger; 21. top plate;

30. mixed flow fan portion;

40. regulating mechanism; 41. first regulating mechanism; 411. first arc-shaped regulating plate; 412. folded edge;

42. second regulating mechanism; 421. second arc-shaped regulating plate;

51. first air duct; 52. second air duct; 53. third air duct; 54. fourth air duct;

60. supporting portion; 61. water pan; 62. annular supporting platform; and

70. overflow channel.

Detailed Description of the Embodiments

[0027] It should be noted that, the embodiments in the present application and the features in the embodiments can be combined with each other if there is no conflict. Hereinafter, the present application will be described in detail with reference to the drawings and in conjunction with the embodiments.

[0028] It should be noted that, the terms used here are only for describing specific embodiments, and are not intended to limit the exemplary embodiments according to the present application. As used herein, unless the context clearly indicates otherwise, a singular form is also intended to include a plural form. In addition, it should also be understood that, when the terms "comprising" and/or "including" are used in this specification, they indicate the presence of features, steps, operations, devices, components, and/or combinations thereof.

[0029] It should be noted that, the terms "first" and "second" and the like in the description and the claims of the present application and the above-mentioned drawings are used for distinguishing similar objects, and are not necessarily used for describing a specific sequence or order. It should be understood that the terms used in this way can be interchanged under appropriate circumstances, so that the embodiments of the present application described herein, for example, can be implemented in an order other than those illustrated or described herein. In addition, the terms "including" and "having" and any variations thereof are intended to cover non-exclusive inclusions, for example, processes, methods, systems, products, or devices that include a series of steps or units are not necessarily limited to those clearly listed steps or units, but can include other steps or units that are not clearly listed or are inherent to these processes, methods, products, or devices.

[0030] Now, the exemplary embodiments according to the present application will be described in more detail with reference to the drawings. However, these exemplary embodiments can be implemented in a variety of different forms, and should not be construed as being limited to the embodiments set forth herein. It should be understood that, these embodiments are provided to make the disclosure of the present application thorough and complete, and to fully convey the concept of these exemplary embodiments to those of ordinary skill in the art. In the drawings, for clarity, the thicknesses of layers and regions may be enlarged, and the same reference signs are used for denoting the same devices, and thus their descriptions will be omitted.

[0031] As shown in Fig. 1 to Fig. 7, according to a specific embodiment of the present application, an air conditioner cabinet is provided.

[0032] In some embodiments, as shown in Fig. 1 and Fig. 7, the air conditioner cabinet includes a housing 10, a heat exchanger 20, a mixed flow fan portion 30 and a regulating mechanism 40. The housing 10 is provided with an upper air port 11 and a lower air port 12. The heat exchanger 20 is disposed in the housing 10 and is located between the upper air port 11 and the lower air port 12. The mixed flow fan portion 30 is disposed in the housing 10. The regulating mechanism 40 is disposed in the housing 10, the regulating mechanism 40 is located between the mixed flow fan portion 30 and the heat exchanger 20, the regulating mechanism 40 has a necking position where the regulating mechanism contracts toward the axis of the housing 10, and the regulating mechanism 40 has a flaring position where the regulating mechanism gradually expands away from the axis of the housing 10, and when the regulating mechanism 40 is located at the necking position, the mixed flow fan portion 30 can suck external airflow into the housing 10 from the upper air port 11, so as to perform heat exchange with the heat exchanger 20, and then discharges the external airflow from the housing 10 by the lower air port 12.

[0033] In some embodiments, by disposing the regu-

lating mechanism in the housing, and controlling the regulating mechanism to be located at the flaring position or the necking position, the air conditioner cabinet with the mixed flow fan portion can realize a mode of air inflow at the upper air port and air outflow at the lower air port, or, the air conditioner cabinet realizes a mode of air outflow at the upper air port and air inflow at the lower air port. Especially when the air conditioner cabinet is in a refrigeration mode, the mode of air outflow at the upper air port and air inflow at the lower air port is utilized, and when the air conditioner cabinet is in a heating mode, the mode of air inflow at the upper air port and air outflow at the lower air port is utilized, the problem of indoor heat layering can be effectively avoided, the temperature difference of the indoor temperature can be very small in the longitudinal direction, and the utilization rate of the energy generated by the air conditioner cabinet can be effectively improved.

[0034] As shown in Fig. 6, when the regulating mechanism 40 is located at the flaring position, the mixed flow fan portion 30 can suck the external airflow into the housing 10 from the lower air port 12, so as to perform heat exchange with the heat exchanger 20, and then discharges the external airflow from the housing 10 by the upper air port 11. The air inflow direction and the air outflow direction of the housing can be changed by disposing the regulating mechanism 40 in the housing, this setting can solve the problem in the prior art that the air inflow mode of the housing can only be changed by utilizing a plurality of fans in the housing, and moreover, in this embodiment, the air inflow mode of the housing can be changed without changing the rotation direction of the mixed flow fan portion 30, such that the practicability of the air conditioner cabinet is effectively improved.

[0035] In some embodiments, as shown in Fig. 6 and Fig. 7, the air conditioner cabinet includes an air duct. The air duct includes a first air duct 51 and a second air duct 52. The first air duct 51 is disposed in the housing 10, a first end of the first air duct 51 is communicated with the lower air port 12, a second end of the first air duct 51 is connected with the regulating mechanism 40, the regulating mechanism 40 and the first air duct 51 are enclosed to form the second air duct 52, and the mixed flow fan portion 30 is disposed in the first air duct 51. By means of this setting, the sealing property between the regulating mechanism 40 and the first air duct 51 can be improved, so that the airflow at the lower air port 12 can smoothly enter the housing through the second air duct 52, so as to perform heat exchange with the heat exchanger.

[0036] In some embodiments, the air duct further includes a third air duct 53 and a fourth air duct 54, and the air conditioner cabinet includes a supporting portion 60. The supporting portion 60 is connected with an inner wall of the housing 10. The regulating mechanism 40 is located below the supporting portion 60, an overflow channel 70 is disposed on the supporting portion 60, the heat exchanger 20 is connected with the supporting por-

tion 60, the heat exchanger 20 is of a hollow structure (that is, as shown in Fig. 6, the hollow structure is a hollow cylindrical structure enclosed by a heat exchanger body), the hollow structure is communicated with the second air duct 52 through the overflow channel 70, so as to form the third air duct 53, an outer surface of the heat exchanger 20 is disposed at a distance from the housing 10, so as to form the fourth air duct 54, and the fourth air duct 54 is communicated with the upper air port 11 and the third air duct 53. By means of this setting, the installation stability of the heat exchanger can be effectively improved, the airflow at the outside of the housing can also enter the fourth air channel 54 from the third air duct 53 effectively and conveniently, or, the airflow at the outside of the housing can enter the third air duct 53 from the fourth air duct 53 conveniently.

[0037] In order to effectively drain condensed water generated in the air conditioner cabinet in time, a water pan 61 is disposed on the supporting portion 60. The water pan 61 is connected with the housing 10, the overflow channel 70 is formed on the water pan 61, and the water pan 61 is used for collecting the condensed water generated by the heat exchanger 20.

