(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 043 807 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
17.08.2022 Bulletin 2022/33

(21) Application number: **20888630.9**

(22) Date of filing: **20.03.2020**

(51) International Patent Classification (IPC):
F24F 1/028 *(2019.01)* ***F24F 13/20*** *(2006.01)*
F24F 13/22 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
F24F 1/028; F24F 13/20; F24F 13/22

(86) International application number:
PCT/CN2020/080463

(87) International publication number:
WO 2021/093247 (20.05.2021 Gazette 2021/20)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **11.11.2019 CN 201921948225 U**
11.11.2019 CN 201921942470 U

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(54) SPIRAL CASING ASSEMBLY, AND MOVABLE AIR CONDITIONER

(57) A spiral casing assembly (100), and a movable air conditioner. The spiral casing assembly (100) comprises a spiral casing cover (200). The spiral casing cover (200) comprises a top plate (210). The top plate (210) has a water-guiding channel (220) extending in a lengthwise direction of the top plate (210). The water-guiding channel (220) comprises a bottom wall (221), and a first side wall (222) and a second side wall (223) respectively connected to the bottom wall (221). The first side wall (222) and the second side wall (223) are arranged opposite to each other. The water-guiding channel (220) further comprises a reinforcement member (224) connected to the bottom wall (221) and the first side wall (222). The reinforcement member (224) is spaced apart from the second side wall (223).

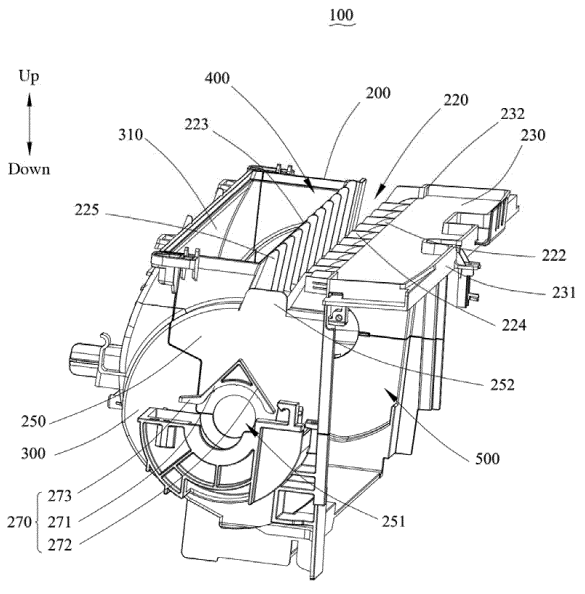

Fig.1

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Description

[0001] The present application claims the priority of Chinese patent application No. 201921948225.4, titled "volute assembly and movable air conditioner" submitted to CNIPA on November 11, 2019, and the priority of Chinese patent application No. 201921942470.4, titled "volute cover and movable air conditioner" submitted to CNIPA on November 11, 2019, which are hereby incorporated for reference in their entirety.

TECHNICAL FIELD

[0002] The present application relates to the technical field of air conditioners, in particular to a volute assembly and a movable air conditioner.

BACKGROUND

[0003] Compared with the traditional floor air conditioner, the wall-mounted air conditioner is smaller, does not need to be installed, and is easy to move. It can be placed at different positions in the house at will.

[0004] In the shell of the movable air conditioner, a compressor, an exhaust fan, an evaporator, a condenser, a volute assembly and other devices are installed. The volute assembly includes a top plate provided above the indoor heat exchanger, and the top plate is also configured to form a side edge of the air outlet of the volute assembly. When the air is discharged from the top of the movable air conditioner, the condensed water will condense on the top plate. When the condensed water is gathered too much, it will disperse and flow downward from the edge of the top plate, which can easily damage the internal components of the movable air conditioner and affects the service life of the movable air conditioner.

SUMMARY

[0005] The main purpose of the present application is to provide a volute assembly and a movable air conditioner, which aims to solve a problem that condensed water formed on the top plate above the indoor heat exchanger of the movable air conditioner disperses downward from its edge and can easily damage the internal components of the movable air conditioner.

[0006] In order to achieve the above purpose, the present application provides a volute assembly, comprising a volute cover comprising a top plate provided with a water diversion groove extending along a length direction of the top plate; the water diversion groove comprising a bottom wall and a first side wall and a second side wall both connected with the bottom wall; the first side wall being opposite to the second side wall, and the water diversion groove also comprising a first reinforcing rib connected with the bottom wall and the first side wall, and the first reinforcing rib being provided spaced from the second side wall.

[0007] In one embodiment of the present application, the water diversion groove further comprises a second reinforcing rib connected with the bottom wall and the second side wall of the water diversion groove, and spaced from the first side wall.

[0008] In one embodiment of the present application, the first reinforcing rib is opposite to the second reinforcing rib, and the first reinforcing rib and the second reinforcing rib form a water passing groove.

[0009] In one embodiment of the present application, the volute assembly comprises a first side plate and a second side plate respectively provided at two ends of the top plate, and the bottom wall of the water diversion groove is inclined downward in a direction from the second side plate to the first side plate.

[0010] In one embodiment of the present application, a lower end of the first reinforcing rib is inclined toward the first side plate.

[0011] In one embodiment of the present application, the top plate comprises an upper extension plate provided on one side of the water diversion groove, and connected with an upper edge of the first side wall, and a periphery of the upper extension plate is convex upwardly with a water blocking rib.

[0012] In one embodiment of the present application, the water blocking rib comprises a first water blocking rib provided at a connection between the upper extension plate and the first side wall, and the first water blocking rib is provided at one end of the water diversion groove and configured to lead water into the water diversion groove.

[0013] In one embodiment of the present application, the volute assembly further comprises a volute cooperated and connected with the volute cover to form a fan air duct; the volute comprises a front air duct plate, and an upper end of the front air duct plate is spaced from the second side wall to form an air outlet between the upper end of the front air duct plate and the second side wall.

[0014] In one embodiment of the present application, the volute further comprises a windshield bottom plate provided at a lower end of the front air duct plate, and the windshield bottom plate is bent and extended from the lower end of the

front air duct plate in a direction away from the front air duct plate.

[0015] In one embodiment of the present application, the volute further comprises an extension plate provided at the lower end of the front air duct plate and extending downward; and the windshield bottom plate is provided at a lower end of the extension plate.

[0016] In one embodiment of the present application, the windshield bottom plate is provided with a windshield plate, and the windshield plate is protruded upward from an upper surface of the windshield bottom plate.

[0017] In one embodiment of the present application, a windshield bulge is provided on the windshield bottom plate, and the windshield plate is formed as a side wall of the windshield bulge away from a side of the front air duct plate; and/or,

[0018] the windshield plate is protruded downward from a lower surface of the windshield bottom plate.

