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

(11) **EP 4 530 552 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.04.2025 Bulletin 2025/14

(21) Application number: **24197292.6**

(22) Date of filing: **29.08.2024**

(51) International Patent Classification (IPC):
F24H 3/04 *(2022.01)* ***F24C 7/00*** *(2006.01)*
F24H 9/00 *(2022.01)* ***F24F 1/0014*** *(2019.01)*
F24F 13/10 *(2006.01)* ***F24F 13/12*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
F24H 3/0417; F24C 7/002; F24F 13/20; F24H 9/0063; F24F 1/0014; F24F 11/79; F24F 13/10; F24F 13/12

(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 ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

(30) Priority: **27.09.2023 CN 202311271655**
27.09.2023 CN 202322653598 U

(71) Applicant: **GD Midea Environment Appliances MFG Co., Ltd.**
Zhongshan, Guangdong 528425 (CN)

(72) Inventors:
- **Li, Xiangyang**
  Guangdong, 528425 (CN)
- **Changlin, YAN**
  Guangdon, 528311 (CN)
- **Cheng, Zhixi**
  Guangdong (CN)

(74) Representative: **RGTH**
Patentanwälte PartGmbB
Neuer Wall 10
20354 Hamburg (DE)

(54) **AIR TREATMENT DEVICE**

(57) The embodiments of the disclosure relate to an air treatment device comprising a housing. The housing is provided with an air inlet, a top of the housing is provided with an first air outlet communicated with the air inlet, and a side part of the housing is provided with a second air outlet communicated with the air inlet; and the housing is provided with a sealing structure, and the sealing structure moves relative to the housing to adjust opening and closing states of at least one of the first air outlet and the second air outlet.

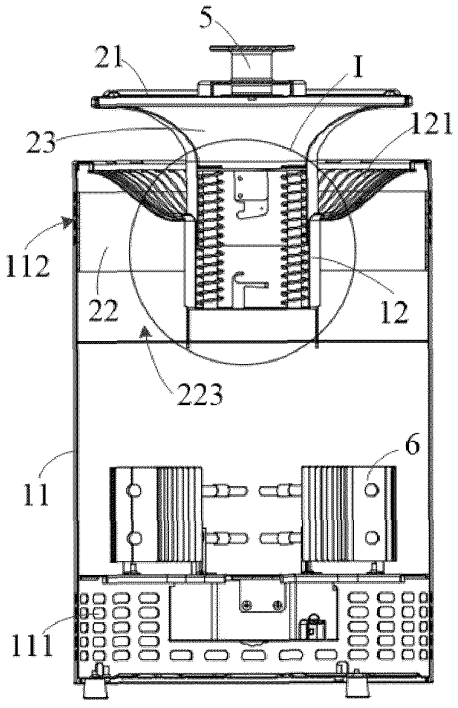

FIG. 2

EP 4 530 552 A1

Description

TECHNICAL FIELD

[0001] The embodiments of the present disclosure relate to the technical field of household appliances, in particular to an air treatment device.

BACKGROUND

[0002] With the increasing living standard of people, air treatment devices, such as heaters, are gradually popularized and become necessary heating devices for most families. However, in the related art, the air treatment devices have a large limitation of air outlet, which cannot meet different use requirements of users for the air treatment devices.

SUMMARY

[0003] In order to solve the above technical problems or at least partially solve the above technical problems, the embodiments of the present disclosure provide an air treatment device.

[0004] According to one or more aspects of some embodiments of the present disclosure, an air treatment device is provided. The air treatment device comprises a housing, the housing is provided with an air inlet, a top of the housing is provided with an first air outlet communicated with the air inlet, and a side part of the housing is provided with a second air outlet communicated with the air inlet; and the housing is provided with a sealing structure, and the sealing structure moves relative to the housing to adjust opening and closing states of at least one of the first air outlet and the second air outlet.

[0005] In some embodiments, the air treatment device is provided with a sealing structure on the housing, and the sealing structure moves relative to the housing to adjust the opening and closing states of at least one of the first air outlet arranged on the top of the housing and the second air outlet arranged on the side part of the housing.

[0006] In some embodiments, the sealing structure moves upward and downward relative to the housing to adjust the opening and closing states of at least one of the first air outlet and the second air outlet.

[0007] In some embodiments, an elastic member is arranged between the housing and the sealing structure; and one end of the elastic member is fixed relative to the housing, and the other end of the elastic member is fixed relative to the sealing structure, which make the sealing structure move upward under an elastic force of the elastic member to open at least part of the first air outlet.

[0008] In some embodiments, the housing is provided with a first locking member, the sealing structure is provided with a second locking member, the first locking member is used for cooperating with the second locking member to lock the sealing structure on the housing when the sealing structure moves downward to shield at least part of the first air outlet; and the first locking member is a locking groove arranged on one of the housing and the sealing structure, and the second locking member is a locking cam arranged on the other one of the housing and the sealing structure and clamped into the locking groove.

[0009] In some embodiments, the sealing structure comprises a top sealing member, a side sealing member and a connecting bracket; the top sealing member is located outside the housing and moves upward and downward relative to the housing to adjust the opening and closing states of the first air outlet; the side sealing member is located inside the housing and moves upward and downward relative to the housing to adjust the opening and closing states of the second air outlet; the top sealing member is arranged on a top of the connecting bracket, the top of the housing is provided with an avoidance hole, and the connecting bracket penetrates through the avoidance hole to be connected with the side sealing member; the connecting bracket is provided with a hollow cavity with a bottom opening, and the elastic member is located in the hollow cavity; the second locking member is arranged in the hollow cavity; and the hollow cavity is internally provided with a guide post, and the elastic member is a spring sleeved on the guide post.

[0010] In some embodiments, the sealing structure comprises a top sealing member and a side sealing member; the top sealing member is located outside the top of the housing and moves upward and downward relative to the housing to adjust the opening and closing states of the first air outlet; and the side sealing member is located inside the housing and moves upward and downward relative to the housing to adjust the opening and closing states of the second air outlet.

[0011] In some embodiments, the top sealing member is a sealing plate.

[0012] In some embodiments, the first air outlet is located in an area surrounded by a projection of the top sealing member in the top of the housing.

[0013] In some embodiments, at least two first air outlets are arranged, and the at least two first air outlets are arranged at intervals along a circumferential direction of the top of the housing.

[0014] In some embodiments, the side sealing member is an annular sealing plate, and the annular sealing plate is annularly arranged along a circumferential direction of an inner wall of the housing.

[0015] In some embodiments, a height dimension of a projection of the side sealing member on a vertical plane is not less than a height dimension of a projection of an opening area of the second air outlet on the vertical plane.

[0016] In some embodiments, at least two second air outlets are arranged, and the at least two second air outlets are arranged at intervals along a circumferential direction of the housing.

[0017] In some embodiments, the top sealing member and the side sealing member are connected via a con-

necting bracket; and the top sealing member is arranged on a top of the connecting bracket, the top of the housing is provided with an avoidance hole, and the connecting bracket penetrates through the avoidance hole to be connected with the side sealing member.

