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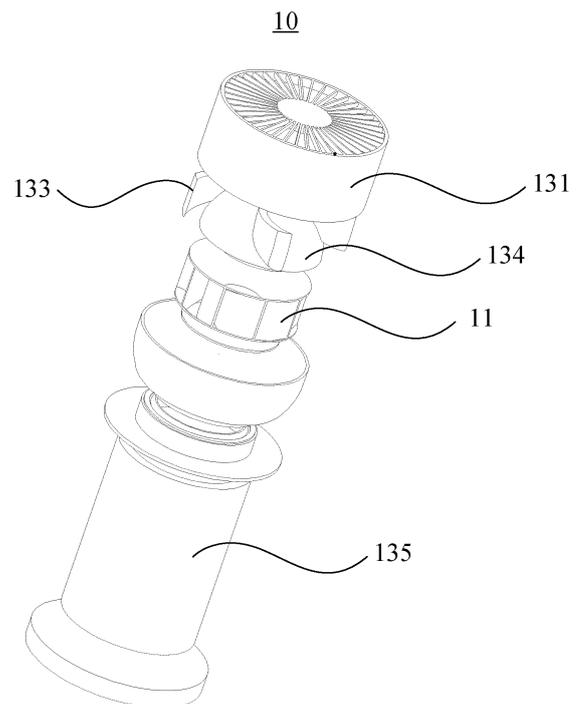
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(54) **AIR OUTLET FLOW GUIDE STRUCTURE AND PURIFIER**

(57) The present disclosure relates to an air outlet flow guiding structure and a purifier. The air outlet flow guiding structure includes an outer housing covering a periphery of a centrifugal blade to form a flow guiding channel; and a flow guiding part is provided in the flow guiding channel, wherein the flow guiding part is located on one side, close to an air outlet of the flow guiding channel, of the centrifugal blade, and the flow guiding part is provided in a longitudinal direction of the flow guiding channel. Under the action of the centrifugal blade, air passes through the flow guiding channel, and the air passing through the centrifugal blades spirally moves in the outer housing towards the air outlet, and the flow guiding part which is provided in the longitudinal direction of the flow guiding channel guides the spirally moving air to flow towards the air outlet in the longitudinal direction of the flow guiding channel, so as to prevent the airflow from turning around in the flow guiding channel, thereby reducing the air volume loss, and improving the air purification efficiency.



**Fig. 8**

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## Description

### Cross-Reference to Related Application

**[0001]** The present application claims the priority of a Chinese Patent Application filed on November 20, 2018, with the No. 201811383329.5, and entitled "Air Outlet Flow Guiding Structure and Purifier", which is incorporated herein by reference in its entirety.

### Technical Field

**[0002]** The present disclosure relates to a field of air purification, and in particular, to an air outlet flow guiding structure and a purifier.

### Background

**[0003]** The purifier filters particles in the air by circulating the indoor air, so as to purify the indoor air. In addition to being directly related to the filtering component, the purification capability of the purifier is closely related to the reasonable design of the flow guiding channel, and the reasonable design of the flow guiding channel will effectively reduce the energy loss of the air in the transmission process. Furthermore, a purifier known to the inventors provides the power for air circulation through centrifugal blades, so as to achieve the purpose of purifying the air. However, the air delivered by the centrifugal blades loses a lot of energy in the flow guiding channel, resulting in low air purification efficiency.

### Summary

**[0004]** On the basis of this, it is necessary to provide an air outlet flow guiding structure and a purifier to improve air purification efficiency.

**[0005]** An air outlet flow guiding structure includes an outer housing, the outer housing covering a periphery of a centrifugal blade to form a flow guiding channel; and a flow guiding part is provided in the flow guiding channel, the flow guiding part is located at a side, close to an air outlet of the flow guiding channel, of the centrifugal blade, and the flow guiding part is provided in a longitudinal direction of the flow guiding channel.

**[0006]** The solution above provides an air outlet flow guiding structure. Under the action of the centrifugal blade, air passes through the flow guiding channel, and the air passing through the centrifugal blade spirally moves in the outer housing towards the air outlet, and the flow guiding part which is provided in the longitudinal direction of the flow guiding channel guides the spirally moving air to flow towards the air outlet in the longitudinal direction of the flow guiding channel, so as to prevent the airflow from turning around in the flow guiding channel, thereby reducing the air volume loss, and improving the air purification efficiency.

**[0007]** In some embodiments, the flow guiding part in-

cludes a flow guiding plate, there are a plurality of flow guiding plates, and the plurality of flow guiding plates are provided in the flow guiding channel at uniform intervals in a circumferential direction.

**[0008]** In some embodiments, the air outlet flow guiding structure further includes an inner housing for supporting an electric motor, the inner housing is located at a side, close to the air outlet of the flow guiding channel, of the centrifugal blade, the flow guiding channel is formed between the inner housing and the outer housing, and the flow guiding part is located between the inner housing and the outer housing.