[0019] In one embodiment of the present application, the volute cover further comprises a first side plate and a second side plate distributed at two ends of the top plate, and the first side plate is provided with a first drainage structure for draining water overflowed from the water diversion groove; and/or, the second side plate is provided with a second drainage structure for draining water overflowed from the water diversion groove.

[0020] In one embodiment of the present application, the first side plate is provided with a first wind wheel mounting hole located below the water diversion groove, and the first drainage structure is configured to guide water overflowed from the water diversion groove to be away from the first wind wheel mounting hole.

[0021] In one embodiment of the present application, the first drainage structure comprises a first drainage rib and a second drainage rib connected with a lower end of the first drainage rib, the first drainage rib is provided on one side of the water diversion groove, and the second drainage rib is extended obliquely toward another side of the water diversion groove.

[0022] In one embodiment of the present application, the first drainage structure further comprises a third drainage rib and a first water leakage hole, the first water leakage hole is provided on a side of the second drainage rib away from the first wind wheel mounting hole; one end of the third drainage rib is connected with the second drainage rib, and another end of the third drainage rib is connected with the first water leakage hole, and the third drainage rib is configured to drain water to the first water leakage hole.

[0023] In one embodiment of the present application, a bottom of the water diversion groove is inclined downward in a direction from the second side plate to the first side plate.

[0024] In one embodiment of the present application, the second side plate is provided with a second wind wheel mounting hole located below the water diversion groove, and the second drainage structure is configured to guide water overflowed from the water diversion groove to be away from the second wind wheel mounting hole.

[0025] In one embodiment of the present application, the second drainage structure comprises a fourth drainage rib and a fifth drainage rib connected with each other, the fourth drainage rib and the fifth drainage rib are extended obliquely to two sides of the second wind wheel mounting hole respectively.

[0026] In addition, the present application also provides a movable air conditioner, comprising a shell and any one of the volute assemblies as mentioned above provided in the shell

[0027] In the technical solution of the present application, when the air is discharged from the top of the movable air conditioner, the condensed water formed on the top plate will converge to the water diversion groove, so as to prevent the condensed water from dispersing and flowing down to the interior of the movable air conditioner, so as to prevent the condensed water from damaging the internal components of the movable air conditioner, thereby improving the service life of the movable air conditioner. Moreover, since the first reinforcing rib is provided in the water diversion groove, the structural strength of the water diversion groove and the volute cover can be improved. At the same time, the first reinforcing rib is provided spaced from the second side wall, which can allow the condensed water to pass, so that the condensed water converged in the water diversion groove can flow out from one end of the water diversion groove, so as to prevent a large amount of the condensed water from accumulating in the water diversion groove.

BRIEF DESCRIPTION OF THE DRAWINGS

[0028] In order to more clearly explain the embodiments of the present application or the technical solutions in the related art, the following will briefly introduce the drawings in the embodiments or the description of the related art. It is obvious that the drawings in the following description are only some embodiments of the present application. For those skilled in the art, other drawings can be obtained according to the structure shown in these drawings without creative labor.

Fig. 1 is a structural view of a volute assembly of a movable air conditioner according to an embodiment of the present application.

Fig. 2 is a partial structural view of the movable air conditioner according to the embodiment of the present application.

Fig. 3 is a structural view of a volute cover of the movable air conditioner according to the embodiment of the present application.

Fig. 4 is an enlarged view of portion A in Fig. 3;

Fig. 5 is another partial structural view of the movable air conditioner according to the embodiment of the present application;

Fig. 6 is a structural view of a volute of the movable air conditioner according to the embodiment of the present application;

Fig. 7 is a structural view of a middle partition plate of the movable air conditioner according to the embodiment of the present application

[0029] Reference numerals of the drawings

Reference numeral	name	Reference numeral	name
100	volute assembly	200	volute cover
210	top plate	220	water diversion groove
221	bottom wall	222	first side wall
223	second side wall	224	first reinforcing rib
225	second reinforcing rib	226	water diversion port
230	upper extension plate	231	water blocking rib
232	first water blocking rib	240	first side plate
241	first wind wheel mounting hole	242	mounting annular boss
243	first water leakage hole	250	second side plate
251	second wind wheel mounting hole	252	baffle
260	first drainage structure	261	first drainage rib
262	bent rib	263	second drainage rib
264	third drainage rib	270	second drainage structure
271	fourth drainage rib	272	fifth drainage rib
273	six drainage rib	300	volute
310	front air duct plate	320	windshield bottom plate
330	extension plate	340	windshield plate
350	windshield bulge	400	air outlet
500	air inlet	600	middle partition plate
610	water receiving groove	620	water collecting groove
621	third side plate	622	fourth side plate
630	drainage groove	631	drainage hole
700	indoor heat exchange		

[0030] The realization of the purpose, functional features and advantages of the present application will be further described with reference to the attached drawings in combination with the embodiments.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0031] The technical solution in the embodiment of the present application will be clearly and completely described below in combination with the accompanying drawings in the embodiment of the present application. Obviously, the described embodiments are only part of the embodiments of the present application, not all of the embodiments. Based on the embodiments of the present application, all other embodiments obtained by those skilled in the art without creative work belong to the claimed scope of the present application.

[0032] It should be noted that all directional indications (such as up, down, left, right, front, back...) in the embodiment of the present application are only used to explain the relative position relationship and movement among components under a specific attitude (as shown in the attached drawings). If the specific attitude changes, the directional indications will change accordingly.

[0033] In addition, in the present application, the description of "first", "second" and so on is only for descriptive purposes, and cannot be understood as indicating or implying the relative importance or implicitly indicating the number of indicated technical features. Thus, the features defined with "first" and "second" may include at least one of the features explicitly or implicitly. In the description of the present application, "multiple" means at least two, such as two, three, etc., unless otherwise expressly and specifically defined.

[0034] In this application, unless otherwise specified and limited, the terms "connection", "fix" and so on should be understood in a broad sense. For example, "fix" can be a fixed connection, a removable connection or an integrated connection. It can be a mechanical connection or an electrical connection. It can be a direct connection or an indirect connection through an intermediate medium. It can be the connection within two elements or the interaction relationship between two elements, unless otherwise clearly defined. For those skilled in the art, the specific meaning of the above terms in the present application can be understood according to the specific circumstances.

[0035] In addition, the technical solutions between the embodiments of the present application can be combined with each other, but it must be based on the realization of those skilled in the art. When the combination of technical solutions is contradictory or impossible, it shall be considered that the combination of technical solutions does not exist and is not within the claimed scope of the present application.

[0036] The "up" and "down" in the present application are based on the orientation shown in Fig. 1, that is, the "up" and "down" in the application correspond to the upper orientation and the lower orientation of Fig. 1, and are only used to explain the relative position relationship among components under the posture shown in Fig. 1. If the specific posture changes, the directional indications will change accordingly.

