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(54) **METHOD AND DEVICE FOR ROTATING AIR DEFLECTOR TO PRESET POSITION AND AIR CONDITIONER**

(57) A method and a device for rotating an air guide plate to a preset position, and an electronic device. The method including: acquiring a first angle between a preset position and a first limiting position and a second angle between a second limiting position and the preset position (S110), wherein the first limiting position and the second limiting position are two limiting positions of the air guide plate rotating upward and downward; judging whether the first angle is less than the second angle

(S120); when the first angle is less than the second angle, controlling the air guide plate rotates to the first limiting position (S130); controlling the air guide plate to rotate in an opposite direction to the preset position (S150).limiting positions An angle of the reverse rotation is usually small, and the probability of the position jump is small, so that a rotation angle of the air guide plate can be positioned more accurately.

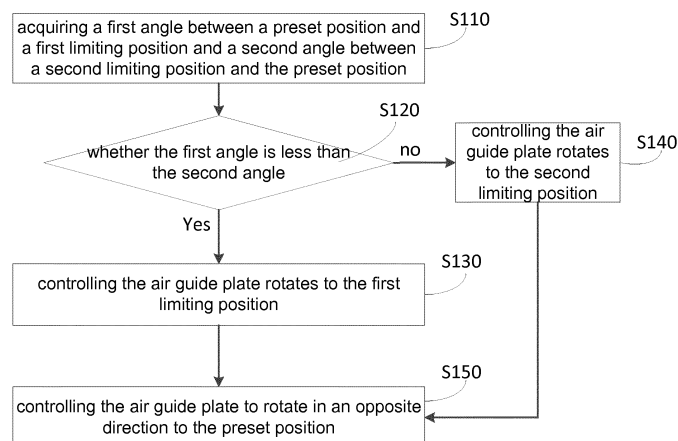


Fig.1

Description

Technical Field

[0001] The present invention relates to the technical field of air conditioner, and in particular, to a method and an device for rotating an air guide plate to a preset position, and an air conditioner.

Background

[0002] As a household appliance commonly used by households, an air conditioner can be made more intelligent, and as a user has a higher requirement on comfort of an air conditioner, the air conditioner rotates to different positions by using different operation modes (refrigeration, heating, etc.) air guide plate, and the position of the air guide plate determines an air supply direction of the air conditioner. Adopting different supply directions in different operation modes can improve the user experience.

[0003] In the patent CN 103383126B, the air scanning angle of the air guide plate is controlled by judging the air conditioner operation mode, and the air guided through the air guide plate flows in a direction of more than horizontal when the upper scanning mode is the lower scanning mode. The wind guided through the air guide plate is caused to flow in a direction less than or equal to the horizontal direction, and when the wind scanning mode is the full-length wind scanning mode, the wind guided through the air guide plate is caused to flow in a direction less than or equal to the horizontal direction and greater than or equal to the horizontal direction. The sweeping operation can be made more reasonable and refined, and various demands of the user can be satisfied. However, the air guide plate drives the air guide plate to rotate via the motor, and during the rotation of the air guide plate, a weight of the air guide plate and/or a gap between the transmission gears, the air guide plate may generate a position jump, i.e., a virtual position of the air guide plate, so that the rotation angle of the air guide plate cannot be accurately positioned, and when the air guide plate is guided at a preset position, the angle deviates, resulting in an inaccurate wind outlet direction. Influencing the use of the air conditioner, and reducing the comfort of the whole machine; When the air conditioner is turned off or the air guiding is stopped, the air guiding plate is stored, possibly due to the imaginary position during the rotation of the air guiding plate, and after the air guiding plate is stored, the gap affects the aesthetic appearance of the air conditioner and the user experience.

Summary

[0004] The technical problem to be solved by the present invention is to position the rotation angle of the air guide plate more accurately.

[0005] To this end, according to a first aspect, an em-

bodiment of the present invention provides acquiring a first angle between a preset position and a first limiting position and a second angle between a second limiting position and the preset position, wherein the first limiting position and the second limiting position are two limiting positions of the air guide plate rotating upward and downward; judging whether the first angle is less than the second angle; when the first angle is less than the second angle, controlling the air guide plate rotates to the first limiting position; controlling the air guide plate to rotate in an opposite direction to the preset position.

[0006] In an exemplary embodiment, when the first angle is greater than the second angle, controlling the air guide plate rotates to the second limiting position.

[0007] In an exemplary embodiment, after the controlling the air guide plate rotates to the first position limiting position, the method includes: compensating for an angle of a reverse rotation of the air guide plate.

[0008] In an exemplary embodiment, the compensating for the angle of the reverse rotation of the air guide plate includes: acquiring the angle of the reverse rotation of the air guide plate; obtaining a compensation angle according to the angle of the reverse rotation; using the compensation angle to compensate the angle of the reverse rotation of the air guide plate.