**[0009]** In some embodiments, the flow guiding part is provided on the inner housing and extends towards a direction close to the outer housing, and is connected with the outer housing.

**[0010]** In some embodiments, the flow guiding part is provided with a wire passing channel, and the wire passing channel penetrates from an end face, connected with the outer housing, of the flow guiding part to an end face, connected with the inner housing, of the flow guiding part.

**[0011]** In some embodiments, an outer diameter of the inner housing gradually decreases in a direction away from the centrifugal blade, and a slope of an outer wall of the inner housing gradually decreases.

**[0012]** In some embodiments, the flow guiding part includes a straight plate or an arc-shaped plate; and when the flow guiding part is an arc-shaped plate, spirally rising air delivered by the centrifugal blade is blocked by a concave surface of the arc-shaped plate and flows in the longitudinal direction of the flow guiding channel.

**[0013]** In some embodiments, the outer housing is a cylindrical housing, a radius of the cylindrical housing is R, and when the flow guiding part includes an arc-shaped

plate, an arc radius of the arc-shaped plate is  $\frac{R}{3} \sim 2R$ .

**[0014]** In some embodiments, the arc radius of the arc-shaped plate is -.

**[0015]** A purifier includes a centrifugal blade, an electric motor for driving the centrifugal blade to rotate, and the air outlet flow guiding structure mentioned above; and the outer housing covers a periphery of the centrifugal blade.

**[0016]** In the solution above, a purifier is provided, by using the air outlet flow guiding structure in any one of the described embodiments, the purifier enables air, passing through the centrifugal blade, to be able to move in the longitudinal direction of the flow guiding channel under the action of the flow guiding part, thereby avoiding the occurrence of the cases where the air volume is reduced and the air supply distance is reduced due to the rotation of the air in the flow guiding channel, thereby improving the air purification efficiency.

**[0017]** In some embodiments, the centrifugal blade is coaxially provided with the outer housing, and the axis of the centrifugal blade is parallel to a side surface of the flow guiding part.

**[0018]** In some embodiments, the purifier further includes a filtering device, and the filtering device is provided at an air inlet of the flow guiding channel and is in communication with the air inlet.

### **Brief Description of the Drawings**

**[0019]** To describe the technical solutions in the embodiments of the present disclosure or in the embodiments known to the inventors more clearly, in the following, the drawings required for describing the embodiments are introduced briefly. Obviously, the drawings in the following description are merely embodiments of the present disclosure, and for a person of skilled in the art, other drawings can also be derived from the disclosed drawings, without involving any inventive effort.

Fig. 1 is a front view of an air outlet flow guiding structure according to some embodiments of the present disclosure;

Fig. 2 is a side view of the air outlet flow guiding structure shown in Fig. 1;

Fig. 3 is a front view of an air outlet flow guiding structure according to some other embodiments of the present disclosure;

Fig. 4 is a front view of an air outlet flow guiding structure according to some other embodiments of the present disclosure;

Fig. 5 is a schematic view of the structure of a purifier without flow guiding part according to some embodiments of the present disclosure;

Fig. 6 is a cross-sectional view of a purifier according to some embodiments of the present disclosure;

Fig. 7 is an exploded view of a purifier according to some embodiments of the present disclosure;

Fig. 8 is an exploded view of a purifier according to some other embodiments of the present disclosure.

### **Detailed Description of the Embodiments**

**[0020]** The following clearly and completely describes the technical solutions in the embodiments of the present disclosure with reference to the drawings in the embodiments of the present disclosure. Obviously, the described embodiments are merely a part rather than all of the embodiments of the present disclosure. All other embodiments obtained by a person of skilled in the art on the basis of the embodiments of the present disclosure without inventive efforts shall belong to the scope of protection of the present disclosure.

**[0021]** Embodiments of the present disclosure provide an air outlet flow guiding structure 13. As shown in Figs. 1 to 4, the air outlet flow guiding structure 13 includes an outer housing 131. As shown in Fig. 6, the outer housing 131 covers a periphery of a centrifugal blade 11 to form a flow guiding channel 132, a flow guiding part 133 is provided in the flow guiding channel 132, the flow guiding part 133 is located at a side, close to an air outlet of the

flow guiding channel 132, of the centrifugal blade 11, and the flow guiding part 133 is provided in a longitudinal direction of the flow guiding channel 132.

**[0022]** The solution above provides an air outlet flow guiding structure 13, under the action of the centrifugal blade 11, air passes through the flow guiding channel 132, as shown in Fig. 5, the air passing through the centrifugal blade 11 spirally moves in the outer housing 131 towards the air outlet, as shown in Fig. 6, the flow guiding part 133 which is provided in the longitudinal direction of the air guide channel 132 guides the spirally moving air to flow towards the air outlet in the longitudinal direction of the flow guiding channel 132, so as to prevent the airflow from turning around in the flow guiding channel 132, thereby reducing the air volume loss, and improving the air purification efficiency.