[0037] The present application provides a volute assembly 100. As shown in Figs. 1, 2 and 3, the volute assembly 100 includes a volute cover 200. The volute cover 200 includes a top plate 210 provided with a water diversion groove 220 extending along a length direction of the top plate 210. The water diversion groove 220 includes a bottom wall 221 and a first side wall 222 and a second side wall 223 both connected with the bottom wall 221. The first side wall 222 is opposite to the second side wall 223, and the water diversion groove 220 also includes a first reinforcing rib 224 connected with the bottom wall 221 and the first side wall 222, and the first reinforcing rib 224 is provided spaced from the second side wall 223.

[0038] When the air is discharged from the top of the movable air conditioner, the condensed water formed on the top plate 210 will converge to the water diversion groove 220, so as to prevent the condensed water from dispersing and flowing down to the interior of the movable air conditioner, and prevent the condensed water from damaging the internal components of the movable air conditioner, thereby improving the service life of the movable air conditioner.

[0039] Moreover, since the first reinforcing rib 224 is provided in the water diversion groove 220, the structural strength of the water diversion groove 220 and the volute cover 200 can be improved. At the same time, the first reinforcing rib 224 is spaced from the second side wall 223 for the condensed water to pass, so that the condensed water converged in the water diversion groove can flow out from one end of the water diversion groove, and prevent a large amount of condensed water from accumulating in the water diversion groove. That is, since the first reinforcing rib 224 is provided spaced from the second side wall 223, the structural strength of the water diversion groove 220 and the volute cover 200 can be strengthened without affecting the discharge of the condensed water in the water diversion groove 220.

[0040] Specifically, the water diversion groove 220 also includes a second reinforcing rib 225 connected with the bottom wall 221 and the second side wall 223 of the water diversion groove 220, and the second reinforcing rib 225 is spaced from the first side wall 222, thereby further strengthening the structural strength of the water diversion groove 220.

[0041] More specifically, the first reinforcing rib 224 is opposite to the second reinforcing rib 225, and the first reinforcing rib 224 and the second reinforcing rib 225 form a water passing groove therebetween. After flowing out of the water passing groove, the condensed water flows into a water receiving groove 610 of the middle partition plate 600 through a drainage structure of the volute assembly 100. The first reinforcing rib 224 is opposite to the second reinforcing rib 225, which can make water diversion groove 220 be stressed uniformly and further improve the structural stability. There is a plurality of first reinforcing ribs 224 and a plurality of second reinforcing ribs 225, the plurality of first reinforcing ribs 224 are evenly distributed along the first side wall 222, and the plurality of second reinforcing ribs 225 are evenly distributed along the second side wall 223. In other embodiments, the first reinforcing ribs 224 and the second reinforcing ribs 225 can also be provided at intervals as long as the condensed water can flow through.

[0042] The volute assembly 100 includes a first side plate 240 and a second side plate 250 respectively provided at both ends of the top plate 210. The bottom wall 221 of the water diversion groove 220 is inclined downward from the second side plate 250 toward the first side plate 240, that is, the bottom wall 221 is inclined along the length direction of the water diversion groove 220, which is more convenient to the flow of condensed water along the bottom wall 221 to one end of the water diversion groove 220 and prevent condensed water from accumulating on the bottom wall 221.

[0043] Further, the lower end of the first reinforcing rib 224 is inclined toward the first side plate 240. The first reinforcing rib 224 not only strengthens the structure of the water diversion groove 220, but also drain the condensed water. The condensed water flows into the bottom wall 221 of the water diversion groove 220 through the first reinforcing rib 224, and then flows into the end of the water diversion groove 220 along the inclined bottom wall 221. The lower end of the second reinforcing rib 225 can also be inclined toward the first side plate 240, and can also drain the water.

[0044] Further, the top plate 210 includes an upper extension plate 230 provided on one side of the water diversion groove 220, the upper extension plate 230 is connected with an upper edge of the first side wall 222, and a periphery of the upper extension plate 230 is convex upward with a water blocking rib 231. The indoor heat exchanger 700 is provided below the upper extension plate 230, and corresponds to an air inlet 500 of the movable air conditioner. an end of the upper extension plate 230 can be flush with an outer side of the indoor heat exchanger 700. A fan air duct is formed inside the volute assembly 100. The air enters the fan air duct through the indoor heat exchanger 700 and then enters the room through the indoor air outlet at the top. The condensed water formed at the top of the volute assembly 100 flows into the water diversion groove 220 along the upper extension plate 230 due to the blocking of the water blocking rib 231, and avoids to flow into the indoor heat exchanger 700 and be sucked into the fan air duct.

[0045] In an embodiment of the present application, the water blocking rib 231 includes a first water blocking rib 232 provided at a connection between the upper extension plate 230 and the first side wall 222. The first water blocking rib 232 is provided at one end of the water diversion groove 220 for draining water into the water diversion groove 220. The first water blocking rib 232 can prevent the condensed water from overflowing from the connection between the upper extension plate 230 and the first side wall 222 and drain the condensed water into the water diversion groove 220.

[0046] The volute assembly 100 also includes a volute 300 connected with the volute cover 200 to form a fan air duct. The volute 300 includes a front air duct plate 310, the upper end of the front air duct plate 310 is spaced from the second side wall 223, and is configured to form an air outlet 400 between the upper end of the front air duct plate 310 and the second side wall 223. The volute 300 is assembled with the volute cover 200 to form the volute assembly 100. The front air duct plate 310 is provided corresponding to the air inlet 500. The air flows into the fan air duct from the air inlet 500 on a side of the volute assembly 100 and then flows out from the air outlet 400 on the top of the volute assembly 100, avoiding that the cold air or hot air blown from the indoor air outlet blows directly on the user, so as to prevent the user from feeling unwell such as feeling too hot or too cold.

[0047] As shown in Figs. 5 to 7, the volute 300 of this embodiment also includes a windshield bottom plate 320 provided at the lower end of the front air duct plate 310, which is bent and extended from the lower end of the front air duct plate 310 in a direction away from the front air duct plate 310. The windshield bottom plate 320 is located on the middle partition plate 600 of the movable air conditioner. The middle partition plate 600 is provided with a water receiving groove 610, a water collecting groove 620 and a drainage groove 630. The indoor heat exchanger 700 is placed in the water receiving groove 610. The water receiving groove 610 is communicated with the water collecting groove 620, the water collecting groove 620 is communicated with the drainage groove 630. The outdoor heat exchanger is located below the drainage groove 630, and a plurality of drainage holes 631 are provided on the drainage groove 630. The condensed water in the water diversion groove 220 first flows into the water receiving groove 610 of the middle partition plate 600, then flows into the water collecting groove 620, then converges to the drainage groove 630, and flows into the outdoor heat exchanger through the drainage hole 631. The water collecting groove 620 includes a third side wall 621, a third side wall 621 and a fourth side wall 622. The third side wall 621 and the fourth side wall 622 abut against a side of the windshield bottom plate 320 away from the front air duct plate 310 to prevent condensed water from flowing into the fan air duct from the windshield bottom plate 320.