[0038] The heat exchanger 20 is of a barrel-shaped structure with an opening at one end, an open end of the heat exchanger 20 is connected with the water pan 61, an inner diameter of the open end of the heat exchanger 20 is greater than an inner diameter of the overflow channel 70, and an airflow in the third air duct 53 exchanges heat through a side wall of the heat exchanger 20 and then flows into the fourth air duct 54, or, an airflow in the fourth air duct 54 can exchanges heat through a side wall of the heat exchanger 20 and then flows into the third air duct 53. By means of this setting, the heat exchange area between the airflow and the heat exchanger can be increased. The annular fourth air channel 54 is formed between the outer surface of the heat exchanger 20 and the inner wall of the housing. Of course, a part of the side wall of the heat exchanger 20 can also be disposed in an installation manner connected with the side wall of the housing. In some embodiments, the axis of the heat exchanger 20 is coincided with the axis of the housing in the vertical direction.

[0039] The regulating mechanism 40 includes a first regulating mechanism 41 and a second regulating mechanism 42. The first end of the first regulating mechanism 41 is movably connected with the second end of the first air duct 51, a second end of the first regulating mechanism 41 is disposed away from the first air duct 51, the second end of the first regulating mechanism 41 has the necking position close to the axis of the housing 10, and the second end of the first regulating mechanism 41 has the flaring position away from the axis of the housing 10. A first end of the second regulating mechanism 42 is movably connected with the water pan 61. The second end of the second regulating mechanism 42 has the necking position close to the axis of the housing 10, and the second end of the second regulating mechanism 42 has

the flaring position away from the axis (that is, the geometric centerline of the housing 10 in the vertical direction) of the housing 10, when the first regulating mechanism 41 and the second regulating mechanism 42 are both located at the necking positions, the first end of the first regulating mechanism 41 is in contact with the second end of the second regulating mechanism 42, and the first regulating mechanism 41 and the second regulating mechanism 42 are enclosed to form a sealed second air duct 52. By means of this setting, the structures of the first regulating mechanism 41 and the second regulating mechanism 42 are simple, and a switching operation between different positions can be realized easily.

[0040] When the first regulating mechanism 41 and the second regulating mechanism 42 are both located at the flaring positions, the first regulating mechanism 41 is enclosed with at least one of the second regulating mechanism 42, the housing 10, the supporting portion 60 and the water pan 61, so as to form the second air duct 52. By means of this setting, no matter what state the regulating mechanism is in, a sealed channel structure is always enclosed between the regulating mechanism and the housing. By means of this setting, the situation of air leakage inside the air conditioner cabinet can be avoided, and thus the reliability of the air conditioner cabinet is improved.

[0041] When the first regulating mechanism 41 and the second regulating mechanism 42 are both located at the necking positions, a cross sectional area of the second air duct 52 is configured to gradually decrease along a direction away from the mixed flow fan portion 30. When the second regulating mechanism 42 are both located at the flaring positions, the cross sectional area of the air duct structure enclosed by the second regulating mechanism 42 is configured to gradually increase along a direction toward the mixed flow fan portion 30. By changing the cross sectional area of an air inflow channel at the upper end of the mixed flow fan portion, the mixed flow fan portion 30 can realizes the function of air suction or air supply. By means of this setting, there is no need to separately dispose a plurality of fans to realize the function of air suction or air supply respectively, such that the practicability of the mixed flow fan portion 30 is effectively improved.

[0042] In some embodiments, the first regulating mechanism 41 includes a plurality of a first arc-shaped regulating plate 411. A first end of each of the plurality of first arc-shaped regulating plate 411 is hinged with an end side wall of the first air duct 51, a second end of each of the plurality of first arc-shaped regulating plate 411 is disposed far away from the first air duct 51, the plurality of first arc-shaped regulating plates 411 are disposed along a circumferential direction of the first air duct 51, and when each of the plurality of first arc-shaped regulating plates 411 is located at the necking position, the plurality of first arc-shaped regulating plates 411 are enclosed to form an annular air duct structure. A driving portion can be disposed inside the housing to drive the

first arc-shaped regulating plate 411 to rotate. The driving portion can drive a single first arc-shaped regulating plate 411 alone, or one driving portion can simultaneously drive the plurality of first arc-shaped regulating plates 411 to rotate. When the first arc-shaped regulating plates 411 are located at the flaring positions, the distances between each two first arc-shaped regulating plates 411 of the plurality of first arc-shaped regulating plates 411 become greater, therefore corresponding widths, lengths and curvatures of the first arc-shaped regulating plates 411 can be set under the premise of ensuring that when each of the plurality of first arc-shaped regulating plates 411 is located at the flaring position, the plurality of first arc-shaped regulating plates 411 can be enclosed to form a sealed air duct.

[0043] In some embodiments, the second end of the first arc-shaped regulating plate 411 is provided with a folded edge 412, and the folded edge 412 is bent toward a side of the housing 10. By means of this setting, the connection reliability between the first arc-shaped regulating plate 411 and the housing can be improved.

[0044] The second regulating mechanism 42 includes a plurality of second arc-shaped regulating plates 421. A first end of each of the plurality of second arc-shaped regulating plates 421 is hinged with the bottom of a water pan 61, and a second end of each of the plurality of second arc-shaped regulating plate 421 is disposed to be able to rotate around a hinge point of the first end of the second arc-shaped regulating plate 421 and the water pan 61. The plurality of second arc-shaped regulating plates are disposed along a circumferential direction of the overflow channel, the plurality of second arc-shaped regulating plates 421 are disposed along a circumferential direction of the overflow channel 70, and when each of the plurality of second arc-shaped regulating plate 421 is located at the necking positions, the plurality of second arc-shaped regulating plates 421 are enclosed to form an annular air duct structure. By setting the second regulating mechanism 42 into an arc-shaped regulating plate-like structure, the processing difficulty of the second regulating mechanism can be reduced. At the same time, the structure is simple, and the operation reliability is high. The driving mode of the second regulating mechanism can be the driving mode of the first regulating mechanism.

[0045] In some embodiments, the supporting portion 60 further includes an annular supporting platform 62. The annular supporting platform 62 is connected with an inner wall of the housing 10. The water pan 61 is connected with the annular supporting platform 62 and is located above the annular supporting platform 62, and when the second arc-shaped regulating plate 421 is located at the flaring position, the second end of the second arc-shaped regulating plate 421 is in sealing connection with an inner circumferential surface of the annular supporting platform 62. By means of this setting, the installation stability of the water pan can be improved, and the sealing property between the regulating mechanism and the housing is improved.

[0046] A bottom of the annular supporting platform 62 is provided with an inclined plane, and when the second arc-shaped regulating plate 421 is located at the flaring position, a lower surface of the second arc-shaped regulating plate 421 is parallel to the inclined plane. By means of this setting, the wind resistance of the airflow can be effectively reduced, and the flow noise of the airflow is reduced.

