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

(57) Disclosed are an air conditioner and a method for controlling the same. The air conditioner includes a housing, a first air guiding plate and a second air guiding plate. The housing is provided with an air outlet, the first air guiding plate is arranged at the air outlet, and is connected to the housing by the first rotating shaft. The first air guiding plate is rotatably arranged at the air outlet, and is connected to the housing by the first rotating shaft. The second air guiding plate is rotatably arranged at the air outlet passage. In the present application, when the air conditioner is in the breeze mode, the first air guiding plate partially shields the air outlet, and the second air guiding plate is extended to the lower side of the air outlet along the air outlet passage, so that air from the air outlet disperses to its surroundings.

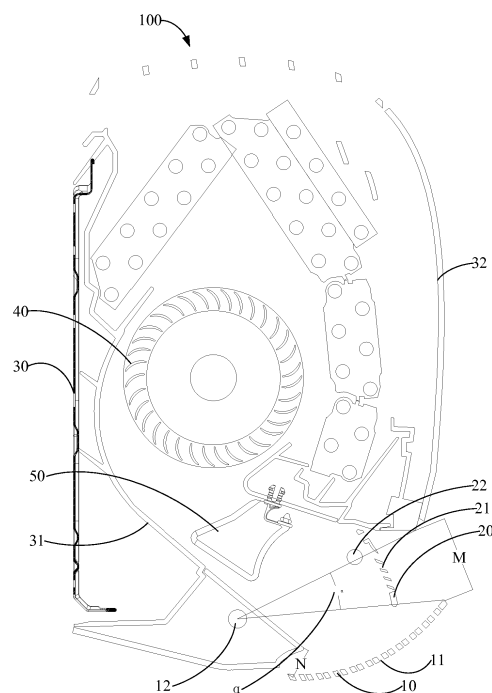


Fig. 1

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**Description****TECHNICAL FIELD**

5     **[0001]** The present disclosure relates to the technical field of air conditioning equipment, in particular to an air conditioner and a method for controlling the air conditioner.

**BACKGROUND**

10    **[0002]** The demand for air conditioner is increasing with continuous improvement of human daily life. Regarding air conditioners in the existing market, the blowing air comes directly to the users with a great discomfort, due to a large long-distance flow area of the air outlet, a large air volume and a long air supply distance. Further, various demands of the users may not be met thanks to the single blowing mode.

**SUMMARY**

**[0003]** The main purpose of the present disclosure is to provide an air conditioner and a method for controlling the air conditioner, aiming at overcoming a single blowing mode regarding the air conditioner in the prior art.

20    **[0004]** In order to achieve the above objective, the present disclosure provides an air conditioner, which a housing, in which the housing includes an air outlet passage formed in the housing; and an air outlet arranged in an outer peripheral wall of the housing and communicated with the air outlet passage; a first air guiding plate rotatably at the air outlet and connected with the housing by a first rotating shaft on the housing; and a second air guiding plate rotatably arranged in the air outlet passage, and being capable of rotating by a second rotating shaft in the housing, in which the air conditioner includes a breeze mode, in response to the breeze mode, a part of the air outlet is shielded by the first air guiding plate, and the second air guiding plate is extended to a lower side of the air outlet in the air outlet passage.

25    **[0005]** Optionally, after the air outlet is closed by the first air guiding plate, the first air guiding plate includes a first side close to an upper wall of the air outlet, and a second side close to a lower wall of the air outlet; in which the first rotating shaft includes a first surface extending towards the first side; and a second surface extending towards an edge of the upper wall of the air outlet, in which  $\alpha$  is an included angle between the first surface and the second surface, and  $\alpha$  is no less than  $30^\circ$  and no more than  $40^\circ$ , after the air conditioner is in a breeze mode.

30    **[0006]** Optionally, in response to the breeze mode, a distance M is no less than 65 mm and no more than 70 mm between the first side and the edge of the upper wall of the air outlet.

**[0007]** Optionally, in response to the breeze mode, a distance N is no less than 15mm and no more than 25 mm between the second side and the edge of the lower wall of the air outlet.