[0048] The volute 300 also includes an extension plate 330 provided at the lower end of the front air duct plate 310, the extension plate 330 is extended downward, and the windshield bottom plate 320 is provided at the lower end of the extension plate 330. Due to the extension plate 330, the windshield bottom plate 320 is moved downward, which increases the internal space of the fan air duct and improves the space utilization rate.

[0049] A windshield plate 340 is provided on the windshield bottom plate 320, and the windshield plate 340 is protruded upward from the upper surface of the windshield bottom plate 320. The windshield plate 340 is located between the third side wall 621 and the fourth side wall 622, which can prevent the condensed water from being blown into the fan air duct and avoid the occurrence of "water blowing".

[0050] A windshield bulge 350 is formed on the windshield bottom plate 320, and the windshield plate 340 is formed as a side wall of the windshield bulge 350 away from the front air duct plate 310; and/or, the windshield plate 340 is protruded downward from a lower surface of the windshield bottom plate 320. The windshield bulge 350 guides the air into the fan air duct and strengthens the structural strength of the windshield bottom plate 320. The windshield plate 340 protruding downward can prevent the air from entering the gap between the windshield 320 and the drainage groove 630, thereby reducing air leakage, improving the utilization rate of the air and reducing the noise caused by air leakage.

[0051] As shown in Figs. 1 and 2, the volute cover 200 includes:

a top plate 210 provided with a water diversion groove 220 extending along a length direction of the top plate 210;

a first side plate 240 and a second side plate 250 respectively provided at both ends of the top plate 210; the first side plate 240 being provided with a first drainage structure 260 for draining the water overflowing from the water diversion groove 220; and/or, the second side plate 250 being provided with a second drainage structure 270 for draining water overflowed from the water diversion groove 220.

[0052] After the condensed water flows into the water diversion groove 220, it converges to the water collecting groove 620 of the middle partition plate 600 through the first drainage structure 260 and/or the second drainage structure 270. If the condensed water flows to the first side plate 240, it is drained through the first drainage structure 260. If the condensed water flows to the second side plate 250, it is drained through the second drainage structure 270. Through the drainage of the water diversion groove 220, the first drainage structure 260 and/or the second drainage structure 270, arbitrary flowing of the condensed water to the interior of the movable air conditioner is prevented, the damage to the internal components of the movable air conditioner is avoided, and the service life of the movable air conditioner is improved.

[0053] As shown in Fig. 4, the first side plate 240 is provided with a first wind wheel mounting hole 241 located below the water diversion groove 220, and the first drainage structure 260 is configured to guide water overflowed from the water diversion groove 220 to be away from the first wind wheel mounting hole 241. The volute 300 is connected with the volute cover 200 to form a fan air duct. A wind wheel is provided in the fan air duct, and one end of the wind wheel is provided in the first wind wheel mounting hole 241. The first drainage structure 260 drains the water to a place away from the first wind wheel mounting hole 241, avoiding the condensed water from being blown into the fan air duct from the first wind wheel mounting hole 241.

[0054] Specifically, as shown in Fig. 4, the first drainage structure 260 includes a first drainage rib 261 and a second drainage rib 263, the second drainage rib 263 is connected with a lower end of the first drainage rib 261, the first drainage rib 261 is provided on one side of the water diversion groove 220, and the second drainage rib 263 is extended obliquely to the other side of the water diversion groove 220. The first side plate 240 also includes a bending rib 262, which extends from one side wall of the water diversion groove 220 to the other side wall of the water diversion groove 220. A water diversion port 226 is formed between the bending rib 262 and the other side wall of the water diversion groove 220. The first drainage rib 261 is connected with the bending rib 262. The bending rib 262 of this embodiment is connected with the second side wall 223. In other embodiments, the bending rib 262 can be connected with the second side wall 223. The bending rib 262 makes the strength of the first drainage rib 261 higher, and makes the first drainage rib 261 closer to the first water leakage hole 243 located below. The upper ends of the first drainage rib 261 and the bending rib 262 can be flush with the upper end of the second side wall 223 to prevent a small amount of the condensed water from overflowing from the upper end of the first drainage rib 261 or from the upper end of the bending rib 262. In other embodiments, the first drainage rib 261 can also be directly connected with the first side wall 222 or with the second side wall 223, as long as the condensed water can be drained to the second drainage rib 263.

[0055] More specifically, a periphery of the first wind wheel mounting hole 241 is provided with a mounting annular boss 242, and a lower end of the second drainage rib 263 is connected with the mounting annular boss 242. The mounting annular boss is configured to install the wind wheel bearing, and a lower end of the first drainage rib 261 is connected with the mounting annular boss, which can increase the strength of the first drainage structure 260.

[0056] The first drainage structure 260 also includes a third drainage rib 264 and a first water leakage hole 243. The first water leakage hole 243 is provided on a side of the second drainage rib 263 away from the first wind wheel mounting hole 241. One end of the third drainage rib 264 is connected with the second drainage rib 263, and the other end of the third drainage rib 264 is connected with the first water leakage hole 243, the third drainage rib 264 is configured to drain water to the first water leakage hole 243. The first water leakage hole 243 is provided at a connection between the volute 300 and the volute cover 200, which not only drains, but also strengthens the sealing of the volute assembly 100 and prevents air leakage. The third drainage rib 264 may include a third inclined rib and a third vertical rib, the third inclined rib is connected with the second drainage rib 263. The third vertical rib is docked with the first water leakage hole 243. The third inclined rib can drain the condensed water to a position away from the first wind wheel mounting hole 241. The third vertical rib can make the condensed water flow into the first water leakage hole 243 more smoothly. After flowing into the first water leakage hole 243, the condensed water directly falls into the middle partition plate 600, and then flows into the drainage groove 630, or flows into the drainage groove 630 after passing through the water collecting groove 620, and then flows into the outdoor heat exchanger from the drainage hole 631 of the drainage groove 630.

[0057] The bottom of the water diversion groove 220 is inclined downward from the second side plate 250 toward the first side plate 240. That is, most of the condensed water will flow to the first drainage structure 260 on the first side plate 240 along the bottom wall 221 of the condensed water, and only a small amount of condensed water will flow to the second drainage structure 270.