[0047] In some embodiments, the heat exchanger 20 is of a cylindrical structure, an axis of the heat exchanger 20 is disposed along a vertical direction, and an end of the heat exchanger 20 close to the upper air port 11 is provided with a top plate 21. By means of this setting, the airflow can only enter or exit through a side wall of the heat exchanger, thereby increasing the heat exchange area between the airflow and the heat exchanger, and improving the heat exchange performance of the air conditioner cabinet. In some embodiments, the heat exchanger is an evaporator.

[0048] In some embodiments, the air conditioner cabinet with this structure can realize the selection of comfortable air outflow function of upper and lower convection, optimize the distribution of an indoor temperature field, and improve the energy utilization efficiency. In some embodiments, one air port is disposed above and below the vertical air conditioner cabinet respectively, the internal structure is provided with a mixed flow fan structure, different air outflow modes of upper and lower convection are realized through the transformation of the internal mechanism by means of utilizing the characteristics of the mixed flow fan, therefore upper and lower circulation convection is realized in the refrigeration and heating modes. During refrigeration, air is discharged from the upper air port and returns from the lower air port, and during heating, the air is discharged from the lower air port and returns from the upper air port. Heat recovery and utilization can be carried out according to the characteristics of cold and hot air, and then the operating mode of the whole machine can be regulated, so as to achieve the effects of energy saving, comfort and power saving.

[0049] As shown in Fig. 6 and Fig. 7, the inside of the housing includes a base, a mixed flow fan, an air duct, a water pan, an evaporator, a regulating mechanism, an upper air port, a lower air port and a top cover. The operation of the product mainly relies on the characteristics of the mixed flow fan, the mixed flow fan is a fan between a centrifugal fan and an axial flow fan, which can output the effects of axial working and centrifugal working, in-depth research on the mixed flow fan shows that, the mixed flow fan has different output conditions under different internal pressures, in the structure shown in the figure, when the internal regulating mechanism is fully opened, the pressure of the internal channel becomes smaller, then the mixed flow fan will do more work in an axial flow mode, as a result, the fan sucks air from the lower air port and supplies the air upward, the air passes through the evaporator from both sides for heat exchange

through a middle through hole position of the water pan, and is finally gathered at the upper air port for air supply. When the internal regulating mechanism is closed to a necking, the pressure in the internal air duct becomes greater, then the mixed flow fan will do more work in a centrifugal mode, such that the fan supplies the air radially and directly from the lower air port next to the fan, resulting in internal air suction, and as a result, a reverse operation mode is realized. The air enters from the upper air port, passes through the evaporator from the surrounding to the middle, and enters the air duct from the middle position of the water pan. The air is supplied to the lower air port under the driven of the fan, so as to realize the purpose of lower air supply.

[0050] According to another embodiment of the present application, a method for controlling an air conditioner cabinet is provided. The method is used for controlling the above-mentioned air conditioner cabinet, and the method includes the following steps: when a heating mode is selected by a controller of the air conditioner cabinet, the regulating mechanism 40 is located at the necking position, the mixed flow fan portion 30 sucks the external airflow into the housing 10 from the upper air port 11, so as to perform heat exchange with the heat exchanger 20, and then discharges the external airflow from the housing 10 through the lower air port 12; and when a refrigeration mode is selected by the controller, the regulating mechanism 40 is located at the flaring position, the mixed flow fan portion 30 sucks the external airflow into the housing 10 from the lower air port 12, so as to perform heat exchange with the heat exchanger 20, and then discharges the external airflow from the housing 10 through the upper air port 11. The air conditioner cabinet further includes an air supply mode, when the air supply mode is selected by the controller, the regulating mechanism 40 is located at the necking position, the mixed flow fan portion 30 sucks the external airflow into the housing 10 from the upper air port 11, and then discharges the external airflow from the housing 10 through the lower air port 12, or, when the air supply mode is selected by the controller, the regulating mechanism 40 is located at the flaring position, the mixed flow fan portion 30 sucks the external airflow into the housing 10 from the lower air port 12, and then discharges the external airflow from the housing 10 through the upper air port 11, and the heat exchanger 20 is in a non-working state in the air supply mode, that is, the heat exchanger does not perform heat exchange work.

[0051] For ease of description, spatially relative terms can be used here, for example, "on", "above", "on the surface of", "on the top" and the like are used for describing the spatial positional relationship between one device or feature and other devices or features shown in the figure. It should be understood that, the spatially relative terms are intended to encompass different orientations in use or operation other than the orientation of the device described in the figure. For example, if the device in the figure is inverted, then it is described as "above other

devices or structures", or the device "above other devices or structures" will be positioned as "below other devices or structures" or "under other devices or structures". Thus, the exemplary term "above" can include two orientations of "above" and "below". The device can also be positioned in other different ways (rotated by 90 degrees or in other orientations), and the spatially relative description used here is explained accordingly.

[0052] In addition to the above description, it should be noted that "one embodiment", "another embodiment", "embodiment" and the like mentioned in this specification refer to that specific features, structures, or features described in conjunction with this embodiment are included in at least one embodiment that is described generally in the present application. The same expression at multiple places in the specification does not necessarily refer to the same embodiment. Furthermore, when a specific feature, structure or characteristic is described in combination with any embodiment, it is claimed that the implementation of this feature, structure or characteristic in conjunction with other embodiments also falls within the scope of the present application.

[0053] In the above-mentioned embodiments, the description of each embodiment has its own focus. For parts that are not described in detail in a certain embodiment, reference can be made to related descriptions of other embodiments.

[0054] The foregoing descriptions are only preferred embodiments of the present application, and are not intended to limit the present application. For those skilled in the art, the present application can have various modifications and changes. Any modifications, equivalent replacements, improvements, and the like, made within the spirit and principle of the present application shall all be included in the protection scope of the present application.

Claims

1. An air conditioner cabinet, comprising:

a housing (10), wherein the housing (10) is provided with an upper air port (11) and a lower air port (12);
a mixed flow fan portion (30), wherein the mixed flow fan portion (30) is disposed in the housing (10); and
a regulating mechanism (40), wherein the regulating mechanism (40) is disposed in the housing (10), the regulating mechanism (40) has a necking position and a flaring position, and when the regulating mechanism (40) is located at the necking position, the mixed flow fan portion (30) sucks an external airflow into the housing (10) from the upper air port (11), and then discharges the external airflow from the housing (10) by the lower air port (12).