35    **[0008]** Optionally, the air conditioner further includes a cooling/heating mode, in which in response to the cooling/heating mode, the first air guiding plate is completely open of the air outlet, and the inclined angle  $\alpha$  is no less than  $65^\circ$  and no more than  $90^\circ$ .

**[0009]** Optionally, in response to the cooling/heating mode, a distance M is no less than 95mm and no more than 110mm between the first side and the edge of the upper wall of the air outlet.

40    **[0010]** Optionally, in response to the breeze mode, a distance N is no less than 25mm and no more than 45mm between the second side and the edge of the lower side of the air outlet.

**[0011]** Optionally, the first air guiding plate defines an air dispersing hole passing through the first air guiding plate along a thickness direction of the first air guiding plate.

45    **[0012]** Optionally, a length of the air dispersing hole in an opening direction is equal to or more than the thickness of the first air guiding plate.

**[0013]** The present disclosure further proposes a method for controlling an air conditioner, in which the air conditioner includes a breeze mode and a cooling/heating mode, and the air conditioner is switchable between the breeze mode and the cooling/heating mode.

50    **[0014]** in response to the breeze mode, shielding a part of an air outlet by a first air guiding plate, and moving a second air guiding plate to a lower wall of the air outlet in the air outlet passage, wherein the first rotating shaft includes a first surface extending towards a first side; and a second surface extending towards an edge of an upper side of the air outlet; an included angle  $\alpha$  between the first surface and the second surface is no less than  $30^\circ$  and no more than  $40^\circ$ ;

**[0015]** in response to the cooling/heating mode, completely opening the air outlet by the first air guiding plate, and the inclined angle  $\alpha$  is no less than  $65^\circ$  and no more than  $90^\circ$ .

55    **[0016]** According to the present disclosure, when the air conditioner is in the breeze mode, the first air guiding plate partially shields the air outlet, and the second air guiding plate is extended to the lower side of the air outlet along the air outlet passage, so that air from the air outlet disperses to the surroundings. Single mode of the air conditioner is overcome, with various modes provided, and users requirement are satisfied.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0017] In order to explain the embodiment of the present disclosure or the technical solution of the prior art more clearly, the following will briefly introduce the drawings necessary in the description of the embodiments or the prior art. Obviously, the drawings in the following description are only some embodiments of the present disclosure. For those ordinary skill in the art, other drawings can be obtained according to the structure shown in these drawings without any creative effort.

Fig. 1 is a schematic structural diagram of an air conditioner in a breeze mode of the present disclosure;

Fig. 2 is a schematic structural diagram of an air conditioner in a cooling/heating mode of the present disclosure.

Description of reference numerals:

[0018]

Reference Numeral	Name	Reference Numeral	Name
100	Air conditioner	10	First air guiding plate
11	Air dispersing hole	12	First rotating shaft
20	Second air guiding plate	21	Second air dispersing hole
22	Second rotating shaft	30	Housing
31	Chassis	32	Panel
40	Fan	50	Swinging blade

[0019] The implementation, functional features and advantages of the present disclosure will be further described with reference to the accompanying drawings with the embodiments.

**DETAILED DESCRIPTION OF THE EMBODIMENTS**

[0020] As following, the technical solution in the embodiments of the present disclosure will be described clearly and completely with reference to the drawings in the embodiment of the present disclosure. Obviously, the described embodiment is only a part of the embodiment of the present disclosure, not all of the embodiments. Based on the embodiments in the present disclosure, all other embodiments perceived by those ordinary skills in the art without creative effort should be fallen within the protection scope of the present disclosure.

[0021] It should be noted that if directional indications (such as up, down, left, right, front, back, horizontal, vertical, etc.) are involved in the embodiments of the present disclosure, the directional indications are only used to explain the relative positional relationship and movement between the components in a certain posture (as shown in the drawings), and if the specific posture changes, the directional indications will change accordingly.