[0058] The first side plate 240 is provided with a water diversion port 226 communicated with the water diversion groove 220 to facilitate the condensed water flow to the first drainage structure 260 and then fall into the middle partition plate 600.

[0059] As shown in Fig. 1, the second side plate 250 is provided with a second wind wheel mounting hole 251 located below the water diversion groove 220, and the second drainage structure 270 is configured to guide water overflowed from the water diversion groove 220 to be away from the second wind wheel mounting hole 251. The second wind wheel mounting hole 251 is configured to mount the other end of the wind wheel. When the bottom wall 221 of the water diversion groove 220 is inclined to the first side plate 240, most of the condensed water will flow to the first drainage structure 260, but there may still be a small amount of condensed water flow to the second side plate 250. Therefore, the setting of the second drainage structure 270 prevents the condensed water from being sucked into the fan air duct from the second wind wheel mounting hole 251.

[0060] The second drainage structure 270 includes a fourth drainage rib 271 and a fifth drainage rib 272 connected with each other, the fourth drainage rib 271 and the fifth drainage rib 272 extend obliquely to two sides of the second wind wheel mounting hole 251 respectively. The fourth drainage rib 271 and the fifth drainage rib 272 form a triangular rib, which not only strengthens the structural strength of the second side plate 250, but also be able to drain the condensed water to be away from the second wind wheel mounting hole 251.

[0061] In one embodiment of the present application, the second drainage structure 270 also includes a sixth drainage rib 273 connected with a lower end of the fourth drainage rib 271, and the sixth drainage rib 273 extends away from the fifth drainage rib 272. The sixth drainage rib 273 can further drain the condensed water to a position away from the second wind wheel mounting hole 251, and the upper surface of the sixth drainage rib 273 is a inclined plane inclined downward, which is conducive to drain the condensed water downward. A second water leakage hole (not shown in the figures) is provided at the lower end of the second drainage structure 270, and is configured to drain the condensed water to the middle partition plate 600 and then enter the water receiving groove 610.

[0062] The second side plate 250 includes a baffle 252 protruding from the top plate 210. The baffle 252 is provided at one end of the water diversion groove 220 and is configured to prevent the overflow of water in the water diversion groove 220. Since most of the water will flow to the first side plate 240, a baffle 252 provided at the end of the diversion groove 220 close to the second side plate 250 can prevent the condensed water from flowing to the second side plate 250, so that more condensed water flows into the water receiving groove 610 of the middle partition plate 600 through the first drainage structure 260.

[0063] In addition, the present application also provides a movable air conditioner, which comprises a shell and the volute assembly 100 mentioned above provided in the shell, and the volute assembly 100 includes the volute cover 200. The specific structure of the volute assembly 100 and the volute cover 200 can make reference to the above embodiment. Since the movable air conditioner adopts all the technical schemes of all the above embodiments, it has at least all the advantages brought by the technical scheme of the above embodiment, which will not be repeated here.

[0064] The above is only an optional embodiment of the present application and does not limit the scope of the patent of the present application. Any equivalent structural transformation made by using the contents of the description and drawings of the present application under the concept of the present application, or directly/indirectly applied in other relevant technical fields, are included in the scope of patent protection of the present application.

Claims

1. A volute assembly comprising a volute cover, the volute cover comprising a top plate provided with a water diversion groove extending along a length direction of the top plate; the water diversion groove comprising a bottom wall and a first side wall and a second side wall both connected with the bottom wall; the first side wall being opposite to the second side wall, and the water diversion groove also comprising a first reinforcing rib connected with the bottom wall and the first side wall, and the first reinforcing rib being spaced from the second side wall.

2. The volute assembly according to claim 1, wherein the water diversion groove further comprises a second reinforcing rib connected with the bottom wall and the second side wall of the water diversion groove, and spaced from the first side wall.

3. The volute assembly according to claim 2,
wherein the first reinforcing rib is opposite to the second reinforcing rib, and the first reinforcing rib and the second reinforcing rib form a water passing groove.

4. The volute assembly according to claim 1, wherein the volute assembly comprises a first side plate and a second side plate respectively provided at two ends of the top plate, and the bottom wall of the water diversion groove is inclined downward in a direction from the second side plate to the first side plate.

5. The volute assembly according to claim 4,

wherein a lower end of the first reinforcing rib is inclined toward the first side plate.

6. The volute assembly according to claim 1, wherein the top plate comprises an upper extension plate provided on one side of the water diversion groove, and connected with an upper edge of the first side wall, and a periphery of the upper extension plate is convex upwardly with a water blocking rib.

7. The volute assembly according to claim 6,
wherein the water blocking rib comprises a first water blocking rib provided at a connection between the upper extension plate and the first side wall, and the first water blocking rib is provided at one end of the water diversion groove and configured to lead water into the water diversion groove.

8. The volute assembly according to claim 1, wherein the volute assembly further comprises a volute connected with the volute cover to form a fan air duct; the volute comprises a front air duct plate, and an upper end of the front air duct plate is spaced from the second side wall to form an air outlet between the upper end of the front air duct plate and the second side wall.

9. The volute assembly according to claim 8, wherein the volute further comprises a windshield bottom plate provided at a lower end of the front air duct plate, and the windshield bottom plate is bent and extended from the lower end of the front air duct plate in a direction away from the front air duct plate.

10. The volute assembly according to claim 9, wherein the volute further comprises an extension plate provided at the lower end of the front air duct plate and extending downward; and the windshield bottom plate is provided at a lower end of the extension plate.

11. The volute assembly according to claim 10, wherein the windshield bottom plate is provided with a windshield plate, and the windshield plate is protruded upward from an upper surface of the windshield bottom plate.

12. The volute assembly according to claim 11, wherein a windshield bulge is provided on the windshield bottom plate, and the windshield plate is formed as a side wall of the windshield bulge away from a side of the front air duct plate; and/or,
the windshield plate is protruded downward from a lower surface of the windshield bottom plate.

13. The volute assembly according to claim 1, wherein the volute cover further comprises a first side plate and a second side plate distributed at two ends of the top plate, and the first side plate is provided with a first drainage structure for draining water overflowed from the water diversion groove; and/or, the second side plate is provided with a second drainage structure for draining water overflowed from the water diversion groove.

14. The volute assembly according to claim 13, wherein the first side plate is provided with a first wind wheel mounting hole located below the water diversion groove, and the first drainage structure is configured to guide water overflowed from the water diversion groove to be away from the first wind wheel mounting hole.

15. The volute assembly according to claim 14, wherein the first drainage structure comprises a first drainage rib and a second drainage rib connected with a lower end of the first drainage rib, the first drainage rib is provided on one side of the water diversion groove, and the second drainage rib is extended obliquely toward another side of the water diversion groove.