[0018] In some embodiments, the housing comprises a hollow cylindrical barrel body with an opening at the top and a top cover covered on the opening, at least part of the air inlet is arranged on the barrel body, and at least part of the second air outlet is arranged on a side wall of the barrel body; the top cover is provided with a containing groove depressed in a direction away from the top sealing member, part of the connecting bracket is located in the containing groove, and the connecting bracket moves upward and downward along the containing groove, the avoidance hole is arranged on a bottom of the containing groove, and at least part of the first air outlet is located outside the containing groove; the connecting bracket comprises a bracket body and a supporting platform arranged on a top of the bracket body, the top sealing member is arranged on the supporting platform, and the bracket body is located in the containing groove; and a bottom surface of the supporting platform matches with a top surface of the top cover in shape.

[0019] In some embodiments, the connecting bracket is provided with a connecting protrusion part extending in a direction towards the side sealing member, the connecting protrusion part penetrates through the avoidance hole, and the side sealing member is provided with a positioning hole for insertion of the connecting protrusion part.

[0020] In some embodiments, the side sealing member is an annular sealing plate, and the annular sealing plate is annularly arranged along a circumferential direction of an inner wall of the housing; a bottom part of the annular sealing plate is connected with a connecting plate, a ventilation gap communicated with the air inlet is formed between the connecting plate and an inner chamber of the annular sealing plate, and the positioning hole is arranged on the connecting plate.

[0021] In some embodiments, the top sealing member is provided with a lifting part for pulling.

[0022] In some embodiments, the housing comprises a hollow barrel body with an opening at the top and a top cover covered on the opening, the top cover is provided with a concave cavity depressed downward, the first air outlet is arranged on a cavity wall of the concave cavity, and when the top sealing member moves downward to shield the first air outlet, a top surface of the top sealing member does not protrude out of a top edge of the top cover.

[0023] In some embodiments, the housing is a hollow cylindrical housing; the housing comprises a hollow cylindrical barrel body with an opening at the top and a top cover covered on the opening, at least part of the air inlet is arranged on a bottom part of a side wall of the barrel body, at least part of the first air outlet is arranged on the top cover, and at least part of the second air outlet is arranged on a top of the side wall of the barrel body; and the top cover is provided with a concave cavity depressed downward, the first air outlet is arranged on a cavity wall of the concave cavity, and when the top sealing member moves downward to shield the first air outlet, and the first air outlet is obliquely extended along a direction from a center of the concave cavity to an edge of the concave cavity.

[0024] In some embodiments, the housing is internally provided with a heating member, and the heating member is located in an air flow channel formed between the air inlet and the first air outlet and/or the second air outlet; wherein, the air treatment device is a heater.

[0025] According to one or more aspects of some embodiments of the present disclosure, an air treatment device is provided. The air treatment device comprises a housing, the housing is provided with an air inlet, a top of the housing is provided with an first air outlet communicated with the air inlet, and a side part of the housing is provided with a second air outlet communicated with the air inlet; and the housing is provided with a rotary sealing member, and the rotary sealing member moves relative to the housing to adjust opening and closing states of at least one of the first air outlet and the second air outlet.

[0026] In some embodiments, the rotary sealing member is arranged in the housing, and the rotary sealing member rotates relative to a vertical rotating shaft.

[0027] In some embodiments, the rotary sealing member comprises a top sealing member and a side sealing member, the top sealing member is located inside the first air outlet to adjust the opening and closing states of the first air outlet; and the side sealing member is located inside the second air outlet to adjust the opening and closing states of the second air outlet.

[0028] In some embodiments, the top sealing member is provided with a top shielding part, and when the rotary sealing member rotates, the top shielding part shields the first air outlet or is staggered from the first air outlet to expose at least part of the first air outlet; and/or, the side sealing member is provided with a side shielding part, and when the rotary sealing member rotates, the side shielding part shields the second air outlet or is staggered from the second air outlet to expose at least part of the second air outlet.

[0029] In some embodiments, when the top sealing member is provided with the top shielding part, the top sealing member is provided with at least two first vents arranged at intervals, the top shielding part is formed between the two adjacent first vents, and when the top shielding part is staggered from the first air outlet, at least part of the first vents is correspondingly communicated with at least part of the first air outlet; and when the side sealing member is provided with the side shielding part, the side sealing member is provided with at least two second vents arranged at intervals, the side shielding part is formed between the two adjacent second vents, and when the side shielding part is staggered from the second air outlet, at least part of the second vents is

correspondingly communicated with at least part of the second air outlet.

[0030] In some embodiments, at least two first air outlets are arranged, and the at least two first air outlets are arranged at intervals on the top of the housing; and the first air vent and the first air outlet are in one-one-one correspondence, and the first air outlet is located in an area surrounded by a projection of the first vent on the top of the housing; and at least two second air outlets are arranged, and the at least two second air outlets are arranged at intervals on the side part of the housing; and the second air vent and the second air outlet are in one-one-one correspondence, and the second air outlet is located in an area surrounded by a projection of the second vent on the side part of the housing.

[0031] In some embodiments, the top sealing member is connected to a top of the side sealing member; and the top sealing member and the side sealing member are arranged with integrated molding.

[0032] In some embodiments, a rotation angle limiting structure is further arranged between the housing and the rotary sealing member to limit a rotation angle of the rotary sealing member; the rotation angle limiting structure comprises a limiting groove arranged on one of the housing and the rotary sealing member and a limiting post arranged on the other one of the housing and the rotary sealing member, and when the rotary sealing member rotates relative to the housing, the limiting post slides in the limiting groove along an extending direction of the limiting groove; and the limiting groove is an arc-shaped limiting groove.

[0033] In some embodiments, the air treatment device further comprises a holding structure, the holding structure is connected with the rotary sealing member, the housing is provided with an avoidance hole, the holding structure penetrates in the avoidance hole, and part of the holding structure is exposed outside the housing to drive the rotary sealing member to rotate through the holding structure.

[0034] In some embodiments, an edge of the avoidance hole is circumferentially provided with an annular extension wall extending towards a direction away from the housing, and the annular extension wall is arranged around a periphery of part of the holding structure.

[0035] In some embodiments, a limiting structure is arranged between the holding structure and the rotary sealing member, and the limiting structure is used for limiting relative movement between the rotary sealing member and the holding structure; and the limiting structure comprises a limiting hole arranged on one of the holding structure and the rotary sealing member and a limiting protrusion arranged on the other one of the holding structure and the rotary sealing member, and the limiting protrusion passes through the avoidance hole and extends into the limiting hole.

[0036] In some embodiments, the housing is a hollow cylindrical housing; and the housing comprises a hollow cylindrical barrel body with an opening at the top and a top cover covered on the opening, at least part of the air inlet is arranged on the barrel body, at least part of the first air outlet is arranged on the top cover, and at least part of the second air outlet is arranged on a top of a side wall of the barrel body.

[0037] In some embodiments, the housing is internally provided with a heating member, and the heating member is located in an air flow channel formed between the air inlet and the first air outlet and/or the second air outlet; and the air treatment device is a heater.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] The drawings herein are incorporated into the specification and constitute a part of the specification, show the embodiments consistent with the present disclosure, and serve to explain the principles of the embodiments of the present disclosure together with the specification.

[0039] In order to illustrate the technical solutions in the embodiments of the present disclosure or the prior art more clearly, the drawings to be used in the description of the embodiments or the prior art will be briefly described below. Obviously, those of ordinary skills in the art can also obtain other drawings based on these drawings without going through any creative work.

