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(54) VENT ASSEMBLY FOR BLOWING DEVICE AND AIR CONDITIONER

(57) A vent assembly for a blowing device includes a frame defining an air outlet therein, and an air deflector pivotally provided in the air outlet and configured to open or close the air outlet. The air deflector is provided with a first attraction member, and the frame is provided with a second attraction member in a corresponding position and configured to attract the first attraction member when the air deflector is closed, such that the air deflector is arranged in a plane where the air outlet is.

FIG. 1

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Description

BACKGROUND

[0001] An air deflector is typically employed in an air blowing device, such as an air conditioner, to deflect a direction of air flow. For example, an air deflector of the air conditioner is connected to the air conditioner body through rotating shafts on its both ends, to thereby generate an airflow with a variable direction.

SUMMARY

[0002] The present disclosure relates to a technical field of blowing devices, and more particularly to a vent assembly for a blowing device and an air conditioner.

[0003] According to a first aspect of embodiments of the present disclosure, a vent assembly for a blowing device is provided, which includes a frame defining an air outlet therein, and an air deflector pivotally provided in the air outlet and configured to open or close the air outlet. The air deflector is provided with a first attraction member, and the frame is provided with a second attraction member in a corresponding position and configured to attract the first attraction member when the air deflector is closed, such that the air deflector is arranged in a plane where the air outlet is.

[0004] In some embodiments, the frame is provided with a rotation driving member, the air deflector has a first end connected to the rotation driving member through a first rotating shaft, and the first attraction member is arranged to a second end of the air deflector away from the first end.

[0005] In some embodiments, the second end is connected to the frame through a second rotating shaft.

[0006] In some embodiments, the first attraction member and the second attraction member are configured to attract each other by a magnetic force.

[0007] In some embodiments, one of the first attraction member or the second attraction member is configured as a metal patch, and another one of the first attraction member or the second attraction member is configured as a permanent magnet.

[0008] In some embodiments, the first attraction member and the second attraction member are both configured as permanent magnets.

[0009] In some embodiments, the first attraction member is configured as an iron core, the second attraction member is configured as a solenoid, and the solenoid is energized at least when the air deflector is closed.

[0010] In some embodiments, the blowing device is configured as an air conditioner, the solenoid is connected with a control circuit of the air conditioner, and the control circuit comprises a solenoid valve configured to control energization and de-energization of the solenoid.

[0011] In some embodiments, a third attraction member is disposed to the first end, the frame is provided with a fourth attraction member in a corresponding position, and the fourth attraction member is configured to attract the third attraction member when the air deflector is closed.

[0012] In some embodiments, the first attraction member is arranged to an inner side of the air deflector.

[0013] In some embodiments, the second attraction member is arranged to an inner side of the frame.

[0014] In some embodiments, the first attraction member is arranged to an inner side of the air deflector, and the second attraction member is arranged to an inner side of the frame.

[0015] In some embodiments, the first attraction member is arranged adjacent to an edge of the air deflector, and the second attraction member is arranged adjacent to an edge of the frame. The edge of the air deflector is opposite to the edge of the frame when the air deflector is closed.

[0016] According to a second aspect of embodiments of the present disclosure, an air conditioner is provided, which includes the vent assembly for the blowing device according to the first aspect of embodiments of the present disclosure.

[0017] In some embodiments, the frame of the vent assembly is provided with a display screen, and the display screen is configured to display a status of the air conditioner in real time.

[0018] In the vent assembly and the air conditioner according to embodiments of the present disclosure, when the air deflector is closed, the air deflector can be evenly stressed by an attraction force between the first attraction member and the second attraction member, and hence can be completely closed in the plane where the air outlet is, so as to ensure a uniform gap between an edge of the air deflector and the frame.

[0019] It should be understood that the above general description and the following detailed description are merely exemplary and explanatory and are not constructed to limit the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] Drawings herein are incorporated into and constitute a part of the specification, and are intended to illustrate embodiments consistent with the present disclosure and together with the specification serve to explain the present disclosure.

FIG. 1 is a front view of an air conditioner according to some embodiments of the present disclosure, in which the air conditioner is provided with a vent assembly for a blowing device according to the present disclosure.

FIG. 2 is a perspective view of the air conditioner in FIG. 1.

FIG. 3 is a partially enlarged view of part A in FIG. 2.

FIG. 4 is a schematic view of an air conditioner according to some other embodiments of the present disclosure, in which the air conditioner is provided with a vent assembly for a blowing device according to the present disclosure.

FIG. 5 is a partially enlarged view of part C in FIG. 4.

FIG. 6 is a partially enlarged view of part B in FIG. 4.

FIG. 7 is a perspective view of the air conditioner in FIG. 1, in which parts of the air conditioner are removed.

FIG. 8 is a schematic view of a part of the air conditioner in FIG. 1.

FIG. 9 is another schematic view of a part of the air conditioner in FIG. 1.

