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(54) HOUSING ASSEMBLY OF AIR CONDITIONER INDOOR UNIT AND AIR CONDITIONER INDOOR UNIT HAVING SAME

(57) A housing assembly (100) and an indoor unit (1000) of an air conditioner having the same, where the housing assembly (100) is composed of face frame (1), which is provided with a front air outlet (111); two end covers (2), which are located in the left and right of the face frame (1) respectively. A part of at least one end cover (2) lies in front of the front surface of the face frame (1), and forms an auxiliary air passage (a) with the face frame (1). Moreover, side air outlet (21), connecting the auxiliary air passage (a), is mounted on at least one end cover (2). On the inner wall of the auxiliary air passage (a), the part limited by the face frame (1) forms the guide wall (112), which directs the air from front air outlet (111) to side air outlet (21).

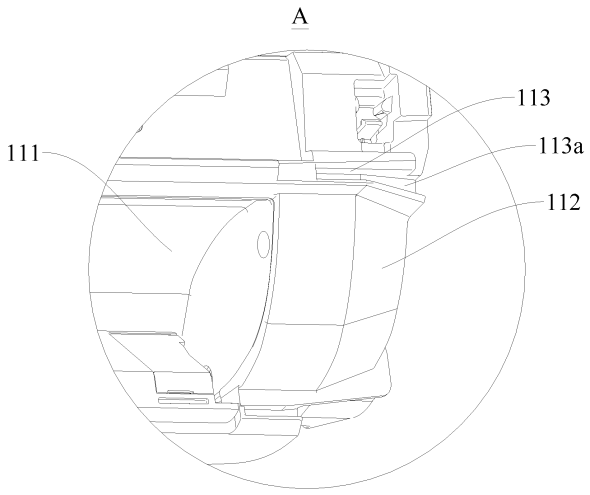


Fig. 3

EP 3 604 967 A1

Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to and benefits of Chinese patent application Serial No. 201820181677.3, filed on January 31, 2018, the entire content of which is incorporated herein by reference.

FIELD

[0002] This application relates to the refrigeration field, in particular to a housing assembly for indoor unit of air conditioner and indoor unit having the same.

BACKGROUND

[0003] In the relevant technology, the housing assembly for indoor unit of air conditioner mainly supplies air toward the front end of the indoor unit of air conditioner, and the air output is limited at the air outlet on the side of housing assembly, which influences the air supply efficiency of housing assembly.

SUMMARY

[0004] The purpose of this application is to address at least one of the technical problems in the existing technology. For this purpose, this application proposes the housing assembly for indoor unit of air conditioner, which can increase the air output from the side air outlet and enhance the air supply efficiency.

[0005] This application also proposes the indoor unit of air conditioner, including the housing assembly.

[0006] The housing assembly based on the embodiment of this application includes a face frame provided with a front air outlet; and two end covers arranged at a left end and a right end of the face frame respectively, wherein a portion of at least one end cover lies is located in front of a front surface of the face frame and defines an auxiliary air passage with the face frame, the at least one end cover is provided with a side air outlet in communication with the auxiliary air passage, a portion of an inner side wall of the auxiliary air passage defined by the face frame forms a guide wall, to direct air from the front air outlet to the side air outlet.

[0007] In the housing assembly for indoor unit of air conditioner based on the embodiment of this application, a part of at least one end cover lies in front of the front surface of the face frame, and forms an auxiliary air passage with the face frame, and the part of the inner wall of each auxiliary air passage, which is limited by the face frame, and forms the guide wall, which directs the air from front air outlet to side air outlet. Consequently it can increase the air output from the side air outlet and enhance the air supply efficiency.

[0008] In some embodiments of this application, portions of the two end covers are located in front of the front surface of the face frame and define the auxiliary air passages with the face frame, each of the two end covers is provided with the side air outlet in communication with a corresponding auxiliary air passage, and a portion of an inner side wall of each of the auxiliary air passages defined by the face frame forms the guide wall.

[0009] Further, the face frame comprises a front frame and two side frames, the front frame is provided with the front air outlet, the two side frames are located at the left end and the right end of the front frame respectively and extend backwards, each of portions of a front surface of the front frame at a left end and a right end of the front air outlet is provided with the guide wall, the guide wall obliquely extends backwards in a direction away from the front air outlet, and each guide wall extends to one corresponding side frame, the two end covers correspond to the side frames one to one respectively and are located at sides of the side frames away from the front frame, each of the two end cover is provided with a front extension part, and the front extension part is located in front of the corresponding guide wall and defines the auxiliary air passage with the guide wall.

[0010] Specifically, an end of the guide wall adjacent to the front air outlet extends to a side wall of the front air outlet.

[0011] Specifically, each of an upper side and a lower side of each guide wall defines a guide groove, each guide groove extends in a left-right direction, an end of each guide groove away from the front air outlet is open, and each front extension part is provided with a guide protrusion matching the guide groove.