**[0023]** Specifically, in the present disclosure, the flow guiding part 133 is provided in the longitudinal direction of the flow guiding channel 132, which refers to the longitudinal direction in the state as shown in Fig. 6, so that spirally rising air is able to be blocked by the flow guiding part 133, thereby the air flows upwards along the flow guiding parts 133, so as to prevent the airflow from turning around in the inner housing 134, thereby reducing the air volume loss. As shown, for example, in Figs. 1, 3, and 4, the visible portion of the flow guiding part 133 in the front views of the embodiments is the end face of the flow guiding part 133. When the installation angle of the purifier 10 is shifted, the arrangement direction of the flow guiding part 133 is also shifted correspondingly. However, the relative position between the flow guiding part 133 and the outer housing 131 remains unchanged, that is, the flow guiding part 133 is capable of guiding the spirally rising airflow in the flow guiding channel 132, so that the airflow moves substantially in the axial direction of the outer housing 131. Specifically, the flow guiding part is a plate-shaped structure. Furthermore, there are a plurality of flow guiding parts 133, so as to improve the blocking effect on the spirally rising air and reduce the air volume loss.

**[0024]** As shown in Figs. 1 to 4, in some embodiments, the flow guiding part 133 is a flow guiding plate, there are a plurality of flow guiding plates, and the plurality of guiding plates are provided in the flow guiding channel 132 at uniform intervals in a circumferential direction. Thus, the air spirally rising in the axial direction is able to be guided to the air outlet more evenly, further increasing the air output volume.

**[0025]** As shown in Fig. 5, in some embodiments, the air outlet flow guiding structure 13 further includes an inner housing 134 for supporting an electric motor 12, the inner housing 134 is located at a side, close to the air outlet of the flow guiding channel 132, of the centrifugal blades 11, the flow guiding channel 132 is located between the inner housing 134 and the outer housing 131, and the flow guiding part 133 is located between the inner housing 134 and the outer housing 131.

**[0026]** When the inner housing 134 is used to support

the electric motor 12, the flow guiding channel 132 is formed between the inner housing 134 and the outer housing 131, and the flow guiding part 133 is provided between the inner housing 134 and the outer housing 131 to guide the air spirally rising in the flow guiding channel 132.

**[0027]** Specifically, the flow guiding parts 133 can be connected with the outer housing 131, and can also be connected with the inner housing 134; or the flow guiding part is supported between the outer housing 131 and the inner housing 134, and can support the inner housing 134 and the outer housing 131, thereby improving the overall strength of the air outlet flow guiding structure 13. For example, in some embodiments, as shown in Figs. 1 to 4, the flow guiding part 133 is provided on the inner housing 134, extending in a direction close to the outer housing 131, and is connected with the outer housing 131.

**[0028]** Furthermore, on the basis of the existence of the flow guiding part 133, when the flow guiding part 133 is supported between the inner housing 134 and the outer housing 131, the flow guiding part 133 is a structure with a certain width, as shown in Fig. 4, and then a channel for wires layout is provided in the flow guiding part 133, thereby omitting the arrangement of a dedicated wire layout channel between the inner housing 134 and the outer housing 131, and further simplifying the structure.

**[0029]** As shown in Fig. 4, in some embodiments, the flow guiding part 133 is provided with a wire passing channel, and the wire passing channel penetrates from an end face, connected with the outer housing 131, of the flow guiding part 133 to an end face, connected with the inner housing 134, of the flow guiding part 133. The wire connected to the electric motor 12 in the inner housing 134 is connected to an external circuit through the wire passing channel, thereby preventing the wire from being exposed in the flow guiding channel 132 and affecting the air output volume.

**[0030]** Further, in some embodiments, an outer diameter of the inner housing 134 gradually decreases in a direction away from the centrifugal blade 11, and a slope of the outer wall of the inner housing 134 gradually decreases. In this way, the outer wall of the inner housing 134 forms a shape similar to a reverse bowl, so as to prevent the airflow in the flow guiding channel 132 from gathering and turning around on the surface of the inner housing 134, thereby further increasing the air output volume.

**[0031]** Further, in some embodiments, the flow guiding part 133 is a straight plate or an arc-shaped plate, as long as the flow guiding part 133 is provided in the longitudinal direction of the flow guiding channel 132 and can guide the spirally rising airflow to flow upward.

**[0032]** Furthermore, in some embodiments, as shown in Figs. 1 to 4, when the flow guiding part 133 is an arc-shaped plate, the spirally rising air delivered by the centrifugal blade 11 is blocked by a concave surface of the arc-shaped plate, and flows in the longitudinal direction

of the flow guiding channel 132. The air guided by the flow guiding part 133 flows along the concave surface of the flow guiding part 133 when being in contact with the flow guiding part 133, and then flows upwards under the blocking of the flow guiding part 133, thereby further reducing the energy loss of the air when being in contact with the flow guiding part 133.