[0022] In addition, if there are descriptions of "first" and "second" in the embodiments of this application, the descriptions of "first" and "second" are used for descriptive purposes only and cannot be understood as indicating or implying their relative importance or implicitly indicating the number of indicated technical features. Thus, features defining "first" and "second" may explicitly or implicitly include at least one such feature. In addition, the technical solutions between the various embodiments may be combined with each other, but must be based on what one of ordinary skill in the art can achieve. When the combination of technical solutions is contradictory or impossible to achieve, it should be considered that the combination of such technical solutions does not exist and is not within the protection scope required by the present disclosure.

[0023] The present disclosure proposes an air conditioner and a control method of the air conditioner. The air conditioner can be a split wall-mounted air conditioner, and further can be a single cooling machine or a cooling and heating machine. In the description of the following, an air conditioner with cooling and heating functions is taken as an example for illustration. The air conditioner in the present technical solution includes a breeze mode and a cooling/heating mode.

[0024] Referring to Fig. 1, an air conditioner 100 includes a housing 30, a first air guiding plate 10 and a second air guiding plate 20. The housing 30 is provided with an air outlet passage (now shown in the figures) formed in the housing 30 and an air outlet (now shown in the figures) communicated with the air outlet passage and arranged in an outer peripheral wall of the housing 30. The first air guiding plate 10 is rotatably arranged at the air outlet and is connected with the housing 30 by a first rotating shaft 12 of the housing 30. The second air guiding plate 20 is rotatably arranged

in the air outlet passage, and is rotatable by a second rotating shaft 22 of the housing. The air conditioner 100 includes a breeze mode, in response to the breeze mode, a part of the air outlet is shielded by the first air guiding plate 10, and the second air guiding plate 20 is extended to a lower side of the air outlet along the air outlet passage.

**[0025]** Specifically, components of the air conditioner 100 are installed in the housing 30, and the housing 30 is used to support and protect internal components while beautifying the appearance of the air conditioner. The housing 30 includes a chassis 31, a face frame (not shown in the figures) and a panel 32. The face frame is provided on the chassis 31, the face frame is open at the front, where the panel 32 is provided. And an air outlet is disposed between the lower end of the panel 32 and the face frame. Specifically, the face frame may be rotatably or detachably arranged on the chassis 31, and the panel 32 may be rotatably or detachably provided on the face frame. It can be understood that the air conditioner 100 further includes swinging blades 50, and the swinging blades 50 are rotatably disposed in the air outlet passage, and controls the air blowing direction from left to right, to realize the air supply in the left and right directions. The air conditioner 100 further includes a fan 40 provided in the housing 30.

**[0026]** In the embodiments of the present disclosure, the housing 30 is further provided with an air outlet passage for air circulation. The air outlet passage forms an air outlet in the outer peripheral wall of the housing 30. When the air conditioner 100 is turned on, the air continuously blows to the indoor space through the air outlet, thereby adjusting the indoor temperature. The first air guiding plate 10 rotates around the first rotating shaft 12 to open or close the air outlet. In the present embodiment, the second air guiding plate 20 is provided with a plurality of second air dispersing holes 21 passing through the second air guiding plate 20. The second air dispersing holes 21 are arranged along the thickness direction of the second air guiding plate 20, and the second air guiding plate 20 can rotate in the air outlet passage along the second rotating shaft 22. With respect to the breezing mode, in response to the breeze mode of the air conditioner 100, a part of the air outlet is shielded by the first air guiding plate 10, and the second air guiding plate 20 is extended to a lower side of the air outlet along the air outlet passage. In a preferred embodiment, the first air guiding plate 10 and the second air guiding plate 20 are substantially mutually perpendicular. The far end of the first air guiding plate 10 in the air out-blowing direction of the air outlet, the far end of the second air guiding plate 20 in the air out-blowing direction of the air outlet, and the first rotating shaft 12 are located substantially on a same plane. The blowing air is blocked by the first air guiding plate 10 and diffused to the surroundings through the second air dispersing holes 21 in the second air guiding plate 20, thereby reducing the air volume and speed of the air outlet. Air blown by the air conditioner 100 is prevented from directly blowing onto the human body, so that the air felt by the human body is rather soft. The air conditioner includes various modes rather than a single mode, and the users demand is met.