16. The volute assembly according to claim 15, wherein the first drainage structure further comprises a third drainage rib and a first water leakage hole, the first water leakage hole is provided on a side of the second drainage rib away from the first wind wheel mounting hole; one end of the third drainage rib is connected with the second drainage rib, and another end of the third drainage rib is connected with the first water leakage hole, and the third drainage rib is configured to drain water to the first water leakage hole.

17. The volute assembly according to claim 13, wherein a bottom of the water diversion groove is inclined downward in a direction from the second side plate to the first side plate.

18. The volute assembly according to claim 13, wherein the second side plate is provided with a second wind wheel mounting hole located below the water diversion groove, and the second drainage structure is configured to guide water overflowed from the water diversion groove to be away from the second wind wheel mounting hole.

19. The volute assembly according to claim 18, wherein the second drainage structure comprises a fourth drainage rib and a fifth drainage rib connected with each other, the fourth drainage rib and the fifth drainage rib are extended obliquely to two sides of the second wind wheel mounting hole respectively.

20. A movable air conditioner comprising a shell and a volute assembly provided in the shell; the volute assembly comprising a volute cover; the volute cover comprising a top plate provided with a water diversion groove extending along a length direction of the top plate; the water diversion groove comprising a bottom wall and a first side wall and a second side wall both connected with the bottom wall; the first side wall being opposite to the second side wall, and the water diversion groove also comprising a first reinforcing rib connected with the bottom wall and the first side wall, and the first reinforcing rib being spaced from the second side wall.

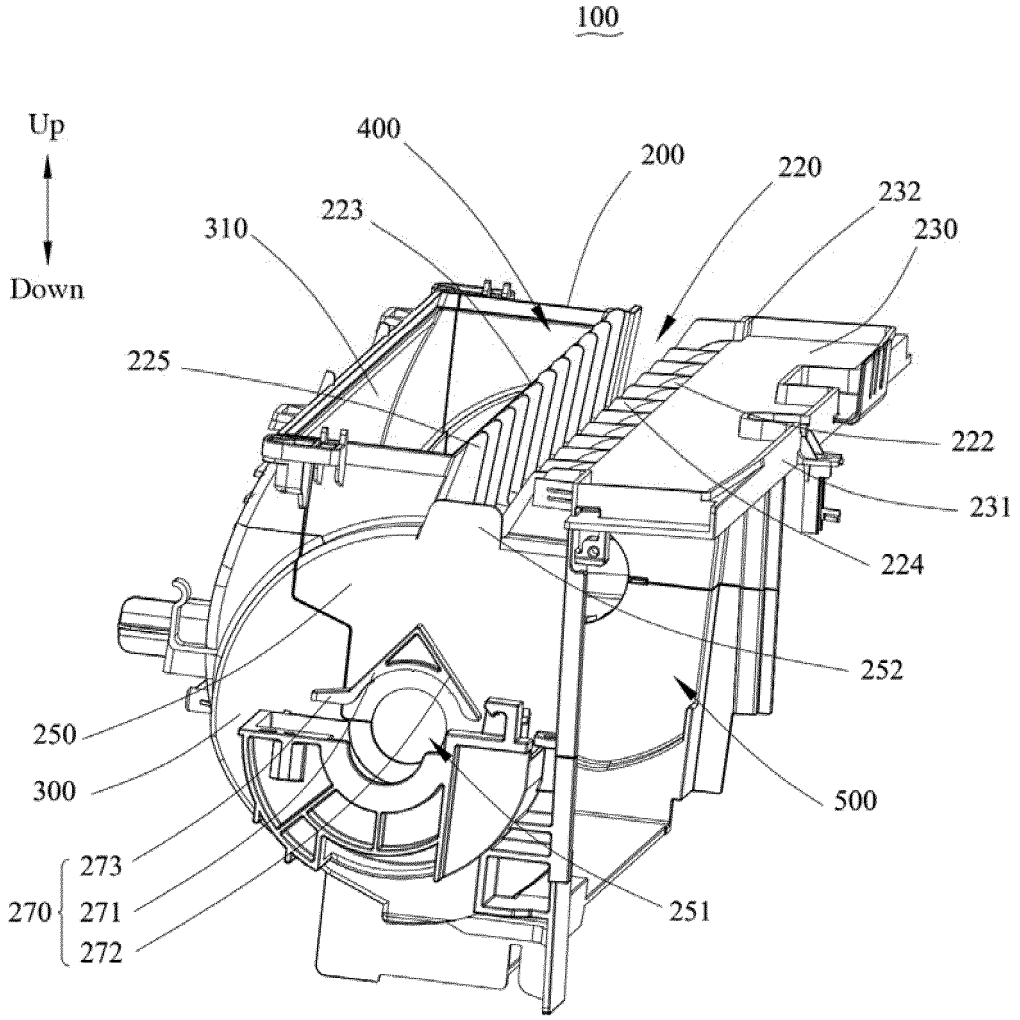
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Fig.1

