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# (54) FRESH AIR MODULE AND AIR CONDITIONER

(57) Disclosed are a fresh air module and an air conditioner. The fresh air module includes a housing, a fan assembly and a purification assembly. The housing is provided with a fresh air inlet and a fresh air outlet. A fresh air duct is formed in the housing and communicates the fresh air inlet with the fresh air outlet. The fan assembly is mounted in the fresh air duct. The purification assembly is disposed in the fresh air duct and located at one end of the fan assembly in an axial direction of the fan assembly to correspond to an air inlet end of the fan assembly.

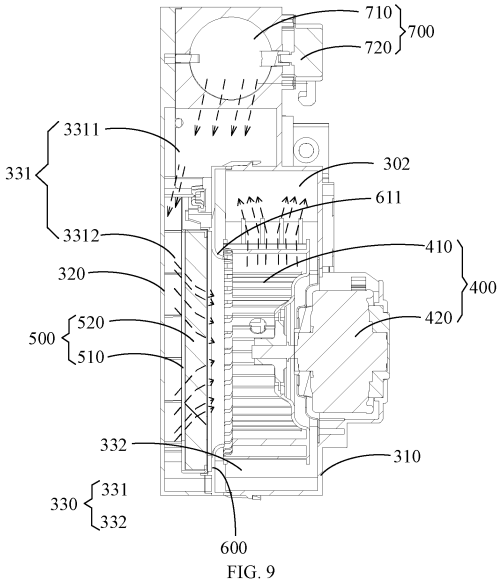

FIG. 9

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## Description

### CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** This application claims priority to Chinese Patent Application No. 202010240346.4, titled "Fresh Air Module and Air Conditioner" and filed on March 30, 2020. The entire content of the aforementioned application is incorporated in this application by reference in its entirety.

### TECHNICAL FIELD

**[0002]** The present application relates to the field of air conditioning, and in particular to a fresh air module and an air conditioner.

### BACKGROUND

**[0003]** In the related art, the air conditioners on the market are usually provided with fresh air modules, and fresh air of the outdoors can be introduced into the indoors by the fresh air modules, to replenish the amount of fresh air of the indoors and improve the air quality of the indoors. However, the outdoor air usually carries impurities such as dust and bacteria, which is bad for the physical health of users over time.

### SUMMARY

**[0004]** The main objective of the present application is to provide a fresh air module, which aim to improve the efficiency of the fresh air module for purifying the air.

**[0005]** In order to achieve the above objective, the present application provides a fresh air module. The fresh air module includes:

a housing provided with a fresh air inlet and a fresh air outlet, a fresh air duct being formed in the housing and communicating the fresh air inlet with the fresh air outlet;
a fan assembly mounted in the fresh air duct; and
a purification assembly disposed in the fresh air duct and located at one end of the fan assembly in an axial direction of the fan assembly to correspond to an air inlet end of the fan assembly.

**[0006]** In an embodiment, the fresh air module further includes a middle partition plate disposed in the fresh air duct, the middle partition plate is located at the air inlet end of the fan assembly and provided with a ventilation hole corresponding to the air inlet end of the fan assembly, and the purification assembly is mounted on the middle partition plate and located on an air inlet side of the ventilation hole.

**[0007]** In an embodiment, the fresh air outlet is provided on a front side wall of the housing, a mounting opening is provided on a side of the fresh air outlet, and the purification assembly is mounted on the middle partition plate and movable from the mounting opening in a pull-push manner.

**[0008]** In an embodiment, the middle partition plate is provided with a guide groove at a periphery of the air inlet side of the ventilation hole, the guide groove has an opening facing the mounting opening of the housing, and the guide groove is configured to guide the purification assembly to be mounted in a pull-push manner.

**[0009]** In an embodiment, a shape of the guide groove matches a shape of the purification assembly, and an inner wall surface of the guide groove is configured to contact an outer peripheral wall of the purification assembly to seal a gap therebetween.

**[0010]** In an embodiment, the guide groove has an arc-shaped guide wall surrounding the ventilation hole at a side away from the mounting opening and strip-shaped guide walls extending from two ends of the arc-shaped guide wall along a linear line towards the mounting opening, and two strip-shaped guide walls and the arc-shaped guide wall cooperate to form a semi-racetrack shape.

**[0011]** In an embodiment, two opposite sides of the purification assembly are provided with elastic buckles extending from the two opposite sides respectively, the two strip-shaped guide walls of the guide groove are recessed to form positioning grooves corresponding to the elastic buckles, and the positioning grooves are configured to clamp the elastic buckles correspondingly and positioning the purification assembly in the guide groove.

**[0012]** In an embodiment, a height of each strip-shaped guide wall extending from a surface of the middle partition plate is greater than a height of the arc-shaped guide wall extending from the surface of the middle partition plate.

**[0013]** In an embodiment, the purification assembly includes a mounting frame and a purifying member mounted on the mounting frame, and a ventilation area of the purifying member is greater than a ventilation area of the ventilation hole.

**[0014]** In an embodiment, the fresh air duct is divided by the middle partition plate into an air inlet cavity communicated with the fresh air inlet and an air outlet cavity communicated with the fresh air outlet, the air outlet cavity is communicated with the air inlet cavity through the ventilation hole of the middle partition plate, and the fan assembly is located in the air outlet cavity.

**[0015]** In an embodiment, the fan assembly includes a centrifugal wind wheel and a first motor, an air inlet end of the centrifugal wind wheel faces the ventilation hole of the middle partition plate, and the first motor is connected to another end of the centrifugal wind wheel.

**[0016]** In an embodiment, the housing includes:

a bottom housing provided with a first cavity and a second cavity, where the middle partition plate is arranged at an opening of the first cavity to cooperate with the first cavity to form the air outlet cavity; and
a cover is fitted with the bottom housing and covers the bottom housing,
a front air inlet cavity communicating with the fresh air inlet is formed between the cover and the second cavity, a rear air inlet cavity communicating with the ventilation hole is formed between the cover and the middle partition plate, and the rear air inlet cavity and the front air inlet cavity are communicated with each other to form the air inlet cavity.

**[0017]** The present application further provides an air conditioner. The air conditioner includes:

a casing provided with an air inlet, a first air outlet and a second air outlet, where the air inlet is in communication with the first air outlet; and
the fresh air module described above, where the fresh air module is mounted in the casing, the fresh air inlet of the fresh air module is configured to communicate with outdoors through a fresh air tube, and the fresh air outlet of the fresh air module is configured to communicate with the second air outlet.

**[0018]** In an embodiment, the air conditioner is any one of an indoor unit of a wall-mounted air conditioner, an indoor unit of a cabinet air conditioner, an air machine, an indoor unit of a ceiling type air conditioner or a mobile air conditioner.

**[0019]** In an embodiment, the casing of the indoor unit of the wall-mounted air conditioner includes a chassis, a frame and a panel, the fresh air module is mounted at an end of the chassis, the fresh air outlet of the fresh air module faces toward the panel, and the panel is provided with the second air outlet corresponding to the fresh air outlet.

**[0020]** According to the embodiments of the present application, the purification assembly is disposed at one end of the fan assembly along the axial direction of the fan assembly and corresponds to the air inlet end of the fan assembly, the large air inlet space at the air inlet end of the fan assembly can be utilized, so that the purification surface of the purification assembly, which is provided for the air to pass through and be purified, can be set to be larger, which improves the air purification efficiency of the purification assembly. In addition, since the purification assembly is correspondingly designed to be relatively large, the purification assembly can capture more air pollutants, the service life of the purification assembly is accordingly prolonged and it takes a longer period before a new purification assembly is needed.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0021]** In order to more clearly explain the embodiments of the present application or the technical solutions in the related art, the drawings used in the description of the embodiments or the related art will be briefly introduced below. Obviously, the drawings in the following description are merely some embodiments of the present application. For those of ordinary skill in the art, other drawings can be obtained based on the structure shown in these drawings without creative work.

FIG. 1 is a schematic view of an air conditioner according to an embodiment of the present application.
FIG. 2 is a schematic view of a fresh air module according to an embodiment of the present application.
FIG. 3 is a front view of the fresh air module of FIG. 2.
FIG. 4 is a cross-sectional view taken along line I-I in FIG. 3.
FIG. 5 is a cross-sectional view taken along line II-II in FIG. 3.
FIG. 6 is an enlarged view of portion A in FIG. 5.
FIG. 7 is an enlarged view of portion B in FIG. 5.
FIG. 8 is a schematic view showing that a handle of FIG. 7 has been rotated outwards.
FIG. 9 is a cross-sectional view of the fresh air module in FIG. 3. viewed from another perspective.
FIG. 10 is a schematic exploded view of the fresh air module in FIG. 3.
FIG. 11 is a schematic structural view of a bottom housing in FIG. 10.
FIG. 12 is a schematic structural view of a middle partition plate in FIG. 10.