DETAILED DESCRIPTION

[0021] Exemplary embodiments of the present disclosure will be described in detail and examples of the embodiments will be illustrated in the drawings. When the following description refers to the drawings, unless specified otherwise, the same numbers in different drawings represent the same or similar elements. The implementations described in the following exemplary embodiments do not represent all implementations consistent with the present disclosure, and instead they are merely examples of devices and methods consistent with aspects of the present disclosure as detailed in the appended claims.

[0022] In the present disclosure, in the absence of description to the contrary, orientation terms, such as "inner," "outer" or the like are generally in terms of a contour of the corresponding component. In addition, the terms such as "first" and "second" in embodiments of the present disclosure are used to distinguish one element from another element, and are not intended to indicate or imply any sequence or relative importance.

[0023] The inventors of the present disclosure have recognized that, an air deflector is typically unevenly stressed when it is closed to a position of an air outlet, which results in a non-uniform gap between the air deflector and a frame where the air outlet is defined. In such a case, external impurities or dust may easily enter the blowing device through the gap and affect operation or service life of internal parts.

[0024] For example, in an air conditioner, during the opening or closure of the air deflector, the air deflector is driven only by a motor disposed on one end of the air deflector and rotates passively and cooperatively by means of the rotating shaft on the other end thereof. Such a structure causes the air deflector to be actively stressed only on one end, that is, the air deflector is unevenly stressed, resulting in a non-uniform gap between the air deflector and a frame of the air conditioner body when the air deflector is closed, thereby causing the above hidden troubles.

[0025] A vent assembly for a blowing device provided in the present disclosure can be applied to various blowing devices, such as air conditioners, air conditioner fans or other devices having a grille outlet, which are well known or common to those skilled in the art. In order to clearly describe further advantageous effects of the vent assembly, the present disclosure will be elaborated by example of the vent assembly being applied to an air conditioner, but the scope of the present disclosure is not limited thereto.

[0026] Referring to FIGS. 1-3, a vent assembly for a blowing device mounted at an air supply port of the air conditioner according to some embodiments of the present disclosure is illustrated.

[0027] The vent assembly includes a frame 200 defining an air outlet therein and an air deflector 100 pivotally arranged in the air outlet and configured to open or close the air outlet. The air deflector 100 is provided with a first attraction member 110, and the frame 200 is provided with a second attraction member 210 in a corresponding position.

[0028] The second attraction member 210 is configured to attract the first attraction member 110 when the air deflector 100 is closed, such that the air deflector 100 is arranged in a plane where the air outlet is. It should be noted that the air deflector 100 can be formed by a panel, a bottom plate, and a reinforcing rib between them, and the air deflector 100 being arranged in the plane where the air outlet is means that the panel of the air deflector 100 is snapped in the air outlet when the air deflector 100 is closed.

[0029] The air deflector 100 has an outer surface flush with an outer surface of the frame 200 and has a peripheral edge evenly spaced apart from the frame 200, such that an air conditioner body can define a closed space therein, which is aesthetic and can prevent external impurities and dust from entering the interior of the air conditioner body. In order to have a sufficient attraction force between the first attraction member 110 and the second attraction member 210, the first attraction member 110 and the second attraction member 210 can be arranged at positions relatively close to each other, and for example, they can be disposed at positions near respective edges of the air deflector 100 and the frame 200.

[0030] Moreover, a plurality of the first attraction members 110 can be uniformly disposed to the air deflector 100 to balance the attraction force across the whole air deflector 100. Additionally, in order to further ensure the sealing performance after the air deflector 100 is closed, the edge of the air deflector 100 or an inner contour of the air outlet of the frame 200 can be provided with a sealing strip to seal a gap between the air deflector 100 and the frame 200 when the air deflector 100 is closed.

[0031] Therefore, when the air deflector 100 is closed, the whole air deflector 100 is evenly stressed by the at-

traction force between the first attraction member 110 and the second attraction member 210 and can be completely closed in the plane of the air outlet, so as to ensure a uniform gap between the edge of the air deflector 100 and the frame 200. The vent assembly has a simple structure and hence saves costs.

[0032] In an embodiment as illustrated in FIGS. 7-9, the frame 200 can be provided with a rotation driving member 230, and the air deflector 100 has a first end connected to the rotation driving member 230 through a first rotating shaft 130, such that the rotation driving member 230 can drive the first rotating shaft 130, and in turn the air deflector 100 is driven to open or close, so as to synchronously realize the rotation of the air deflector 100.

[0033] As illustrated in FIGS. 2 and 3, the first attraction member 110 can be disposed on a second end of the air deflector 100 away from the first end, and the second attraction member 210 can be disposed to the frame 200 in the corresponding position, such that when the first end of the air deflector 100 is subjected to an active force of the rotation driving member 230, the second end of the air deflector 100 is also directly subjected to the attraction force from the second attraction member 210, which ensures the existence of driving points of forces on the first end and the second end so as to make the air deflector 100 evenly stressed, and ensures the uniform gap between the air deflector 100 and the frame 200 after the air deflector 100 is closed so as to avoid an inclination angle of the air deflector 100 relative to the plane where the air outlet is located. The rotation driving member 230 can be a motor or another drive part.