2. The air conditioner cabinet as claimed in claim 1, wherein the air conditioner cabinet comprises: a heat exchanger (20), wherein the heat exchanger (20) is disposed in the housing (10) and is located between the upper air port (11) and the lower air port (12), the regulating mechanism (40) is located between the mixed flow fan portion (30) and the heat exchanger (20), the regulating mechanism (40) has the necking position where the regulating mechanism contracts toward an axis of the housing (10), the regulating mechanism (40) has the flaring position where the regulating mechanism gradually expands away from the axis of the housing (10), and when the regulating mechanism (40) is located at the necking position, the mixed flow fan portion (30) sucks the external airflow into the housing (10) from the upper air port (11), so as to perform heat exchange with the heat exchanger (20), and then discharges the external airflow from the housing (10) by the lower air port (12).
3. The air conditioner cabinet as claimed in claim 2, wherein when the regulating mechanism (40) is located at the flaring position, the mixed flow fan portion (30) sucks the external airflow into the housing (10) from the lower air port (12), so as to perform heat exchange with the heat exchanger (20), and then discharges the external airflow from the housing (10) by the upper air port (11).
4. The air conditioner cabinet as claimed in claim 2, wherein the air conditioner cabinet comprises an air duct, the air duct comprises a first air duct (51) and a second air duct (52), the first air duct (51) is disposed in the housing (10), a first end of the first air duct (51) is communicated with the lower air port (12), a second end of the first air duct (51) is connected with the regulating mechanism (40), the regulating mechanism (40) and the first air duct (51) are enclosed to form the second air duct (52), and the mixed flow fan portion (30) is disposed in the first air duct (51).
5. The air conditioner cabinet according to claim 4, wherein the air duct further comprises a third air duct (53) and a fourth air duct (54), the air conditioner cabinet comprises:
 - a supporting portion (60), wherein the supporting portion (60) is connected with an inner wall of the housing (10), the regulating mechanism (40) is located below the supporting portion (60), an overflow channel (70) is disposed on the supporting portion (60), and the heat exchanger (20) is connected with the supporting portion (60).
6. The air conditioner cabinet as claimed in claim 5, wherein the heat exchanger (20) is of a hollow structure, the hollow structure is communicated with the second air duct (52) through the overflow channel (70), so as to form the third air duct (53), an outer surface of the heat exchanger (20) is disposed at a distance from the housing (10), so as to form the fourth air duct (54), and the fourth air duct (54) is communicated with the upper air port (11) and the third air duct (53).
7. The air conditioner cabinet as claimed in claim 5, wherein the supporting portion (60) comprises: a water pan (61), wherein the water pan (61) is connected with the housing (10), the overflow channel (70) is formed on the water pan (61), and the water pan (61) is used for collecting condensed water generated by the heat exchanger (20).
8. The air conditioner cabinet as claimed in claim 7, wherein the heat exchanger (20) is of a barrel-shaped structure with an opening at one end, an open end of the heat exchanger (20) is connected with the water pan (61), an inner diameter of the open end of the heat exchanger (20) is greater than an inner diameter of the overflow channel (70), and an airflow in the third air duct (53) exchanges heat through a side wall of the heat exchanger (20) and then flows into the fourth air duct (54), or an airflow in the fourth air duct (54) exchanges heat through a side wall of the heat exchanger (20) and then flows into the third air duct (53).
9. The air conditioner cabinet as claimed in claim 7, wherein the regulating mechanism (40) comprises:
 - a first regulating mechanism (41), wherein a first end of the first regulating mechanism (41) is movably connected with the second end of the first air duct (51), a second end of the first regulating mechanism (41) is disposed away from the first air duct (51), the second end of the first regulating mechanism (41) has the necking position close to the axis of the housing (10), and the second end of the first regulating mechanism (41) has the flaring position away from the axis of the housing (10); and
 - a second regulating mechanism (42), wherein a first end of the second regulating mechanism (42) is movably connected with the water pan (61), a second end of the second regulating mechanism (42) has the necking position close to the axis of the housing (10), and the second end of the second regulating mechanism (42) has the flaring position away from the axis of the housing (10), when the first regulating mechanism (41) and the second regulating mechanism (42) are both located at the necking positions, the first end of the first regulating mechanism (41) is in contact with the second end of the second regulating mechanism (42).

ond regulating mechanism (42), and the first regulating mechanism (41) and the second regulating mechanism (42) are enclosed to form a sealed second air duct (52).

10. The air conditioner cabinet as claimed in claim 9, wherein when the first regulating mechanism (41) and the second regulating mechanism (42) are both located at the flaring positions, the first regulating mechanism (41) is enclosed with at least one of the second regulating mechanism (42), the housing (10), the supporting portion (60) and the water pan (61), so as to form the second air duct (52).
11. The air conditioner cabinet as claimed in claim 9, wherein when the first regulating mechanism (41) and the second regulating mechanism (42) are both located at the necking positions, a cross sectional area of the second air duct (52) is configured to gradually decrease along a direction away from the mixed flow fan portion (30).
12. The air conditioner cabinet as claimed in claim 9, wherein when the first regulating mechanism (41) and the second regulating mechanism (42) are both located at the flaring positions, a cross sectional area of the air duct structure enclosed by the second regulating mechanism (42) is configured to gradually increase along a direction toward the mixed flow fan portion (30).
13. The air conditioner cabinet as claimed in claim 9, wherein the first regulating mechanism (41) comprises:
a plurality of a first arc-shaped regulating plate (411), a first end of each of the plurality of first arc-shaped regulating plate (411) is hinged with an end side wall of the first air duct (51), a second end of each of the plurality of first arc-shaped regulating plate (411) is disposed far away from the first air duct (51), the plurality of first arc-shaped regulating plates (411) are disposed along a circumferential direction of the first air duct (51), and when each of the plurality of first arc-shaped regulating plates (411) is located at the necking position, the plurality of first arc-shaped regulating plates (411) are enclosed to form an annular air duct structure.
14. The air conditioner cabinet as claimed in claim 13, wherein the second end of the first arc-shaped regulating plate (411) is provided with a folded edge (412), and the folded edge (412) is bent toward a side of the housing (10).
15. The air conditioner cabinet as claimed in claim 9, wherein the second regulating mechanism (42) comprises:
a plurality of second arc-shaped regulating plates

(421), a first end of each of the plurality of second arc-shaped regulating plates (421) is hinged with a bottom of the water pan (61), a second end of each of the plurality of second arc-shaped regulating plate (421) is disposed to be able to rotate around a hinge point of the first end of the second arc-shaped regulating plate (421) and the water pan (61), the plurality of second arc-shaped regulating plates (421) are disposed along a circumferential direction of the overflow channel (70), and when each of the plurality of second arc-shaped regulating plate (421) is located at the necking positions, the plurality of second arc-shaped regulating plates (421) are enclosed to form an annular air duct structure.