FIG. 13 is a schematic structural view of assembling a purification assembly in FIG. 10.

Description of reference signs in the figures:,

**[0022]**

| Reference sign | Name | Reference sign | Name |
|---|---|---|---|
| 100 | Air conditioner | 420 | First motor |
| 110 | Casing | 500 | Purification assembly |
| 111 | Chassis | 510 | Mounting frame |
| 112 | Frame | 511 | Main frame |
| 113 | Panel | 512 | Side frame |
| 101 | Air inlet | 513 | End plate |
| 102 | First air outlet | | |
| 103 | Second air outlet | 520 | Purifying member |
| 200 | Fresh air module | 530 | Handle |
| 300 | Housing | 531 | Pressing portion |
| 310 | Bottom housing | 532 | Handheld portion |
| 311 | First cavity | 540 | Elastic buckle |
| 312 | Second cavity | 600 | Middle partition plate |
| 320 | Cover | 610 | Ventilation hole |
| 330 | Fresh air duct | 620 | Guide groove |
| 331 | Air inlet cavity | 621 | Arc-shaped guiding wall |
| 332 | Air outlet cavity | 622 | Strip-shaped guide wall |
| 301 | Fresh air inlet | 623 | Positioning groove |
| 302 | Fresh air outlet | 700 | Valve assembly |
| 303 | Mounting opening | 710 | Fresh air door |
| 400 | Fan assembly | 720 | Second motor |
| 410 | Centrifugal wind wheel | 800 | Fresh air tube |

**[0023]** The realization of the objectives, functional features and advantages of the present application will be further explained with reference to the accompanying drawings in combination with the embodiments.

## DETAILED DESCRIPTION OF THE EMBODIMENTS

**[0024]** It should be noted that all directional indicators (such as up, down, left, right, front, back, etc.) in the embodiments of the present application are only used to explain the relative positional relationship, movement situation, etc. between components in a specific attitude (as shown in the drawings). If the specific attitude changes, the directional indication also changes accordingly.

**[0025]** In addition, the descriptions related to "first", "second" and the like in the present application are for descriptive purposes only, and should not be understood as indicating or implying their relative importance or implicitly indicating the number of technical features indicated. Therefore, a feature defined by "first" and "second" may explicitly or implicitly include at least one of such feature. In addition, the technical solutions of the embodiments may be combined with each other, but must be based on what a person of ordinary skill in the art can achieve. When the combination of the technical solutions is contradictory or cannot be realized, it should be considered that the combination of the technical solutions does not exist, and is not within the claimed scope of the present application.

**[0026]** Referring to FIG. 1 to FIG. 13, the present application provides embodiments of a fresh air module and an air

conditioner including the fresh air module. The dashed arrows in FIG. 5 and FIG. 9 indicate an airflow direction. The fresh air module can improve the efficiency of air purification by the fresh air module. The air conditioner may be an indoor unit of a wall-mounted air conditioner, an indoor unit of a cabinet air conditioner, an air machine, an indoor unit of a ceiling type air conditioner or a mobile air conditioner. In the following embodiments, the indoor unit of the wall-mounted air conditioner is taken as an example for illustration, and provides reference for other types of air conditioner.

**[0027]** Referring to FIG. 2, FIG. 3 and FIG. 9, in an embodiment of the fresh air module 200, the fresh air module 200 includes a housing 300, a fan assembly 400 and a purification assembly 500. The housing 300 is provided with a fresh air inlet 301 and a fresh air outlet 302, and the housing 300 is provided with a fresh air duct 330 inside. The fresh air duct 330 communicates with the fresh air inlet 301 and the fresh air outlet 302. The fan assembly 400 and the purification assembly 500 are mounted in the fresh air duct 330, and the purification assembly 500 is located at an end of the fan assembly 400 along an axial direction of the fan assembly 400 and corresponds to an air inlet end of the fan assembly 400.

**[0028]** In an embodiment, the fresh air inlet 301 may be provided at a bottom of the housing 300, and the fresh air outlet 302 may be provided at a top, a front side, a left side or a right side of the housing 300, and the positions of the fresh air inlet 301 and the fresh air outlet 302 can be designed according to the types of the air conditioners employing the fresh air module in practical applications. In this embodiment, the fresh air inlet 301 can be provided at the bottom of the housing 300, and the fresh air outlet 302 can be provided at a front side of the housing 300. The fresh air inlet 301 and the fresh air outlet 302 are distributed in different radial directions of the fan assembly 400.

**[0029]** Referring to FIG. 5, when the fresh air module 200 works, the fan assembly 400 is turned on, and the fan assembly 400 drives fresh air to enter the fresh air duct 330 from the fresh air inlet 301. The fresh air flows to the air inlet end of the fan assembly 400 firstly, and is subsequently purified to be clean fresh air by the purification assembly 500 which is located at the air inlet end of the fan assembly 400. The clean fresh air enters the fan assembly from the air inlet end of the fan assembly 400 and is propelled by the fan assembly 400 along the radial directions to the fresh air outlet 302. Finally, the clean fresh air is blown out from the fresh air outlet 302.

**[0030]** The air enters the fan assembly 400 along the axial direction of the fan assembly 400 and exits the fan assembly 400 along the radial directions of the fan assembly 400. As compared to a narrower air inlet surface formed at the fresh air inlet 301 and the vicinity, a larger air inlet surface is formed at the air inlet end of the fan assembly 400, and thus a relatively large air inlet space is formed at the air inlet end of the fan assembly. Therefore, the purification assembly 500 is arranged to correspond to the air inlet end of the fan assembly 400, accordingly a purification surface of the purification assembly 500, which is provided for the air to pass through and be purified, can be set to be larger, and the efficiency of the purification assembly 500 to purify the air is improved. In addition, since the purification assembly 500 is correspondingly set to be relatively large, the amount of air that can be purified by the purification assembly 500 is accordingly increased, the service life of the purification assembly 500 is accordingly prolonged and it takes a longer period before a new purification assembly 500 is needed.

**[0031]** There are various schemes for the purification assembly 500, and the schemes are not limited herein. For example, the schemes include but are not limited to that the purification assembly 500 includes a mounting frame 510 and a purifying member 520 mounted on the mounting frame 510 (as shown in FIG. 13). The purifying member 520 may be adapted to remove any one or more types of air pollutant such as dust, fine particulate matter, microorganisms, and organic volatile gases such as formaldehyde in the air. The specific type of the purifying member 520 may be selected according to the function thereof, and the purifying member 520 may be any one or two of a conventional filter screen, an HEPA screen, a formaldehyde remover or an IFD filter, or be any one or more than one of a primary efficiency filter screen, a medium efficiency filter screen, and a high efficiency filter screen.

**[0032]** According to this embodiment of the present application, the purification assembly 500 is disposed at one end of the fan assembly 400 along the axial direction of the fan assembly 400 and corresponds to the air inlet end of the fan assembly 400, the large air inlet space at the air inlet end of the fan assembly 400 can be utilized, so that the purification surface of the purification assembly 500, which is provided for the air to pass through and be purified, can be set to be larger, which improves the air purification efficiency of the purification assembly 500. In addition, since the purification assembly 500 is correspondingly designed to be relatively large, the purification assembly 500 can capture more air pollutants, the service life of the purification assembly 500 is accordingly prolonged and it takes a longer period before a new purification assembly 500 is needed.

**[0033]** Referring to FIG. 3, FIG. 5 and FIG. 9, in an embodiment, the fresh air module 200 further includes a middle partition plate 600 disposed in the fresh air duct 330 and located at the air inlet end of the fan assembly 400. The middle partition plate 600 is provided with a ventilation hole 610 corresponding to the air inlet end of the fan assembly 400. The purification assembly 500 is mounted on the middle partition plate 600 and located on an air inlet side of the ventilation hole 610.

**[0034]** Referring to FIG. 2 and FIG. 10, in an embodiment, in order to facilitate disassembly and assembly of the purification assembly 500, the fresh air outlet 302 is provided on a front side wall of the housing 300, and a mounting opening 303 is provided on a side of the fresh air outlet 302. The purification assembly 500 is mounted on the middle partition plate 600 and movable from the mounting opening (303) in a pull-push manner.