[0012] Further, an inner bottom wall of the end of at least one guide groove is provided with a guide bevel, and the guide bevel obliquely extends backwards in a direction away from the front air outlet.

[0013] In some embodiments of this application, the guide wall has a flat surface or an arc surface.

[0014] In some embodiments of this application, one of the face frame and the end covers is provided with a hook, and the other one of the face frame and the end covers defines a snapping groove fitted with the hook.

[0015] Further, a plurality of hooks and a plurality of snapping grooves are provided, and the snapping grooves correspond to the hooks one to one.

[0016] The indoor unit of air conditioner based on the embodiment of this application includes housing assembly.

[0017] With the housing assembly in the embodiment of this application, the indoor unit of air conditioner based on the embodiment of this application can increase the air output and air supply efficiency of indoor unit of air conditioner.

[0018] Additional aspects and benefits of this application will be presented in the following sections, which will become apparent from the following descriptions or through the practice of this application.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The above and/or additional aspects and advantages of this application will become apparent and easy to be understood from the description of embodiments in combination with the attached drawings below, where:

Fig. 1 is a view of the indoor unit of air conditioner based on the embodiment of this application;
Fig. 2 is a view of the face frame based on the embodiment of this application;
Fig. 3 is an enlarged view of A in Fig. 2;
Fig. 4 is a view of the end cover based on the embodiment of this application;
Fig. 5 is a partial-cutaway view of the housing assembly based on the embodiment of this application.

Reference numerals:

[0020]

Indoor unit 1000;
Housing assembly 100;
Face frame 1; front frame 11; front air outlet 111; guide wall 112; guide groove 113; guide bevel 113a; Side frame 12; auxiliary air passage a;
End cover 2; side air outlet 21; front extension part 22; guide protrusion 221;
Hook 3;
Snapping groove 4;
Air outlet grille 5; sub-grille 51.

DETAILED DESCRIPTION

[0021] The embodiments of this application are described in detail below, and examples of the embodiments are shown in the attached drawings, where throughout which the identical or similar labels are used to denote the identical or similar elements or elements having identical or similar functions. The embodiments described below by reference to the attached drawings are illustrative and are used only to interpret this application but should not be construed as restrictions on this application.

[0022] In the description of this application, it should be understood that the orientation or position relations indicated with the terms "up", "down", "front", "back", "left", "right", "vertical", "horizontal", "top", "bottom" "inner" and "outer", and the like are based on the orientation or position relationships shown in the attached drawings, are used only for the convenience of describing this application and simplifying the description, rather than indicating or implying that the device or element referred to must have a particular orientation, be constructed and operated in a particular orientation, so they shall not be construed as a restriction on this application. In addition, a feature defined as "first" or "second" may, explicitly or implicitly, include one or more such features. Unless otherwise stated, "multiple" means two or more in the description of this application.

[0023] In the description of this application, it should be noted that unless otherwise expressly specified and defined, the terms "installation", "linking" and "connection" shall be understood generally, for example, it may be fixed connection, detachable connection, or integral connection; or mechanical or electrical connections; or direct linking, indirect linking through an intermediate medium, or internal connection of two components. The specific meaning of the above terms in this application may be understood on a case by case basis by common technicians in the field.

[0024] The housing assembly 100 for indoor unit 1000 based on the embodiment of this application is described below with reference to Figs. 1-5.

[0025] As shown in Figs 1-5, the housing assembly 100, based on the embodiment of this application includes face frame 1 and two end covers 2.

[0026] Specifically, front air outlet 111 is mounted on the face frame 1. Two end covers 2 are located in the left and right of the face frame 1 respectively. A part of at least one end cover 2 lies in front of the front surface of the face frame 1, and forms an auxiliary air passage with the face frame 1. The side air outlet 21, connecting the auxiliary air passage a, is mounted on at least one end cover 2. In other words, the wind produced by the indoor unit 1000 can be supplied from the front air outlet 111, or the side air outlet 21 after passing through the auxiliary air passage a, consequently increasing the supply scope of air of the housing assembly 100.

[0027] For the housing assembly 100 based on the embodiment of this application, a part of one end cover 2 lies in front of the front surface of the face frame 1, and forms an auxiliary air passage a with the face frame 1. In this case, the wind produced by the indoor unit 1000 can flow toward the side air outlet 21 along the auxiliary air passage a, and is finally supplied toward the left or right of housing assembly 100. As well, parts of two end covers 2 lie in front of the front surface of the face frame 1, and form auxiliary air passage a with the face frame 1. In this case, the wind produced by the indoor unit 1000 can flow toward two side air outlets 21 along two auxiliary air passages a, and is finally supplied toward the left and right of housing assembly 100.

[0028] The part of the inner side wall of each auxiliary air passage a, which is limited by the face frame 1, forms the guide wall 112. It directs the air from the front air outlet 111 to the side air outlet 21. It is understandable that an air deflector is mounted on the front air outlet 111 of the indoor unit 1000. If the air deflector is open, the wind produced by the indoor unit 1000 is mainly supplied from the front air outlet 111, and seldom through the side air outlet 21 after passing through the auxiliary air passage a. If the air deflector is closed, the wind produced by the indoor unit 1000 flows to the front air outlet 111, and then largely passes along the auxiliary air passage a to the

side air outlet 21 (one-way arrow indicates the airflow direction in the Fig. 5).

