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(54) **AIR-GUIDING DEVICE AND AIR CONDITIONER**

(57) The invention provides an air-guiding device and an air conditioner. Wherein the air-guiding device includes: a mounting plate (10); a plurality of blades (20), provided on the mounting plate (10) at intervals, the blades (20) being pivotally connected with the mounting plate (10); a connecting rod (30), comprising a body (31) and a guiding protrusion (32) provided on the body (31), the body (31) being pivotally connected with the blades

(20); and a guiding plate (40), an arc-shaped limiting opening (41) being provided on the guiding plate (40), a part of the guiding protrusion (32) being tightly clamped in the limiting opening (41), and an edge, in contact with the guiding protrusion (32), of the limiting opening (41) having a smoothly deformed curved surface. Moreover, the air conditioner has the air-guiding device.

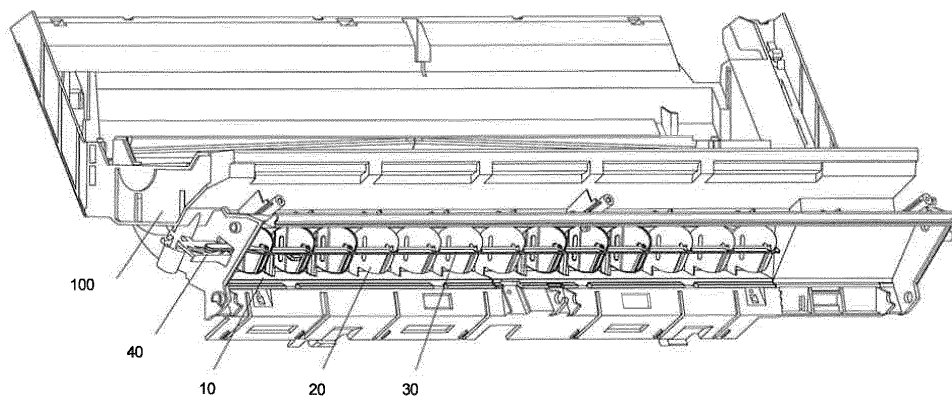


Fig. 1

Description

Technical field of the invention

[0001] The invention relates to the field of air conditioners, and in particular to an air-guiding device and an air conditioner.

Background of the invention

[0002] An air outlet of an air conditioner will be provided with a two-way air-guiding device, and an air supply range is controlled by means of the directions of blades in order that the air conditioner sweeps air. Each of some air conditioners will be provided with a manual air-guiding device in order to be conveniently operated, the blades are manually stirred to control the air supply range of the air conditioner, and the blades of the air-guiding device will have a locating structure, such that the blades are fixed to set positions and cannot self-rotate.

[0003] The locating structure in the prior art comprises a saw-toothed bayonet provided at the air outlet and a chuck connected with the blades, and the chuck is clamped into the bayonet. The locating structure is large in size and inconvenient to operate, and the saw-toothed bayonet has a peak and a valley. When the chuck moves to the peak, a stress direction will be suddenly changed, so that the chuck falls to the valley and collides with the bayonet, thereby increasing the resistance and the noise during stirring of the blades, easily damaging the chuck and the bayonet, and shortening the service life of the locating structure.

Summary of the invention

[0004] The invention aims to provide an air-guiding device and an air conditioner, which are intended to solve the problems in the prior art that the locating structure in the air-guiding device is inconvenient to operate and high in noise.

[0005] In order to solve the technical problems, according to one aspect of the invention, an air-guiding device is provided, which comprises: a mounting plate; a plurality of blades, provided on the mounting plate at intervals, the blades being pivotally connected with the mounting plate; a connecting rod, comprising a body and a guiding protrusion provided on the body, the body being pivotally connected with the blades; and a guiding plate, an arc-shaped limiting opening being provided on the guiding plate, a part of the guiding protrusion being tightly clamped in the limiting opening, and an edge, in contact with the guiding protrusion, of the limiting opening having a smoothly deformed curved surface.

[0006] Furthermore, a diameter of the guiding protrusion is 0.2-0.4mm greater than a width of the limiting opening.

[0007] Furthermore, the guiding protrusion is provided at one end of the body.

[0008] Furthermore, the guiding plate further comprises a first assistant opening configured to assist in expanding the limiting opening, the first assistant opening being provided on one side of the limiting opening.