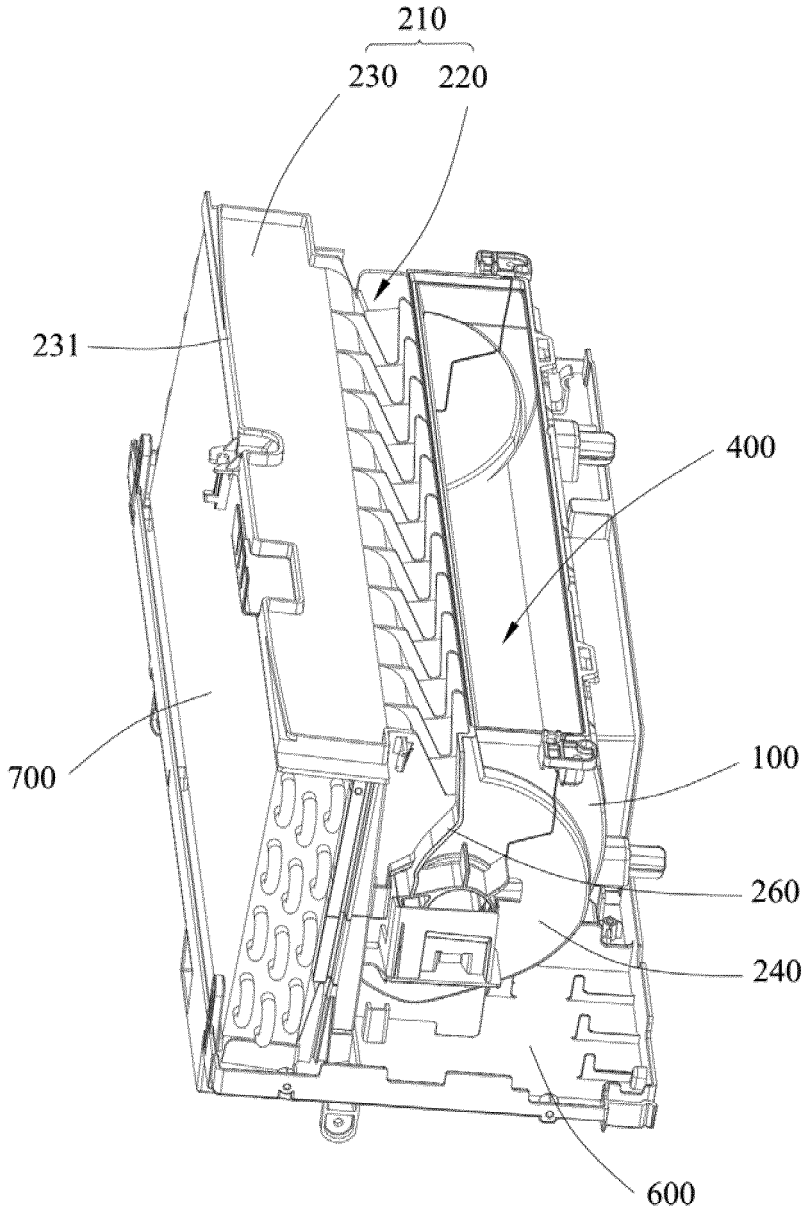

Fig.2

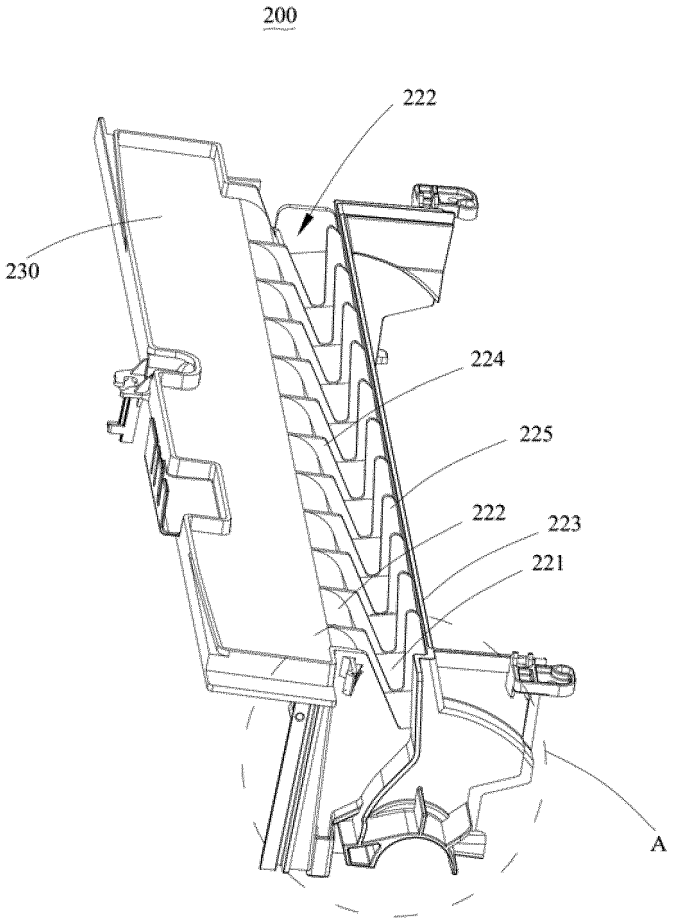

Fig.3

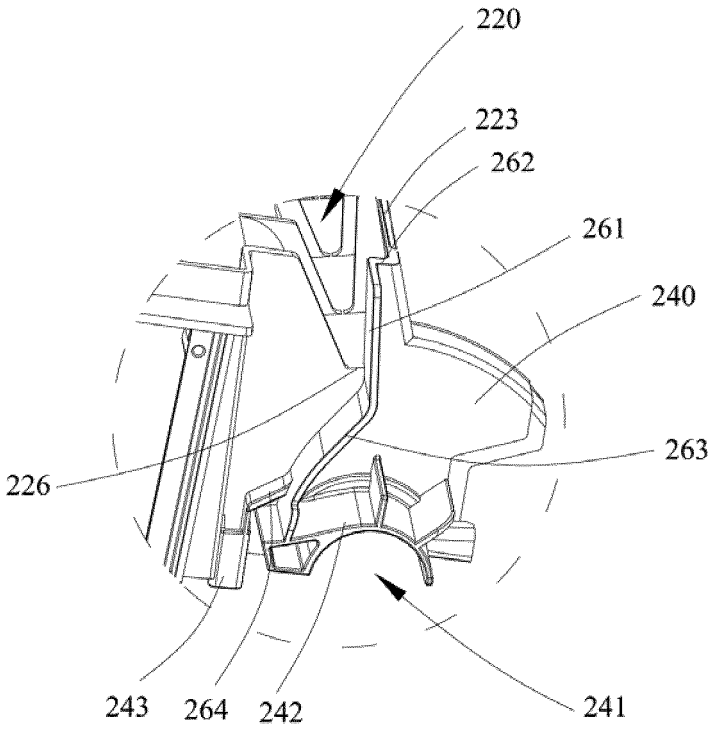
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Fig.4

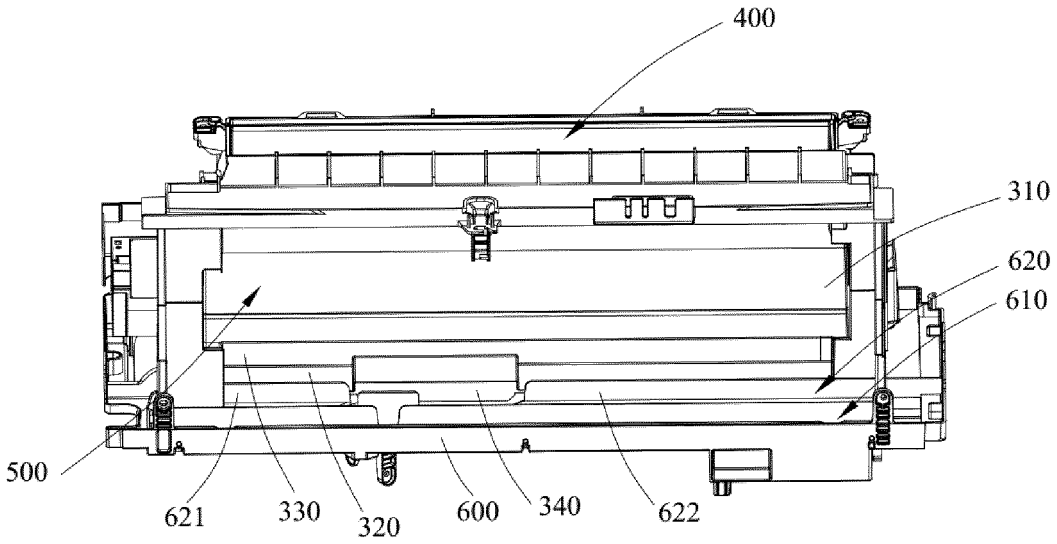
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Fig.5