FIG. 1 is a schematic structural diagram of an air treatment device when a first air outlet is opened according to an embodiment of the present disclosure;

FIG. 2 is a schematic diagram of FIG. 1 split along an axial direction of a housing;

FIG. 3 is an enlarged structural diagram of a portion I in FIG. 2;

FIG. 4 is a schematic structural diagram of the air treatment device when a second air outlet is opened according to the embodiment of the present disclosure;

FIG. 5 is a schematic diagram of the FIG. 4 split along an axial direction of a housing;

FIG. 6 is an enlarged schematic diagram of a portion A in FIG. 5;

FIG. 7 is an enlarged structural diagram of a portion B in FIG. 5;

FIG. 8 is an exploded view of a local structure of the air treatment device according to the embodiment of the present disclosure;

FIG. 9 is a schematic structural diagram I of a top cover according to the embodiment of the present disclosure;

FIG. 10 is a schematic structural diagram II of the top cover according to the embodiment of the present disclosure;

FIG. 11 is a schematic structural diagram of a connecting bracket according to the embodiment of the present disclosure;

FIG. 12 is a schematic structural diagram of a side

sealing member according to the embodiment of the present disclosure;

FIG. 13 is a schematic structural diagram of a connection between a sealing structure and a top cover according to the embodiment of the present disclosure;

FIG. 14 is a schematic structural diagram of an air treatment device according to another embodiment of the present disclosure;

FIG. 15 is a schematic structural diagram of a top cover according to another embodiment of the present disclosure;

FIG. 16 is an enlarged structural diagram of a portion I in FIG. 15;

FIG. 17 is a schematic structural diagram of a rotary sealing member according to another embodiment of the present disclosure;

FIG. 18 is an enlarged schematic diagram of a portion A in FIG. 17;

FIG. 19 is a schematic structural diagram of a holding knob according to another embodiment of the present disclosure;

FIG. 20 is a sectional view of the air treatment device in an axial direction when a first air outlet is shielded according to another embodiment of the present disclosure;

FIG. 21 is an enlarged structural diagram of a portion B in FIG. 20;

FIG. 22 is an enlarged structural diagram of a portion C in FIG. 20;

FIG. 23 is a sectional view of the air treatment device in the axial direction when a second air outlet is shielded according to another embodiment of the present disclosure; and

FIG. 24 is an enlarged drawing of a portion D in FIG. 23.

[0040] In FIGs. 1 to 13, reference numbers of components are as follows: 1 - housing; 11 - barrel body; 111 - air inlet; 112 - second air outlet; 12 - top cover; 121 - first air outlet; 122 - concave cavity; 123 - containing groove; 124 - first locking member; 125 - avoidance hole; 2 - sealing structure; 21 - top sealing member; 22 - side sealing member; 221 - positioning hole; 222 - connecting plate; 223 - ventilation gap; 23 - connecting bracket; 231 - second locking member; 232 - connecting protrusion part; 233 - hollow cavity; 234 - bracket body; 235 - supporting platform; 3 - elastic member; 4 - guide post; 5 - lifting part; 6 - heating member; 7 - control structure; and 8 - gasket.

[0041] In FIGs. 14 to 24, reference numbers of components are as follows: 9 - housing; 91 - barrel body; 911 - air inlet; 912 - second air outlet; 913 - flanging; 92 - top cover; 921 - first air outlet; 922 - limiting groove; 923 - avoidance hole; 924 - annular extension wall; 10 - rotary sealing member; 101 - top sealing member; 1010 - top shielding part; 1011 - first vent; 1012 - limiting post; 1013 - limiting hole; 1014 - second mounting hole; 102 - side sealing member; 1020 - side shielding part; 1021 - second vent; 110 - rotation angle limiting structure; 120 - holding structure; 1201 - limiting protrusion; 1202 - annular protrusion part; 1203 - first mounting hole; 130 - control structure; and 140 - limiting structure.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0042] In order to better understand the above objects, features and advantages of the embodiments of the present disclosure, the solutions of the embodiments of the present disclosure will be further described below. It should be noted that, in case of no conflict, the embodiments in the present disclosure and the features in the embodiments may be combined with each other.

[0043] Numerous specific details are set forth in the following description to facilitate a thorough understanding of the embodiments of the present disclosure, but the embodiments of the present disclosure can also be implemented in other ways different from those described here. Obviously, the embodiments described in the specification are merely a part of, rather than all of, the embodiments of the present disclosure.

[0044] Referring to FIG. 1 to FIG. 13, the embodiment provides an air treatment device. The air treatment device comprises a housing 1. The housing 1 is provided with an air inlet 111, a top of the housing 1 is provided with an first air outlet 121 communicated with the air inlet 111, and a side part of the housing 1 is provided with a second air outlet 112 communicated with the air inlet 111.

[0045] In other words, an air flow channel is formed between the air inlet 111 and the first air outlet 121, and an air flow channel is also formed between the air inlet 111 and the second air outlet 112. In practice, for example, a fan may be arranged in the housing 1, so that outside air may enter the housing 1 from the air inlet 111 under a negative pressure formed by the fan.

[0046] For example, the air treatment device may be a heater, for example, for a user to perform operations such as heating. Certainly, the air treatment device may also be a humidifier, an air purifier and the like.

[0047] When the air treatment device is a heater, the housing 1 is internally provided with a heating member 6, and the heating member 6 can heat the air entering into the housing 1 to form hot air. In practice, when the first air outlet 121 on the top of the housing 1 is opened, the hot air flows out from the top of the housing 1 and rises rapidly, which is convenient for heating the top and also achieves rapid temperature rise in a three-dimensional space. When the second air outlet 112 on the side part of the housing 1 is opened, the hot air is forced to flow from the side part of the housing 1 to surrounding of the housing 1 firstly, and then continues to flow upward, so that effects of heating a plurality of people surrounding a furnace and then three-dimensional heating are achieved.

[0048] Referring to FIG. 1 and FIG. 4, the housing 1 is further provided with a control structure 7. The control structure 7 may be, for example, a control knob, a control

key and the like. The control structure 7 is electrically connected with the heating member 6 above, and is used for controlling a heating state of the heating member 6 (for example, controlling the heating member 6 to start heating, stop heating, increase heating power, decrease heating power, and the like).

[0049] The housing 1 is provided with a sealing structure 2, and the sealing structure 2 moves relative to the housing 1 to adjust opening and closing states of at least one of the first air outlet 121 and the second air outlet 112. Specifically, the opening and closing states comprise an opening state or a closing state; wherein the opening state comprises a fully opening state or a partially opening state.

[0050] With the arrangement, by controlling movement of the sealing structure 2, the opening and closing states of the first air outlet 121 may be adjusted, or the opening and closing states of the second air outlet 112 may be adjusted, or the opening and closing states of the first air outlet 121 and the second air outlet 112 may be adjusted at the same time, which may enable the air treatment device discharging air from different directions, so that limitation of air outlet of the air treatment device is low.

[0051] When the opening and closing states of the first air outlet 121 and the second air outlet 112 are adjusted at the same time, for example, one of the first air outlet 121 and the second air outlet 112 may be in the opening state and the other one of the first air outlet 121 and the second air outlet 112 may be in the closing state, so as to achieve switch between top air outlet and side air outlet. For example, both the first air outlet 121 and the second air outlet 112 may be in the opening state.