**[0033]** Further, in some embodiments, as shown in Figs. 1 to 8, the outer housing 131 is a cylindrical housing, a radius of the cylindrical housing is R, and when the flow guiding part 133 is an arc-shaped plate, an arc radius of

$$\frac{R}{3} \sim 2R.$$

the arc-shaped plate is  $\frac{R}{3} \sim 2R$ . While ensuring the guiding effect of the flow guiding part 133 on the air, it also makes the overall air volume larger. In some embodiments, the arc radius of the R arc-shaped plate is -.

**[0034]** Further, some other embodiments provide a purifier 10, as shown in Figs. 6 to 8, the purifier 10 includes a centrifugal blade 11, an electric motor 12 for driving the centrifugal blade 11 to rotate, and the air outlet flow guiding structure 13 mentioned above; and the outer housing 131 covers a periphery of the centrifugal blade 11.

**[0035]** In the solution above, a purifier 10 is provided, by using the air outlet flow guiding structure 13 in any one of the described embodiments, the purifier enables the air, passing through the centrifugal blade 11, to be able to move in the longitudinal direction of the flow guiding channel 132 under the action of the flow guiding part 133, thereby avoiding the occurrence of the cases where the air volume is reduced and the air supply distance is reduced due to the rotation of the air in the flow guiding channel 132, thereby improving the air purification efficiency.

**[0036]** Further, in some embodiments, the centrifugal blade 11 is coaxially provided with the outer housing 131, and the axis of the centrifugal blade 11 is parallel to a side surface of the flow guiding part 133. In this way, a distribution of the airflow in the flow guiding channel 132 is more uniform, and the overall air output effect is better.

**[0037]** Further, in some embodiments, as shown in Figs. 6 to 8, the purifier 10 further includes a filtering device 135, and the filtering device 135 is provided at an air inlet of the flow guiding channel 132 and is in communication with the air inlet.

**[0038]** Under the driving of the electric motor 12, the centrifugal blade 11 rotates to suck in outside air, and the outside air passes through the flow guiding channel 132 after passing through the filtering device 135; and under the action of the flow guiding part 133, the air spirally rising in the flow guiding channel 132 is guided to be the air flowing in the longitudinal direction of the flow guiding channel 132, which reduces the occurrence of air rotating in the flow guiding channel 132, thereby increasing the air output volume, and improving the purification efficiency.

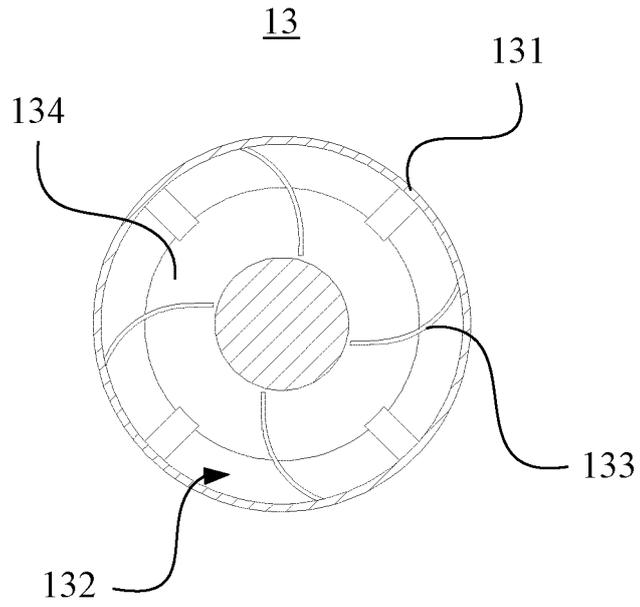
**[0039]** Various technical features of the described embodiments can be combined in any way, and in order to

make the description concise, all possible combinations of the technical features in the described embodiments are not described. However, as long as the combination of these technical features is not contradictory, the combination should be considered to belong to the scope of the description.

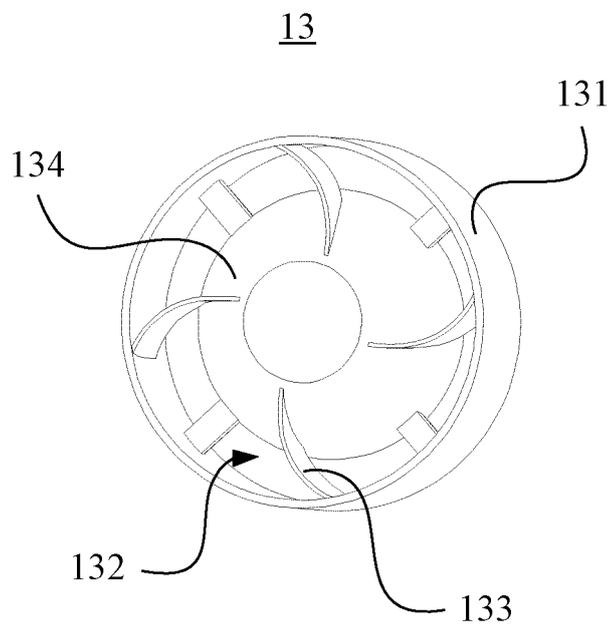
**[0040]** The foregoing embodiments merely represent several implementations of the present disclosure. The description of these embodiments is more specific and detailed, but it should not be understood as a limitation on the scope of the disclosure. It should be noted that, for a person skilled in the art, various modifications and improvements can be made without departing from the concept of the present disclosure, and all these modifications and improvements belong to the scope of protection of the present disclosure. Therefore, the scope of protection of the present disclosure should be subject to the appended claims.