[0009] Furthermore, the guiding plate further comprises a second assistant opening configured to assist in expanding the limiting opening, the second assistant opening being provided on the other side of the limiting opening.

[0010] Furthermore, the first assistant opening and the second assistant opening is identical to the limiting opening in curvature, the air-guiding device comprises a plurality of second assistant openings, the first assistant opening is corresponding to the middle of the limiting opening, and the second assistant openings are corresponding to two ends of the limiting opening.

[0011] Furthermore, two ends of the first assistant opening and each of the second assistant openings are partially overlapped in an extending direction of the limiting opening.

[0012] Furthermore, the guiding protrusion comprises a rod body and a flange located at an end of the rod body, the diameter of the flange is greater than a diameter of the rod body, and the flange penetrates through the limiting opening.

[0013] Furthermore, a groove is provided on the flange along an axial direction of the guiding protrusion.

[0014] Furthermore, the groove extends to an end, away from the flange, of the rod body.

[0015] According to another aspect of the invention, an air conditioner is also provided, which comprises a conditioner body. An air outlet is provided at the conditioner body. The air conditioner further comprises an above-mentioned air-guiding device. The air-guiding device is provided at the air outlet, and a mounting plate of the air-guiding device being connected with the conditioner body.

[0016] The blades of the air-guiding device in the invention are connected by the connecting rod, the blades rotate along with the movement of the connecting rod, and therefore a person can adjust an air direction by moving the connecting rod. The guiding protrusion on the connecting rod is located by the limiting opening, and the edge, in contact with the guiding protrusion, of the limiting opening has the smoothly deformed curved surface, so that the size and direction of a force exerted on the guiding protrusion during movement in the limiting opening cannot be suddenly changed, and the guiding protrusion can steadily move in the limiting opening under the action of an external force, thereby enabling the guiding protrusion and the limiting opening to smoothly rub against each other when the connecting rod is moved. The resistance is lower than the movement resistance of a chuck in a saw-toothed locating structure, and the guiding protrusion is easier to slide. In addition, since the guiding protrusion will not suddenly hit the limiting opening in a sliding process, the sliding noise is lower.

Brief description of the drawings

[0017] The drawings forming a part of the invention are intended to provide further understanding of the invention. The schematic embodiments and descriptions of the invention are intended to explain the invention, and do not form improper limits to the invention. In the drawings:

Fig. 1 schematically shows a diagram of an air outlet of an air conditioner in the invention;

Fig. 2 schematically shows a local diagram of an air-guiding device in the invention; and

Fig. 3 schematically shows a diagram of a protrusion part of an air-guiding device in the invention.

[0018] Drawing marks: 10, mounting plate; 20, blade; 30, connecting rod; 31, body; 32, protrusion; 33, handle; 40, guiding plate; 41, limiting opening; 42, first assistant opening; 43, second assistant opening; 321, rod body; 322, flange; 323, groove; and 100, conditioner body.

Detailed description of the embodiments

[0019] The embodiments of the invention are described below in detail with reference to the drawings. However, the invention can be implemented in multiple different modes limited and covered by claims.

[0020] According to one aspect of the invention, an air-guiding device is provided. As shown in Fig. 1 to Fig. 3, the air-guiding device comprises: a mounting plate 10; a plurality of blades 20, provided on the mounting plate 10; a connecting rod 30, comprising a body 31 and a guiding protrusion 32 provided on the body 31, the body 31 being connected with the blades 20; and a guiding plate 40, a limiting opening 41 being provided on the guiding plate 40, a part of the guiding protrusion 32 being provided in the limiting opening 41 and located by the limiting opening 41. The guiding protrusion 32 can slide in the limiting opening 41 along an extending direction of the limiting opening 41 under an action of an external force, and an edge, in contact with the guiding protrusion 32, of the limiting opening 41 has a smoothly deformed curved surface.

[0021] The blades 20 of the air-guiding device in the invention are connected by the connecting rod 30, the blades 20 rotate along with a movement of the connecting rod 30, and therefore a person can adjust an air direction by moving the connecting rod 30. The guiding protrusion 32 on the connecting rod 30 is located by the limiting opening 41, and the edge, in contact with the guiding protrusion 32, of the limiting opening 41 has the smoothly deformed curved surface, so that the size and the direction of a force exerted on the guiding protrusion 32 during movement in the limiting opening 41 cannot be suddenly changed, and the guiding protrusion 32 can steadily move in the limiting opening 41 under the action of the external force, thereby enabling the guiding protrusion

32 and the limiting opening 41 to smoothly rub against each other when the connecting rod 30 is moved. The resistance is lower than the movement resistance of a chuck in a saw-toothed locating structure, and the guiding protrusion 32 is easier to slide. In addition, since the guiding protrusion 32 will not suddenly hit the limiting opening 41 in a sliding process, the sliding noise is lower.