**[0035]** In an embodiment, the mounting opening 303 is in an elongated strip shape and extended in the same direction as one side of the fresh air outlet 302. By mounting the purification assembly 500 to the middle partition plate 600 in a pull-push manner from the mounting opening 303, the purification assembly 500 has a working state after being mounted on the middle partition plate and corresponding to the ventilation hole 610 of the middle partition plate 600, and an idle state after being pulled out from the middle partition plate 600 through the mounting opening 303. In the working state, the purification assembly 500 can purify the airflow flowing into the air outlet cavity 332 from the air inlet cavity 331 through the ventilation hole 610 to remove pollutants in the air. In the idle state, the purification assembly 500 can be cleaned or replaced by the user. The user can switch the state of the purification assembly 500 by pulling the purification assembly 500 by hands, which is simple and easy to operate.

**[0036]** In addition, the fresh air outlet 302 of the fresh air module 200 usually faces an area where the user is located, and the mounting opening 303 for pulling or pushing the purification assembly 500 is disposed at a side of the fresh air outlet 302, that is, the mounting opening 303 faces the area where the user is located, so that it is convenient for the user to draw the purification assembly 500 from the front side to switch the states of the purification assembly 500.

**[0037]** Referring to FIG. 10 to FIG. 12, in an embodiment, in order to facilitate the pulling and pushing of the purification assembly 500 on the middle partition plate 600, the middle partition plate 600 is configured with a guide groove 620 at a periphery of the air inlet side of the ventilation hole 610. The guide groove 620 has an opening towards the mounting opening 303 of the housing 300, and the guide groove 620 is adapted to guide the pulling, pushing and mounting of the purification assembly 500. The opening of the guide groove 620 is docked with the mounting opening 303, so that after the purification assembly 500 is pushed inward from the mounting opening 303, the purification assembly 500 will move along the guide groove 620 toward the ventilation hole 610 on the middle partition plate 600. When the purification assembly 500 reaches an inner end of the guide groove 620, the purification assembly 500 covers the ventilation hole 610.

**[0038]** In this regard, when the purification assembly 500 is in the working state, and a gap is formed between the guide groove 620 and the purification assembly 500, a portion of the airflow entering from the fresh air inlet 301 may leak from the gap to the ventilation hole 610, and then enters the fan assembly 400 through the ventilation hole 610 without passing through the purification assembly 500. To avoid this from occurring, optionally, a shape of the guide groove 620 can be adapted to match a shape of the purification assembly 500, and an inner wall surface of the guide groove 620 contacts an outer peripheral wall of the purification assembly 500 to seal the gap between the inner wall surface and the outer peripheral wall.

**[0039]** In an embodiment, when the purification assembly 500 is in the working state, the inner wall surface of the guide groove 620 and the outer peripheral wall of the purification assembly 500 are in close contact to abut against each other, so that the gap between the guide groove 620 and the purification assembly 500 is close to be none or minimal, thereby achieving the effect of sealing the gap between the two. As to the shape of the guide groove 620, the shape of the guide groove 620 should be consistent with the shape of the purification assembly 500. Therefore, the shape of the guide groove 620 can be designed according to the shape of the purification assembly 500. The shape of the purification assembly 500 may be, but is not limited to shapes of semi-circular, or semi-elliptical, or a shape liking a semi-racetrack.

**[0040]** Referring to FIG. 10 to FIG. 12, in an embodiment, the purification assembly 500 is in a semi-racetrack shape. Accordingly, the guide groove 620 is also in a semi-racetrack shape. In an embodiment, the guide groove 620 has an arc-shaped guiding wall 621 that is arc-shaped and surrounds a side of the ventilation hole 610 away from the mounting opening 303, and strip-shaped guiding walls 622 extending from two ends of the arc-shaped guiding wall 621 along a straight line towards the mounting opening 303. The two strip-shaped guiding walls 622 and the arc-shaped guiding wall 621 cooperate to form a semi-racetrack shape.

**[0041]** In an embodiment, a height of each strip-shaped guide wall 622 from a surface of the middle partition plate 600 is greater than a height of the arc-shaped guide wall 621 from the surface of the middle partition plate 600, so that an inner wall surface of each strip-shaped guide wall 622 forms a large guide surface, which helps to guide the purification assembly 500 to enter or move from the opening of the guide groove 620, and prevents the purification assembly 500 from deviating from the opening of the guide groove 620 and being separated from the guide groove 620.

**[0042]** In order to ensure the stability of the purification assembly 500 in the working state, elastic buckles 540 may be provided on two opposite sides of the purification assembly 500. The two strip-shaped guide walls 622 of the guide groove 620 are recessed to form positioning grooves 623 corresponding to the elastic buckles 540, and the positioning grooves 623 are adapted for clamping the elastic buckles 540 and positioning the purification assembly 500 in the guide groove 620.

**[0043]** When the purification assembly 500 is being installed, the purification assembly 500 is pushed inwards along the guide groove 620 from the mounting opening 303. When the purification assembly 500 is in the working state, the elastic buckles 540 on the purification assembly 500 are clamped by the positioning grooves 623 on the strip-shaped guide walls 622 of the guide groove 620, so that the purification assembly 500 is fixed and not prone to being loosen and falling off. When the purification assembly 500 needs to be disassembled, the purification assembly 500 is forced by an external force to overcome the binding force of the elastic buckles 540, and elastically deformed to separate from the positioning grooves 623. Subsequently, the purification assembly 500 can be pulled out, and switched to the idle state.

**[0044]** Referring to FIG. 10, FIG. 12 and FIG. 13, on the basis of any one of the above embodiments, because that the purification assembly 500 includes a mounting frame 510 and a purifying member 520 mounted on the mounting frame 510, in an embodiment, the mounting frame 510 includes a main frame 511 and a side frame 512 arranged at one end of the main frame 511. The main frame 511 is formed with a mounting groove with an opening facing a front air inlet cavity 3312, and the mounting groove is configured to mount the purifying member 520. The side frame 512 is adapted for being held by the user to pull or push the mounting frame 510, thereby implementing pulling and mounting of the whole purification assembly 500.

**[0045]** Further, the side frame 512 of the mounting frame 510 has an end plate 513 away from the main frame 511 of the mounting frame 510. The end plate 513 can be adapted to cover the mounting opening 303. The end plate 513 is formed with a handle 530 for the user to hold. As the end plate 513 can fit and cover the mounting opening 303, the overall appearance of the fresh air module 200 can be smooth, and external sundries can be prevented from falling into the fresh air module 200 through the mounting opening 303 to cause contamination in the fresh air module 200.

**[0046]** Referring to FIG. 5, FIG. 7 and FIG. 8, as for the shape of the handle 530, the handle 530 may be a pull ring, a handle slot, or a handle hole. However, in this regard, the handle 530 of these shapes may be concave or convex relative to other outer surfaces of the fresh air module 200, thereby compromising the integrity of the overall exterior surface of the fresh air module 200.

**[0047]** In view of this, in order to improve the integrity of the overall outer surface of the fresh air module 200, an outer surface of the handle 530 can be flush with an outer surface of the end plate 513, and the handle 530 is adapted to that, when a portion thereof is pressed inwardly, another portion thereof is rotated outwards for being held by the user (as shown by the dashed arrow in FIG. 8). In an embodiment, the handle 530 includes a pressing portion 531 and a handheld portion 532 connected to the pressing portion 531, and a portion of the handle 530 located between the pressing portion 531 and the handheld portion 532 is rotatably connected to the end plate 513. P in FIG. 7 and FIG. 8 indicates a position where the handle 530 is rotatably mounted.

**[0048]** Therefore, when the pressing portion 531 of the handle 530 is pressed inwardly, the handle 530 rotates relative to the end plate 513. Thus, the handheld portion 532 of the handle 530 rotates outwards, and can be subsequently held by the user to pull out the mounting frame 510. For the convenience of the user to pull and push, an inner wall surface of the handheld portion 532 may be formed with a pull ring for the user to hold and pull, and the pull ring is hidden in the end plate 513 and not exposed to the outside when not being used, which does not compromise the integrity of the overall outer surface of the fresh air module 200.

**[0049]** Referring to FIG. 4, FIG. 5 and FIG. 9, based on any one of the above embodiments, the middle partition plate 600 divides the fresh air duct 330 into an air inlet cavity 331 in communication with the fresh air inlet 301 and an air outlet cavity 332 in communication with the fresh air outlet 302. The air outlet cavity 332 communicates with the air inlet cavity 331 through the ventilation hole 610 of the middle partition plate 600. The fan assembly 400 is located in the air outlet cavity 332.