[0009] According to a second aspect, an embodiment of the present invention provides an device for rotating an air guide plate to a preset position, including: an acquisition unit, configured to acquire a first angle between a preset position and a first limiting position and a second angle between the preset position between a second limiting position, wherein the first limiting position and the second limiting position are two limiting positions of the air guide plate rotating upward and downward; a judging unit, configured to judge whether the first angle is less than the second angle; a first control unit, configured to control the air guide plate rotates to the first limiting position when the judging unit judges that the first angle is less than the second angle; a reversing unit, configured to control the air guide plate to rotate in an opposite direction to the preset position.

[0010] In an exemplary embodiment, the device for rotating the air guide plate to the preset position further includes: a second control unit, configured to control the air guide plate rotates to the second limiting position when the judging unit judges that the first angle is greater than the second angle.

[0011] In an exemplary embodiment, the device for rotating the air guide plate to the preset position further includes: a compensation unit, configured to compensate for an angle of a reverse rotation of the air guide plate.

[0012] In an exemplary embodiment, the compensation unit includes: an acquisition subunit, configured to acquire the angle of the reverse rotation of the air guide plate; a compensation angle obtaining subunit, configured to obtain a compensation angle according to the angle of the reverse rotation; a compensation subunit, configured to use the compensation angle to compensate

the angle of the reverse rotation of the air guide plate.

[0013] According to a third aspect, an embodiment of the present invention provides a non-transitory computer readable storage medium for storing computer instructions, where the computer instructions are used to cause the computer to execute the method for rotating a air guide plate to a preset position described in any one of the first aspect or the first aspect.

[0014] According to a fourth aspect, an embodiment of the present invention provides an air conditioner, including: an air guide plate, a memory and a processor, in which the air guide plate, the memory and the processor are connected to each other via a bus, the memory stores a computer instruction, and the processor implements the method for rotating the air guide plate to a preset position described in any one of the first aspect or the first aspect by executing the computer instruction.

[0015] The method and device for rotating an air guide plate to a preset position and the air conditioner provided by the embodiments of the present invention determine the magnitude of the angle between the preset position and the two limiting positions of the air guide plate rotating, select a limiting position with a smaller included angle with the preset position, and rotate the air guide plate to the limiting position. Then, the reverse rotation is performed on the basis of this, the angle of the reverse rotation is often small, and the probability that the position jumps is small, so that the rotation angle of the air guide plate can be precisely positioned. The comfort of the user using the air conditioner and the accuracy of the air guide plate when the air guide plate reset are improved

Brief Description of the Drawings

[0016] To illustrate the technical solutions in the embodiments of the present invention or in the prior art more clearly, the following briefly introduces the accompanying drawings required for describing the embodiments or the prior art. Obviously, the accompanying drawings in the following description are some embodiments of the present invention. For a person of ordinary skill in the art, other drawings can be obtained from these drawings without creative efforts.

Fig. 1 is a schematic flowchart of a method for rotating an air guide plate to a preset position according to an embodiment of the present invention;

Fig. 2a is a schematic diagram showing the position of an air guide plate according to an embodiment of the present invention;

Fig. 2b is a schematic diagram showing the position of the air guide plate when the air guide plate is guided upward according to an embodiment of the present invention;

Fig. 2c is a schematic diagram showing the position of the air guide plate when the air guide plate is guided downward according to an embodiment of the present invention;

Fig. 3 is a schematic flowchart of another method for rotating an air guide plate to a preset position according to an embodiment of the present invention; Fig. 4 is a schematic flowchart of an angle compensation method according to an embodiment of the present invention;

Fig. 5 is a schematic diagram of a device for rotating an air guide plate to a preset position according to an embodiment of the present invention;

Fig. 6 is a schematic diagram of an electronic device according to an embodiment of the present invention.

Detailed Description of the Embodiments

[0017] The technical solutions of the present invention will be clearly and completely described below with reference to the accompanying drawings, and obviously, the described embodiments are a part of the embodiments of the present invention rather than all of the embodiments. Based on the embodiments of the present invention, all other embodiments obtained by those skilled in the art without creative efforts fall within the scope of protection of the present invention

[0018] In the description of the present invention, it should be noted that the terms "installation", "connection" and "connection" should be understood broadly, for example, may be a fixed connection, may also be a detachable connection, or may be integrally connected, unless otherwise specified and defined. may be a mechanical connection or an electrical connection; The communication may be a direct connection or an indirect connection via an intermediate medium, or an internal connection of two elements, or a wireless connection or a wired connection. For a person of ordinary skill in the art, the specific meaning of the above terms in the present invention can be understood in particular.