[0052] In the air treatment device provided by the embodiment, the sealing structure 2 is arranged on the housing 1, so that the sealing structure 2 can move relative to the housing 1 to adjust the opening and closing states of at least one of the first air outlet 121 on the top of the housing 1 and the second air outlet 112 on the side part of the housing 1. That is to say, by moving the sealing structure 2, for example, adjusting the opening and closing of the first air outlet 121 or the second air outlet 112, or adjusting the opening and closing of the first air outlet 121 and the second air outlet 112 at the same time, the air treatment device can discharge air from different directions, and thus achieving the flexible adjustment and switch air outlet directions of the air treatment device to a certain extent, reducing limitation of air outlet of the air treatment device, meeting different use requirements of the user for the air treatment device, and realizing good user experience.

[0053] In some embodiments, referring to FIG. 1 to FIG. 13, the sealing structure 2 moves relative to the housing 1 to adjust the opening and closing states of at least one of the first air outlet 121 and the second air outlet 112.

[0054] In other words, by controlling the sealing structure 2 to move upward and downward relative to the housing 1, the air outlet direction of the air treatment device can be adjusted flexibly, which reduces the limitation of air outlet of the air treatment device and meets the different use requirements of the user for the air treatment device.

[0055] In some embodiments, referring to FIG. 1 to FIG. 13, an elastic member 3 is arranged between the housing 1 and the sealing structure 2. One end of the elastic member 3 is fixed relative to the housing 1, and the other end of the elastic member 3 is fixed relative to the sealing structure 2, so that the sealing structure 2 moves upward under an elastic force of the elastic member 3 to open at least part of the first air outlet 121.

[0056] The arrangement can improve convenience when the sealing structure 2 moves upward to open at least part of the first air outlet 121, adjust the opening and closing states of the first air outlet 121 conveniently, and improve moving convenience of the sealing structure 2.

[0057] In some embodiments, referring to FIG. 2 to FIG. 8, the housing 1 is provided with a first locking member 124, and the sealing structure 2 is provided with a second locking member 231. The first locking member 124 is used for cooperating with the second locking member 231 to lock the sealing structure 2 on the housing 1 when the sealing structure 2 moves downward to shield at least part of the first air outlet 121.

[0058] With the arrangement, when the sealing structure 2 moves downward and shields the first air outlet 121, the sealing structure 2 can be locked on the housing 1 through the cooperating of the first locking member 124 and the second locking member 231, which may improve a position stability of the sealing structure 2 when covering the first air outlet 121 to a certain extent, and obtain a better covering effect on the first air outlet 121.

[0059] For example, when the sealing structure 2 is pressed to move downward until the first locking member 124 and the second locking member 231 are matched and locked together, the sealing structure 2 is locked on the housing 1 and shields at least part of the first air outlet 121. Meanwhile, when the sealing structure 2 is pressed again, the first locking member 124 and the second locking member 231 are disengaged, and the sealing structure 2 can be ejected upward under the elastic force of the elastic member 3 to make at least part of the first air outlet 121 be opened, which may achieve pressing rebound between the housing 1 and the sealing structure 2 and a high convenience of adjusting and using the air outlet direction.

[0060] In some embodiments, referring to FIG. 2, FIG. 3, FIG. 5 and FIG. 8, the first locking member 124 is a locking groove arranged on the housing 1, and the second locking member 231 is a locking cam arranged on the sealing structure 2 and clamped into the locking groove.

[0061] With the arrangement, it may achieve the locking and unlocking between the sealing structure 2 and the housing 1 through clamping the locking cam in the locking groove and removing the locking cam out of the locking groove, and thus achieve the adjustment of the opening and closing states of the first air outlet 121 by the sealing

structure 2, and the convenience of adjusting the air outlet direction.

[0062] Certainly, in some other embodiments, the first locking member 124 may also be a locking groove arranged on the sealing structure 2, and the second locking member 231 is a locking cam arranged on the housing 1 and clamped into the locking groove.

[0063] In some other embodiments, the sealing structure 2 can move upward and downward relative to the housing 1 by threaded fit between the sealing structure and the housing 1.

[0064] In some embodiments, referring to FIG. 1 to FIG. 13, the sealing structure 2 comprises a top sealing member 21 and a side sealing member 22. The top sealing member 21 is located outside the top of the housing 1 and moves upward and downward relative to the housing 1 to adjust the opening and closing states of the first air outlet 121. The side sealing member 22 is located inside the housing 1 and moves upward and downward relative to the housing 1 to adjust the opening and closing states of the second air outlet 112.

[0065] That is to say, it can achieve the adjustment of a top air outlet state by the upward and downward movement of the top sealing member 21, and the adjustment of a side air outlet state by the upward and downward movement of the side sealing member 22, and thus adjust the air outlet direction of the air treatment device to a certain extent, which is flexible and convenient to use.

[0066] For example, by adjusting upward and downward movement distances of the top sealing member 21 and the side sealing member 22 relative to the housing 1, it can enable the top sealing member 21 and the side sealing member 22 being located at different positions relative to the first air outlet 121 and the second air outlet 112, and thus achieve the adjustment of air outlet areas and air outlet volumes of the air treatment device during top air outlet and side air outlet to a certain extent.

[0067] In some other embodiments, the side sealing member 22 may also be an annular sealing member with two open ends and sleeved outside the housing 1. For example, at least two connecting supporting members may be arranged between the top sealing member 21 and the side sealing member 22, and the at least two connecting supporting members are arranged at intervals along a circumferential direction of the side sealing member 22, and air holes are formed between the two adjacent connecting supporting members.

[0068] For example, when the sealing structure 2 moves upward relative to the housing 1, the side sealing member 22 is shielded at the second air outlet 112 on the side part of the housing, and the air hole described above is communicated with the first air outlet 121 on the top of the housing 1 to achieve top air outlet. When the sealing structure 2 moves downward relative to the housing 1, the side sealing member 22 is shielded at the first air outlet 121 on the top of the housing, and the air hole described above is communicated with the second air outlet 112 on the side part of the housing 1 to achieve side air outlet.

[0069] In some embodiments, referring to FIG. 1 to FIG. 13, the sealing structure 2 further comprises a connecting bracket 23. The top sealing member 21 is arranged on a top of the connecting bracket 23, the top of the housing 1 is provided with an avoidance hole 125, and the connecting bracket 23 penetrates through the avoidance hole 125 to be connected with the side sealing member 22.

[0070] Connecting the top sealing member 21 and the side sealing member 22 together by the connecting bracket 23 can enable the top sealing member 21 and the side sealing member 22 moving upward and downward at the same time, which may achieve the adjustment of the opening and closing states of the first air outlet 121 and the second air outlet 112 at the same time, and a more convenience and more flexible adjustment of the air outlet direction.

[0071] For example, when the sealing structure 2 moves downward, the top sealing member 21 moves toward a direction close to the top of the housing 1 to shield at least part of the first air outlet 121, and meanwhile, the side sealing member 22 also moves downward together to expose at least part of the second air outlet 112, thus adjusting the air outlet direction of the air treatment device.

[0072] In some embodiments, referring to FIG. 2 to FIG. 6, the connecting bracket 23 is provided with a hollow cavity 233 with a bottom opening, and the elastic member 3 is located in the hollow cavity 233. The second locking member 231 is arranged in the hollow cavity 233.

[0073] The arrangement can protect the elastic member 3 and the second locking member 231 to a certain extent, ensure normal operation of the elastic member 3, the first locking member 124 and the first locking member 231, and improve the stability and convenience of the sealing structure 2 when adjusting the air outlet direction.