**[0050]** Referring to FIG. 9 and FIG. 10, the fan assembly 400 includes a centrifugal wind wheel 410 and a first motor 420. An air inlet end of the centrifugal wind wheel 410 corresponds to the ventilation hole 610 of the middle partition plate 600, and the other end of the centrifugal wind wheel 410 is connected to the first motor 420 to drive the centrifugal wind wheel 410 to rotate through the first motor 420. Fresh air enters the fresh air duct 330 from the fresh air inlet 301, and then passes through the purification assembly 500 to be purified by the purification assembly 500 to generate clean fresh air. The clean fresh air passes through the ventilation hole 610 of the middle partition plate 600 and enters the centrifugal wind wheel 410, and finally is blown out by the centrifugal wind wheel 410 to the fresh air outlet.

**[0051]** In the above embodiment, a ventilation area of the ventilation hole 610 of the middle partition plate 600 may be substantially equal to or slightly smaller than an area of the air inlet end of the centrifugal wind wheel 410. The purification assembly 500 is arranged in a flat shape and disposed on an air inlet side of the ventilation hole 610. A ventilation area of the purifying member 520 is greater than the ventilation area of the ventilation hole 610, so that the purifying member 520 completely covers the ventilation hole 610, and provides a larger purification surface. Thus, more air pollutants can be captured, and the purification efficiency of the purification assembly 500 is improved.

**[0052]** Further, in order to facilitate the airflow passing from the purification assembly 500 to enter the centrifugal wind wheel 410 through the ventilation hole 610, in one embodiment, an air guide ring 611 is formed on a periphery of the ventilation hole 610. The air guide ring 611 is in a tapered shape and extended from the periphery of the ventilation hole 610 towards the air outlet cavity 332, to reduce the resistance to the airflow passing through the ventilation hole, which helps to guide the airflow from the purification assembly 500 to enter the centrifugal wind wheel 410 through the ventilation hole 610.

**[0053]** As the fresh air inlet 301 and the fresh air outlet 302 are located in different radial directions of the fan assembly 400, an included angle is formed between an air inlet direction and an air outlet direction. Therefore, in order to facilitate the flowing of the air entering from the fresh air inlet 301 to the air inlet end of the fan assembly 400, the air inlet cavity 331 of the fresh air duct 330 is extended from the fresh air inlet 301 towards the air inlet end of the centrifugal wind wheel 410 and terminated at the middle partition plate 600.

**[0054]** Referring to FIG. 9 to FIG. 11, in an embodiment, the housing 300 includes a bottom housing 310 and a cover 320. The bottom housing 310 is defined with a first cavity 311 and a second cavity 312. The middle partition plate 600 is disposed at an opening of the first cavity 311 to cooperate with the first cavity 311 to form the air outlet cavity 332. A front air outlet cavity 3311 is formed between the cover 320 and the second cavity 312 and communicated with the fresh air inlet 301, a rear air inlet cavity 3312 is formed between the cover 320 and the middle partition plate 600 and communicated with the ventilation hole 610, and the rear air inlet cavity 3312 and the front air outlet cavity 3311 are communicated with each other to form the air inlet cavity 331.

**[0055]** During assembly, the middle partition plate 600 is installed at the opening of the first cavity 311 of the bottom housing 310, and the middle partition plate 600 and the bottom housing 310 may be snap-connected by a snap structure and/or connected into an integral piece by a screw structure. Then, the cover 320 is covered on the integral piece formed by connecting the bottom housing 310 with the middle partition plate 600, and the cover 320 may be connected and fixed with the bottom housing 310 and/or the middle partition plate 600 by any one or both of a snap structure and a screw structure.

**[0056]** Referring to FIG. 5 and FIG. 9, based on any of the above embodiments, the fresh air module 200 further includes a valve assembly 700 installed at the fresh air inlet 301, and the valve assembly 700 includes a fresh air door 710 which is rotatable relative to the fresh air inlet 301, and a second motor 720 connected with the fresh air door 710. The second motor 720 drives the fresh air door 710 to turn over, so that the fresh air door 710 opens or closes the fresh air inlet 301. For example, in winter, the temperature of outdoors is low, the fresh air inlet 301 may be closed by the fresh air door to prevent the outdoor cold air from entering and freezing the fresh air module 200 or entering the indoors through the fresh air module 200.

**[0057]** Referring to FIG. 1, FIG. 2 and FIG. 9, the present application further provides an air conditioner 100. The air conditioner 100 includes a casing 110 and a fresh air module 200 mounted in the casing 110. The detailed structure of the fresh air module 200 can be referred to the above embodiments. Since the air conditioner 100 adopts all the technical solutions of all the above embodiments, the air conditioner 100 at least possesses the beneficial effects brought by the technical solutions of the above embodiments, which will not be repeated here. The air conditioner 100 is any one of an indoor unit of a wall-mounted air conditioner, an indoor unit of a cabinet air conditioner, an air machine, an indoor unit of a ceiling type air conditioner or a mobile air conditioner. The indoor unit of the wall-mounted air conditioner is taken as an example for illustrating the air conditioner 100 in the following.

**[0058]** In an embodiment, the casing 110 is provided with an air inlet 101, a first air outlet 102 and a second air outlet 103. The air inlet 101 is in communication with the first air outlet 102. The fresh air module 200 is mounted in the casing 110, the fresh air inlet 301 of the fresh air module is adapted to communicate with the outdoors through a fresh air tube 800, and the fresh air outlet 302 of the fresh air module 200 is adapted to communicate with the second air outlet 103. Thus, the air conditioner 100 has an indoor air circulation mode and a fresh air mode.

**[0059]** In the indoor air circulation mode, the indoor air enters the casing 110 through the air inlet 101, cold air or hot air is generated after heat exchange by a heat exchange assembly inside the casing 110, and then the cold air or hot air is blown back to the indoors from the first air outlet 102 to realize the indoor air circulation.

**[0060]** In the fresh air mode, the outdoor air enters the fresh air module 200 through the fresh air tube 800, and clean fresh air is generated after purification by the purification assembly 500 of the fresh air module 200. The fresh air is blown to the second air outlet 103 of the casing 110 from the fresh air outlet 302 of the fresh air module 200, and finally blown to the indoors from the second air outlet 103, to replenish the fresh air of the indoors.

**[0061]** In an embodiment, the casing 110 includes a chassis 111, a frame 112 and a panel 113. The fresh air module 200 is mounted at an end of the chassis 111. The fresh air outlet 302 of the fresh air module 200 faces toward the panel 113. Accordingly, the panel 113 is provided with the second air outlet 103 corresponding to the fresh air outlet 302, so that the fresh air is outputted by the air conditioner 100 and accurately reaches where the user stays.

**[0062]** In addition, in order to prevent the fresh air from being directly blown to the user, the second air outlet 103 may be set to consist of a plurality of micropores penetrating through the panel 113. Therefore, after the fresh air is blown out from the plurality of micropores, the airflow is divided into small airflows with a smaller diameter, the speed of the airflows is reduced, the airflows become soft, and are not directly blown to the user, which avoids causing discomfort to the user.

**[0063]** The above are only preferred embodiments of the present application, and are not intended to limit the scope of the present application. Any equivalent structural transformation made by using the specification and drawings of the present application, or any direct or indirect application to other related technical fields, is included in the claimed scope of the present application.

## Claims

**1.** A fresh air module **characterized by** comprising:

a housing provided with a fresh air inlet and a fresh air outlet, a fresh air duct being formed in the housing and communicating the fresh air inlet with the fresh air outlet;
a fan assembly mounted in the fresh air duct; and
a purification assembly disposed in the fresh air duct and located at one end of the fan assembly in an axial direction of the fan assembly to correspond to an air inlet end of the fan assembly.

**2.** The fresh air module according to claim 1, wherein:

the fresh air module further comprises a middle partition plate disposed in the fresh air duct,
the middle partition plate is located at the air inlet end of the fan assembly and provided with a ventilation hole corresponding to the air inlet end of the fan assembly, and
the purification assembly is mounted on the middle partition plate and located on an air inlet side of the ventilation hole.

**3.** The fresh air module according to claim 2, wherein:

the fresh air outlet is provided on a front side wall of the housing,
a mounting opening is provided on a side of the fresh air outlet, and
the purification assembly is mounted on the middle partition plate and movable from the mounting openingin a pull-push manner.