[0022] Preferably, the limiting opening 41 is arc-shaped. The guiding protrusion 32 can smoothly slide in the arc-shaped limiting opening 41, and the guiding protrusion 32 is self-locked in the arc-shaped limiting opening 41 by means of a friction force.

[0023] Alternatively, the limiting opening 41 is wavy. The wavy limiting opening 41 is not saw-toothed in the prior art. A stress direction of the guiding protrusion 32 during movement in the wavy limiting opening 41 is uniformly changed, and sudden change of the stress direction caused by movement in a saw-toothed bayonet cannot be caused. Thus, the guiding protrusion 32 can steadily move in the limiting opening 41 under the action of the external force, and can be more stably fixed to a valley position of the limiting opening 41. Compared with the saw-toothed bayonet, the wavy limiting opening 41 has the advantages that the guiding protrusion 32 can more steadily slide in the wavy limiting opening 41, the friction force is relatively small, and the generated noise is relatively weak.

[0024] Preferably, the guiding protrusion 32 can be self-locked at a random position in the limiting opening 41. Compared with the prior art in which the chuck may be only fixed to a valley part in the saw-toothed bayonet, the invention has the advantages that the guiding protrusion 32 can be self-locked at the random position in the limiting opening 41, thereby providing more diversified optional air supply directions.

[0025] Preferably, a maximum outer diameter of the guiding protrusion 32 is 0.2-0.8mm greater than a width of the limiting opening 41. Thus, the guiding protrusion 32 is enabled to be tightly clamped in the limiting opening 41 usually, so as to be self-locked without random movement, thereby guaranteeing a direction stability of the blades 20. A difference between the maximum outer diameter of the guiding protrusion 32 and the width of the limiting opening 41 is decided according to a material of the guiding plate 40. If the guiding plate 40 is made of a material which is easily deformed, the difference between the maximum outer diameter of the guiding protrusion 32 and the width of the limiting opening 41 can be relatively large. If the guiding plate 40 is made of a material which is not easily deformed, the difference is relatively small.

[0026] Preferably, an interference of about 0.3mm exists between the guiding protrusion 32 and the limiting opening 41 in an actual movement process so as to enable the guiding protrusion 32 to be self-locked. Meanwhile, an interference value cannot be over-large. Otherwise, the resistance is over-high, which does not facilitate sliding of the guiding protrusion 32.

[0027] Preferably, as shown in Fig. 1 and Fig. 2, the

guiding protrusion 32 is provided at one end of the body 31. The guiding protrusion 32 and the guiding plate 40 can be provided outside the air outlet, and therefore the air outlet can be more simplified.

[0028] Preferably, the connecting rod 30 further comprises a handle 33. The handle 33 is provided on the body 31, and extends towards a direction away from the blades 20.

[0029] Preferably, the guiding plate 40 further comprises a first assistant opening 42 configured to assist in expanding the limiting opening 41. Preferably, the guiding plate 40 further comprises a second assistant opening 43 configured to assist in expanding the limiting opening 41, the first assistant opening 42 being provided on one side of the limiting opening 41, and the second assistant opening 43 being provided on the other side of the limiting opening 41. Since the diameter of the guiding protrusion 32 is greater than the width of the limiting opening 41, the guiding protrusion 32 or the limiting opening 41 will be deformed when the guiding protrusion 32 moves in the limiting opening 41. In order to make the guiding protrusion 32 move in the limiting opening 41 more conveniently, an assistant opening is provided on the guiding plate 40 in the invention so as to assist in deforming and expanding the limiting opening 41.

[0030] Preferably, as shown in Fig. 2, the limiting opening 41 is arc-shaped, and the first assistant opening 42 and the second assistant opening 43 are identical to the limiting opening 41 in curvature. If the limiting opening 41 is wavy, the first assistant opening 42 and the second assistant opening 43 may be arc-shaped, or may be wavy in correspondence to the limiting opening 41.