16. The air conditioner cabinet as claimed in claim 15, wherein the supporting portion (60) further comprises:
an annular supporting platform (62), wherein the annular supporting platform (62) is connected with an inner wall of the housing (10), the water pan (61) is connected with the annular supporting platform (62) and is located above the annular supporting platform (62), and when the second arc-shaped regulating plate (421) is located at the flaring position, the second end of the second arc-shaped regulating plate (421) is in sealing connection with an inner circumferential surface of the annular supporting platform (62).
17. The air conditioner cabinet according to claim 16, wherein a bottom of the annular supporting platform (62) is provided with an inclined plane, and when the second arc-shaped regulating plate (421) is located at the flaring position, a lower surface of the second arc-shaped regulating plate (421) is parallel to the inclined plane.
18. The air conditioner cabinet as claimed in claim 2, wherein the heat exchanger (20) is of a cylindrical structure, an axis of the heat exchanger (20) is disposed along a vertical direction, and an end of the heat exchanger (20) close to the upper air port (11) is provided with a top plate (21).
19. A method for controlling an air conditioner cabinet, the method is used for controlling the air conditioner cabinet according to any one of claims 1-18, wherein the method comprises following steps:

when a heating mode is selected by a controller of the air conditioner cabinet, the regulating mechanism (40) is located at the necking position, the mixed flow fan portion (30) sucks the external airflow into the housing (10) from the upper air port (11), so as to perform heat exchange with the heat exchanger (20), and then discharges the external airflow from the housing

(10) through the lower air port (12); and
when a refrigeration mode is selected by the
controller, the regulating mechanism (40) is lo-
cated at the flaring position, the mixed flow fan
portion (30) sucks the external airflow into the 5
housing (10) from the lower air port (12), so as
to perform heat exchange with the heat ex-
changer (20), and then discharges the external
airflow from the housing (10) through the upper
air port (11). 10

- 20.** The method as claimed in claim 19, wherein the air
conditioner cabinet further comprises an air supply
mode, when the air supply mode is selected by the 15
controller, the regulating mechanism (40) is located
at the necking position, the mixed flow fan portion
(30) sucks the external airflow into the housing (10)
from the upper air port (11), and then discharges the
external airflow from the housing (10) through the 20
lower air port (12), or, when the air supply mode is
selected by the controller, the regulating mechanism
(40) is located at the flaring position, the mixed flow
fan portion (30) sucks the external airflow into the
housing (10) from the lower air port (12), and then 25
discharges the external airflow from the housing (10)
through the upper air port (11),
wherein the heat exchanger (20) is in a non-working
state in the air supply mode.