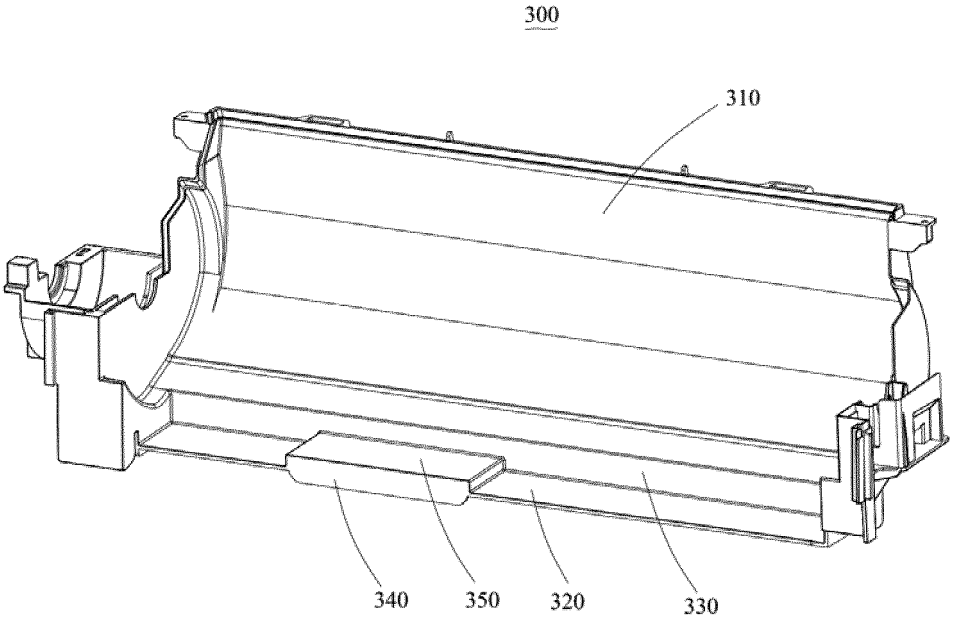

Fig.6

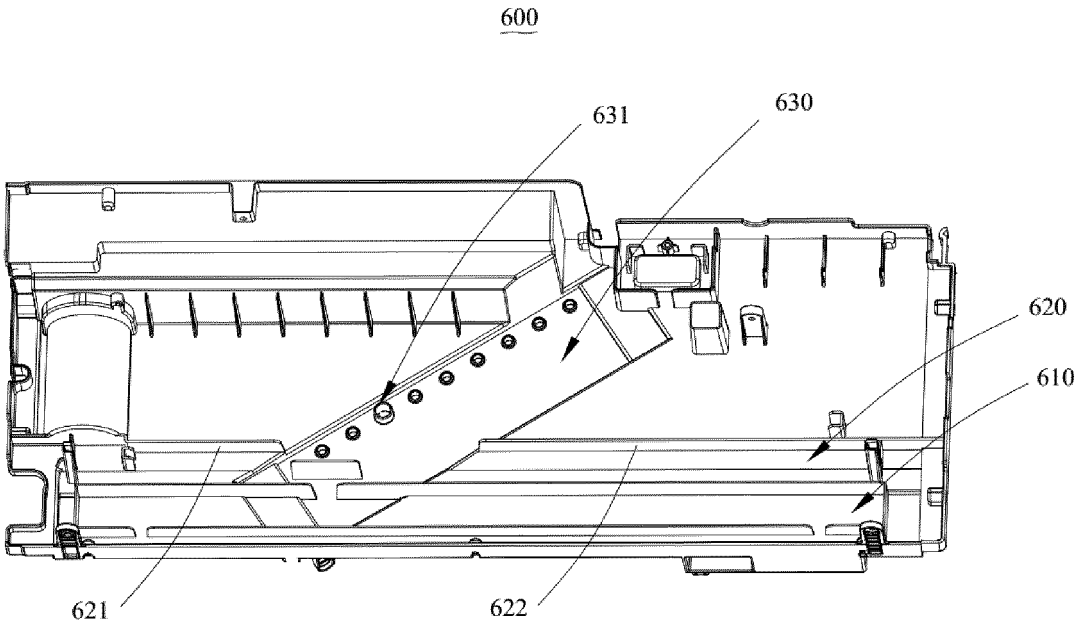

Fig.7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2020/080463

A. CLASSIFICATION OF SUBJECT MATTER

F24F 1/028(2019.01)i; F24F 13/20(2006.01)i; F24F 13/22(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, CNKI, SIPOABS, DWPI: 蜗壳, 移动空调, 盖, 顶板, 接水盘, 水槽, 壁, 加强筋, 挡风底板, volute, mobile air conditioner, cover, top plate, drain pan, water channel, wall, stiffener, windshield

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 208419149 U (AUX AIR CONDITIONER CO., LTD.) 22 January 2019 (2019-01-22) description paragraphs 0057-0063, figure 5	1-8, 20
Y	CN 208419149 U (AUX AIR CONDITIONER CO., LTD.) 22 January 2019 (2019-01-22) description paragraphs 0057-0063, figure 5	13-19
Y	CN 208382523 U (GUANGDONG MIDEA REFRIGERATION EQUIPMENT CO., LTD. et al.) 15 January 2019 (2019-01-15) description, paragraphs 0028-0035, and figure 2	13-19
X	CN 108870552 A (AUX AIR CONDITIONER CO., LTD.) 23 November 2018 (2018-11-23) description paragraphs 0237-0243, figure 36	1-8, 20
A	CN 110068064 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD.) 30 July 2019 (2019-07-30) entire document	1-20
A	CN 208419151 U (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 22 January 2019 (2019-01-22) entire document	1-20
A	JP 2001021169 A (FUJITSU GENERAL LTD.) 26 January 2001 (2001-01-26) entire document	1-20

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

* Special categories of cited documents:
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"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
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 July 2020	**10 August 2020**

Name and mailing address of the ISA/CN	Authorized officer
China National Intellectual Property Administration (ISA/CN) **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China**	
Facsimile No. **(86-10)62019451**	Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2020/080463

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 208419149 U	22 January 2019	None	
CN 208382523 U	15 January 2019	None	
CN 108870552 A	23 November 2018	None	
CN 110068064 A	30 July 2019	None	
CN 208419151 U	22 January 2019	None	
JP 2001021169 A	26 January 2001	None	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 201921948225 **[0001]**
- CN 201921942470 **[0001]**