### Claims

1. An air outlet flow guiding structure (13), comprising an outer housing (131), the outer housing (131) covering a periphery of a centrifugal blade (11) to form a flow guiding channel (132); a flow guiding part (133) is provided in the flow guiding channel (132), the flow guiding part (133) being located on one side, close to an air outlet of the flow guiding channel (132), of the centrifugal fan blade (11), and the flow guiding part (133) is provided in a longitudinal direction of the flow guiding channel (132).
2. The air outlet flow guiding structure (13) as claimed in claim 1, wherein the flow guiding part (133) comprises a flow guiding plate, and there are a plurality of flow guiding plates, and the plurality of flow guiding plates are provided in the flow guiding channel (132) at uniform intervals in a circumferential direction.
3. The air outlet flow guiding structure (13) as claimed in claim 1 or 2, wherein, the air outlet flow guiding structure (13) further comprises an inner housing (134) for supporting an electric motor (12), the inner housing (134) being located at a side, close to the air outlet of the flow guiding channel (132), of the centrifugal blade (11), the flow guiding channel (132) being formed between the inner housing (134) and an outer housing (131), and the flow guiding part (133) being located between the inner housing (134) and the outer housing (131).
4. The air outlet flow guiding structure (13) as claimed in claim 3, wherein the flow guiding part (133) is provided on the inner housing (134), extending towards a direction close to the outer housing (131), and is connected with the outer housing (131).
5. The air outlet flow guiding structure (13) as claimed in claim 4, wherein the flow guiding part (133) is provided with a wire passing channel, and the wire passing channel penetrates from an end face, connected with the outer housing (131), of the flow guiding part (133) to an end face, connected with the inner housing (134), of the flow guiding part (133).
6. The air outlet flow guiding structure (13) as claimed in claim 3, wherein an outer diameter of the inner housing (134) gradually decreases in a direction away from the centrifugal blade (11), and a slope of an outer wall of the inner housing (134) gradually decreases.
7. The air outlet flow guiding structure (13) as claimed in claim 1 or 2, wherein the flow guiding part (133) comprises a straight plate or an arc-shaped plate, and when the flow guiding part (133) is an arc-shaped plate, spirally rising air delivered by the centrifugal blade (11) is blocked by a concave surface of the arc-shaped plate, and flows in the longitudinal direction of the flow guiding channel (132).
8. The air outlet flow guiding structure (13) as claimed in claim 7, wherein the outer housing (131) is a cylindrical housing, a radius of the cylindrical housing is R, and when the flow guiding part (133) comprises an arc-shaped plate, an arc radius of the arc-shaped plate is  $\frac{R}{3} \sim 2R$ .
9. The air outlet flow guiding structure (13) as claimed in claim 8, wherein the arc R radius of the arc-shaped plate is -.
10. A purifier (10), wherein, the purifier (10) comprises a centrifugal blade (11), an electric motor (12) for driving the centrifugal blade (11) to rotate, and an air outlet flow guiding structure (13) as claimed in any one of claims 1 to 9, wherein the outer housing (131) covers a periphery of the centrifugal blade (11).
11. The purifier (10) as claimed in claim 10, wherein the centrifugal blade (11) is coaxially provided with the outer housing (131), and an axis of the centrifugal blade (11) is parallel to a side surface of the flow guiding part (133).
12. The purifier (10) as claimed in claim 10, wherein, the purifier (10) further comprises a filtering device (135), wherein the filtering device (135) is provided at an air inlet of the flow guiding channel (132) and is in communication with the air inlet.