30

35

40

45

50

55

Fig. 1

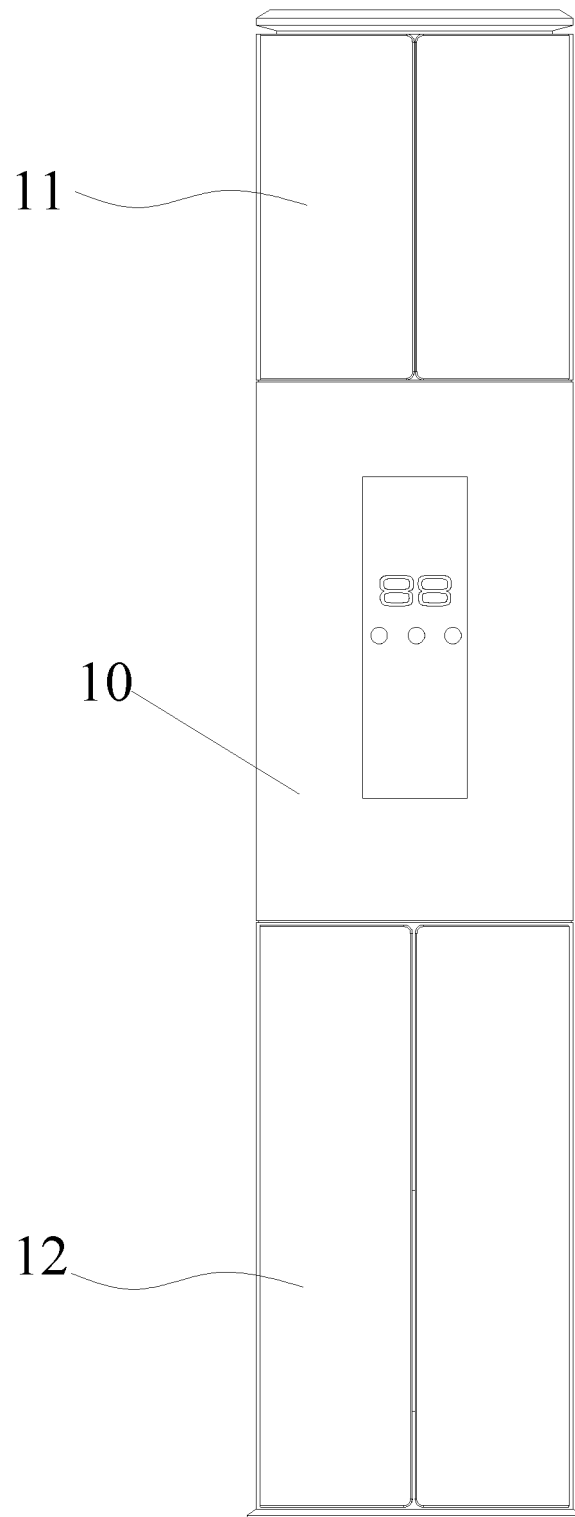


Fig. 2

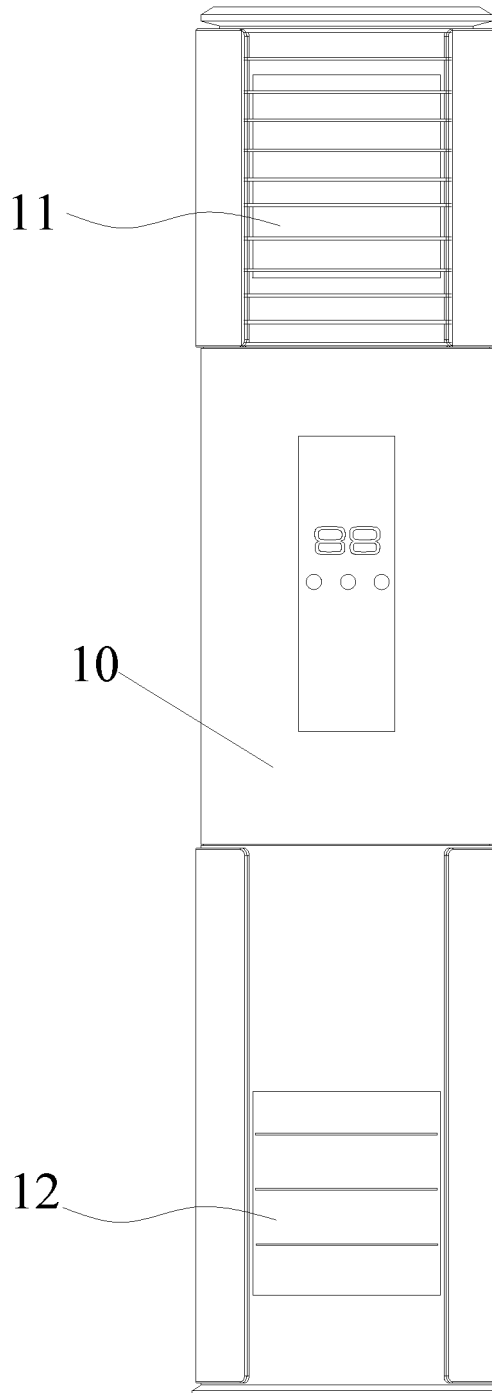


Fig. 3

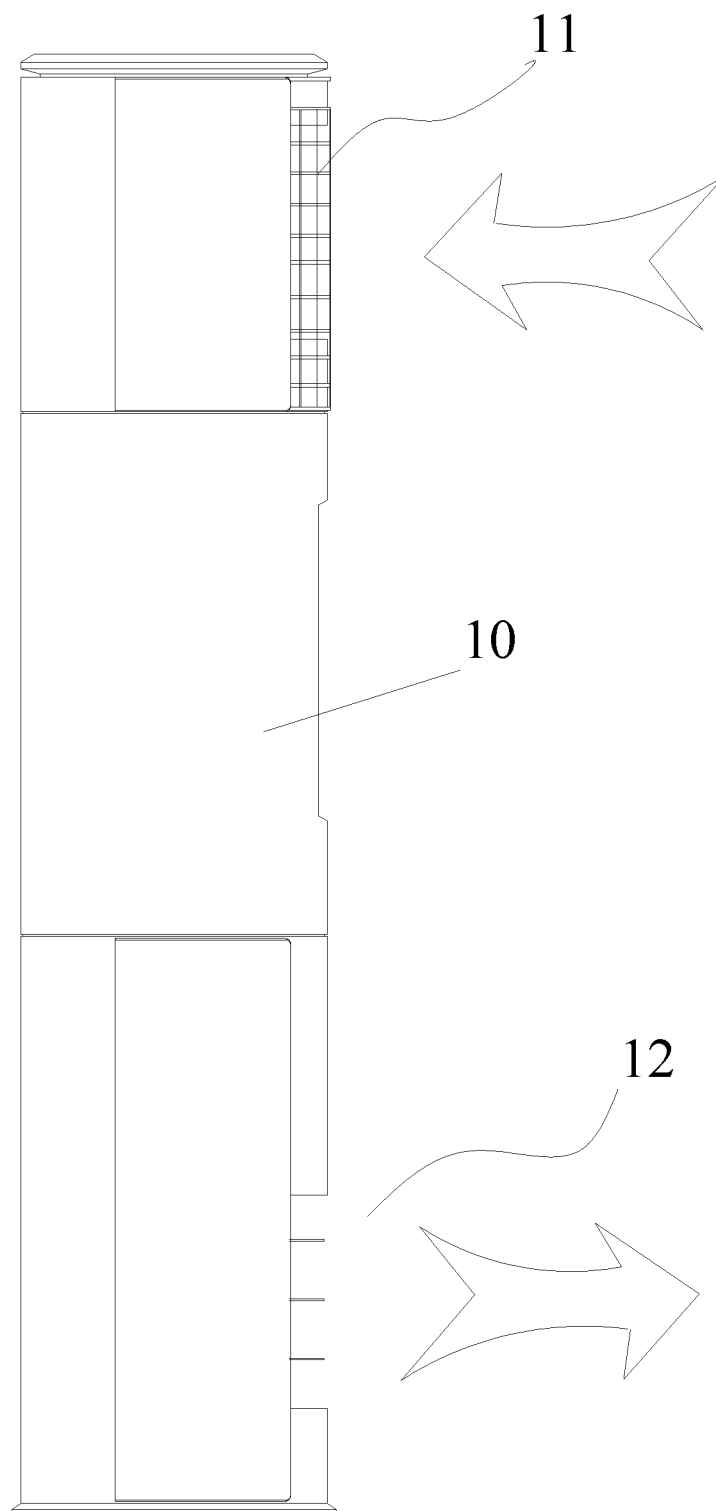


Fig. 4