[0019] An embodiment of the present invention provides a method for rotating an air guide plate to a preset position, where the method is applicable to Fig. 1, and may include the following steps:

S110. Acquire a first angle between the preset position and the first limiting position and a second angle between the preset position and the second limiting position. In particular embodiments, the first limiting position and the second limiting position are two limiting positions of the air guide plate rotating upward and downward. In this embodiment, the preset position may generally include a fixed upward air guiding position, a fixed downward air guiding position, and a reset position of the air guiding plate. Specifically, Fig. 2a shows the reset position of the air guiding plate, which may be a position before the air guiding plate is positioned after the air guiding is completed. Fig. 2b shows the position of the air guide plate when the wind is guided upward, in order to ensure that the comfort of the user can be guided

upward in the wind guide direction during cooling, and Fig. 2c shows that the position of the air guide plate when the wind is guided downward is to ensure that the comfort of the user can be guided downward in the wind guide direction during heating. The preset position may be obtained according to the current working mode, so that the first angle and the second angle may be obtained.

S120. judge whether the first angle is less than the second angle. In particular embodiments, during the rotation of the air guide plate, due to a weight of the air guide plate and a gap between the gears driving the air guide plate to rotate, a virtual position of the air guide plate may be caused, the larger the rotation angle of the air guide plate, and the probability and the times of the virtual position of the air guide plate may be increased correspondingly. Especially when the air guide plate is rotated to a gravity center of the air guide plate near a vertical line of the rotating shaft, the probability of virtual position increases, it is necessary to select a path with a smaller angle from the limiting position to the preset position to rotation, and when the first angle is less than the second angle, the process proceeds to step S130; When the first angle is greater than the second angle, the process proceeds to step S140.

S130. Control the air guide plate rotates to the first limiting position. In particular embodiment, since the first angle is less than the second angle, a distance between the first limiting position and the preset position is less than a distance between the second limiting position and the preset position. After the air guide plate is rotated to the first limiting position, the distance to the preset position is smaller, the times or the probability of generating a virtual position is smaller, and the air guide plate may be more accurately rotated to the preset position. In this embodiment, the limiting position may be an upper limiting position, or may be a lower limiting position. Specifically, the limiting position is arranged opposite to the second limiting position.

S140. Control the air guide plate rotates to the second limiting position. Referring specifically to the description of controlling the rotation of the air guide plate to the first limiting position in step S130 described above.

S150. Control the reverse rotation of the air guide plate rotates to a preset position. In particular embodiments, after the air guide plate is rotated to the limiting position, the rotation angle of the air guide plate is reset to zero, based on the limiting position, that is, a limiting position is set to zero, and according to an angle between the preset position and the limiting position, the air guide plate is controlled to rotate the angle between the preset position and the limiting position in an opposite direction, so that the air guide plate is rotated to the preset position. In the present embodiment, due to the angle of the reverse rotation

is generally small. In the process of rotating the air guide plate, the probability or of the times of virtual positions is small, so that the air guide plate can be controlled more accurately to a preset position.

[0020] After the air guide plate is rotated to the limiting position, during the reverse rotation of the air guide plate to the preset position, the virtual position may be generated, resulting in a rotation angle is inaccurate, as shown in Fig. 3, the method for rotating the air guide plate to the preset position may further include the following steps:

S210. Acquire a first angle between the preset position and the first limiting position and a second angle between the preset position and the second limiting position. For details, reference may be made to the description of obtaining the first angle and the second angle in step S110 of above embodiments. S220. judge whether the first angle is less than the second angle. For details, reference may be made to the description of judging whether the first angle is less than the second angle in step S120 of above embodiments, and when the first angle is less than the second angle, the process proceeds to step S230; When the first angle is greater than the second angle, the process proceeds to step S240.

S230. Control the air guide plate rotates to the first limiting position. For details, reference may be made to the description of controlling the rotation of the air guide plate to the first position limiting position in step S130 of above embodiments.

S240 controls the air guide plate rotates to the second limiting position. For details, reference may be made to the description of controlling the rotation of the air guide plate to the second limiting position in step S140 of above embodiments.

S250. Compensate for the reverse rotation angle of the air guide plate. In particular embodiments, the air guide plate generates the virtual position during rotation, and may increase or decrease an angle of the air guide plate according to the rotation direction of the air guide plate. Specifically, when an upper limiting position is rotated reversely to the preset position, due to the gravity of the air guide plate, when the air guide plate is generated virtual position, the air guide plate is rotated by a certain angle in advance, and an angle can be reduced, so as to ensure that after a driving mechanism rotates by a compensated preset angle, the preset angle is reduced by a certain angle, so that the air guide plate can reach the preset position more accurately. When reverse rotating to the preset position based on a lower limiting position, due to the gravity of the air guide plate, the air guide plate returns a certain angle when the virtual position is generated, and an angle may be added to ensure that after the driving mechanism rotates through the compensated preset angle, the preset angle is increased by a certain angle, so that

the air guide plate can reach the preset position more accurately.