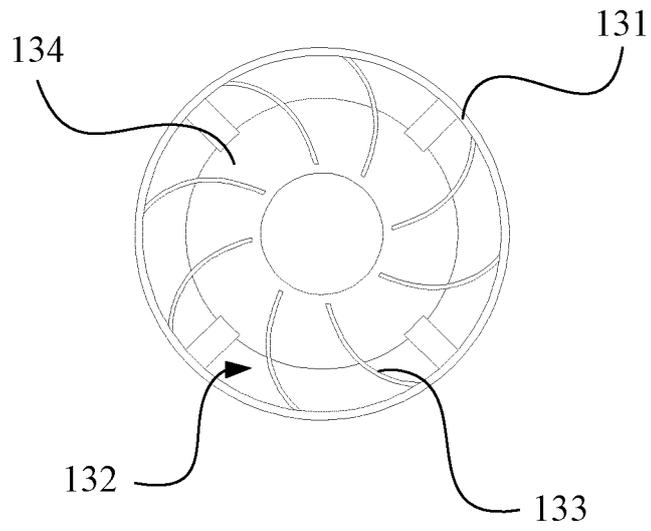


**Fig. 1**



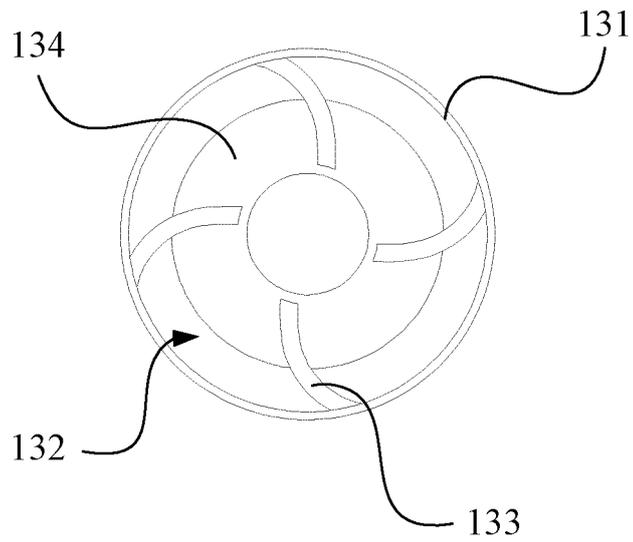
**Fig. 2**

13

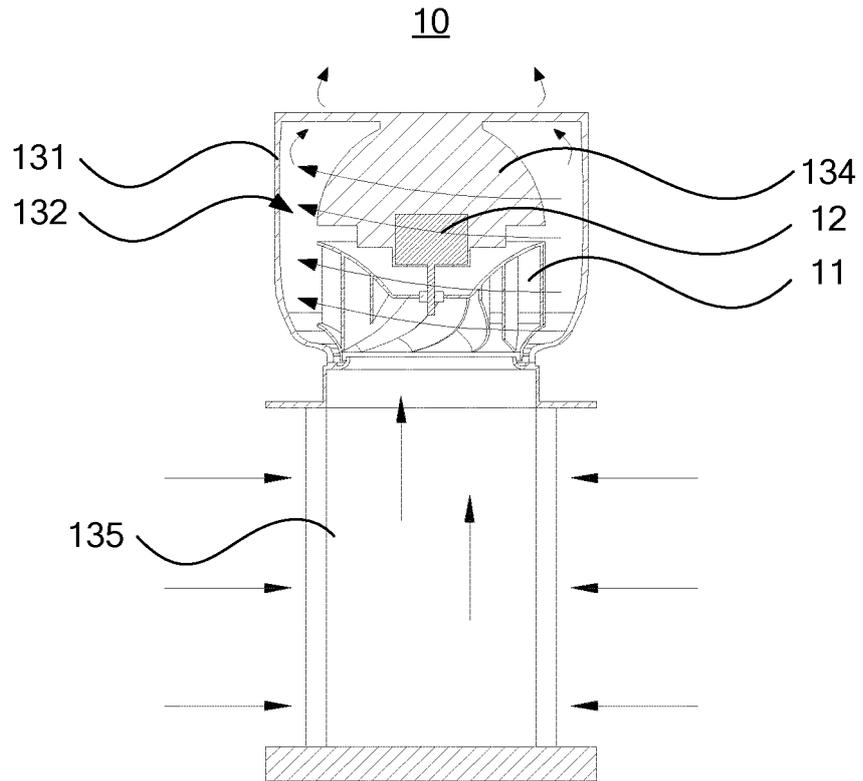