**4.** The fresh air module according to claim 3, wherein:

the middle partition plate is provided with a guide groove at a periphery of the air inlet side of the ventilation hole,
the guide groove has an opening facing the mounting opening of the housing, and
the guide groove is configured to guide the purification assembly to be mounted in a pull-push manner.

**5.** The fresh air module according to claim 4, wherein:

a shape of the guide groove matches a shape of the purification assembly, and
an inner wall surface of the guide groove is configured to contact an outer peripheral wall of the purification assembly to seal a gap between the inner wall surface and the outer peripheral wall.

**6.** The fresh air module according to claim 5, wherein:

the guide groove has an arc-shaped guide wall surrounding the ventilation hole at a side away from the mounting opening and strip-shaped guide walls extending from two ends of the arc-shaped guide wall along a linear line towards the mounting opening, and
two strip-shaped guide walls and the arc-shaped guide wall cooperate to form a semi-racetrack shape.

**7.** The fresh air module according to claim 6, wherein:

two opposite sides of the purification assembly are provided with elastic buckles extending from the two opposite sides respectively,
the two strip-shaped guide walls of the guide groove are recessed to form positioning grooves corresponding to the elastic buckles, and
the positioning grooves are configured to clamp the elastic buckles correspondingly and positioning the purification assembly in the guide groove.

**8.** The fresh air module according to claim 6, wherein a height of each strip-shaped guide wall extending from a surface of the middle partition plate is greater than a height of the arc-shaped guide wall extending from the surface of the middle partition plate.

**9.** The fresh air module according to any one of claims 2 to 8, wherein:

the purification assembly comprises a mounting frame and a purifying member mounted on the mounting frame, and
a ventilation area of the purifying member is greater than a ventilation area of the ventilation hole.

**10.** The fresh air module according to any one of claims 2 to 8, wherein:

the fresh air duct is divided by the middle partition plate into an air inlet cavity communicated with the fresh air inlet and an air outlet cavity communicated with the fresh air outlet,
the air outlet cavity is communicated with the air inlet cavity through the ventilation hole of the middle partition plate, and
the fan assembly is located in the air outlet cavity.

**11.** The fresh air module according to claim 10, wherein:

the fan assembly comprises a centrifugal wind wheel and a first motor,
an air inlet end of the centrifugal wind wheel faces the ventilation hole of the middle partition plate, and
the first motor is connected to another end of the centrifugal wind wheel.

**12.** The fresh air module of claim 10, wherein the housing comprises:

a bottom housing provided with a first cavity and a second cavity, wherein the middle partition plate is arranged at an opening of the first cavity to cooperate with the first cavity to form the air outlet cavity; and
a cover is fitted with the bottom housing and covers the bottom housing,
wherein a front air inlet cavity communicating with the fresh air inlet is formed between the cover and the second cavity, a rear air inlet cavity communicating with the ventilation hole is formed between the cover and the middle partition plate, and the rear air inlet cavity and the front air inlet cavity are communicated with each other to form the air inlet cavity.

**13.** An air conditioner **characterized by** comprising:

a casing provided with an air inlet, a first air outlet and a second air outlet, wherein the air inlet is in communication with the first air outlet;
a fresh air module according to any one of claims 1 to 12,
wherein the fresh air module is mounted in the casing , the fresh air inlet of the fresh air module is configured to communicate with outdoor through a fresh air tube, and the fresh air outlet of the fresh air module is configured to communicate with the second air outlet.

**14.** The air conditioner according to claim 13, wherein the air conditioner is any one of an indoor unit of a wall-mounted air conditioner, an indoor unit of a cabinet air conditioner, an air machine, an indoor unit of a ceiling type air conditioner or a mobile air conditioner.

**15.** The air conditioner according to claim 14, wherein:

The casing of the indoor unit of the wall-mounted air conditioner comprises a chassis, a frame and a panel, and the fresh air module is mounted at an end of the chassis, a fresh air outlet of the fresh air module faces towards the panel, and the panel is provided with the second air outlet corresponding to the fresh air outlet.