[0074] In some embodiments, referring to FIG. 2 to FIG. 6, the hollow cavity 233 is internally provided with a guide post 4, and the elastic member 3 is a spring sleeved on the guide post 4.

[0075] The arrangement may have a good guiding for the lifting movement of the sealing structure 2 relative to the housing 1, and ensure the stability in a lifting process, which may improve the stability and reliability when adjusting the air outlet direction to a certain extent.

[0076] Specifically, for example, a bottom end of the guide post 4 may be fixed in a fixing hole of the housing 1 by a screw, and an avoidance via hole for a top end of the guide post 4 to penetrate through is formed in a top cavity wall of the hollow cavity 233. When the top end of the guide post 4 is connected with a gasket 8 and the sealing structure 2 moves upward to expose the first air outlet 121, the gasket 8 abuts against one side of the top cavity wall of the hollow cavity 233 away from the first air outlet 121 to prevent the guide post 4 from coming out of the hollow cavity 233.

[0077] Certainly, in some other embodiments, the elas-

tic member 3, for example, may also be a gas spring, an elastic rope, an elastic strip, and the like.

[0078] In some other embodiments, the movement of the sealing structure 2 relative to the housing 1 described above may also refer to the rotation of the sealing structure 2 relative to the housing 1. For example, the sealing structure 2 rotates around a vertical rotating shaft to adjust the opening and closing states of the first air outlet and the second air outlet. For example, the sealing structure 2 comprises a top shielding part and a side shielding part which are connected, and the top shielding part and the side shielding part can rotate around the vertical rotating shaft relative to the housing 1. The top shielding part can shield the first air outlet 121 or is staggered from the first air outlet 121 to expose at least part of the first air outlet 121. The side sealing member can shield the second air outlet 112 or is staggered from the second air outlet to expose at least part of the second air outlet 112. In this way, it may achieve the adjustment of the air outlet direction by the rotation of the sealing structure 2 relative to the housing 1.

[0079] In some embodiments, referring to FIG. 1 to FIG. 8, the top sealing member 21 is a sealing plate. With the arrangement, on one hand, it may improve a covering effect of the top sealing member 21 on the first air outlet 121 to a certain extent, and meanwhile, enable the top sealing member 21 being not limited by the arrangement of the first air outlet 121 when covering the first air outlet 121 for a covering range being wider. On the other hand, the user can also use the sealing plate as a bearing panel to place food for cooking, heating and keeping warm the food placed on the sealing plate through contact heat transfer.

[0080] In some embodiments, referring to FIG. 1 to FIG. 5, the first air outlet 121 is located in an area surrounded by a projection of the top sealing member 21 on the top of the housing 1. With the arrangement, when the top sealing member 21 descends to shield the first air outlet 121, the top sealing member 21 can completely cover the first air outlet 121, which make the covering effect on the first air outlet 121 be good.

[0081] Meanwhile, when the top sealing member 21 moves downward to shield the first air outlet 121, it can prevent the dust and the like from entering an inner chamber of the housing 1 to a certain extent, improve the cleanliness of the air treatment device to a certain extent, and ensure the air treatment effect.

[0082] In some embodiments, referring to FIG. 1 to FIG. 10, at least two first air outlets 121 are arranged, and the at least two first air outlets 121 are arranged at intervals along a circumferential direction of the top of the housing 1. The arrangement can improve uniformity of top air outlet of the air treatment device to a certain extent, and make the air treatment effect be better.

[0083] In some embodiments, referring to FIG. 1 to FIG. 13, the side sealing member 22 is an annular sealing plate, and the annular sealing plate is annularly arranged along a circumferential direction of an inner wall of the housing 1.

[0084] The arrangement can improve a covering effect of the side sealing member 22 on the second air outlet 112 to a certain extent, and at the same time, make the side sealing member 22 be not limited by the arrangement of the second air outlet 112 when covering the second air outlet 112 and a covering range being wider.

[0085] In some embodiments, referring to FIG. 1 to FIG. 13, a height dimension of a projection of the side sealing member 22 on a vertical plane is not less than a height dimension of a projection of an opening area of the second air outlet 112 on the vertical plane. The opening area of the second air outlet 112 specifically refers to an area defined between an upper edge and a lower edge of the second air outlet 112 in a vertical direction of the air treatment device in FIG. 1. The above height dimension specifically refers to an absolute height of the corresponding projection.

[0086] With the arrangement, it can achieve the side sealing member 22 completely covering the second air outlet 112 on the vertical plane, and thus improve the covering effect of the second air outlet 112 to a certain extent, and make an adjustment range of an air outlet area be wider.

[0087] In some embodiments, referring to FIG. 1 to FIG. 6, at least two second air outlets 112 are arranged, and the at least two second air outlet 112 are arranged at intervals along a circumferential direction of the housing 1. The arrangement can improve uniformity of side air outlet of the air treatment device to a certain extent, and make the air treatment effect be better. For example, when the air treatment device is a heater, the above arrangement can achieve the heating effect of the user surrounding the furnace, and make a heat dissipation range be large.

[0088] In some embodiments, referring to FIG. 1 to FIG. 6, the housing 1 is a hollow cylindrical housing. The arrangement can improve smoothness of air flowing in the housing 1 and uniformity of an air flow field to a certain extent, and make the air treatment effect be better.

[0089] In some embodiments, referring to FIG. 1 to FIG. 10, the housing 1 comprises a hollow barrel body 11 with an opening at the at the top and a top cover 12 covered on the opening, at least part of the air inlet 111 is arranged on the barrel body 11, and at least part of the second air outlet 112 is arranged on a side wall of the barrel body 11. In practice, for example, the barrel body 11 above may be a hollow cylindrical barrel body. At least part of the first air outlet 121 is arranged on the top cover 12.

[0090] For example, at least part of the first air outlet 121 may be arranged on a bottom part of the side wall of the barrel body 11. Certainly, at least part of the first air outlet 121 may also be arranged on a bottom wall of the barrel body 11. For example, at least part of the second air outlet 112 may be arranged on a top of the side wall of the barrel body 11. The top cover 12 may be detachably

connected with the barrel body 11 by a screw or the like, or the two can be arranged with integrated molding.

[0091] In some embodiments, referring to FIG. 1 to FIG. 10, the top cover is provided with a containing groove 123 depressed in a direction away from the top sealing member 21, part of the connecting bracket 23 is located in the containing groove 123, and the connecting bracket 23 moves upward and downward along the containing groove 123. The avoidance hole 125 is arranged at a bottom of the containing groove 123, and at least part of the first air outlet 121 is located outside the containing groove. That is to say, at least part of the first air outlet 121 is arranged on the part of the top cover 12 without the containing groove 123.

[0092] With the arrangement, when the connecting bracket 23 moves upward and downward relative to the housing 1, the containing groove 123 can guide the connecting bracket 23 to a certain extent, which may thus improve the stability and reliability of the sealing structure 2 for moving upward and downward, and have high convenience and stability for adjusting the air outlet direction of the air treatment device, and make the air outlet of the air treatment device be stable.

[0093] Specifically, for example, the bottom end of the guide post 4, a bottom end of the spring, and the first locking member 124 can be fixed relative on a bottom groove wall of the containing groove 123.

[0094] For example, the avoidance hole 125 may also be arranged on a side wall of the containing groove 123, wherein the avoidance hole is a strip-shaped hole extending along a groove depth direction of the containing groove 123.