[0029] It is known that the guide wall 112 can deflect wind. So the guide wall 112 can increase the volume of air flowing to the side air outlet 21 to some extent, thus resulting in the rise in air output of the side air outlet 21. In this case, the air supply efficiency of the side air outlet 21 of the housing assembly 100 is enhanced.

[0030] For the housing assembly 100 for indoor unit 1000 based on the embodiment of this application, a part of at least one end cover 2 lies in front of the front surface of the face frame 1, and forms an auxiliary air passage a with the face frame 1. In addition, the part of the inner side wall of the auxiliary air passage a, which is limited by the face frame 1, forms the guide wall 112. It directs the air from the front air outlet 111 to the side air outlet 21. In this case, the air output of the side air outlet 21 and air supply efficiency of the housing assembly 100 are enhanced.

[0031] In some embodiments of this application, parts of two end covers 2 lie in front of the front surface of the face frame 1, and form an auxiliary air passage a respectively with the face frame 1.

[0032] In this case, the wind produced by the indoor unit 1000 can flow toward two side air outlets 21 along two auxiliary air passages a, and is finally supplied toward the left and right of housing assembly 100. The side air outlet 21, connecting the auxiliary air passage a, is mounted on each end cover 2. The part of the inner side wall of each auxiliary air passage a, which is limited by the face frame 1, forms the guide wall 112. In this case, indoor unit 1000 can supply wind left and right. It ensures the air supply efficiency of the housing assembly 100. Moreover, it enhances the structural strength of the end cover 2, as well as the overall strength of the housing assembly 100.

[0033] Further, face frame 1 includes front frame 11 and two side frames 12.

[0034] Specifically, front air outlet 111 is mounted on the front frame 11. Two side frames 12 are located in the left and right of the front frame 11 respectively, and extend backward. There are guide walls 112 on the front surface of front frame 11 on left and right ends of the front air outlet 111. Therefore, the parts of two end covers 2 in front of the front frame 11 form the auxiliary air passage a respectively with the front frame 11.

[0035] The guide wall 112 extends obliquely backward in a direction away from the front air outlet 111. Each guide wall 112 extends to the corresponding side frame 12. Two end covers 2 match two side frames 12 and are located on the side of corresponding side frame 12 away from the front frame 11. There is front extension part 22 on each end cover 2, which is located in front of the corresponding guide wall 112, and forms the auxiliary air passage a with the guide wall 112. In other words, front extension part 22 forms auxiliary air passage a with the front frame 11. The guide wall 112 can further improve the performance of wind deflection, ensure that the wind flows to the side air outlet 21, and consequently assures the air supply efficiency of the housing assembly 100.

[0036] Specifically, the end of the guide wall 112 adjacent to front air outlet 111 extends to the side wall of the front air outlet 111. It ensures the performance of wind deflection of the auxiliary air passage a. In addition, if the air deflector is closed, the wind from the front air outlet 111 can pass through the auxiliary air passage a, avoiding the interference of front frame 11 to the airflow.

[0037] Specifically, guide grooves 113 are located on upper and lower sides of each guide wall 112 respectively. Each guide groove 113 extends left and right. The end of each guide groove 113 far away from the front air outlet 111 is open. On each front extension part 22, the guide protrusion 221 matches the guide groove 113. Therefore, if the guide protrusion 221 gradually extends into guide groove 113 along the open end of the guide groove 113, it can match the guide groove 113. In this case, the assembly of the front extension part 22 and face frame 1 can be complete. Moreover, it makes assembly simple and reliable, and disassembly convenient. In this case, the assembly of the front extension part 22 and face frame 1 can be complete. Moreover, it makes assembly simple and reliable, and disassembly convenient.

[0038] Optionally, guide groove 113 is located on upper or lower side of each guide wall 112. In other words, guide groove 113 is located on one side of each guide wall 112. It ensures the assembly of the front extension part 22 and frame 1, simple structure of housing assembly 100, and lower production cost of housing assembly 100.

[0039] Further, there is guide bevel 113a on the inner bottom wall on one end of at least one guide groove 113. The guide bevel 113a inclines upward and extends backward in a direction away from the front air outlet 111. Therefore, during the assembly of the face frame 1 and end cover 2, the guide bevel 113a serves as the guide for the assembly of the guide protrusion 221 and guide groove 113. It decreases the difficulties in the assembly of face frame 1 and end cover 2, enhances assembly efficiency, and facilitates the disassembly of end cover 2.

[0040] Preferably, there is guide bevel 113a on the inner bottom wall of each guide groove 113 adjacent to the side frame 12. It can further enhance the assembly efficiency of face frame 1 and end cover 2, and facilitate the disassembly.