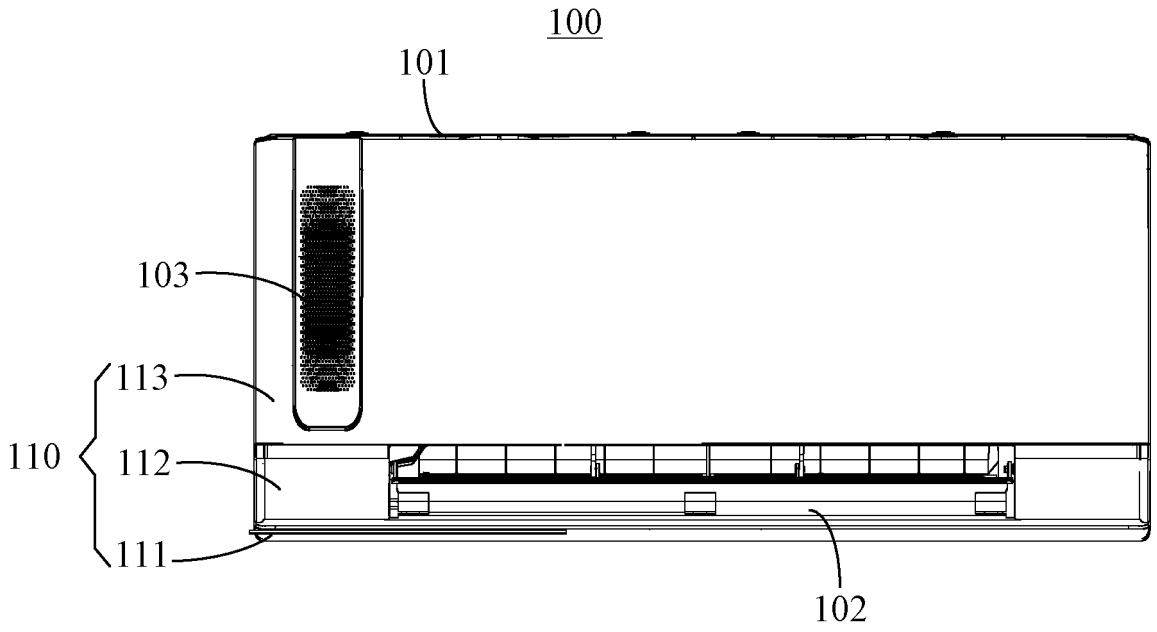


FIG. 1

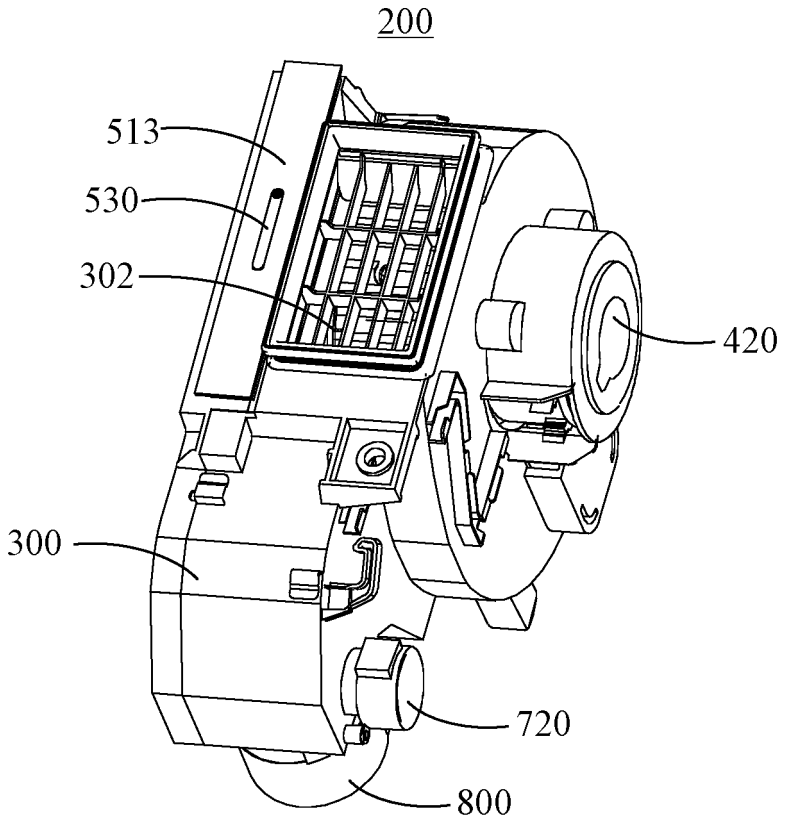


FIG. 2

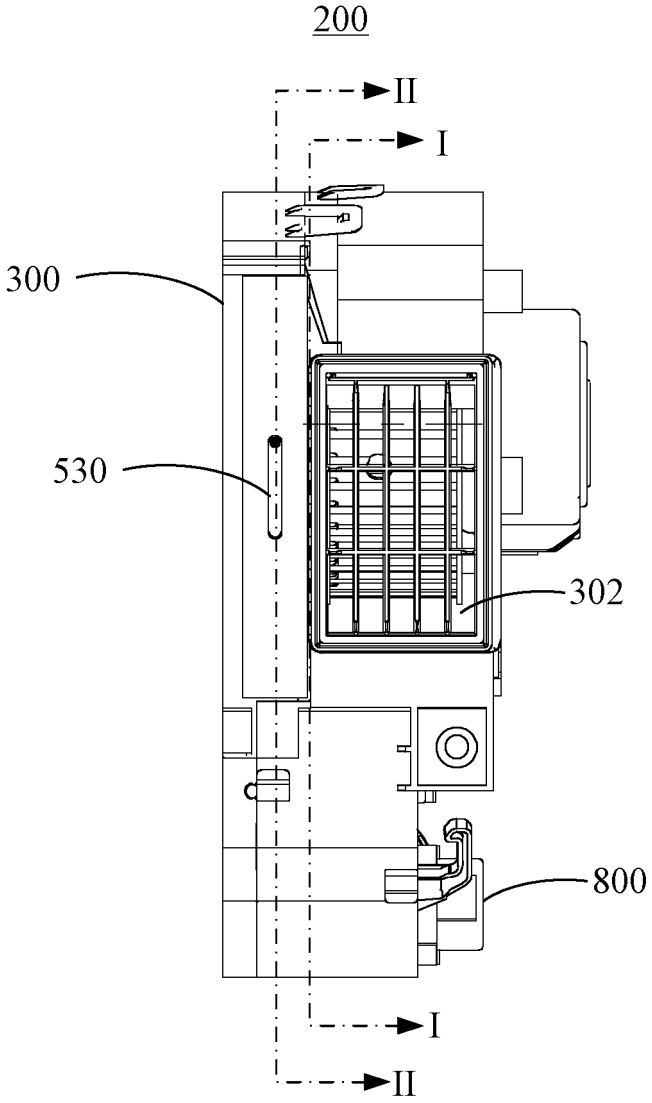


FIG. 3

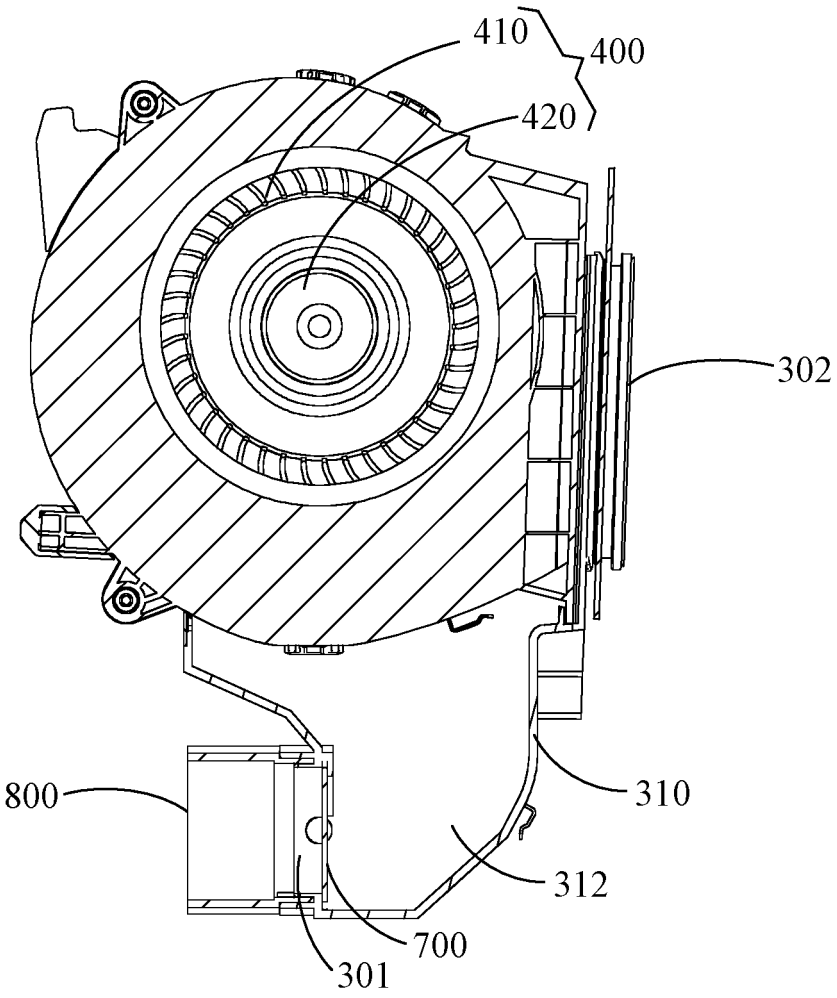


FIG. 4

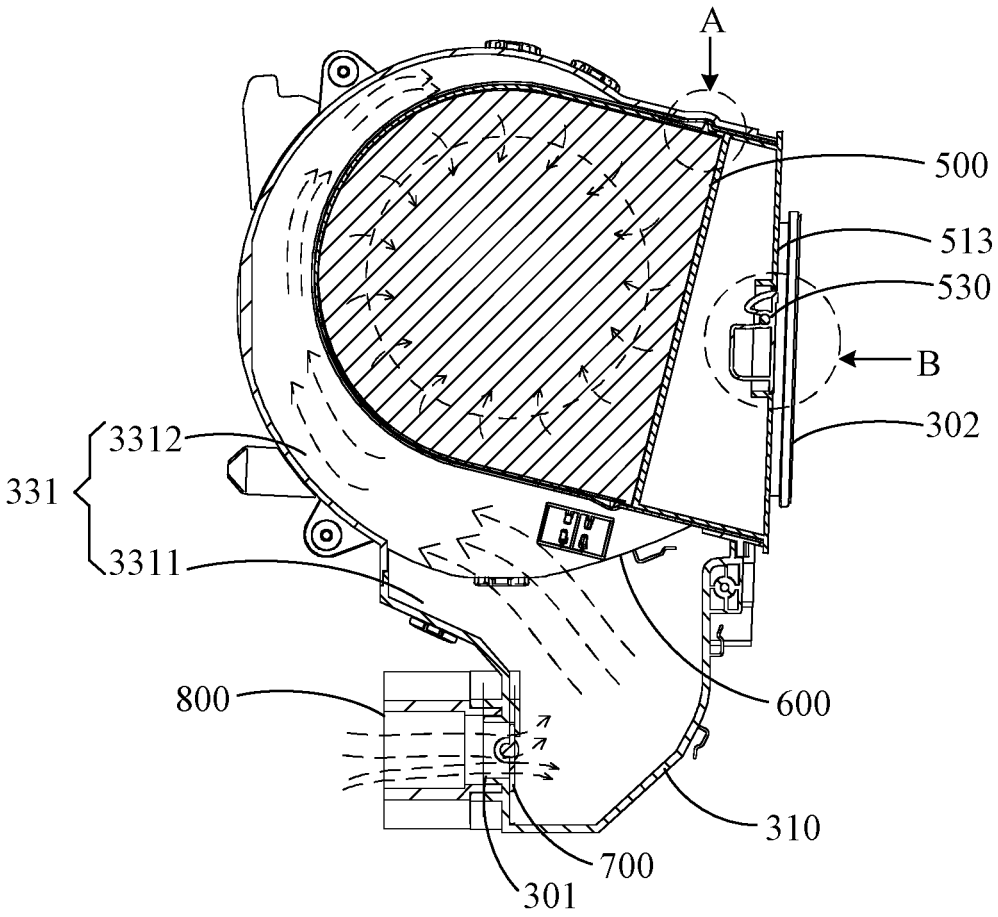
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FIG. 5