[0034] Further, as illustrated in FIG. 9, the second end can be connected to the frame 200 through a second rotating shaft 140 to provided support so as to prevent the air deflector 100 from forming a cantilever beam structure and affecting the strength. The second rotating shaft 140 herein is used for passive and cooperative rotation.

[0035] According to some embodiments of the present disclosure, the first attraction member 110 and the second attraction member 210 can attract each other by a magnetic force. For example, one of the first attraction member 110 and the second attraction member 210 can be a metal patch, and the other one can be a permanent magnet. For another example, the first attraction member 110 and the second attraction member 210 can both be permanent magnets to actively attract each other by a long-term magnetic field when the first attraction member 110 and the second attraction member 210 approach each other, and no additional operation is required. Certainly, the first attraction member 110 and the second attraction member 210 can attract each other in other ways, such as vacuum attraction, which will not be specifically defined herein.

[0036] The permanent magnet can be a permanent ferromagnet. The permanent ferromagnet is widely used in various fields such as an electronic field, an electrical field, a mechanical field, a transportation field, a medical field and a daily necessity field. The permanent ferromagnet has advantages of a wide hysteresis loop, a high coercivity and a high remanence, and it is magnetically stable and can store large magnetic energy.

[0037] In some other embodiments, the first attraction member 110 and the second attraction member 210 can attract each other by an electromagnetic force. The first attraction member 110 can be an iron core, and the second attraction member 210 can be correspondingly a solenoid that is energized at least when the air deflector 100 is closed. Thus, when the air deflector 100 is closed, the solenoid is energized, and together with the iron core forms an electromagnet, generating a magnetic force, such that the iron core and the solenoid are attracted together to ensure the uniform gap between the air deflector 100 and the frame 200.

[0038] FIG. 7 is a perspective view of the air conditioner in FIG. 1, in which parts of the air conditioner are removed. FIG. 8 is a schematic view of a part of the air conditioner in FIG. 1. FIG. 9 is another schematic view of a part of the air conditioner in FIG. 1.

[0039] As illustrated, the solenoid can be connected with a control circuit 400 of the air conditioner, and a solenoid valve 500 configured to control energization and de-energization of the solenoid can be provided in the control circuit 400. When the air deflector 100 is closed, the control circuit 400 turns on the solenoid valve 500, the solenoid is energized, and the magnetic force is generated between the second attraction member 210 and the first attraction member 110, so as to assist with the closure of the air deflector 100 to the plane where the air outlet is.

[0040] When the air deflector 100 is open, the control circuit 400 turns off the solenoid valve 500, the solenoid is de-energized, and the magnetic force between the second attraction member 210 and the first attraction member 110 disappears, such that the air deflector 100 is driven to open by means of the rotation driving member 230. It should be noted the driving force of the rotation driving member 230 is much greater than the attraction force of the attraction members. In a case where the air deflector 100 needs to be opened, the rotation driving member 230 can drive the air deflector 100 to open against the attraction force, even if the solenoid is not de-energized. In order to solve the problem of the non-uniform gap between the air deflector 100 and the frame 200 existing in the related art, the control circuit 400 of the air conditioner can control the solenoid to be energized at least when the air deflector 100 is closed, so as to achieve the auxiliary magnetic attraction and fixation of the air deflector 100 and the frame 200 by the corresponding attraction members.

[0041] In some other embodiments, referring to FIG. 4, FIG. 5 that provides a partially enlarged view of part C in FIG. 4, and FIG. 6 that provides a partially enlarged view of part B in FIG. 4, the air deflector 100 can further be provided with a third attraction member 120 at the first end thereof, and the frame 200 can be provided with a fourth attraction member 220 in a corresponding position

and configured to attract the third attraction member 120 when the air deflector 100 is closed. The third attraction member 120 and the fourth attraction member 220 can be specifically the structural components described above, or can be other components having an attraction function.

[0042] In this way, both ends of the air deflector 100 can be attracted with the frame 200 when the air deflector 100 is closed, so as to further ensure the uniform gap between the air deflector 100 and the frame 200.

[0043] Additionally, as illustrated in FIG. 2, and FIG. 3 where a partially enlarged view of part A in FIG. 2 is illustrated, the air deflector 100 and the frame 200 can have a plate-like structure. To guarantee an aesthetic appearance of the air conditioner, the first attraction member 110 can be arranged to an inner side of the panel of the air deflector 100, and the second attraction member 210 can also be arranged to an inner side of the frame 200, in which the first attraction member 110 and the second attraction member 210 are secured for example by embedding or bonding. Herein, the inner side of the air deflector 100 and the inner side of the frame 200 are referenced to the overall contour of the air conditioner, that is, the inner sides refer to the sides inside the air conditioner. The positions of the attraction members are not necessarily determined exclusively, and can be set according to specific structures of the air deflector 100 and the frame 200. For example, the air deflector 100 and the frame 200 can each has a cavity, and the corresponding attraction members can be arranged in the cavities.

[0044] As described above, the present disclosure also provides an air conditioner including the vent assembly for the blowing device provided by the present disclosure. The air conditioner has all the beneficial effects of the above-mentioned vent assembly, which will not be elaborated herein.