**[0027]** Further, when the first air guiding plate 10 closes the air outlet, a side of the first air guiding plate 10 close to an upper side of the air outlet is defined as a first side (not shown in the figures), and a side of the first air guiding plate 10 close to a lower side of the air outlet is defined as a second side (not shown in the figures); the first rotating shaft 12 is extended to the first side to form a first surface, and the first rotating shaft 12 is extended to an edge of the upper side of the air outlet to form a second surface. In which  $\alpha$  is an included angle between the first surface and the second surface. That is, the initial position of the first guiding wind corresponds to the initial state when the first air guiding plate completely closes the air outlet. The rotating angle of the first air guiding plate 10 around the first rotating shaft 12 from the initial position is  $\alpha$ , when the air conditioner works in the breeze mode, the range of  $\alpha$  is no less than  $30^\circ$  and no more than  $40^\circ$ . As such, the air speed coming out of the air outlet passage is weak, the wind volume is not large, and the air is prevented to blow on user's body through the blockage of the first air guiding plate 10. By diffusing to the surroundings along the first air guiding plate 10, the air becomes softer and brings more comfort to the user.

**[0028]** Further, when the air conditioner 100 is in the breeze mode and the range of  $\alpha$  is no less than  $30^\circ$  and no more than  $40^\circ$ , the distance M is between the first side and the edge of housing at the upper side of the air outlet, and M is no less than 65mm and no more than 70mm. Alternatively, when the air conditioner 100 is operated in the breeze mode, the distance N is between the second side and the edge of the housing on the lower side of the air outlet, and N is no less than 5mm and no more than 25mm. When the air conditioner works in the breeze mode, the air coming out of the air outlet passage is prone to soften under the action of the first air guiding plate 10. As such, the air from the air conditioner 100 diffusing to the surroundings along the first air guiding plate 10, reduces the air speed and volume out coming from the air outlet, and the user feels soft wind.

**[0029]** Referring to Fig. 2, further, the air conditioner further comprises a cooling/heating mode, and in response to the cooling/heating mode, the first air guiding plate is completely avoided for the air outlet, and the inclined angle  $\alpha$  is no less than  $65^\circ$  and no more than  $90^\circ$ . In the embodiments of the present disclosure, the second working mode is a cooling/heating mode, and the first air guiding plate 10 and the second air guiding plate 20 respectively rotate to a position substantially parallel to the air out-blowing direction of the air outlet passage. As such, the side of the first air guiding plate 10 close to the upper side of the air outlet is the first side, and the side of the first air guiding plate 10 close to the lower side of the air outlet is the second side. The first rotating shaft 12 is extended to the first side to form a first surface, the first rotating shaft 12 is extended to end edge of housing at the upper side of the air outlet to form a second surface, the included angle between the first surface and the second surface is  $\alpha$ , that is, taking the initial state that the first air guiding plate completely closes the air outlet is taken as an initial position,  $\alpha$  is the rotation angle of the first air

guiding plate 10 around the first rotating shaft 12 from the initial position. When the rotation angle  $\alpha$  of the first air guiding plate 10 is within the range of  $\alpha$  being no less than  $65^\circ$  and no more than  $90^\circ$ , the first air guiding plate 10 and the second air guiding plate 20 have less resistance to the blowing air from the air outlet passage, so that the air speed and volume coming out of the air outlet passage are relatively large. The ambient temperature can be changed quickly.