[0095] When the sealing structure 2 moves upward and downward relative to the housing 1 by means of threaded fit between the sealing structure 2 and the housing, it is specifically possible to provide an internal thread on an outer side wall of the connecting bracket 23, and provide an external thread matching with the internal thread on the groove wall of the containing groove 123, and arrange the avoidance hole 125 along a circumferential direction of the groove bottom of the containing groove 123 and enable the connecting bracket 23 rotating along an axial direction of the housing 1. The arrangement can drive the sealing structure 2 to move upward and downward relative to the housing 1, when the sealing structure 2 is screwed.

[0096] In some embodiments, referring to FIG. 1 to FIG. 13, the connecting bracket 23 comprises a bracket body 234 and a supporting platform arranged on a top of the bracket body 234. The top sealing member 21 is arranged on the supporting platform 235, and the bracket body 234 is located in the containing groove 123.

[0097] The arrangement may enable the supporting platform 235 to achieve stable support and better bearing of the top sealing member 21, which may improve the stability of the top sealing member 21 to a certain extent, make the top sealing member 21 have a better cover effect for the first air outlet 121 and also having a better bearing effect for the food on the top sealing member 21, and achieve a better effect of cooking, heating and heat preservation.

[0098] In some embodiments, referring to FIG. 1 to FIG. 8, a bottom surface of the supporting platform 235 matches with a top surface of the top cover 12 in shape. The arrangement enables the supporting platform 235 to achieve stable bear effect for the top sealing member 21, and can also achieve a better shielding for the first air outlet 121 through matching with the top sealing member 21 at the same time, which may ensure the stable adjustment of the air outlet direction.

[0099] In some embodiments, referring to FIG. 2 to FIG. 13, the connecting bracket 23 is provided with a connecting protrusion part 232 extending in a direction towards the side sealing member 22, the connecting protrusion part 232 penetrates through the avoidance hole 125, and the side sealing member 22 is provided with a positioning hole 221 for insertion of the connecting protrusion part 232.

[0100] The arrangement may achieve the connection between the connecting bracket 23 and the side sealing member 22 through the matching between the connecting protrusion part 232 and the positioning hole 221, which may have a simple and high efficient for the connection assembly.

[0101] In some embodiments, referring to FIG. 2 to FIG. 13, a bottom part of the annular sealing plate is connected with a connecting plate 222, a ventilation gap 223 communicated with the air inlet 111 is formed between the connecting plate 222 and an inner chamber of the annular sealing plate, and the positioning hole 221 is arranged on the connecting plate 222.

[0102] The arrangement may enable the outside air entering into the inner chamber of the housing 1 from the air inlet 111, and being treated by the heating member 6, and then flowing to the outside of the air treatment device through the ventilation gap 223, the inner cavity of the annular sealing plate and at least one of the first air outlet 121 and the second air outlet 112 sequentially for the user to heat.

[0103] Referring to FIG. 8 and FIG. 12, the connecting plate 222 may be, for example, a U-shaped plate. For example, two ends of an opening of the U-shaped plate may be respectively connected to a top end surface of the annular sealing plate to form the ventilation gap 223 between the U-shaped plate and the inner chamber of the annular sealing plate.

[0104] In some embodiments, referring to FIG. 1 to FIG. 8, the top sealing member 21 is provided with a lifting part 5 for lifting. The arrangement make it convenient for the user to lift and press the sealing structure 2 through the lifting part 5, and is convenient to use .

[0105] In some embodiments, referring to FIG. 1 to FIG. 13, the top cover 12 is provided with a concave cavity 122 depressed downward, and the first air outlet 121 is arranged on a cavity wall of the concave cavity 122. When the top sealing member 21 moves downward to

cover the first air outlet 121, a top surface of the top sealing member 21 does not protrude out of a top edge of the top cover 12.

[0106] The arrangement may enable the overall air treatment device having a good aesthetic appearance when the top sealing member 21 shields the first air outlet 121. At the same time, when the top sealing member 21 is provided with the lifting part 5, it is convenient to operate the sealing structure 2 correspondingly through the lifting part 5 for adjusting the air outlet direction of the air treatment device, which is convenient to use while ensuring the aesthetic appearance of the air treatment device.

[0107] Specifically, for example, a bottom part of the cavity wall of the concave cavity 122 may be depressed downward to form the containing groove 123.

[0108] In some embodiments, referring to FIG. 1 to FIG. 13, the first air outlet 121 is obliquely extended along a direction from a center of the concave cavity 122 to an edge of the concave cavity 122. With the arrangement, when the first air outlet 121 is opened, the first air outlet 121 can guide the air to a certain extent, which may enable the air treated by the air treatment device flowing out of the first air outlet 121 in time and quickly, and make an air flowing rate be higher, and thus improve the air treatment efficiency to a certain extent.

[0109] In some embodiments, the embodiments of the present disclosure also provide another air treatment device. Referring to FIG. 14 to FIG. 24, the air treatment device comprises a housing 9. The housing 9 is provided with an air inlet 911, a top of the housing 9 is provided with an first air outlet 921 communicated with the air inlet 911, and a side part of the housing 9 is provided with a second air outlet 912 communicated with the air inlet 911.

[0110] In other words, an air flow channel may be formed between the air inlet 911 and the first air outlet 921, and an air flow channel may also be formed between the air inlet 911 and the second air outlet 912. In practice, for example, a fan may be arranged in the housing 9 for enabling outside air entering into the housing 9 from the air inlet 911 under a negative pressure formed by the fan.

[0111] For example, the air treatment device may be a heater, for example, for a user to perform operations such as heating. Certainly, the air treatment device may also be a humidifier, an air purifier and the like.

[0112] When the air treatment device is a heater, the housing 9 is internally provided with a heating member, and the heating member can heat the air entering into the housing 9 to form hot air. In practice, when the first air outlet 921 on the top of the housing 9 is opened, the hot air flows out from the top of the housing 9 and rises rapidly, which is convenient for heating the top and also achieves rapid temperature rise in a three-dimensional space. When the second air outlet 912 on the side part of the housing 9 is opened, the hot air is forced to flow from the side part of the housing 9 to surrounding of the housing 9 firstly, and then continues to flow upward, which can achieve effects of heating a plurality of people surrounding a furnace and then three-dimensional heating.

[0113] Referring to FIG. 14, the housing 9 is further provided with a control structure 130. The control structure 130 may be, for example, a control knob, a control key and the like. The control structure 130 is electrically connected with the heating member above, and is used for controlling a heating state of the heating member (for example, controlling the heating element to start heating, stop heating, increase a heating power, decrease heating power, and the like).

[0114] The housing 9 is provided with a rotary sealing member 10, and the rotary sealing member 10 moves relative to the housing 9 to adjust opening and closing states of at least one of the first air outlet 921 and the second air outlet 912. Specifically, the opening and closing states comprise an opening state or a closing state; wherein the opening state comprises a fully opening state or a partially opening state.

[0115] With the arrangement, it may be capable to control movement of the rotary sealing member 10 for adjusting the opening and closing states of the first air outlet 921, or the opening and closing states of the second air outlet 912, or the opening and closing states of the first air outlet 921 and the second air outlet 912 at the same time, which may enable the air treatment device discharging air from different directions, and achieve the limitation of air outlet of the air treatment device being low, and improve the air outlet flexibility.