S260 controls the reverse rotation of the air guide plate rotates to the preset position. For details, reference may be made to the description of controlling the reverse rotation of the air guide plate rotates to a preset position in step S150 in above embodiments.

[0021] In an optional embodiment, as shown in Fig. 4, step S250 may include:

S251. Acquire the angle of the reverse rotation of the air guide plate. In a specific embodiment, the angle of the reverse rotation may be obtained according to the angle between the position limiting position nearer to the preset position and the preset position. The magnitude of the angle of the reverse rotation may be determined after the operation mode of the air guide plate is determined.

S252. Obtain a compensation angle according to the angle of the reverse rotation. In a specific embodiment, since the virtual position is actually generated during the reverse rotation of the air guide plate, the larger the rotation angle is, the more the virtual position angle may be generated, in this embodiment, the compensation angle may be determined according to the magnitude of the angle of the reverse rotation, for example, The the angle of the reverse rotation may be compensated in a ratio of a certain the angle of the reverse rotation, for example, when the angle of the reverse rotation is 30°, 3° may be compensated, and when the angle of the reverse rotation is 60°, 6° may be compensated. The specific ratio may be determined according to the actual use condition.

S253. Compensate the angle of the reverse rotation of the air guide plate with the compensation angle. For a specific compensation method, reference may be made to the compensation for the angle of the reverse rotation in step S250.

[0022] Judging the magnitude of the included angle between the preset position and the two limiting positions of the air guide plate rotation, selecting a limiting position with a small included angle with the preset position, rotating the air guide plate to the limiting position, and performing reverse rotation on this basis, the angle of the reverse rotation is general small, and the probability of the position jump is very small, so that the rotation angle of the air guide plate can be precisely positioned. The comforts of the user using the air conditioner and the accuracy of the air guide plate when the air guide plate reset are improved.

[0023] In order to save the time for the air guide plate rotates to the preset position, in an optional embodiment, the method for rotating the air guide plate to the preset position may also compensate for the angle for the air

guide plate to rotate, specifically, acquire the included angle between a current position the air guide plate and the preset position. The compensation angle is determined according to the magnitude of the included angle, and reference may be made to the method for determining the compensation angle in step S252 of above embodiments. Compensate the rotation angle from the current position of the air guide plate to the preset position with the compensation angle. Only the rotation angle from the current position of the air guide plate to the preset position is compensated, and the air guide plate does not need to be rotated firstly to the limiting position, and the angle is compensated in the process of rotating from the current position to the preset position, thereby saving the time of rotating to the preset position.

[0024] An embodiment of the present invention further provides a device for rotating an air guide plate to a preset position, including: an acquisition unit 1000, configured to acquire a first angle between the preset position and the first limiting position and the second angle between the preset position and a second limiting position, wherein the first limiting position and the second limiting position are two limiting positions in which the air guide plate rotating upward and downward; a judging unit 2000, configured to judge whether the first angle is less than the second angle; a first control unit 3000, configured to control the air guide plate rotates to the first limiting position when the judging unit determines that the first angle is less than the second angle; a reversing unit 4000, configured to control the air guide plate to rotate in an opposite direction to the preset position.

[0025] In an optional embodiment, the device for rotating the air guide plate to the preset position further includes: a second control unit, configured to control the air guide plate rotates to a second limiting position when the judging unit judges that the first angle is greater than the second angle.

[0026] In an optional embodiment, the device for rotating the air guide plate to the preset position further includes: and a compensation unit, configured to compensate for an angle of reverse rotation of the air guide plate.

[0027] In an optional embodiment, the compensation unit includes: an acquisition subunit, configured to acquire the angle of the reverse rotation of the air guide plate; a compensation angle obtaining subunit, configured to obtain a compensation angle according to an angle of reverse rotation; a compensation subunit, configured to use the compensation angle to compensate the angle of the reverse rotation of the air guide plate.

[0028] An embodiment of the present invention further provides a non-transitory computer readable storage medium for storing computer instructions, where the computer instructions are used for causing a computer to execute the method for rotating a air guide plate to a preset position described in any one of above embodiments.

[0029] An embodiment of the present invention further provides an air conditioner, including: the air guide plate

10, the memory 20 and the processor 30 are connected to each other via a bus, the memory 20 stores a computer instruction, and the processor 30 implements the method for rotating the air guide plate to a preset position described in the first embodiment by executing the computer instruction.

[0030] While embodiments of the present invention have been described in connection with the accompanying drawings, those skilled in the art may make various modifications and variations without departing from the spirit and scope of the present invention, such modifications and variations all fall within the scope defined by the appended claims.