[0031] Preferably, the first assistant opening 42 is corresponding to the middle of the limiting opening 41, and the second assistant openings 43 are corresponding to two ends of the limiting opening 41. Since the guiding protrusion 32 moves in the limiting opening 41 along different stress directions, when the guiding protrusion 32 moves to the middle of the limiting opening 41, the limiting opening 41 is deformed towards a centre direction of an arc, so that the first assistant opening 42 is provided on a side, close to the centre, of the limiting opening 41. When the guiding protrusion 32 moves to the two ends of the limiting opening 41, the limiting opening 41 needs to be deformed towards a side away from the centre, so that the second assistant openings 43 are provided on the side, away from the centre, of the limiting opening 41. If an assistant opening is provided on only one side, the resistance of movement of the guiding protrusion 32 in the middle or at the end of the limiting opening 41 is high, and the guiding protrusion 32 is unlikely to poke. If the assistant openings completely corresponding to the limiting opening 41 are provided on two sides simultaneously, the resistance of movement of the guiding protrusion 32 in the middle or at the end of the limiting opening 41 is over-low, and the guiding protrusion 32 is difficult to self-lock. However, the effect of assisting the limiting opening 41 in deformation can be achieved by providing

the assistant opening on only one side of the limiting opening 41 or providing the complete assistant openings on the two sides of the limiting opening. The design of the assistant openings shown in Fig. 2 is preferred.

[0032] Preferably, two ends of the first assistant opening 42 and each of the second assistant openings 43 are partially overlapped in the extending direction of the limiting opening 41. A mutual overlapping degree of the first assistant opening 42 and the second assistant openings 43 is 8 to 15 DEG. An overlapped area is intended to more facilitate the deformation of the limiting opening 41 when the guiding protrusion 32 moves to a corresponding position.

[0033] Preferably, the centre radius of the limiting opening 41 is 23mm to 27mm.

[0034] Preferably, as shown in Fig. 3, the guiding protrusion 32 comprises a rod body 321 and a flange 322 located at an end of the rod body 321, a maximum outer diameter of the flange 322 is greater than a diameter of the rod body 321, and the flange 322 penetrates through the limiting opening 41. The flange 322 can be configured to prevent the guiding protrusion 32 from disengaging from the limiting opening 41 so as to guarantee that the blades 20 will not be out of control.

[0035] Preferably, the diameter of an end, away from the rod body 321, of the flange 322 is smaller than the width of the limiting opening 41. One end of the flange 322 is conical, so that the limiting opening 41 can be more conveniently widened, thereby sleeving the flange 322 by the limiting opening 41.

[0036] Preferably, a groove 323 is provided on the flange 322 along an axial direction of the guiding protrusion 32. Preferably, the groove 323 extends to the middle of the rod body 321. When the guiding protrusion 32 is mounted into the limiting opening 41, if it is expected to inwardly squeeze the flange 322 to push the flange through the limiting opening 41, the flange can be assisted in deformation by providing the groove 323. After penetrating through the limiting opening 41, the flange 322 springs back. During disassembly, the flange 322 is squeezed inwardly, and then is withdrawn from the limiting opening 41. In addition, the groove 323 can also assist the rod body 321 in deformation in order to move in the limiting opening 41.

[0037] According to another aspect of the invention, an air conditioner is also provided. As shown in Fig. 1, the air conditioner comprises a conditioner body 100. An air outlet is provided at the conditioner body 100. The air conditioner further comprises an air-guiding device according to claims. The air-guiding device is provided at the air outlet, and a mounting plate 10 of the air-guiding device is connected with the conditioner body 100.

[0038] By means of the air conditioner with the air-guiding device in the invention, the air-guiding device is easy to adjust, low in resistance and low in noise, and the service life is longer than that of the saw-toothed bayonet in the prior art. In addition, as shown in Fig. 1, a guiding protrusion 32 and a guiding plate 40 are provided outside

the air outlet of the air conditioner, air output from the air outlet cannot be affected, and the effect of making the air outlet tidy and attractive can be achieved.

[0039] Preferably, the mounting plate 10 of the air-guiding device and the conditioner body are integrally formed.

[0040] Preferably, the guiding plate 40 and the conditioner body are integrally formed.