**Fig. 3**

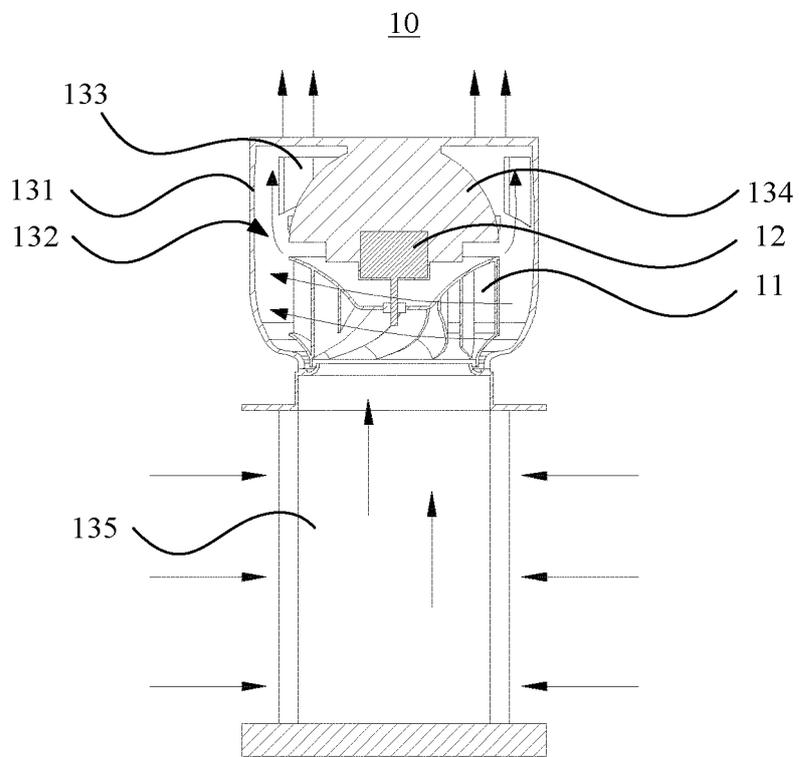
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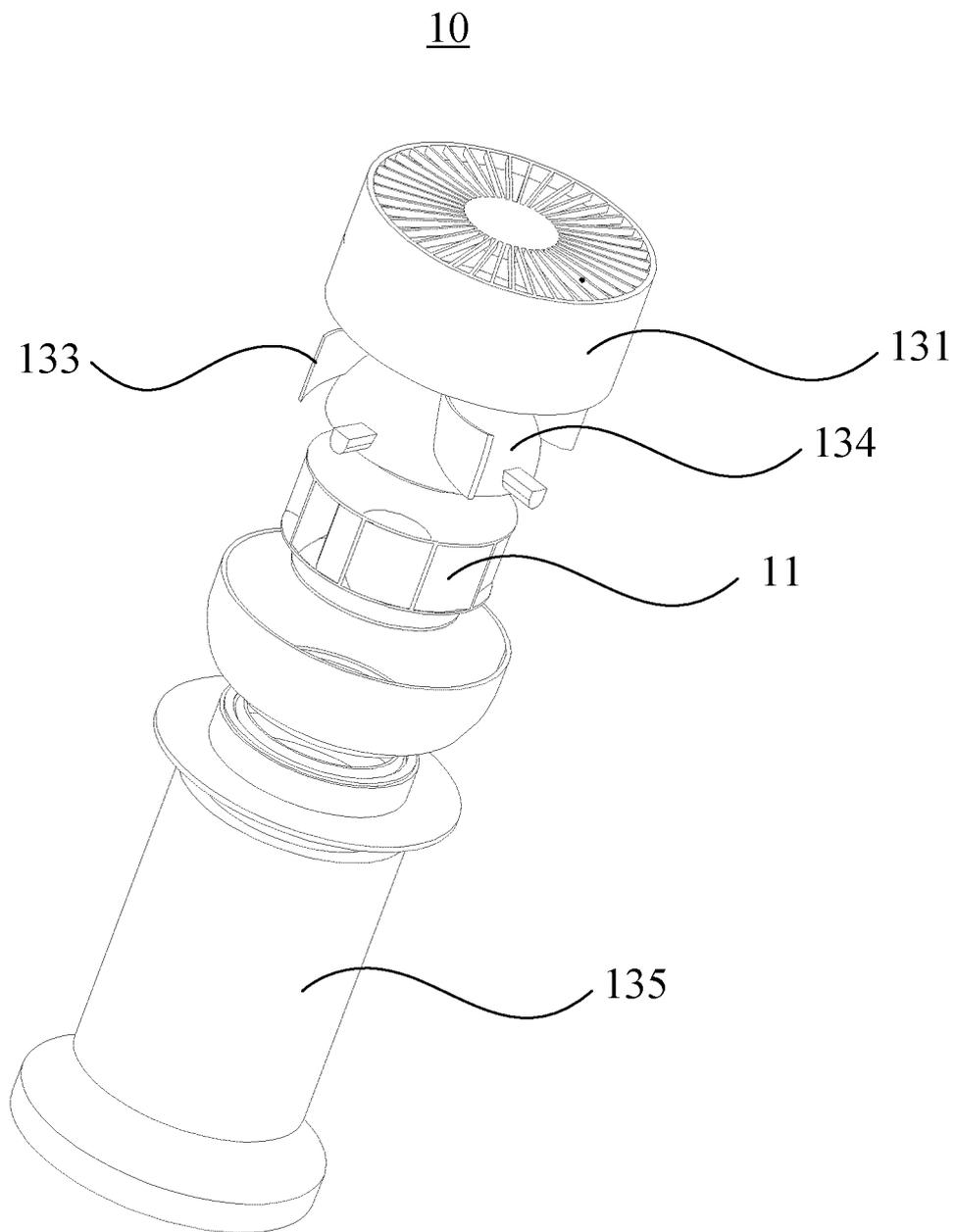
**Fig. 4**