Claims

1. A method for rotating an air guide plate to a preset position, comprising:

acquiring a first angle between a preset position and a first limiting position and a second angle between a second limiting position and the preset position, wherein the first limiting position and the second limiting position are two limiting positions of the air guide plate rotating upward and downward;
judging whether the first angle is less than the second angle;
when the first angle is less than the second angle, controlling the air guide plate rotates to the first limiting position;
controlling the air guide plate to rotate in an opposite direction to the preset position.

2. The method for rotating the air guide plate to the preset position as claimed in claim 1, wherein:
when the first angle is greater than the second angle, controlling the air guide plate rotates to the second limiting position.

3. The method for rotating the air guide plate to the preset position as claimed in claim 1, wherein after the controlling the air guide plate rotates to the first position limiting position, the method comprises:
compensating for an angle of a reverse rotation of the air guide plate.

4. The method for rotating the air guide plate to the preset position as claimed in claim 3, wherein the compensating for the angle of the reverse rotation of the air guide plate comprises:

acquiring the angle of the reverse rotation of the air guide plate;
obtaining a compensation angle according to the angle of the reverse rotation;
using the compensation angle to compensate

the angle of the reverse rotation of the air guide plate.

5. A device for rotating an air guide plate to a preset position, comprising:

an acquisition unit, configured to acquire a first angle between a preset position and a first limiting position and a second angle between the preset position between a second limiting position, wherein the first limiting position and the second limiting position are two limiting positions of the air guide plate rotating upward and downward;

a judging unit, configured to judge whether the first angle is less than the second angle;

a first control unit, configured to control the air guide plate rotates to the first limiting position when the judging unit judges that the first angle is less than the second angle;

a reversing unit, configured to control the air guide plate to rotate in an opposite direction to the preset position.

6. The device for rotating the air guide plate to the preset position as claimed in claim 5, further comprising:
a second control unit, configured to control the air guide plate rotates to the second limiting position when the judging unit judges that the first angle is greater than the second angle.

7. The device for rotating the air guide plate to the preset position as claimed in claim 5, further comprising:
a compensation unit, configured to compensate for an angle of a reverse rotation of the air guide plate.

8. The device for rotating the air guide plate to the preset position as claimed in claim 7, wherein the compensation unit comprises:

an acquisition subunit, configured to acquire the angle of the reverse rotation of the air guide plate;

a compensation angle obtaining subunit, configured to obtain a compensation angle according to the angle of the reverse rotation;

a compensation subunit, configured to use the compensation angle to compensate the angle of the reverse rotation of the air guide plate.

9. A non-transitory computer readable storage medium, wherein:

the non-transitory computer readable storage medium stores computer instructions for causing the computer to execute the method for rotating the air guide plate to the preset position as claimed in any one of claims 1 to 4.

10. An air conditioner, comprising:

an air guide plate, a memory and a processor, in which the air guide plate, the memory and the processor are connected to each other via a bus, the memory stores a computer instruction, and the processor implements the method for rotating the air guide plate to a preset position as claimed in any one of claims 1 to 4 by executing the computer instruction.