[0041] The above is only the preferred embodiments of the invention, and is not intended to limit the invention. There can be various modifications and variations in the invention for those skilled in the art. Any modifications, equivalent replacements, improvements and the like within the spirit and principle of the invention shall fall within the protection scope of the invention.

Claims

1. An air-guiding device, comprising:

a mounting plate (10);
a plurality of blades (20), provided on the mounting plate (10);
a connecting rod (30), comprising a body (31) and a guiding protrusion (32) provided on the body (31), the body (31) being connected with the blades (20); and
a guiding plate (40), a limiting opening (41) being provided on the guiding plate (40), a part of the guiding protrusion (32) being provided in the limiting opening (41) and located by the limiting opening (41), the guiding protrusion (32) being capable of sliding in the limiting opening (41) along an extending direction of the limiting opening (41) under an action of an external force, and an edge, in contact with the guiding protrusion (32), of the limiting opening (41) having a smoothly deformed curved surface.

2. The air-guiding device according to claim 1, wherein a maximum outer diameter of the guiding protrusion (32) is 0.2-0.8mm greater than a width of the limiting opening (41).

3. The air-guiding device according to claim 1, wherein the guiding plate (40) further comprises a first assistant opening (42) configured to assist in expanding the limiting opening (41).

4. The air-guiding device according to claim 3, wherein the guiding plate (40) further comprises a second assistant opening (43) configured to assist in expanding the limiting opening (41), the first assistant opening (42) being provided on one side of the limiting opening (41), and the second assistant opening (43) being provided on the other side of the limiting opening (41).

5. The air-guiding device according to claim 4, wherein the limiting opening (41) is arc-shaped, and the first assistant opening (42) and the second assistant opening (43) are identical to the limiting opening (41) in curvature.

6. The air-guiding device according to claim 4, wherein the first assistant opening (42) is corresponding to the middle of the limiting opening (41), and the second assistant openings (43) are corresponding to two ends of the limiting opening (41).

7. The air-guiding device according to claim 6, wherein two ends of the first assistant opening (42) and each of the second assistant openings (43) are partially overlapped in the extending direction of the limiting opening (41), and a mutual overlapping degree of the first assistant opening (42) and the second assistant openings (43) is 8 to 15 DEG.

8. The air-guiding device according to claim 1, wherein the guiding protrusion (32) comprises a rod body (321) and a flange (322) located at an end of the rod body (321), the maximum outer diameter of the flange (322) is greater than a diameter of the rod body (321), and the flange (322) penetrates through the limiting opening (41).

9. The air-guiding device according to claim 8, wherein the diameter of an end, away from the rod body (321), of the flange (322) is smaller than a width of the limiting opening (41).

10. The air-guiding device according to claim 8, wherein a groove (323) is provided on the flange (322) along an axial direction of the guiding protrusion (32).

11. The air-guiding device according to claim 10, wherein the groove (323) extends to an end, away from the flange (322), of the rod body (321).

12. An air conditioner, comprising a conditioner body (100), an air outlet being provided at the conditioner body (100), wherein the air conditioner further comprising an air-guiding device according to any one of claims 1 to 11, the air-guiding device being provided at the air outlet, and a mounting plate (10) of the air-guiding device being connected with the conditioner body (100).