[0030] Further, when in the cooling/heating mode, a distance M ranges from 95mm to 110 mm between the first side and the edge of the housing at the upper side of the air outlet. Alternatively, a distance N ranges from 25mm to 45mm between the second side and the edge of the housing at the lower side of the air outlet. In the embodiments of the present disclosure, when the air conditioner 100 is in the cooling/heating mode, and  $\alpha$  is no less than  $65^\circ$  and no more than  $90^\circ$ , M ranges from 95mm to 110mm or N ranges from 25mm to 45mm. It is easy to improve the air speed and volume from the air outlet. At present state, the first air guiding plate 10 has little obstruction to the air outlet of the air conditioner 100, so that the air speed blowing from the air outlet passage is high and the air volume is large, and the temperature in the room is quickly adjusted.

[0031] In the embodiments of the present disclosure, the first air guiding plate 10 is provided with air dispersing holes 11 passing through the first air guiding plate 10 in a thickness direction. The length of the diffuser holes 11 in the opening direction is equal to or greater than the thickness of the first air guiding plate 10. The air dispersing holes 11 gradually increase in diameter in a direction from the inner side of the first air guiding plate 10 to the outer side of the first air guiding plate 10. The structure of the air conditioner is simple, enabling the air in the air outlet passage to diffuse to the surroundings from the air dispersing holes 11 of the first air guiding plate 10.

[0032] The present disclosure further proposes a control method of the air conditioner 100 which is described above. the air conditioner includes a breeze mode and a cooling/heating mode, in which the air conditioner is switchable between the breeze mode and the cooling/heating mode; the method includes: in response to the breeze mode, shielding a part of an air outlet by a first air guiding plate, and moving the second air guiding plate to a lower side of the air outlet in an air outlet passage, in which the first rotating shaft includes: a first surface extending towards a first side; and a second surface extending towards an edge of an upper side of the air outlet; an included angle  $\alpha$  between the first surface and the second surface is no less than  $30^\circ$  and no more than  $40^\circ$ ; in response to the cooling/heating mode, completely opening the air outlet by the first air guiding plate, and the inclined angle  $\alpha$  is no less than  $65^\circ$  and no more than  $90^\circ$ . The specific structure of the air conditioner 100 refers to the above-mentioned embodiment and will not be described herein.

[0033] This is only some embodiments of the present disclosure and is not intended to limit the scope of the present disclosure. Any equivalent structural change made under the concept of the present disclosure using the contents of the present disclosure specification and drawings, or directly/indirectly applied in other related technical fields, shall be included in the protection scope of the present disclosure.

## Claims

1. An air conditioner, **characterized in that** the air conditioner comprises:

a housing, wherein the housing comprises:

an air outlet passage formed in the housing; and

an air outlet arranged in an outer peripheral wall of the housing and communicated with the air outlet passage;

a first air guiding plate rotatably at the air outlet and connected with the housing by a first rotating shaft on the housing; and a second air guiding plate rotatably arranged in the air outlet passage, and being capable of rotating around a second rotating shaft in the housing,

wherein the air conditioner comprises a breeze mode, in response to the air conditioner operating in the breeze mode, a part of the air outlet is shielded by the first air guiding plate, and the second air guiding plate is extended to a lower side of the air outlet in the air outlet passage.

2. The air conditioner of claim 1, **characterized in that**

after the air outlet is closed by the first air guiding plate,

the first air guiding plate comprises a first side close to an upper side of the air outlet, and

a second side close to the lower side of the air outlet;

wherein the first rotating shaft comprises:

a first surface extending towards the first side; and

a second surface extending towards an edge of an end of the upper side of the air outlet, wherein

$\alpha$  is an included angle between the first surface and the second surface, and  $\alpha$  is no less than 30° and no more than 40°, when the air conditioner is in a breeze mode.

**3. The air conditioner of claim 2, characterized in that**

in response to the air conditioner operating in the breeze mode, a distance M is no less than 65 mm and no more than 70 mm between the first side and the edge of the end of the upper side of the air outlet.

**4. The air conditioner of claim 2, characterized in that**

in response to the air conditioner operating in the breeze mode, a distance N is no less than 15 mm and no more than 25 mm between the second side and the edge of the end of the lower side of the air outlet.