[0116] When the opening and closing states of the first air outlet 921 and the second air outlet 912 are adjusted at the same time, for example, one of the first air outlet 921 and the second air outlet 912 may be in the opening state and the other one of the first air outlet 921 and the second air outlet 912 may be in the closing state, it is capable to achieve switch between top air outlet and side air outlet. For example, both the first air outlet 921 and the second air outlet 912 may be in the opening state.

[0117] The air treatment device provided by the embodiment may enable the rotary sealing member 10 to move relative to the housing 9 for adjusting the opening and closing states of at least one of the first air outlet 921 on the top of the housing 9 and the second air outlet 912 on the side part of the housing 9 by arranging the rotary sealing member 10 on the housing 9. That is to say, by moving the rotary sealing member 10, for example, adjusting the opening and closing of the first air outlet 921 or the second air outlet 912, or adjusting the opening and closing of the first air outlet 921 and the second air outlet 912 at the same time, it is capable to make the air treatment device discharge air from different directions, which may achieve flexibly adjusting and switching of the air outlet directions of the air treatment device to a certain extent, reduce limitation of air outlet of the air treatment device, meet different use requirements of the user for the air treatment device, and achieve good user experience.

[0118] In some embodiments, referring to FIG. 14 to FIG. 24, the housing is a hollow cylindrical housing. The

arrangement can improve smoothness of air flowing in the housing 9 and uniformity of an air flow field to a certain extent, and have a better effect of the air treatment.

[0119] In some embodiments, referring to FIG. 14 to FIG. 24, the housing 9 comprises a hollow barrel body 91 with an opening at the top and a top cover 92 covered on the opening, at least part of the air inlet 911 is arranged on the barrel body 91, at least part of the first air outlet 921 is arranged on the top cover 92, and at least part of the second air outlet 912 is arranged on a top of a side wall of the barrel body 91. In practice, for example, the barrel body 91 above may be a hollow cylindrical barrel body.

[0120] Through the above arrangement, it may capable to make the air entering through the air inlet 911 at the bottom part of the side wall of the barrel body 91. For example, after being heated by the heating element, the treated air flows out through the first air outlet 921 on the top cover 92 and the second air outlet 912 on the top of the side wall of the barrel body 91 for the user to heat.

[0121] For example, at least part of the air inlet 911 may be arranged on the bottom part of the side wall of the barrel body 91, and for example, at least part of the air inlet 911 may also be arranged on a bottom wall of the barrel body 91.

[0122] Referring to FIG. 20 to FIG. 24, for example, a top of the barrel body 91 is provided with a flanging 913 extending toward a center of the barrel body 91, and for example, the top cover 92 may be connected below the flanging 913.

[0123] In some embodiments, referring to FIG. 14 to FIG. 24, the rotary sealing member 10 is arranged in the housing 9, and the rotary sealing member 10 rotates relative to a vertical rotating shaft.

[0124] The arrangement can improve aesthetic appearance of the overall air treatment device on one hand; and it can also protect the rotary sealing member 10 through the housing to a certain extent on other hand, which ensures smoothness and flexibility of a rotating process of the rotary sealing member 10 and improves convenience of adjusting the air outlet direction.

[0125] In some embodiments, referring to FIG. 17 to FIG. 24, the rotary sealing member 10 comprises a top sealing member 101. The top sealing member 101 is located inside the first air outlet 921 to adjust the opening and closing states of the first air outlet 921.

[0126] With the arrangement, it may be capable to adjust the opening and closing states of the first air outlet 921 by the rotation of the top sealing member 101 relative to the housing 9 to open or close the top air outlet of the air treatment device, which may achieve a flexible adjustment of the air outlet direction.

[0127] In some embodiments, referring to FIG. 17 to FIG. 24, the top sealing member 101 is provided with a top shielding part 1010. When the rotary sealing member 10 rotates, the top shielding part 1010 may shield the first air outlet 921, or is staggered from the first air outlet 921 to expose at least part of the first air outlet 921.

[0128] In other words, when the top shielding part 1010 rotates to the first air outlet 921, the top shielding part 1010 may shield the first air outlet 921 to close the first air outlet 921. When the top shielding part 1010 rotates to be staggered from the first air outlet 921, at least part of the top shielding part 1010 is located in a non-air outlet area of the top of the housing 9 to expose at least part of the first air outlet 921, which achieves the top air outlet of the air treatment device and has higher air regulation efficiency in a three-dimensional space.

[0129] Specifically, when the top shielding part 1010 shields the first air outlet 921, the first air outlet 921 may be located in an area surrounded by an outer contour of a projection of the top shielding part 1010 on the top of the housing 9, which can enable the top shielding part 1010 realizing completely shielding of the first air outlet 921.

[0130] For example, by adjusting the top shielding part 1010 to shield the first air outlet 921 in different degrees, an air outlet area and an air volume can be adjusted to some extent during the top air outlet of the air treatment device.

[0131] In some embodiments, referring to FIG. 17 to FIG. 24, the top sealing member 101 is provided with at least two first vents 1011 arranged at intervals, the top shielding part 1010 is formed between the two adjacent first vents 1011, and when the top shielding part 1010 is staggered from the first air outlet 921, at least part of the first vents 1011 is correspondingly communicated with at least part of the first air outlet 921.

[0132] That is to say, arranging at least two first vents 1011 arranged at intervals on the top sealing member 101 can form the top shielding part 1010 described above between the two adjacent first vents 1011, and have an better integrity of the overall top sealing member 101, which may improve the stability when the top sealing member 101 rotates to adjust an air outlet state of the first air outlet 921 to a certain extent, and have a higher efficient of the air outlet direction.

[0133] In some embodiments, referring to FIG. 14 to FIG. 24, at least two first air outlets 921 are arranged, and the at least two first air outlets 921 are arranged at intervals on the top of the housing 9. The first air vent 1011 and the first air outlet 921 are in one-one-one correspondence, and the first air outlet 921 is located in an area surrounded by a projection of the first vent 1011 on the top of the housing 9.

[0134] By providing at least two first air outlets 921, it may be capable to improve the air outlet uniformity of the first air outlet 921 to a certain extent, and improve the air treatment effect. By making the first air outlet 921 located in the area surrounded by the outer contour of the projection of the first air vent 1011 on the top of the housing 9, which means that the first air outlet 921 can be completely exposed without being shielded by the top shielding part 1010 when the first air vent 1011 is communicated with the first air outlet 921 correspondingly, the air outlet effect of the first air outlet 921 is better, and the air outlet area on the top of the housing 9 can be ensured to a certain extent, and the air treatment effect is good.

[0135] For example, referring to FIG. 14 to FIG. 24, for example, the at least two of first air outlets 921 may be radially arranged on the top of the housing 9.

[0136] In some embodiments, referring to FIG. 17 to FIG. 24, the rotary sealing member 10 comprises a side sealing member 102. The side sealing member 102 is located inside the second air outlet 912 to adjust the opening and closing states of the second air outlet 912.

[0137] With the arrangement, it can achieve the adjustment of the opening and closing states of the second air outlet 912 by the rotation of the side sealing member 102 relative to the housing 9 to open or close the side air outlet of the air treatment device, which may achieve the flexible adjustment of the air outlet direction.

[0138] In some embodiments, referring to FIG. 17 to FIG. 24, the side sealing member 102 is provided with a side shielding part 1020. When the rotary sealing member 10 rotates, the side shielding part 1020 may shield the second air outlet 912, or is staggered from the second air outlet 912 to expose at least part of the second air outlet 912.