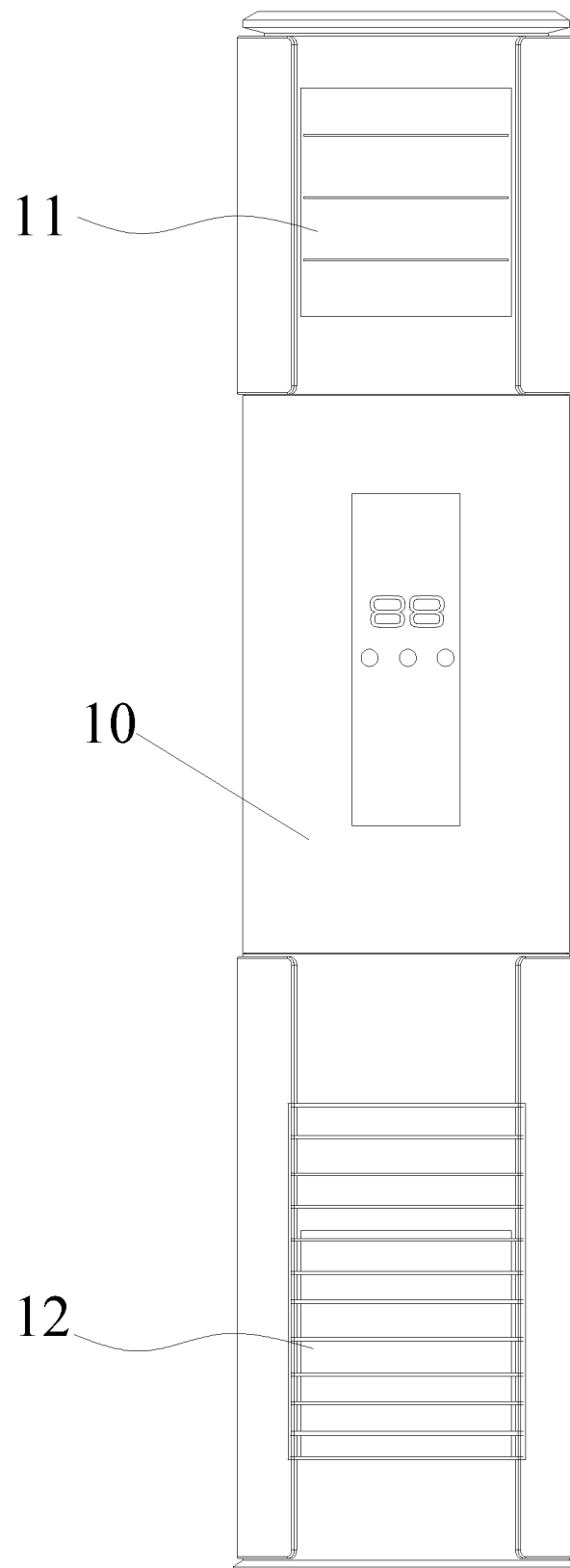


Fig. 5

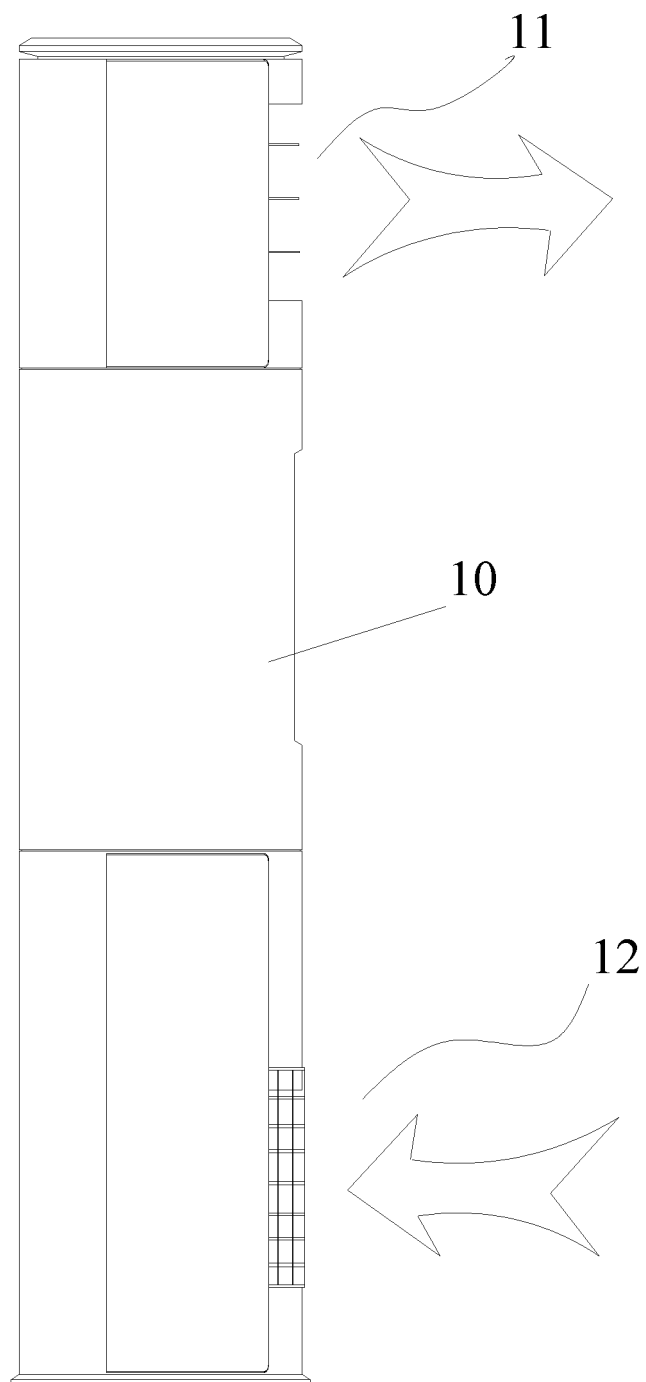


Fig. 6

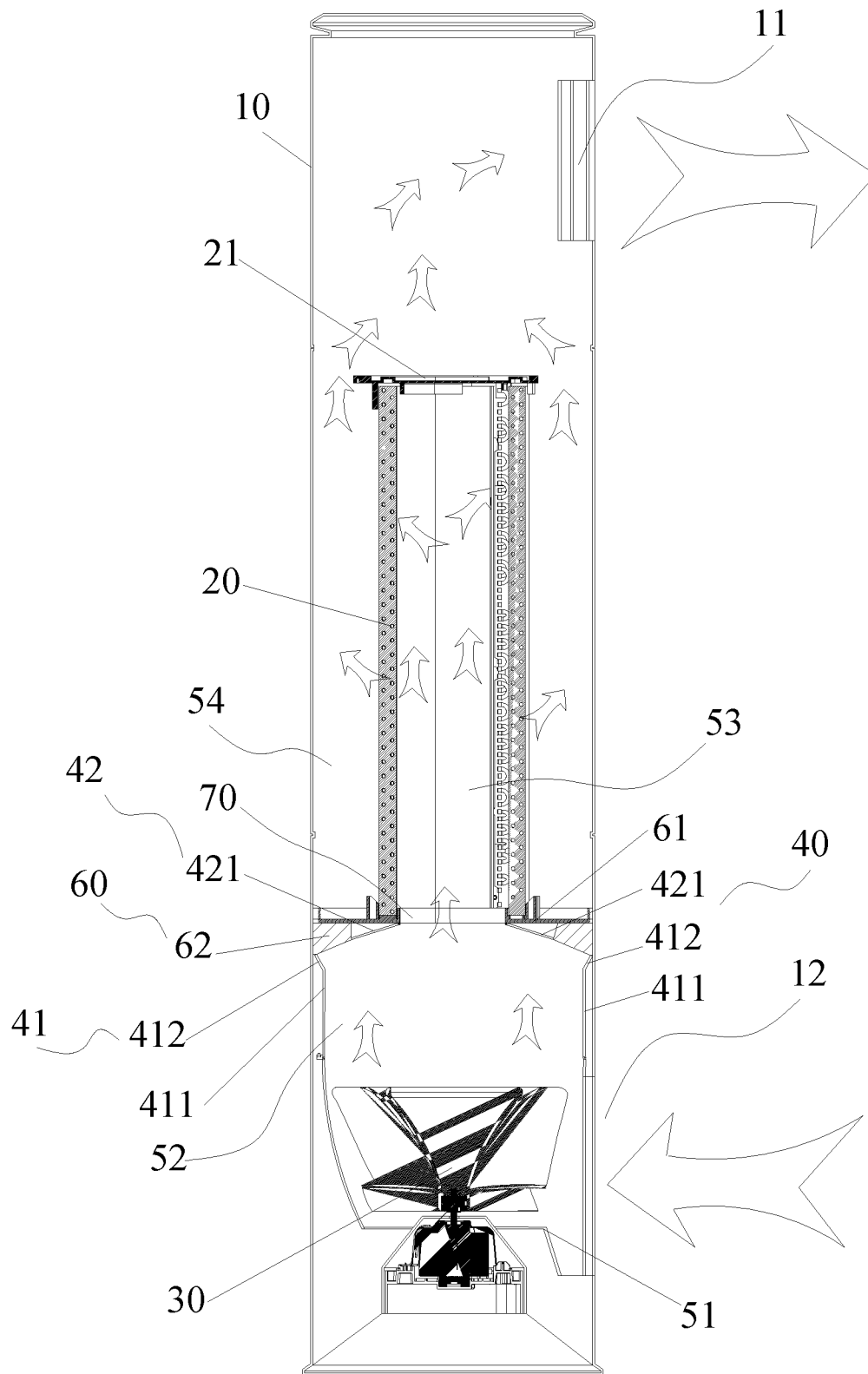
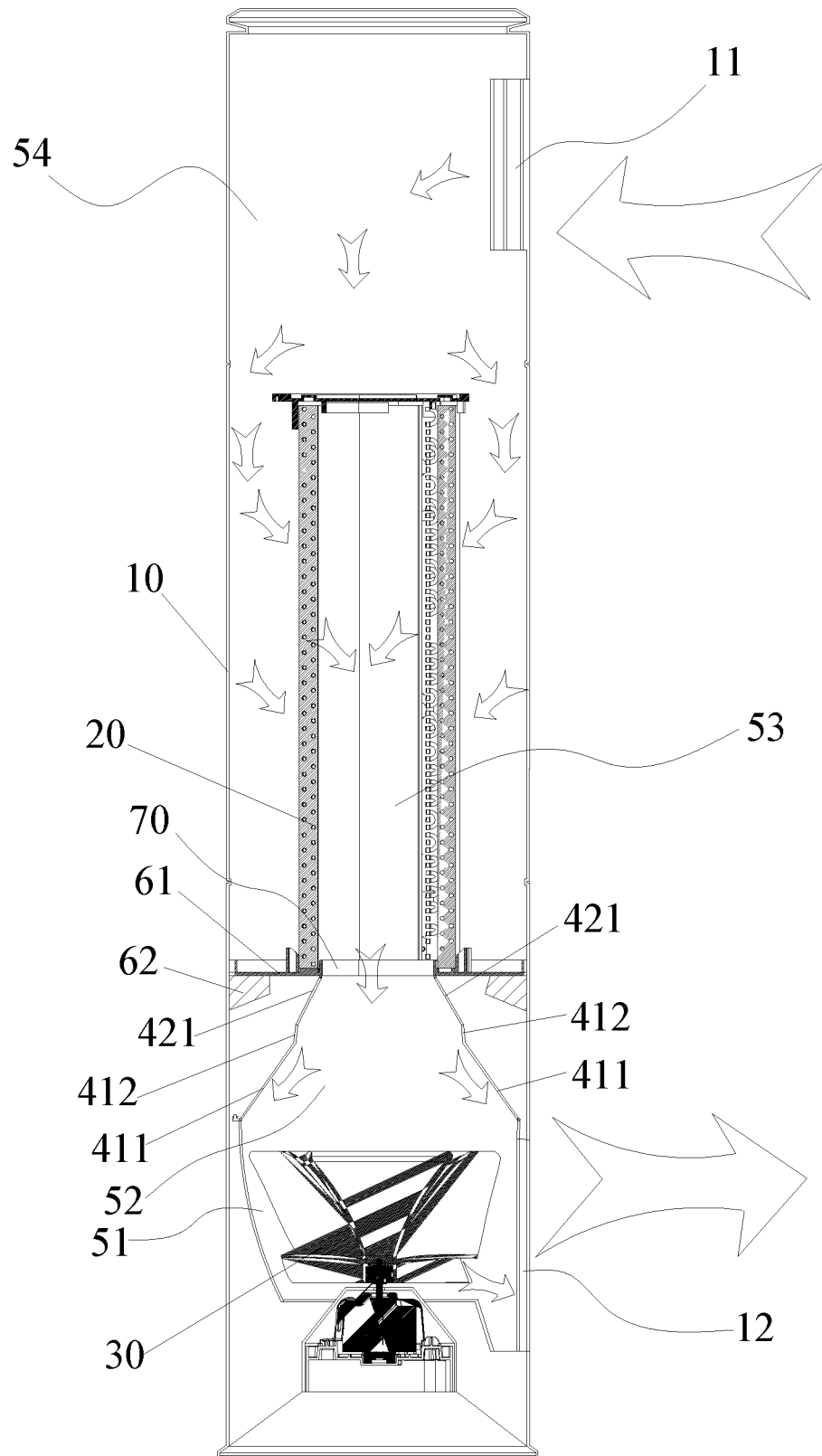