[0041] In some embodiments of this application, the guide wall 112 is a plane or an arc. It can assure the performance of wind deflection of the guide wall 112, and simple structure of the guide wall 112.

[0042] In some embodiments of this application, either the face frame 1 or end cover 2 is provided with the hook 3, while the other is configured with the snapping groove 4. In other words, when the face frame 1 is provided with the hook 3, the end cover 2 is configured with the snapping groove 4. When the end cover 2 is provided with the hook 3, the face frame 1 is configured with the snapping groove 4. Through the matching of the hook 3 and snap-

ping groove 4, the face frame 1 and end cover 2 can be assembled. Without using other parts (such as bolt and screw), the face frame 1 and end cover 2 can be connected and fixed. In this way, it makes assembly simple and reliable, enhances assembly efficiency of the end cover 2, simplifies the installation of the housing assembly 100, and facilitates the maintenance and disassembly.

[0043] Further, there are multiple hooks 3 and snapping grooves 4, and the grooves 4 match the hooks 3. It can improve the connection of the face frame 1 and end cover 2, making them fit better. In addition, it assures the reliability and stability of the assembly of the face frame 1 and end cover 2, enhances the reliability and stability of the housing assembly 100, and avoids shake between the face frame 1 and end cover 2 during the operation of indoor unit 1000. Consequently, it reduces the noise during the operation of indoor unit 1000, and brings users comfortable experience.

[0044] Specifically, the face frame 1 and each end cover 2 are both provided with the hook 3 and snapping groove 4. There are multiple hooks 3 and snapping grooves 4, and the grooves 4 match the hooks 3. It facilitates the assembly of the face frame 1 and end cover 2, making it more flexible.

[0045] The housing assembly 100 also includes air outlet grille 5, which is located at the side air outlet 21. In this case, external impurities such as dust can be prevented from entering the interior of the housing assembly 100 through the side air outlet 21, which may influence the normal operation of the indoor unit 1000. Consequently, the cleaning frequency of the indoor unit 1000 can be reduced. Moreover, the air outlet grille 5 can also be used for the wind deflection.

[0046] Further, air outlet grille 5 includes multiple sub-grilles 51, the neighboring two sub-grilles 51 are spaced, at least partially. It can ensure the airflow from the side air outlet 21, and the reliability of the housing assembly 100.

[0047] Specifically, the ends of multiple sub-grilles 51 are connected. It can ensure the airflow from the side air outlet 21, and the simple structure of the air outlet grille 5.

[0048] Optionally, air outlet grille 5 is an all-in-one component. It can improve the production efficiency of housing assembly 100 and simplify the installation of the housing assembly 100.

[0049] Optionally, each sub-grille 51 is in "S" shape. It improves the appearance of the housing assembly 100.

[0050] The indoor unit 1000 based on the embodiment of this application includes the housing assembly 100.

[0051] With the housing assembly 100 in the embodiment of this application, the indoor unit 1000 based on the embodiment of this application can increase the air output and air supply efficiency of the indoor unit 1000.

[0052] Other configurations and operations of the indoor unit 1000 based on the embodiment of this application are known to those of ordinary skill in the art and will not be described in detail herein.

[0053] In the description of this application, the terms "an embodiment", "some embodiments", "schematic embodiment", "example", "specific example", or "some examples" etc. mean that the specific feature, structure, material or characteristic of that embodiment or example described are included in at least one embodiment or example of this application. In this description, the schematic presentation of such terms may not refer to the same embodiment or example. Moreover, the specific features, structure, material or characteristics described may be combined in an appropriate manner in any one or multiple embodiments or examples.

[0054] Although the embodiments of this application have been presented and described, the common technicians in the field can understand that multiple changes, modifications, substitutions and variations of such embodiments can be made without deviating from the principles and purposes of this application, and that the scope of this application is defined by the claims and their equivalents.

Claims

1. A housing assembly for an indoor unit of an air conditioner, comprising:

   a face frame provided with a front air outlet; and two end covers arranged at a left end and a right end of the face frame respectively, wherein a portion of at least one end cover lies is located in front of a front surface of the face frame and defines an auxiliary air passage with the face frame, the at least one end cover is provided with a side air outlet in communication with the auxiliary air passage, a portion of an inner side wall of the auxiliary air passage defined by the face frame forms a guide wall, to direct air from the front air outlet to the side air outlet.

2. The housing assembly according to claim 1, wherein portions of the two end covers are located in front of the front surface of the face frame and define the auxiliary air passages with the face frame, each of the two end covers is provided with the side air outlet in communication with a corresponding auxiliary air passage, and a portion of an inner side wall of each of the auxiliary air passages defined by the face frame forms the guide wall.