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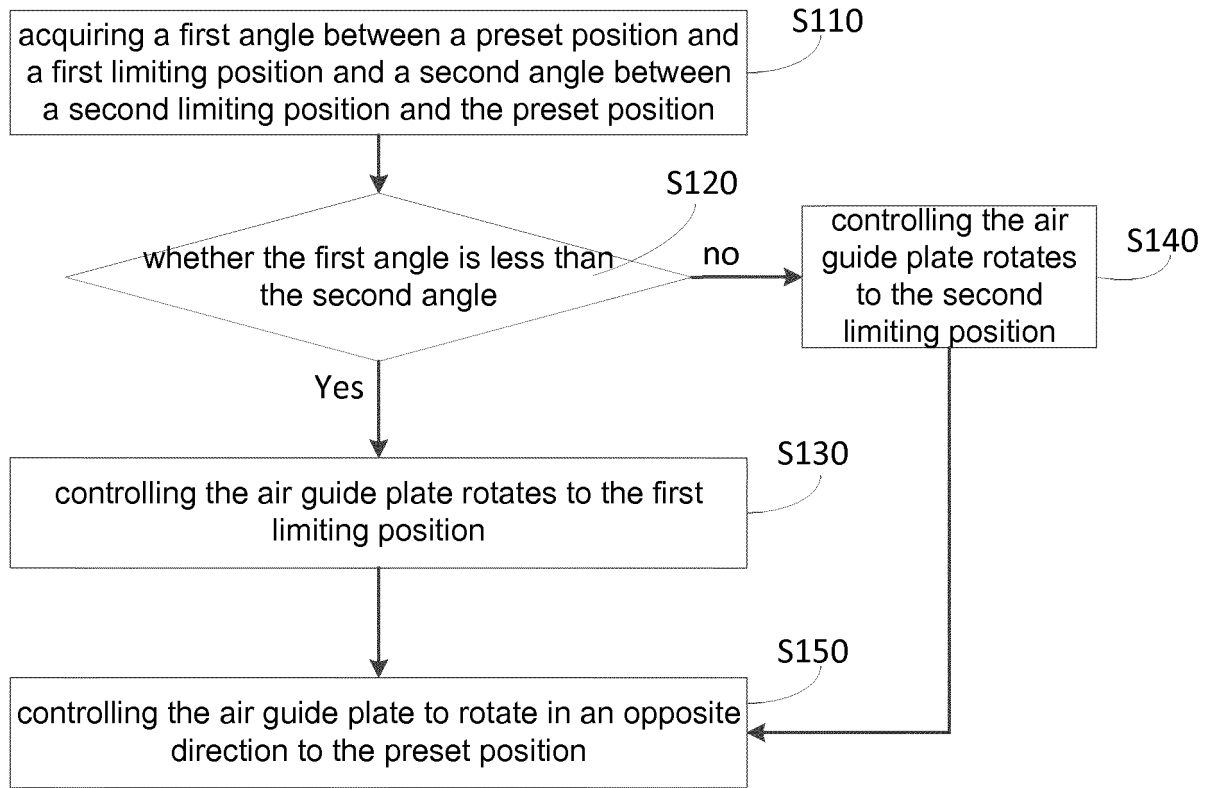