**5. The air conditioner of claim 2, characterized in that**

the air conditioner further comprises a cooling/heating mode, wherein in response to the air conditioner operating in the cooling/heating mode, the first air guiding plate completely avoid the air outlet, and the included angle  $\alpha$  is no less than 65° and no more than 90°.

**6. The air conditioner of claim 5, characterized in that**

in response to the air conditioner operating in the cooling/heating mode, a distance M is no less than 95 mm and no more than 110 mm between the first side and the edge of the end of the upper side of the air outlet.

**7. The air conditioner of claim 5, characterized in that**

in response to the air conditioner operating in the breeze mode, a distance N is no less than 25mm and no more than 45 mm between the second side and the edge of the end of the lower side of the air outlet.

**8. The air conditioner of claim 1, characterized in that**

the first air guiding plate is provided with at least one air dispersing hole (11) penetrating through the first air guiding plate (10) along a thickness direction of the first air guiding plate.

**9. The air conditioner of claim 8, characterized in that**

a length of the air dispersing hole in an opening direction of the air dispersing hole (11) is equal to or larger than the thickness of the first air guiding plate.

**10. A method for controlling an air conditioner, characterized in that**

the air conditioner comprises a breeze mode and a cooling/heating mode, wherein the air conditioner is switchable between the breeze mode and the cooling/heating mode; the method comprises:

in response to the air conditioner operating in the breeze mode, shielding a part of an air outlet by a first air guiding plate, extending a second air guiding plate to a lower side of the air outlet in an air outlet passage, forming a first surface as a first rotating shaft extending towards a first side and forming a second surface as the first rotating shaft extending towards an edge of an end of the upper side of the air outlet, wherein an included angle  $\alpha$  between the first surface and the second surface is no less than 30° and no more than 40°; in response to the air conditioner operating in the cooling/heating mode, the first air guiding plate completely avoiding the air outlet, and the included angle  $\alpha$  is no less than 65° and no more than 90°.