3. The housing assembly according to claim 2, wherein the face frame comprises a front frame and two side frames, the front frame is provided with the front air outlet, the two side frames are located at the left end and the right end of the front frame respectively and extend backwards, each of portions of a front surface of the front frame at a left end and a right end of the front air outlet is provided with the guide wall, the

guide wall obliquely extends backwards in a direction away from the front air outlet, and each guide wall extends to one corresponding side frame,
the two end covers correspond to the side frames one to one respectively and are located at sides of the side frames away from the front frame, each of the two end cover is provided with a front extension part, and the front extension part is located in front of the corresponding guide wall and defines the auxiliary air passage with the guide wall.

4. The housing assembly according to claim 3, wherein an end of the guide wall adjacent to the front air outlet extends to a side wall of the front air outlet.

5. The housing assembly according to claim 3 or 4, wherein each of an upper side and a lower side of each guide wall defines a guide groove, each guide groove extends in a left-right direction, an end of each guide groove away from the front air outlet is open, and each front extension part is provided with a guide protrusion matching the guide groove.

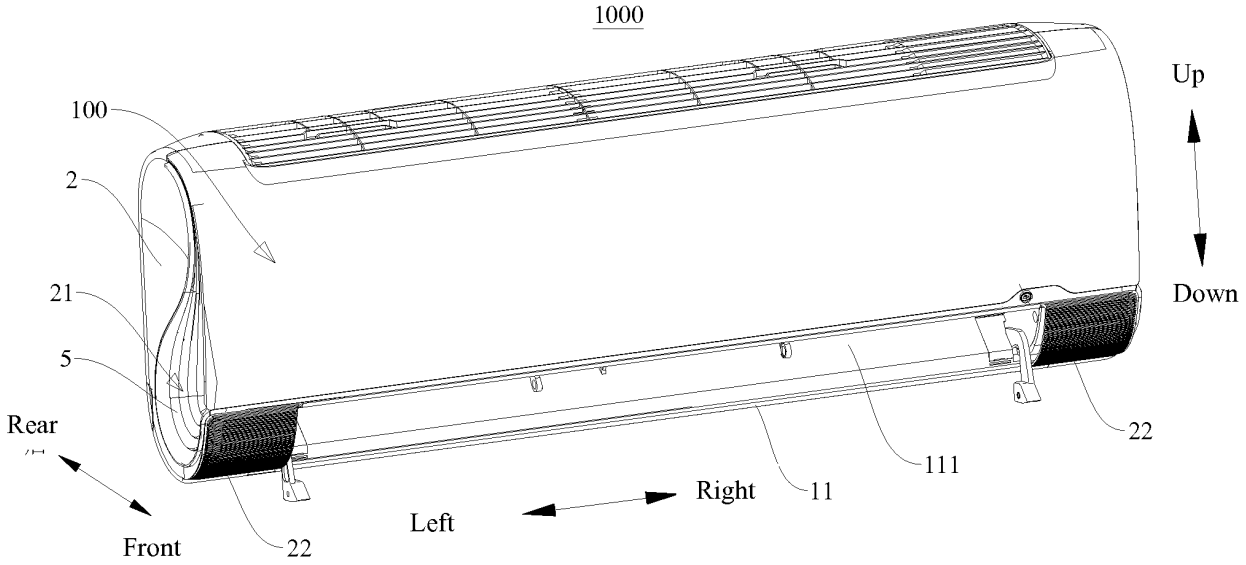
6. The housing assembly according to claim 5, wherein an inner bottom wall of the end of at least one guide groove is provided with a guide bevel, and the guide bevel obliquely extends backwards in a direction away from the front air outlet.

7. The housing assembly according to any one of claims 1 to 6, wherein the guide wall has a flat surface or an arc surface.

8. The housing assembly according to any one of claims 1 to 7, wherein one of the face frame and the end covers is provided with a hook, and the other one of the face frame and the end covers defines a snapping groove fitted with the hook.

9. The housing assembly according to claim 8, wherein a plurality of hooks and a plurality of snapping grooves are provided, and the snapping grooves correspond to the hooks one to one.

10. An indoor unit of an air conditioner, comprising: a housing assembly according to any one of claims 1 to 9.


1000
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2
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111
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Fig. 1