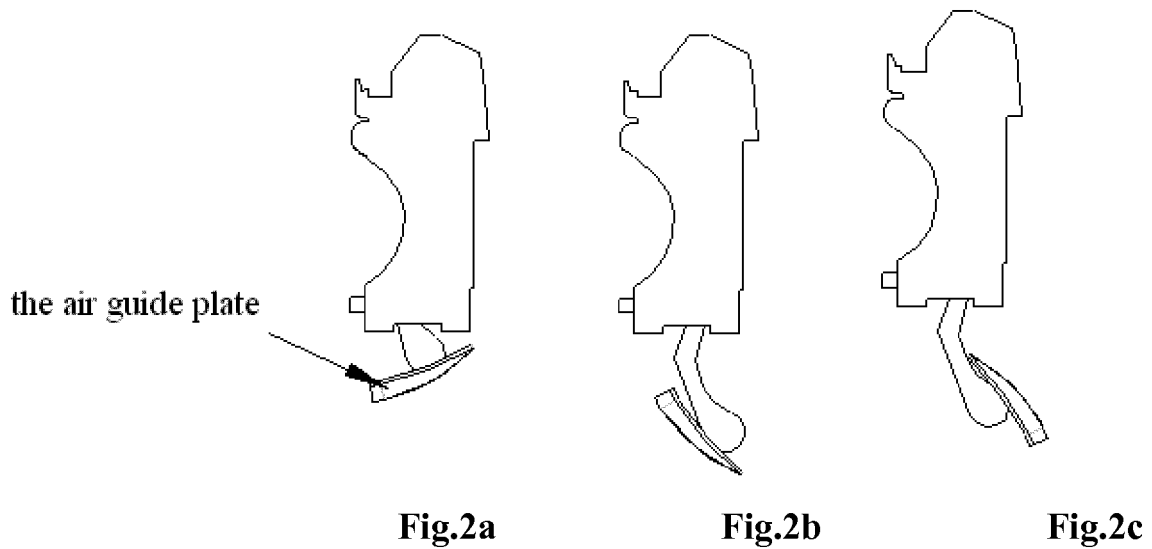
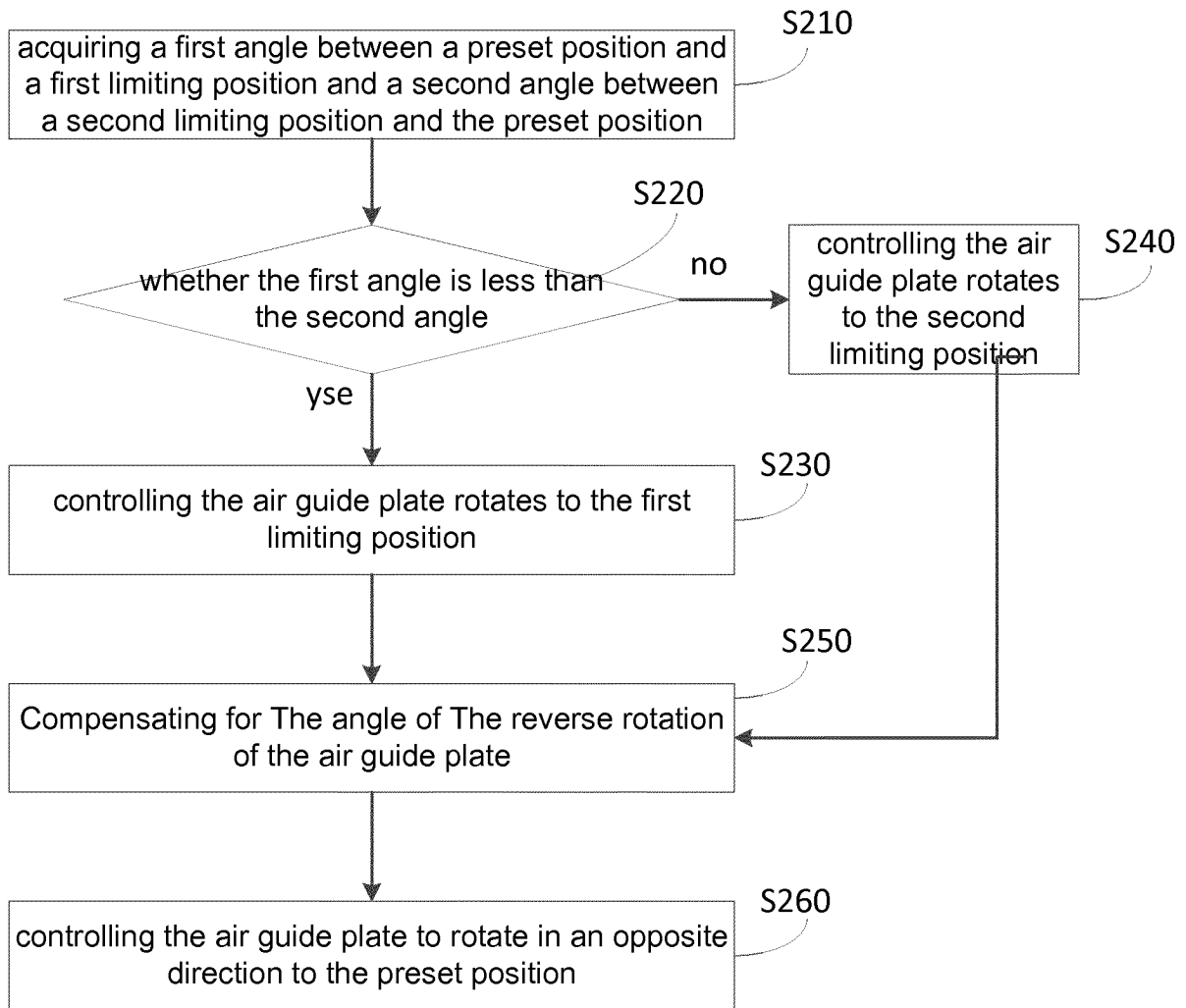
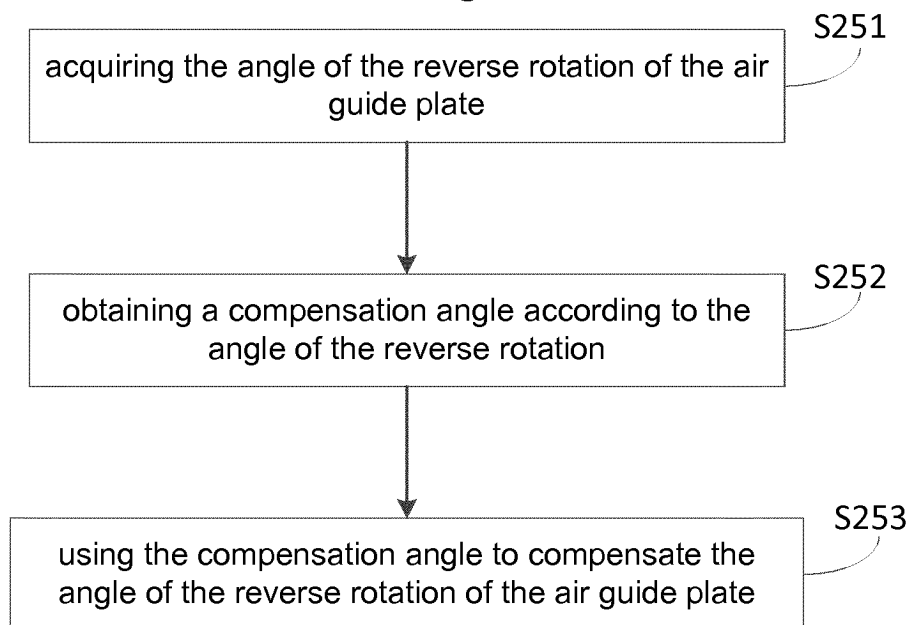