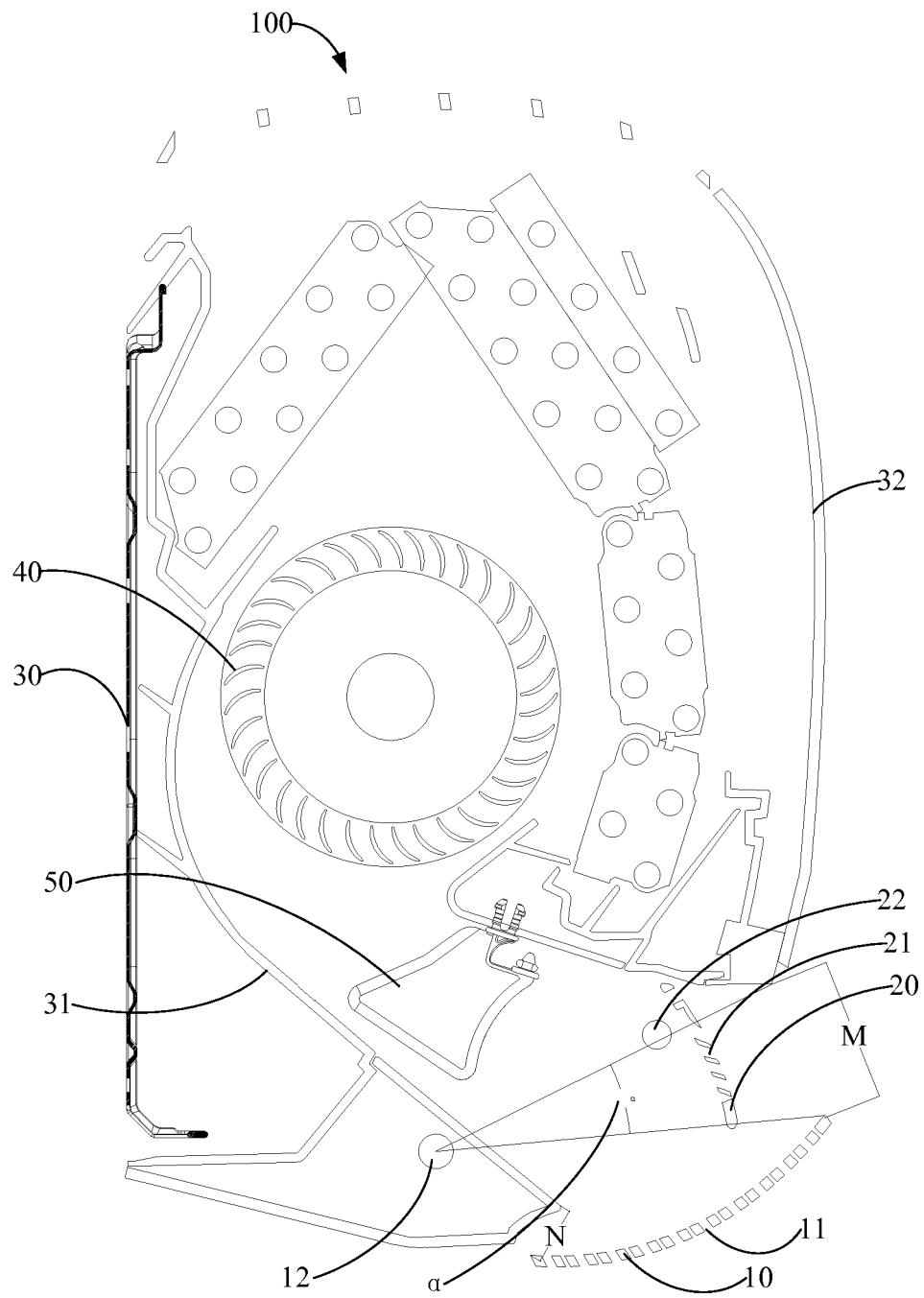


Fig. 1

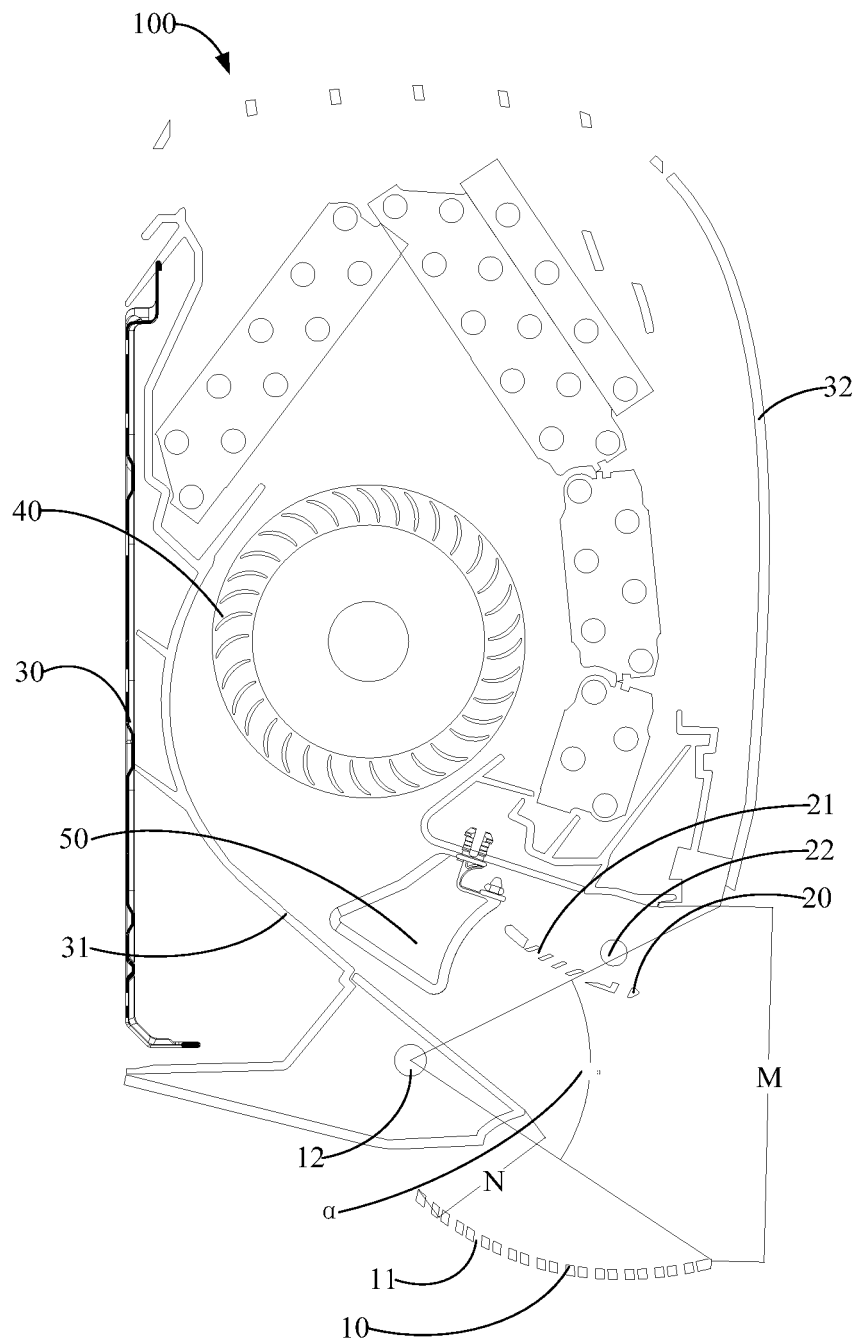


Fig. 2



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2018/084801

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> F24F 1/00(2011.01)i; F24F 11/00(2018.01)i; F24F 13/08(2006.01)i; F24F 13/20(2006.01)i; F24F 13/10(2006.01)i According to International Patent Classification (IPC) or to both national classification and IPC																					
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) F24F1; F24F13; F24F11 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; VEN; CNTXT; CNKI: 空调, 空气调节, 内机, 导风板, 内, 外, 第一, 第二, 出风口, 风道, 旋转, 柔风, 微风, 弱风, 无风, 散风孔, 出风孔, 气流, 驱动, 轴, air condition+, indoor?, damper?, guide plate, wind effect?, breeze, natural winds, vent																					
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>CN 107388370 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 24 November 2017 (2017-11-24) description, paragraphs 28-73, and figures 1-7</td> <td>10</td> </tr> <tr> <td>Y</td> <td>CN 107388370 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 24 November 2017 (2017-11-24) description, paragraphs 28-73, and figures 1-7</td> <td>1-9</td> </tr> <tr> <td>Y</td> <td>CN 107401776 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 28 November 2017 (2017-11-28) description, paragraphs 42-96, and figures 1-13</td> <td>1-9</td> </tr> <tr> <td>A</td> <td>CN 107449038 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 08 December 2017 (2017-12-08) entire document</td> <td>1-10</td> </tr> <tr> <td>A</td> <td>CN 103673093 A (DAIKIN INDUSTRIES. LTD.) 26 March 2014 (2014-03-26) entire document</td> <td>1-10</td> </tr> <tr> <td>A</td> <td>CN 103322661 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 25 September 2013 (2013-09-25) entire document</td> <td>1-10</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	CN 107388370 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 24 November 2017 (2017-11-24) description, paragraphs 28-73, and figures 1-7	10	Y	CN 107388370 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 24 November 2017 (2017-11-24) description, paragraphs 28-73, and figures 1-7	1-9	Y	CN 107401776 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 28 November 2017 (2017-11-28) description, paragraphs 42-96, and figures 1-13	1-9	A	CN 107449038 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 08 December 2017 (2017-12-08) entire document	1-10	A	CN 103673093 A (DAIKIN INDUSTRIES. LTD.) 26 March 2014 (2014-03-26) entire document	1-10	A	CN 103322661 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 25 September 2013 (2013-09-25) entire document	1-10
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**INTERNATIONAL SEARCH REPORT**  
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