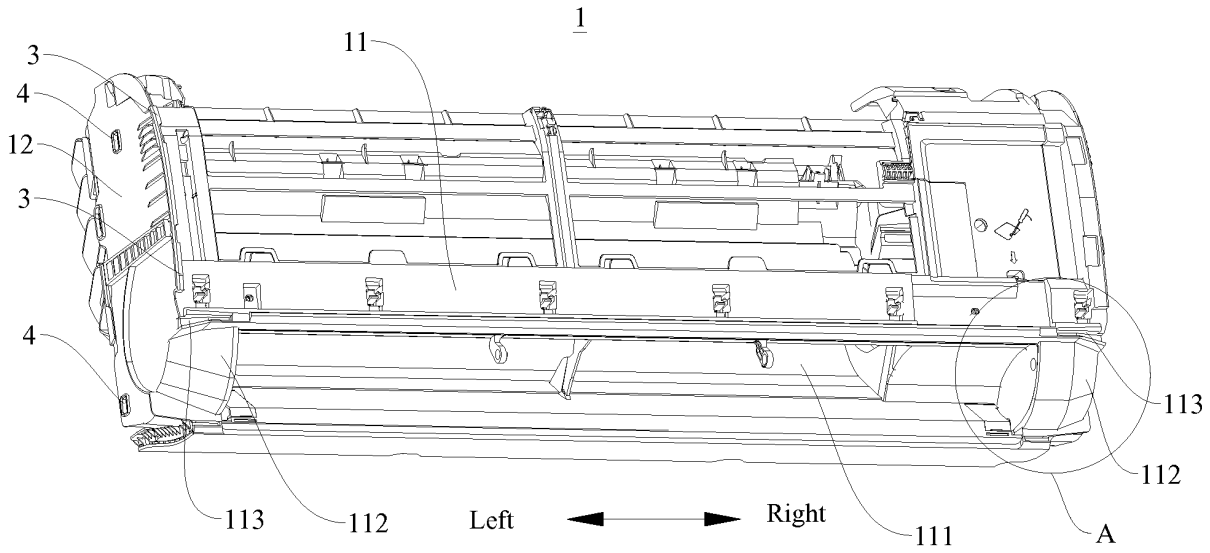
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Fig. 2