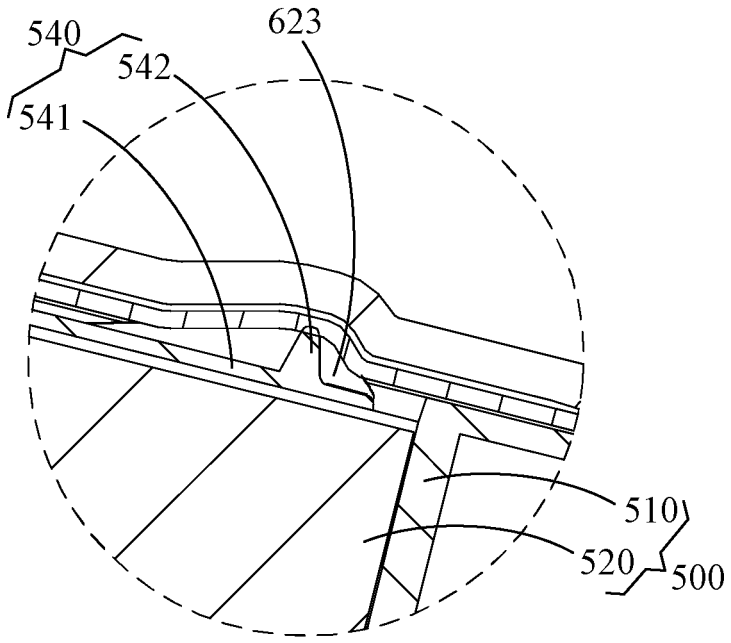
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FIG. 6

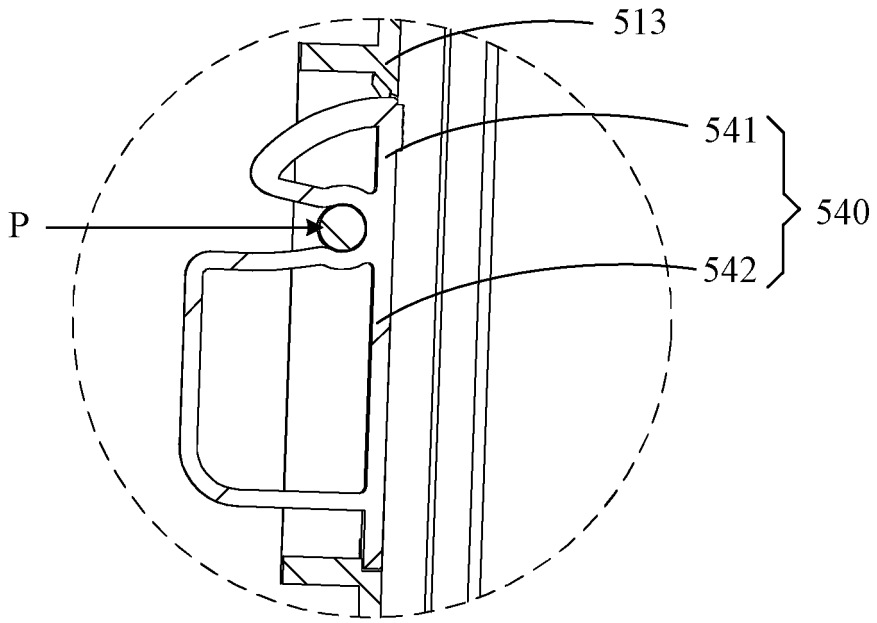


FIG. 7

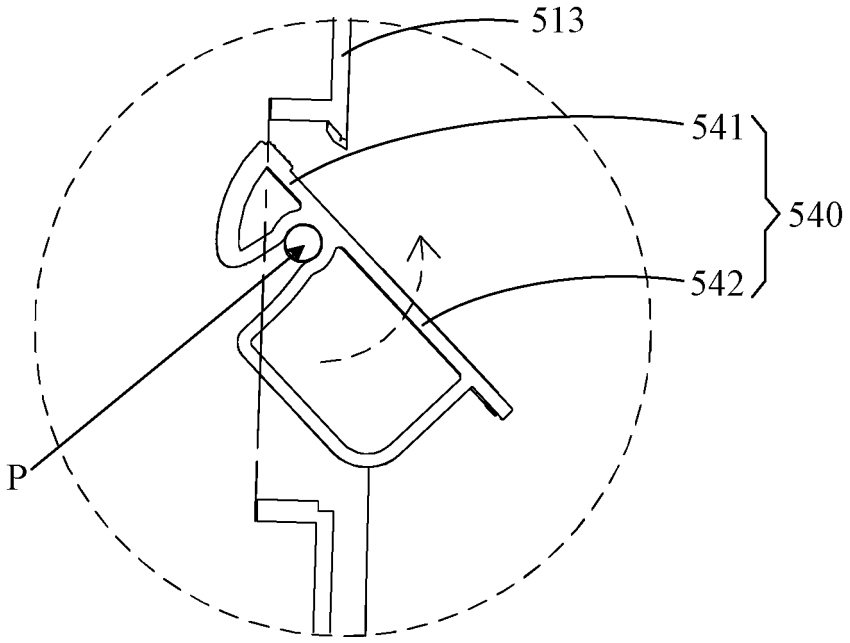


FIG. 8

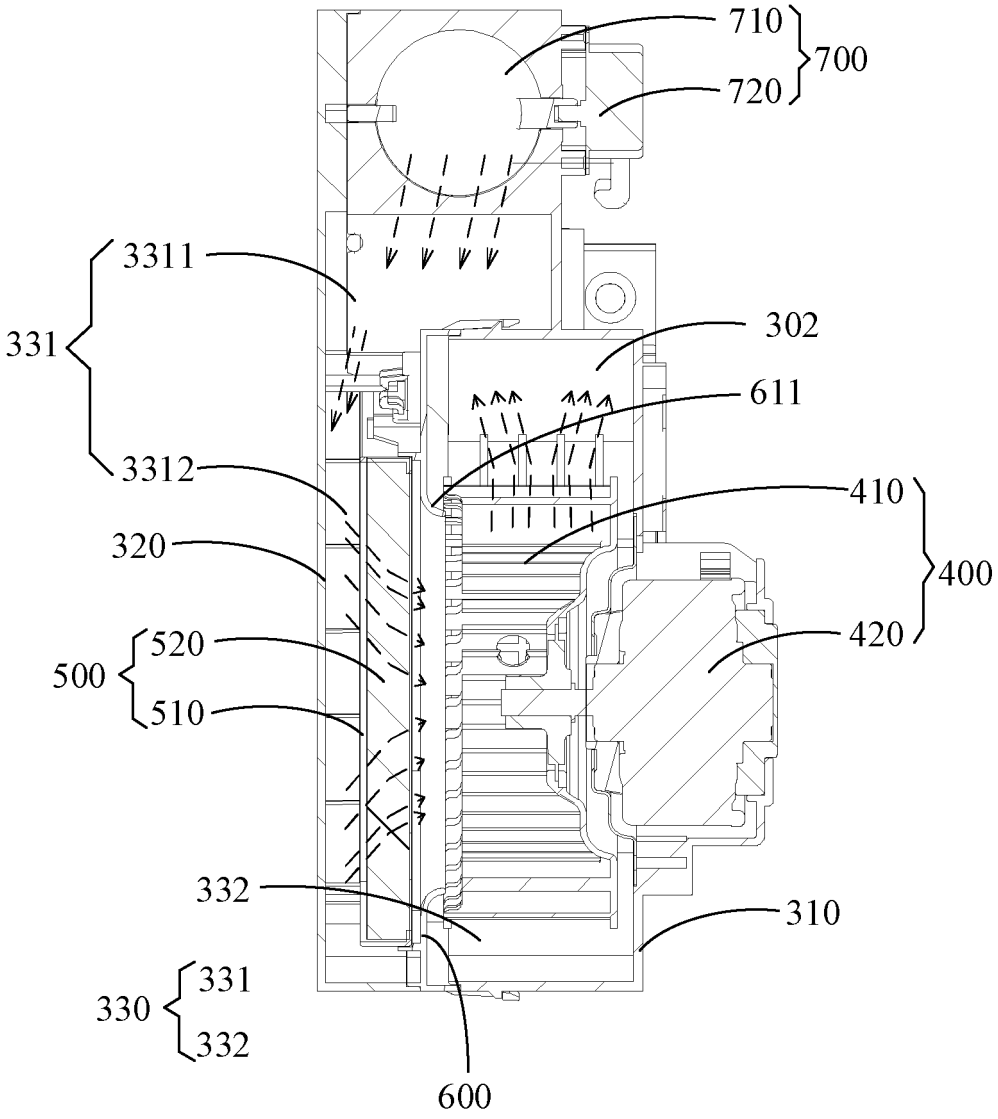
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FIG. 9