Fig.1



**Fig.3****Fig.4**

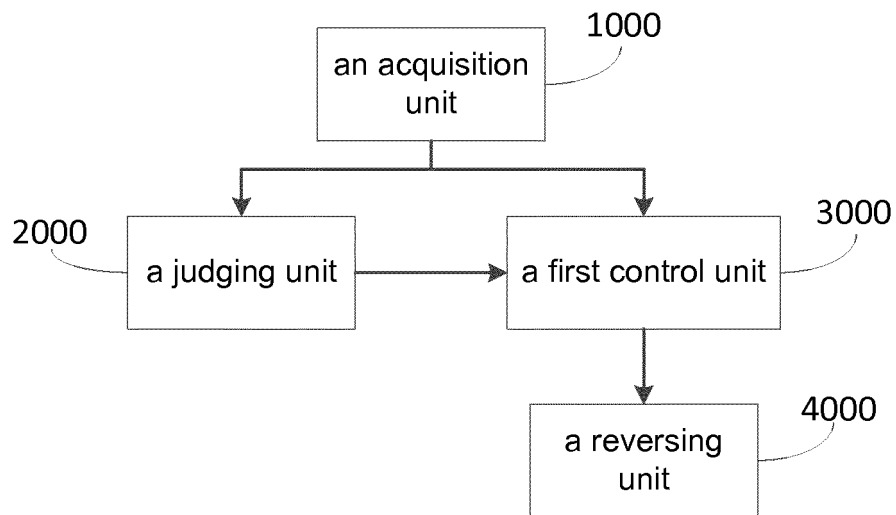


Fig.5

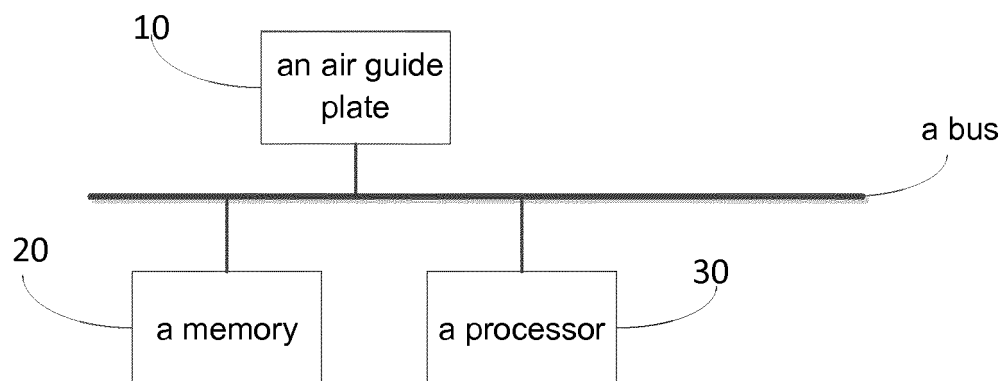


Fig.6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/084395

A. CLASSIFICATION OF SUBJECT MATTER

F24F 13/10 (2006.01) i; F24F 11/00 (2018.01) 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)

F24F

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, VEN: 空调, 空气调节, 导风板, 叶片, 位置, 角度, 限位, 极限, 上限, 下限, 最大, 全开, 旋转, 转动, 摆动, 反转, 反向, 反方向, 预设, 预定, 设定, 小于, 目标, 补偿, air condition+, guide, deflect, plate, vane, flap, vane, louver, position, angle, limit, upper limit, lower limit, max+, full open, rotate, swing, reverse, set, preset, less than, target, compensate

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 103900233 A (QINGDAO HISENSE HITACHI AIR CONDITIONING SYSTEM CO., LTD.) 02 July 2014 (02.07.2014), description, paragraph [0023], and figures 4 and 5	1-10
A	CN 106403047 A (GUANGDONG MIDEA REFRIGERATION EQUIPMENT CO., LTD.) 15 February 2017 (15.02.2017), entire document	1-10
A	KR 100554281 B1 (SAMSUNG ELECTRONICS CO., LTD.) 24 February 2006 (24.02.2006), entire document	1-10
A	KR 20060002528 A (LG ELECTRONICS INC.) 09 January 2006 (09.01.2006), entire document	1-10

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

* Special categories of cited documents:

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“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

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Date of the actual completion of the international search

13 June 2018

Date of mailing of the international search report

06 July 2018

Name and mailing address of the ISA
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INTERNATIONAL SEARCH REPORT
Information on patent family membersInternational application No.
PCT/CN2018/084395

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 103900233 A	02 July 2014	CN 103900233 B	02 November 2016
CN 106403047 A	15 February 2017	None	
KR 100554281 B1	24 February 2006	None	
KR 20060002528 A	09 January 2006	KR 100672508 B1	24 January 2007

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 103383126 B [0003]