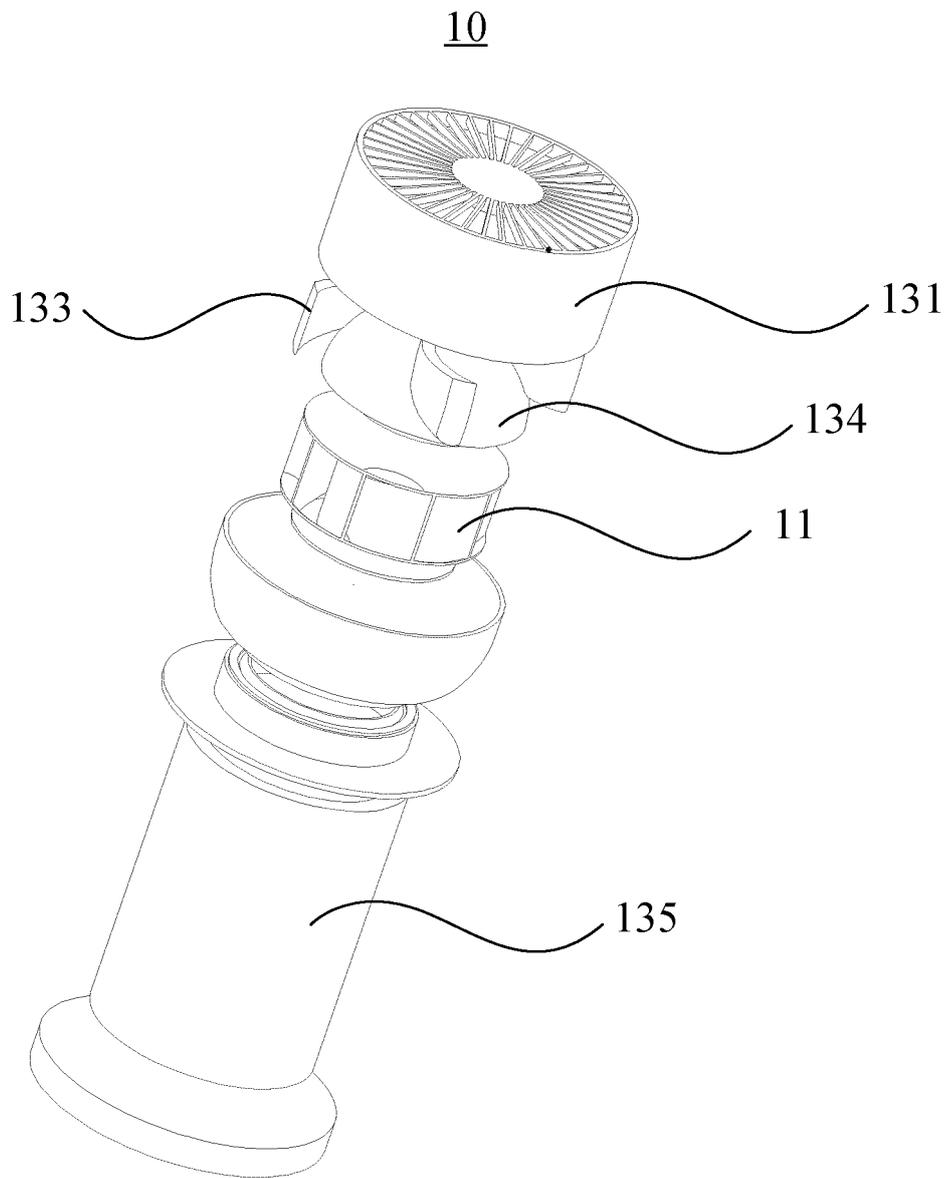
**Fig. 5**



**Fig. 6**



**Fig. 7**



**Fig. 8**

## INTERNATIONAL SEARCH REPORT

International application No.

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5	<b>A. CLASSIFICATION OF SUBJECT MATTER</b> F24F 13/08(2006.01)i; F24F 13/20(2006.01)j  According to International Patent Classification (IPC) or to both national classification and IPC	
10	<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) F24F; F04D29  Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched	
15	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) DWPI; VEN; CNABS; CNTXT; CNKI: 离心, 风机, 风叶, 出风, 送风, 流道, 风道, 纵向, 轴向, 导流, 引流, 引导, 穿线, 走线, fan, blower, centrifugal+, axial+, lognitudinal, outflow, induct+, guidance	
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25	Category*	Citation of document, with indication, where appropriate, of the relevant passages
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35	PX	CN 109282394 A (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 29 January 2019 (2019-01-29) claims 1-12
	X	CN 104456772 A (XIAOMI TECHNOLOGY CO., LTD.) 25 March 2015 (2015-03-25) description, paragraphs [0059], [0060], [0067], and [0075], and figures 1-3 and 6
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	<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.	
40	* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "D" document cited by the applicant in the international application "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
45	Date of the actual completion of the international search <b>22 October 2019</b>	Date of mailing of the international search report <b>30 October 2019</b>
50	Name and mailing address of the ISA/CN <b>China National Intellectual Property Administration (ISA/ CN) No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088 China</b>	Authorized officer
55	Facsimile No. <b>(86-10)62019451</b>	Telephone No.

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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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Information on patent family members

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**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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