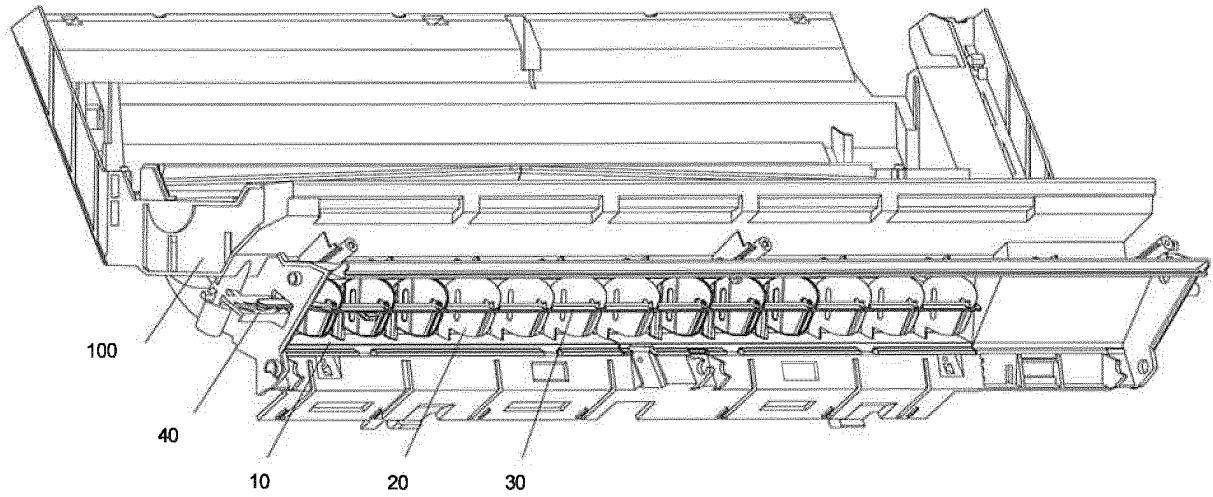


Fig. 1

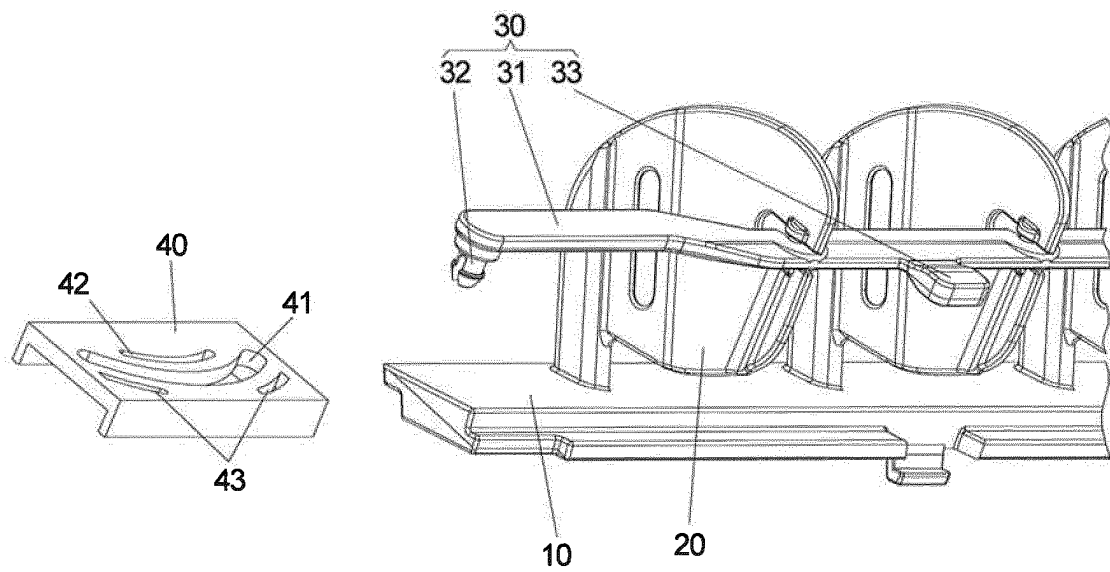


Fig. 2

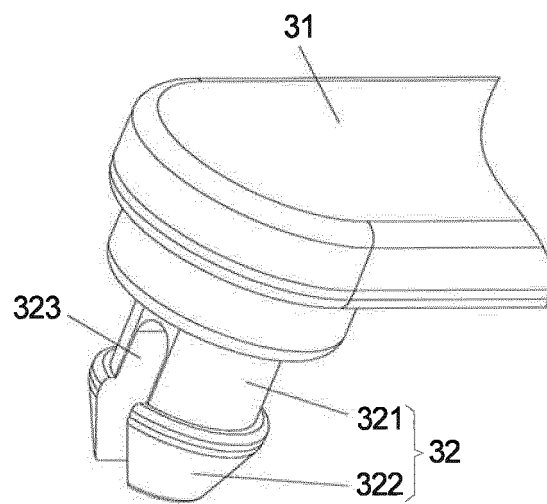


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2014/081610

A. CLASSIFICATION OF SUBJECT MATTER

F24F 13/15 (2006.01) i; F24F 1100 (2011.01) 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 13, F24F 1

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)

CNKI, CPRS, WPI, EPODOC: fan blade, air guide, wind direction, connecting rod, limiting, interference, extrude, louver, blade, rod, lever, link, shaft, opening, slot, hole, guide, direct, position, guide, locate, limit, manual, interfere, friction, diameter, size, dimension, width

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2014/081610

5	C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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