Fig. 7



INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/095224

A. CLASSIFICATION OF SUBJECT MATTER

F24F 1/0014(2019.01)i; F24F 1/0018(2019.01)i; F24F 1/0063(2019.01)i; F24F 11/67(2018.01)i; F24F 11/65(2018.01)i;
F24F 13/30(2006.01)i; F24F 13/22(2006.01)i; F24F 13/10(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24F1/-;F24F11/-;F24F13/-

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

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

CNABS, CNTXT, CNKI, DWPI, SIPOABS, EPTXT, USTXT, WOTXT, 柜机, 柜式, 落地式, 立式, 空调, 室内机, 上风口, 第一风口, 下风口, 第二风口, 风口, 出口, 混流风机, 混流风扇, 混流风叶, 混流叶轮, 风道, 流道, 缩口, 扩口, 收缩, 缩小, 张开, 扩张, 切换, 可变, 调节, 挡板, 板, 变形, 锥形, 锥型, 梯形, 梯型, 风向, 方向, 改变, 转变, 换向, 转向, 制冷, 制热, air condition+, stand+, floor, vertical+, port?, vent?, outlet?, upper, lower, mix+, fan?, motor?, channel?, passage?, neck+, shrink +, reduc+, stretch+, expan+, switch+, baffle?, adjust+, plate?, distort+, taper, trapezium, trapezoid, wind, direction?, chang+, turnover+, cooling, heating

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	CN 210740546 U (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 12 June 2020 (2020-06-12) claims 1-20	1-20
A	CN 206361810 U (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 28 July 2017 (2017-07-28) description paragraphs 0025-0036, figures 1-3	1-20
A	CN 103776203 A (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 07 May 2014 (2014-05-07) entire document	1-20
A	CN 105972700 A (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 28 September 2016 (2016-09-28) entire document	1-20
A	CN 2303198 Y (GD MIDEA HOLDING CO., LTD.) 06 January 1999 (1999-01-06) entire document	1-20

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

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

“E” earlier application or patent but published on or after the international filing date

“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

18 August 2020

Date of mailing of the international search report

28 August 2020

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
CN)
No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing
100088
China

Authorized officer

Facsimile No. (86-10)62019451

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/095224

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 208920209 U (QINGDAO HAIER AIR CONDITIONER GENERAL CO., LTD.) 31 May 2019 (2019-05-31) entire document	1-20
A	CN 103807922 A (DAIKIN INDUSTRIES, LTD.) 21 May 2014 (2014-05-21) entire document	1-20
A	JP H0331621 A (MATSUSHITA REFRIGERATION) 12 February 1991 (1991-02-12) entire document	1-20
A	JP 2005315531 A (FUJITSU GENERAL LTD.) 10 November 2005 (2005-11-10) entire document	1-20
A	US 5187949 A (SAMSUNG ELECTRONICS CO., LTD.) 23 February 1993 (1993-02-23) entire document	1-20

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2020/095224

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 210740546 U	12 June 2020	None	
CN 206361810 U	28 July 2017	None	
CN 103776203 A	07 May 2014	CN 103776203 B	01 February 2017
CN 105972700 A	28 September 2016	CN 105972700 B	27 November 2018
CN 2303198 Y	06 January 1999	None	
CN 208920209 U	31 May 2019	None	
CN 103807922 A	21 May 2014	CN 103807922 B	07 September 2016
		JP 2014092317 A	19 May 2014
		JP 5720657 B2	20 May 2015
JP H0331621 A	12 February 1991	None	
JP 2005315531 A	10 November 2005	None	
US 5187949 A	23 February 1993	KR 920007088 Y1	02 October 1992
		JP H0497218 U	24 August 1992
		JP 2509882 Y2	04 September 1996

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

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 201910713842 [0001]