[0045] Further, as illustrated in FIGS. 1, 2 and 4, the frame 200 of the vent assembly can be provided with a display screen 300. The display screen 300 can display a status of the air conditioner in real time, and information such as temperature settings or air supply levels can be clearly displayed through a panel of the display screen 300. The display screen 300 can be an organic light emitting diode (OLED) display screen, and the OLED display screen has a self-luminous characteristic, requires no light source, and has a wide visible range and a fast response speed. In some other embodiments, a liquid-crystal display (LCD) or other types of display screens can be employed.

[0046] Other embodiments of the present disclosure will be conceivable for those skilled in the related art after they consider the specification and practice the present disclosure. The present application is intended to cover any variations, usages, or adaptations of the present disclosure, which follow the general principles of the present disclosure and include common knowledge or conventional technical means in the art and undisclosed in the present disclosure. The specification and embodiments should be regarded as illustrative, and the actual scope of the present disclosure is indicated by the claims.

[0047] In the present disclosure, it is to be understood that the terms "bottom," "inside," and other orientation or positional relationships are based on example orientations illustrated in the drawings, and are merely for the convenience of the description of some embodiments, rather than indicating or implying the device or component being constructed and operated in a particular orientation. Therefore, these terms are not to be construed as limiting the scope of the present disclosure.

[0048] Moreover, the terms "first" and "second" are used for descriptive purposes only and are not to be construed as indicating or implying a relative importance or implicitly indicating the number of technical features indicated. Thus, elements referred to as "first" and "second" may include one or more of the features either explicitly or implicitly. In the description of the present disclosure, "a plurality" indicates two or more unless specifically defined otherwise.

[0049] In the present disclosure, the terms "connected," "coupled," and the like shall be understood broadly, and may be either a fixed connection or a detachable connection, or integrated, unless otherwise explicitly defined. These terms can refer to mechanical or electrical connections, or both. Such connections can be direct connections or indirect connections through an intermediate medium. These terms can also refer to the internal connections or the interactions between elements. The specific meanings of the above terms in the present disclosure can be understood by those of ordinary skill in the art on a case-by-case basis.

[0050] In the present disclosure, a first element being "on," a second element may indicate direct contact between the first and second elements, without contact, or indirect through an intermediate medium, unless otherwise explicitly stated and defined.

[0051] In the description of the present disclosure, the terms "some embodiments," "example," and the like may indicate a specific feature described in connection with the embodiment or example, a structure, a material or feature included in at least one embodiment or example. In the present disclosure, the schematic representation of the above terms is not necessarily directed to the same embodiment or example.

[0052] Moreover, the particular features, structures, materials, or characteristics described may be combined in a suitable manner in any one or more embodiments or examples. In addition, various embodiments or examples described in the specification, as well as features of various embodiments or examples, may be combined and reorganized.

Claims

1. A vent assembly for a blowing device, comprising:

a frame (200) having an air outlet therein; and
an air deflector (100) pivotally provided in the air outlet and configured to open or close the air outlet,
wherein:

the air deflector (100) is provided with a first attraction member (110);
the frame (200) is provided with a second attraction member (210) in a corresponding position; and
the second attraction member (210) is configured to attract the first attraction member (110) when the air deflector (100) is closed, such that the air deflector (100) is arranged in a plane of the air outlet.

2. The vent assembly for the blowing device according to claim 1, wherein:

the frame (200) is provided with a rotation driving member (230);
the air deflector (100) has a first end connected to the rotation driving member (230) through a first rotating shaft (130); and
the first attraction member (110) is arranged to a second end of the air deflector (100) away from the first end.

3. The vent assembly for the blowing device according to claim 2, wherein the second end is connected to the frame (200) through a second rotating shaft (140).

4. The vent assembly for the blowing device according to claim 2 or 3, wherein the first attraction member (110) and the second attraction member (210) are configured to attract each other by a magnetic force.

5. The vent assembly for the blowing device according to claim 4, wherein:

one of the first attraction member (110) or the second attraction member (210) is configured as a metal patch; and
another one of the first attraction member (110) or the second attraction member (210) is configured as a permanent magnet.

6. The vent assembly for the blowing device according to claim 4, wherein the first attraction member (110) and the second attraction member (210) are both configured as permanent magnets.

7. The vent assembly for the blowing device according to claim 4, wherein:

the first attraction member (110) is configured as an iron core;
the second attraction member (210) is configured as a solenoid; and
the solenoid is energized at least when the air deflector (100) is closed.

8. The vent assembly for the blowing device according to claim 7, wherein:

the blowing device is configured as an air conditioner;
the solenoid is connected with a control circuit (400) of the air conditioner; and
the control circuit (400) comprises a solenoid valve (500) configured to control energization and de-energization of the solenoid.

9. The vent assembly for the blowing device according to any one of claims 2-8, wherein:

a third attraction member (120) is disposed to the first end;
the frame (200) is provided with a fourth attraction member (220) in a corresponding position; and
the fourth attraction member (220) is configured to attract the third attraction member (120) when the air deflector (100) is closed.