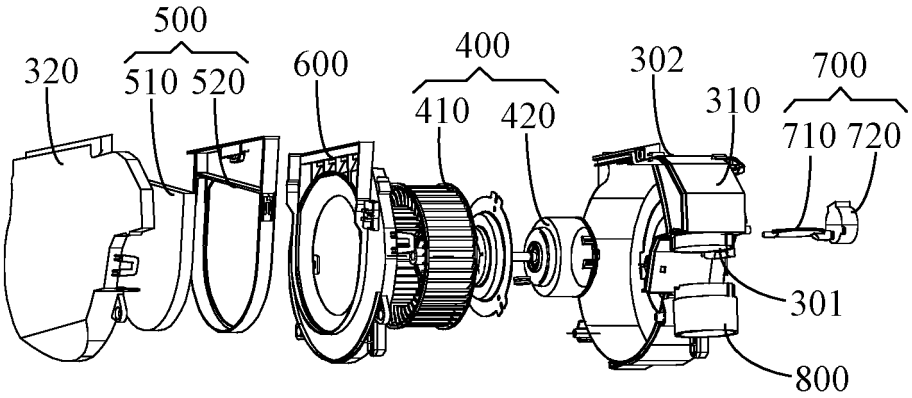
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FIG. 10

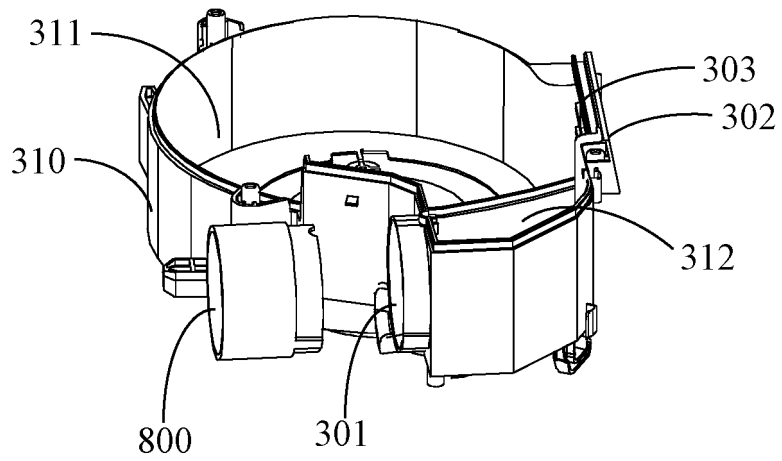


FIG. 11

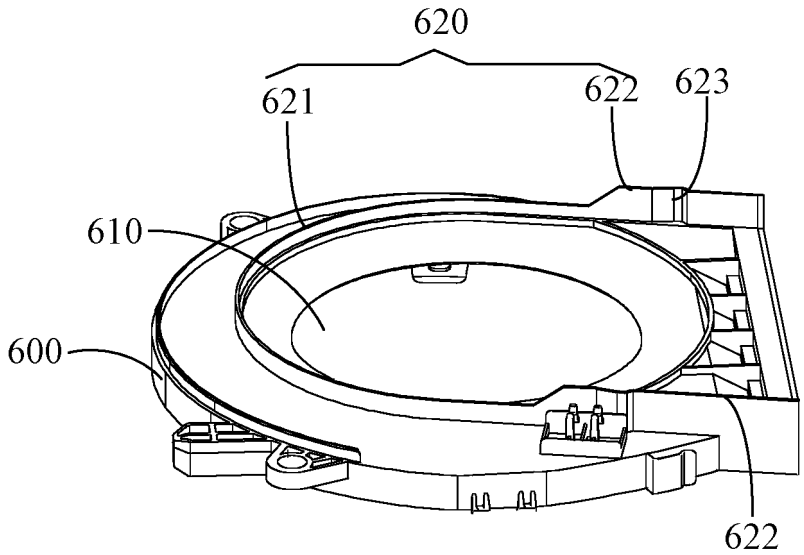


FIG. 12

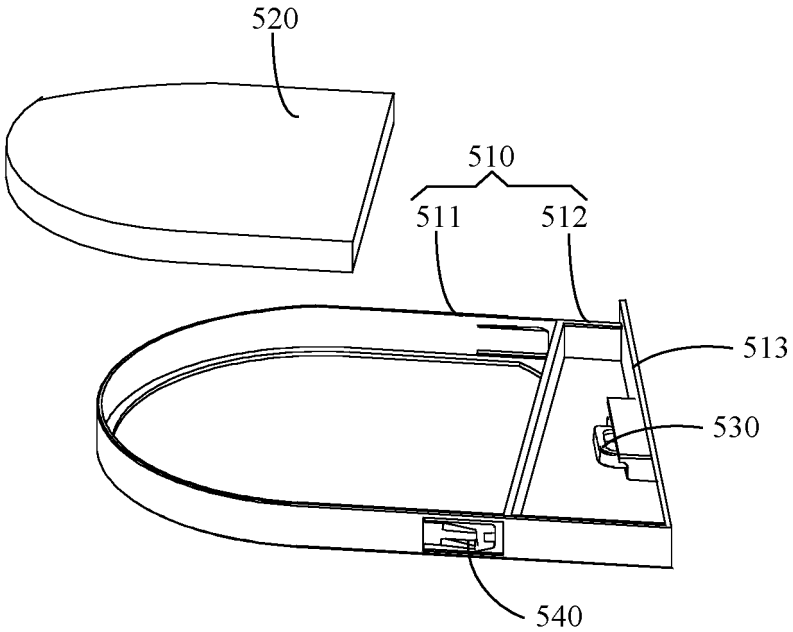


FIG. 13

## INTERNATIONAL SEARCH REPORT

International application No.
**PCT/CN2020/129248**

**A. CLASSIFICATION OF SUBJECT MATTER**

F24F 1/0035(2019.01)i; F24F 1/0073(2019.01)i; F24F 13/02(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, 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, SIPOABS, CNKI, CNTXT, VEN: 新风模块, 壳体, 机壳, 进风, 出风, 进口, 出口, 净化, 过滤, 风机, 风扇, 风轮, 风道, 风管, 管道, 通道, 隔板, fresh air module, fresh air assemble, fresh air unit, shell, cas+, air inlet, air outlet, purify+, filt+, fan, duct, passage, plate, board, partition

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | CN 109489123 A (GUANGDONG MEDIA REFRIGERATION EQUIPMENT CO., LTD. et al.) 19 March 2019 (2019-03-19)<br>description, paragraphs [0074]-[0117], figures 1-14 | 1-15 |
| X | CN 208936303 U (GUANGDONG MEDIA REFRIGERATION EQUIPMENT CO., LTD. et al.) 04 June 2019 (2019-06-04)<br>description, description, paragraphs [0049]-[0068], figures 1-9B | 1-15 |
| X | CN 208936417 U (GUANGDONG MEDIA REFRIGERATION EQUIPMENT CO., LTD. et al.) 04 June 2019 (2019-06-04)<br>description, paragraphs [0046]-[0083], figures 1-7 | 1-15 |
| X | CN 208936280 U (GUANGDONG MEDIA REFRIGERATION EQUIPMENT CO., LTD. et al.) 04 June 2019 (2019-06-04)<br>description, paragraphs [0038]-[0055], figures 1-8B | 1-15 |
| A | JP 2000249365 A (MITSUBISHI ELECTRIC CORP.) 12 September 2000 (2000-09-12)<br>entire document | 1-15 |

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

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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| **18 January 2021** | **27 January 2021** |

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Telephone No.

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**INTERNATIONAL SEARCH REPORT**

International application No.
**PCT/CN2020/129248**

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| PX | CN 111306633 A (GUANGDONG MEDIA REFRIGERATION EQUIPMENT CO., LTD.) 19 June 2020 (2020-06-19)<br>claims 1-15 | 1-15 |

Form PCT/ISA/210 (second sheet) (January 2015)

**INTERNATIONAL SEARCH REPORT**
**Information on patent family members**

International application No.
**PCT/CN2020/129248**

| Patent document cited in search report | Publication date (day/month/year) | Patent family member(s) | Publication date (day/month/year) |
|---|---|---|---|
| CN 109489123 A | 19 March 2019 | None | |
| CN 208936303 U | 04 June 2019 | None | |
| CN 208936417 U | 04 June 2019 | None | |
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| JP 2000249365 A | 12 September 2000 | JP 3917319 B2 | 23 May 2007 |
| CN 111306633 A | 19 June 2020 | None | |

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

## REFERENCES CITED IN THE DESCRIPTION

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