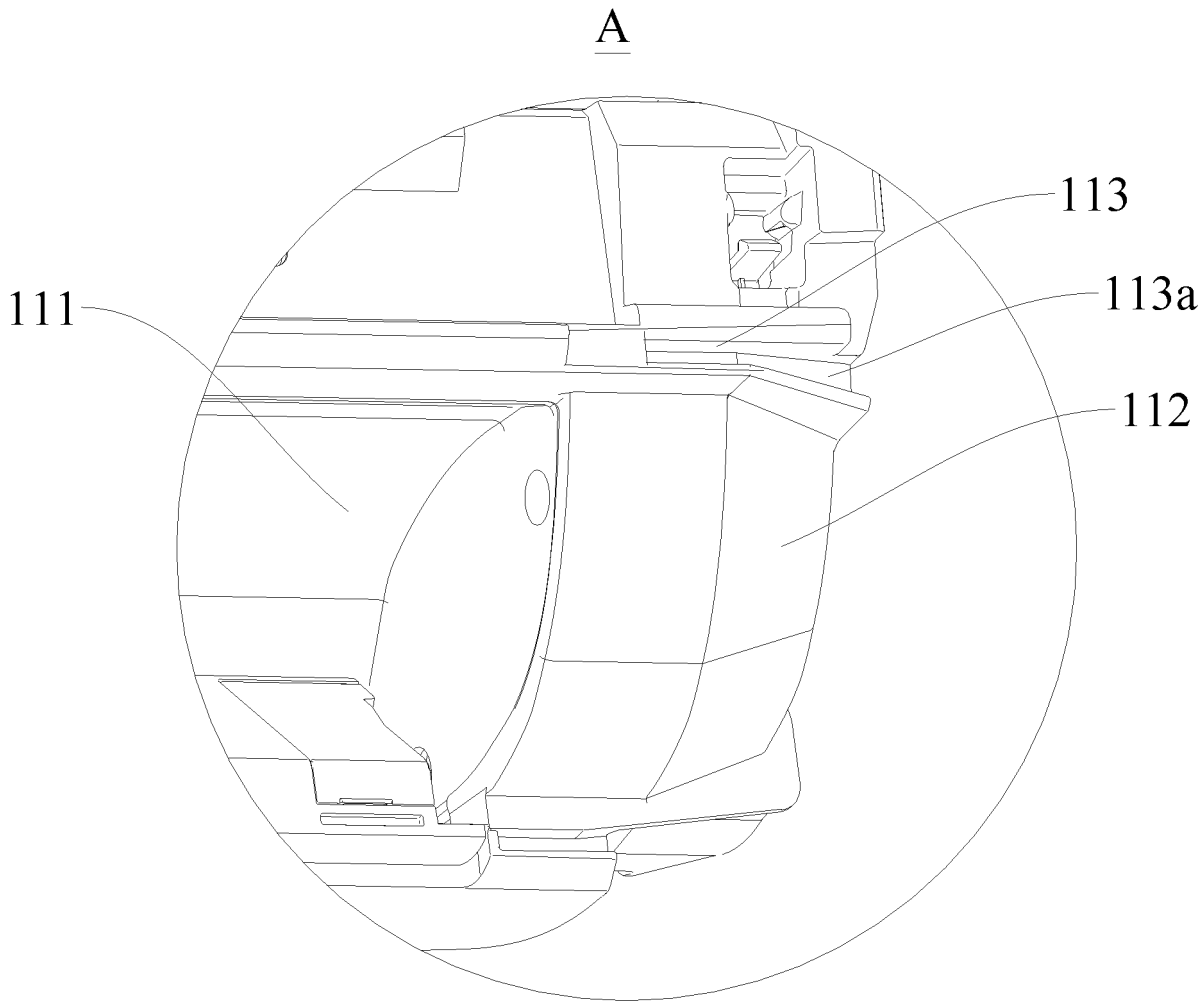

Fig. 3

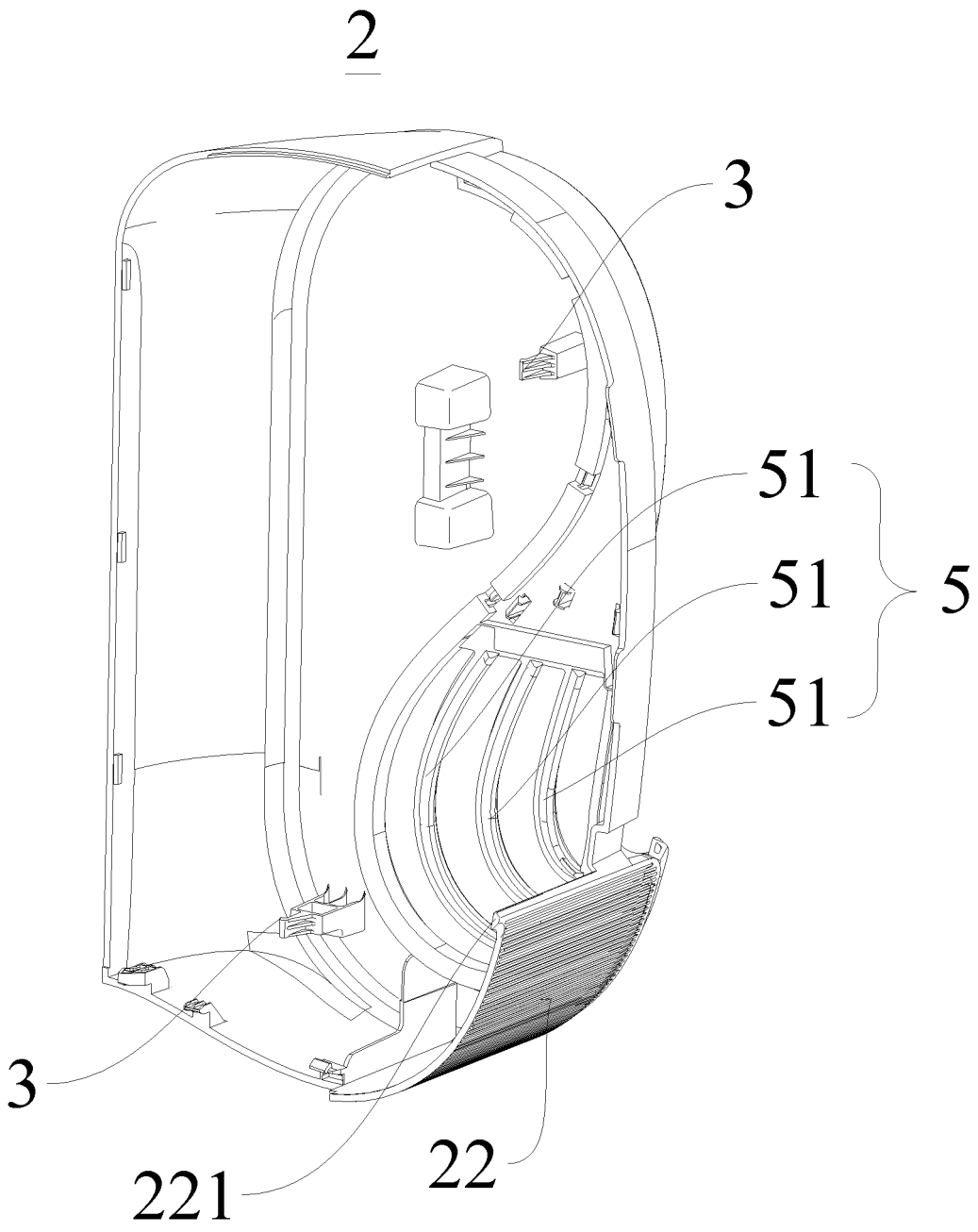

Fig. 4

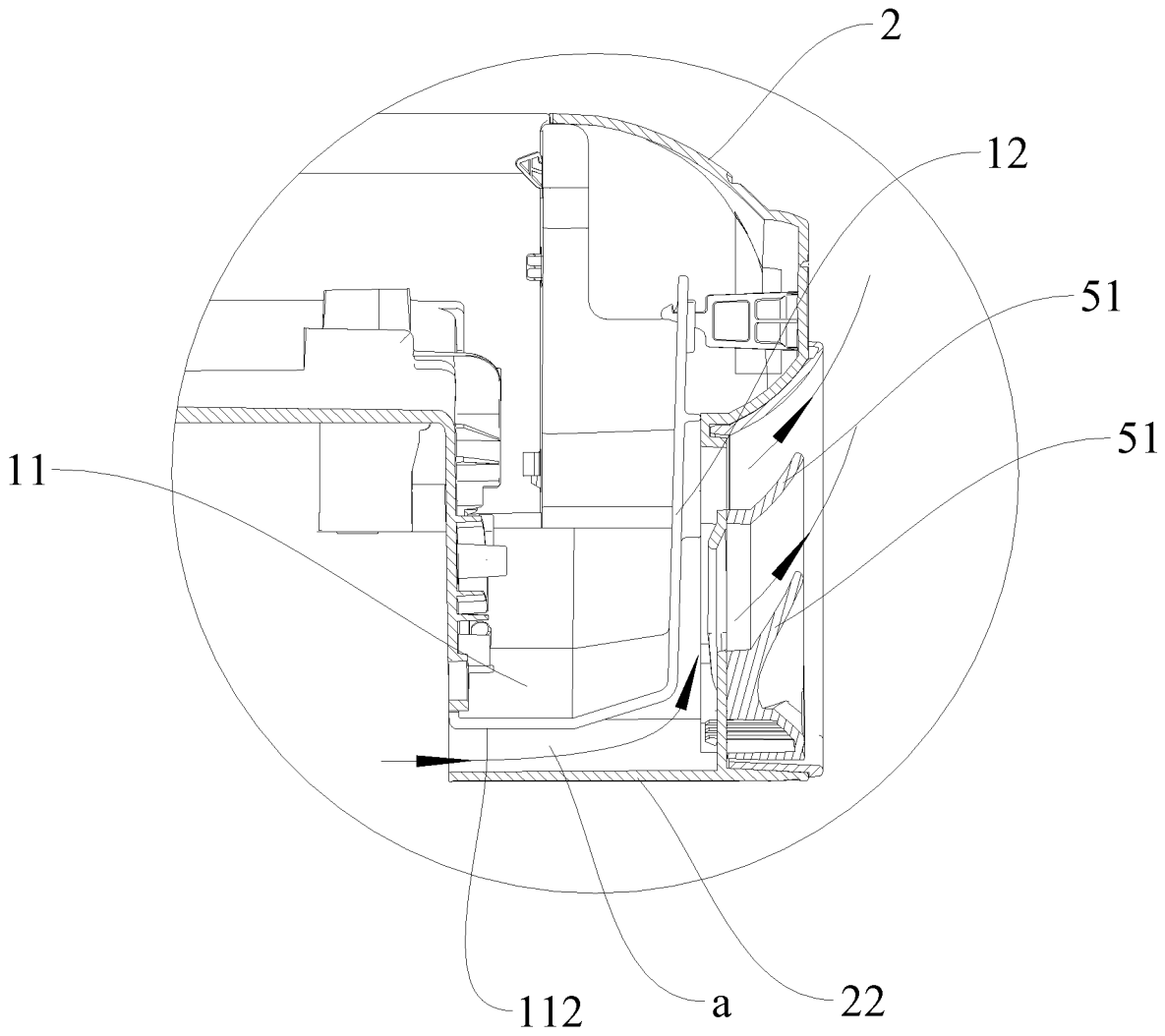

Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/108006

A. CLASSIFICATION OF SUBJECT MATTER

F24F 13/20(2006.01)i; F24F 13/02(2006.01)i; F24F 13/08(2006.01)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; DWPI; SIPOABS; CNKI: 端盖, 两侧, 侧面, 出风, 排风, 辅助, 导向, end, cover, side, lateral, outlet, auxiliary, guide

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 107166514 A (QINGDAO HAIER AIR CONDITIONER GENERAL CO., LTD.) 15 September 2017 (2017-09-15) description, paragraphs [0042]-[0066], and figures 1-6	1-10
X	CN 107166510 A (QINGDAO HAIER AIR CONDITIONER GENERAL CO., LTD.) 15 September 2017 (2017-09-15) description, paragraphs [0040]-[0061], and figures 1-3	1-10
X	CN 105333513 A (GREE ELECTRIC APPLIANCES INC. OF ZHUHAI) 17 February 2016 (2016-02-17) description, paragraphs [0025]-[0035], and figures 1-3	1-10
A	CN 106642324 A (QINGDAO HAIER AIR CONDITIONER GENERAL CO., LTD.) 10 May 2017 (2017-05-10) entire document	1-10
A	CN 106705216 A (QINGDAO HAIER AIR CONDITIONER GENERAL CO., LTD.) 24 May 2017 (2017-05-24) entire document	1-10
A	CN 104296243 A (MIDEA GROUP WUHAN REFRIGERATION EQUIPMENT CO., LTD.) 21 January 2015 (2015-01-21) entire document	1-10

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

* Special categories of cited documents:
"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
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"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

Date of the actual completion of the international search	Date of mailing of the international search report
07 December 2018	**02 January 2019**
Name and mailing address of the ISA/CN **National Intellectual Property Administration, PRC (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2018/108006

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2011033703 A1 (DAIKIN INDUSTRIES, LTD. ET AL.) 24 March 2011 (2011-03-24) entire document	1-10

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2018/108006

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