10. The vent assembly for the blowing device according to any one of claims 1-9, wherein the first attraction member (110) is arranged to an inner side of the air deflector (100).

11. The vent assembly for the blowing device according to any one of claims 1-9, wherein the second attraction member (210) is arranged to an inner side of the frame (200).

12. The vent assembly for the blowing device according to any one of claims 1-9, wherein:

the first attraction member (110) is arranged to an inner side of the air deflector (100); and
the second attraction member (210) is arranged to an inner side of the frame (200).

13. The vent assembly for the blowing device according to any one of claims 1-12, wherein the first attraction member (110) is arranged adjacent to an edge of the air deflector (100), and the second attraction member (210) is arranged adjacent to an edge of the frame (200),
wherein the edge of the air deflector (100) is opposite to the edge of the frame (200) when the air deflector (100) is closed.

14. An air conditioner, comprising a vent assembly for a

blowing device according to any one of claims 1-13.

15. The air conditioner according to claim 14, wherein the frame (200) of the vent assembly is provided with a display screen (300), and the display screen (300) is configured to display a status of the air conditioner in real time.

FIG. 1

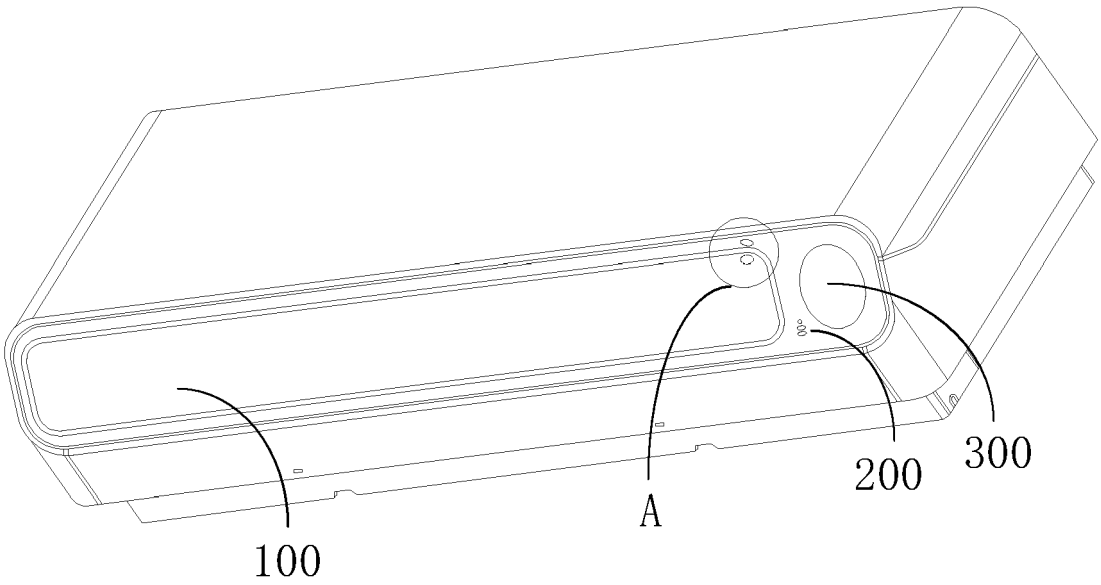

FIG. 2

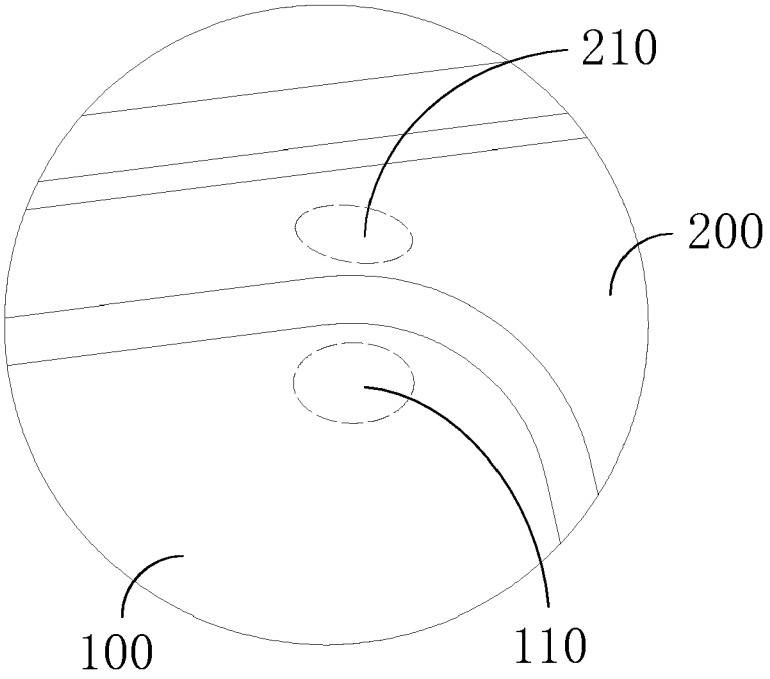

FIG. 3

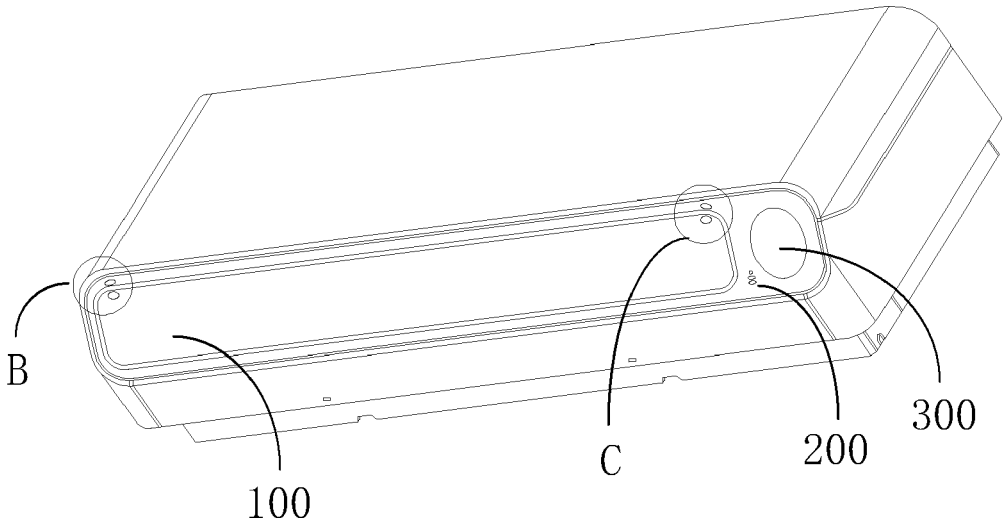

FIG. 4

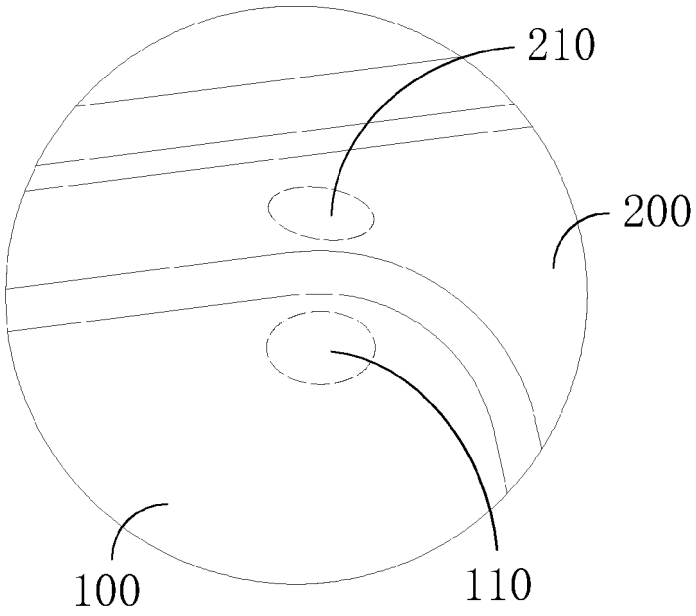

FIG. 5

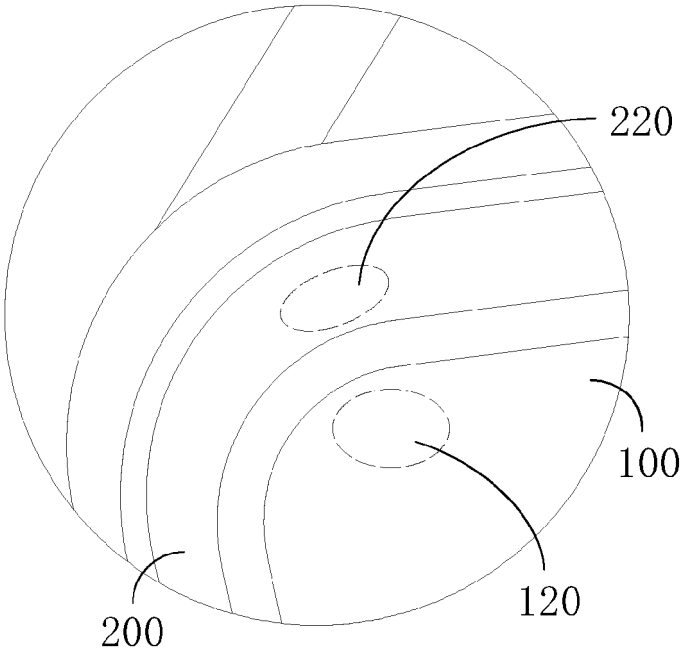

FIG. 6

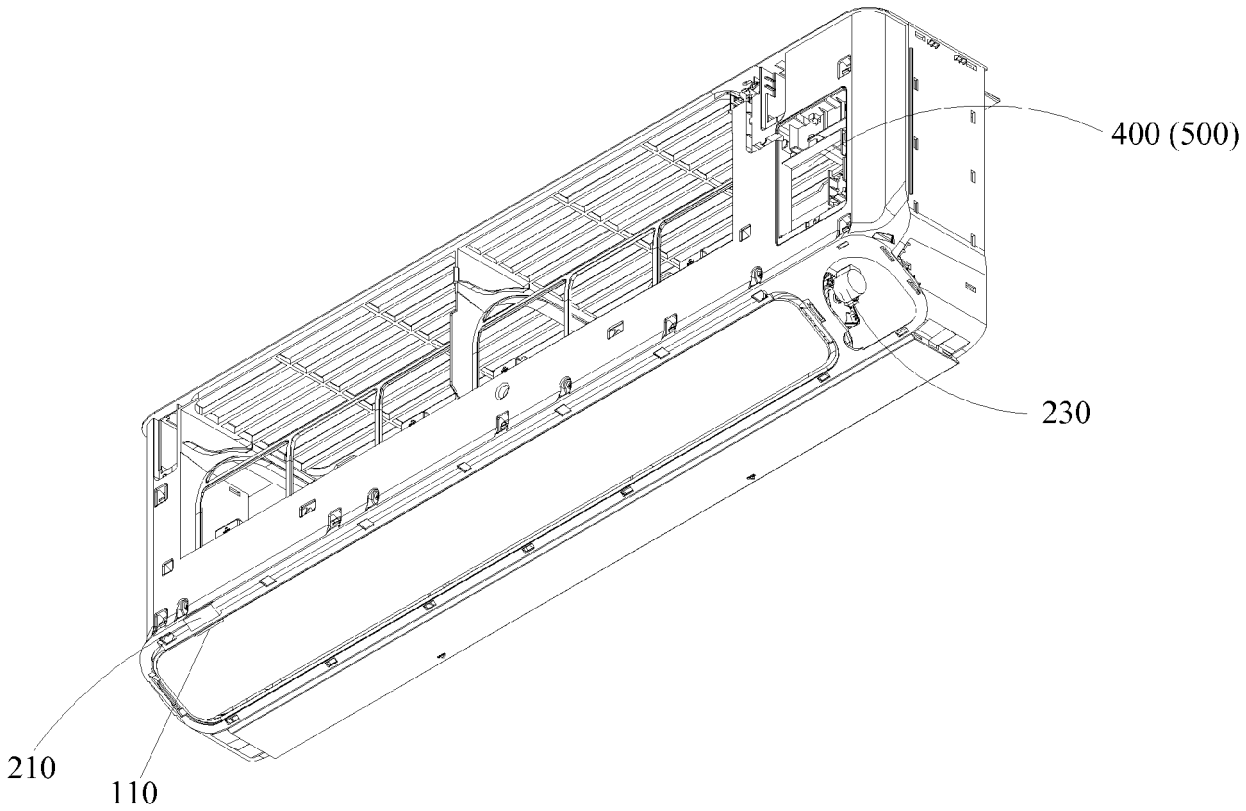

FIG. 7

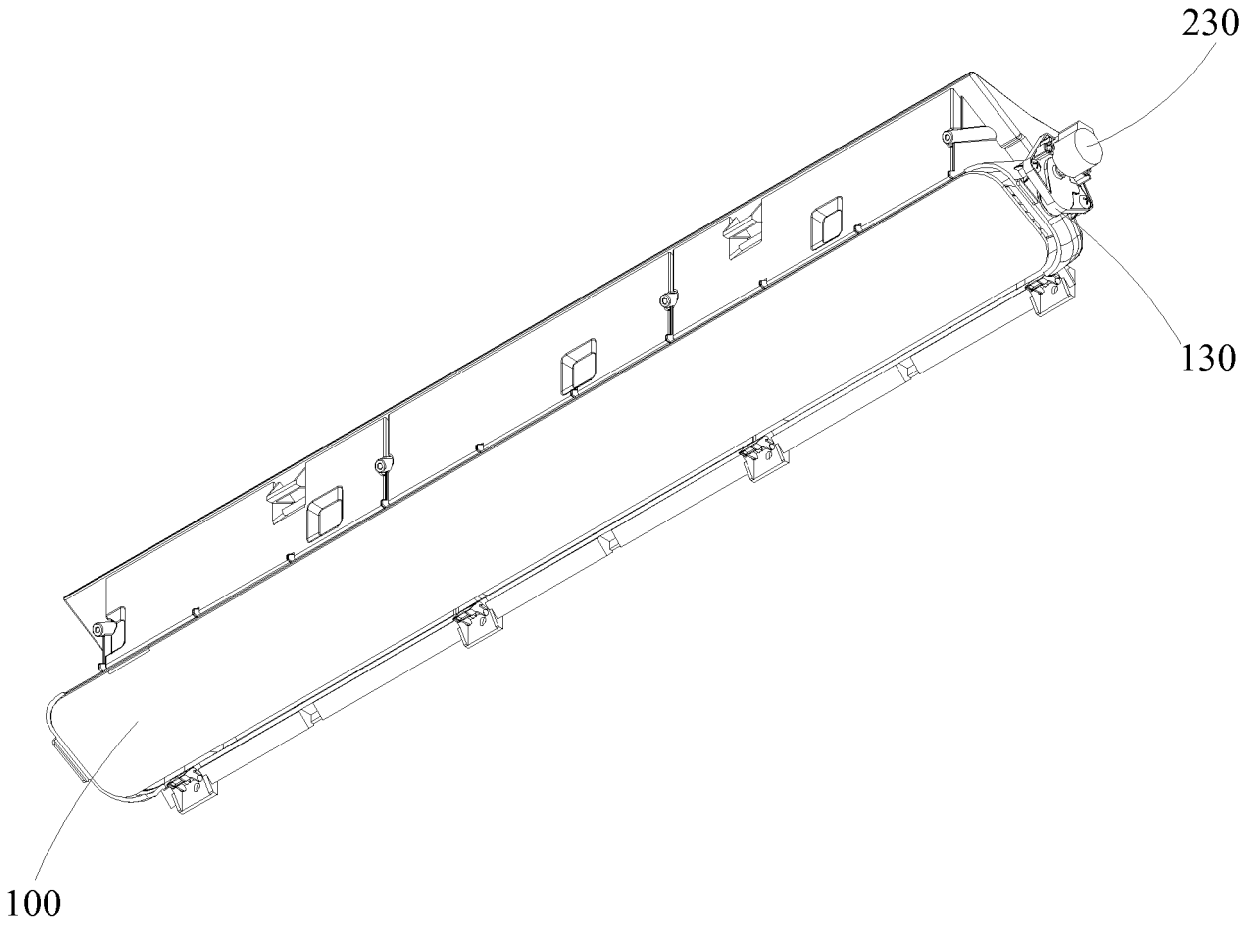

FIG. 8

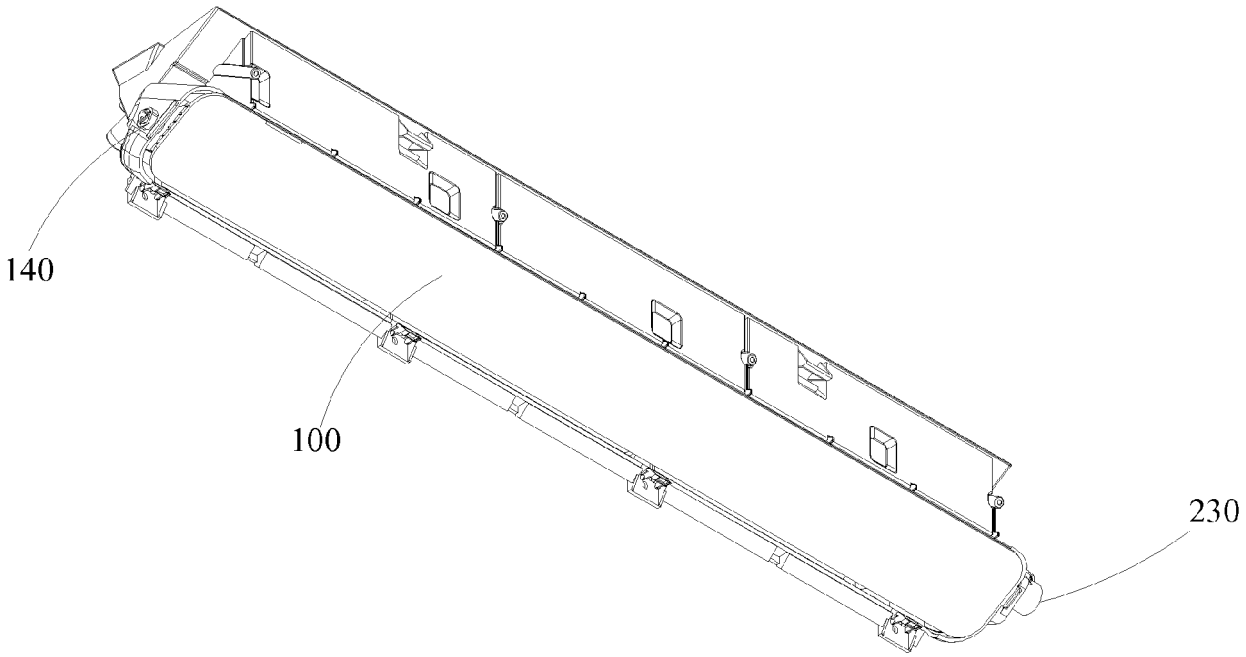

FIG. 9

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EUROPEAN SEARCH REPORT

Application Number
EP 19 19 4644

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	KR 200 178 061 Y1 (SAMSUNG ELECTRONICS CO LTD [KR]) 15 April 2000 (2000-04-15) * the whole document * -----	1-14 15	INV. F24F11/52 F24F13/14
X Y	KR 100 723 942 B1 (WINIAMANDO INC [KR]) 25 May 2007 (2007-05-25) * the whole document * -----	1-15 15	
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Y	EP 2 363 653 A2 (MITSUBISHI ELECTRIC CORP [JP]) 7 September 2011 (2011-09-07) * paragraph [0156]; figure 50 * -----	15	

TECHNICAL FIELDS SEARCHED (IPC)

F24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	30 January 2020	Ast, Gabor

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 19 4644

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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30-01-2020

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