[0139] In other words, when the side shielding part 1020 rotates to the second air outlet 912, the side shielding part 1020 may shield the second air outlet 912 to close the second air outlet 912. When the side shielding part 1020 rotates to be staggered from the second air outlet 912, at least part of the side shielding part 1020 is located in a non-air outlet area of the side part of the housing 9, which may expose at least part of the second air outlet 912 to achieve the side air outlet of the air treatment device, for example, achieve the heating effect of the user surrounding the furnace.

[0140] Specifically, when the side shielding part 1020 shields the second air outlet 912, it can make the second air outlet 912 be located in an area surrounded by an outer contour of a projection of the side shielding part 1020 on the side part of the housing 9 to achieve the complete shielding of the side shielding part 1020 for the second air outlet 912.

[0141] For example, by adjusting the side shielding part 1020 to shield the second air outlet 912 in different degrees, it may be capable to adjust an air outlet area and an air volume to some extent during the side air outlet of the air treatment device.

[0142] In some embodiments, referring to FIG. 17 to FIG. 21, the side sealing member 102 is provided with at least two second vents 1021 arranged at intervals, and a side shielding part 1020 is formed between the two adjacent second vents 102. When the side shielding part 1020 is staggered from the second vent 1021, at least part of the first vents 1011 is correspondingly communicated with at least part of the second air outlet 912.

[0143] That is to say, arranging at least two second vents 1021 arranged at intervals on the side sealing member 102 may form the side shielding part 1020 between the two adjacent second vents 1021, and have a better integrity of the overall side sealing member 102, which may improve the stability for rotating the side sealing member 102 to adjust an air outlet state of the second air outlet 912 to a certain extent, and have a higher efficient for adjusting the air outlet direction.

[0144] In some embodiments, referring to FIG. 14 to FIG. 24, at least two second air outlets 912 are arranged, and the at least two second air outlets 912 are arranged at intervals on the side part of the housing 9. The second vent 1021 and the second air outlet 912 are in one-one-one correspondence, and the second air outlet 912 is located in an area surrounded by a projection of the second vent 1012 on the side part of the housing 9.

[0145] By providing at least two second air outlets 912, it may be capable to improve the air outlet uniformity of the second air outlet 912 to a certain extent, and improve the air treatment effect. For example, when the air treatment device is a heater, the above arrangement can achieve the heating effect of the user surrounding the furnace, and have a larger heat dissipation range.

[0146] By making the second air outlet 912 located in the area surrounded by the outer contour of the projection of the second vent 1021 on the side part of the housing 9, which means that the second air outlet 912 may be completely exposed without being shielded by the side shielding part 1020 when the second vent 1021 is communicated with the second air outlet 912 correspondingly, it may have a better air outlet effect of the second air outlet 912, and also ensure the air outlet area on the side part of the housing 9 to a certain extent, and have a better air treatment effect.

[0147] In some embodiments, referring to FIG. 17, the top sealing member 101 is connected to a top of the side sealing member 102. With the arrangement, the top sealing member 101 and the side sealing member 102 have little influence on air outlet states of the first air outlet 921 and the second air outlet 912, which ensures an adjustment effect of the air outlet direction, and also improve the aesthetic appearance of the overall air treatment device to a certain extent.

[0148] In some other embodiments, it may also connect the top sealing member 101 to other position of the side sealing member 102 such as a bottom part or a side part, as long as it may be capable to adjust the air outlet states of the first air outlet 921 and the second air outlet 912 by rotating the top sealing member 101 and the side sealing member 102 relative to the housing 9.

[0149] In some embodiments, the top sealing member 101 and the side sealing member 102 are arranged with integrated molding. In this way, the top sealing member 101 and the side sealing member 102 have better integrity and higher connection strength, which may improve the assembly convenience, ensure the stability and reliability for adjusting the air outlet direction, and have a better user experience.

[0150] In some other embodiments, the rotary sealing member 10 may also be arranged outside the housing 9, for example, the rotary sealing member is a cover body with a bottom opening, and the cover body is covered on a top outside the housing 9 and can rotate relative to the

housing 9. A top wall and a side wall of the cover body are provided with vents, the top wall of the cover body is used for cooperating with the first air outlet 921 on the top of the housing, and the side wall of the cover body is used for cooperating with the second air outlet 912 on the side part of the housing, which may achieve the adjustment of the opening and closing states of the first air outlet and the second air outlet.

[0151] In some embodiments, referring to FIG. 15 to FIG. 24, a rotation angle limiting structure 110 is further arranged between the housing 9 and the rotary sealing member 10 to limit a rotation angle of the rotary sealing member 10. In other words, the rotary sealing member 10 drives the housing 9 to rotate within a preset angle range.

[0152] When the rotary sealing member 10 rotates relative to the housing 9 within the preset angle range, the air outlet direction may be adjusted accordingly, which is convenient for the user to use. Specifically, the rotation angle limiting structure 110 is located between the top cover 92 and the rotary sealing member 10.

[0153] In some embodiments, referring to FIG. 15 to FIG. 18, the rotation angle limiting structure 110 comprises a limiting groove 922 arranged on the housing 9 and a limiting post 1012 arranged on the rotary sealing member 10, and when the rotary sealing member 10 rotates relative to the housing 9, the limiting post 1012 slides in the limiting groove 922 along an extending direction of the limiting groove 922.

[0154] That is to say, it can achieve the limitation of the rotation angle of the rotary sealing member 10 relative to the housing 9 by the sliding of the limiting post 1012 in the limiting groove 922, which may make the rotary sealing member 10 rotate within the preset angle range.

[0155] For example, when the limiting post 1012 slides to abut against one side wall in the extending direction of the limiting groove 922, it can achieve top air outlet by opening the first air outlet 921 and closing the second air outlet 912. When the limiting post 1012 continuously slides to abut against another side wall in the extending direction of the limiting groove 922, it can achieve side air outlet by closing the first air outlet 921 and opening the second air outlet 912. Thus the matching between the limiting groove 922 and the limiting post 1012 can provide a certain guide for the user to adjust and use the air outlet direction, which is convenient to use. The limiting groove 922 is specifically arranged on the top cover 92.

[0156] Certainly, in some other embodiments, the limiting groove may also be arranged on the rotary sealing member 10, and the limiting post is arranged on the housing 9. The limiting post can slide in the limiting groove along the extending direction of the limiting groove.

[0157] In some embodiments, the limiting groove 922 is an arc-shaped limiting groove to limit the rotation angle of the rotary sealing member 10 relative to the housing 9. Specifically, the arc-shaped limiting groove is recessed in a direction away from an axial direction of the housing 9.

[0158] Certainly, in some other embodiments, for example, the limiting groove 922 may also be a rectangular limiting groove, for example, a groove width of the rectangular limiting groove is larger than a diameter of the limiting post. When the limiting post moves from a groove wall on one side in the extending direction of the rectangular limiting groove to a groove wall on the other side in the extending direction of the rectangular limiting groove, the rotary sealing member 10 rotates relative to the housing 9 by a preset angle.

[0159] In some embodiments, referring to FIG. 14 to FIG. 24, the air treatment device further comprises a holding structure 120. The holding structure 120 is connected with the rotary sealing member 10, the housing 9 is provided with an avoidance hole 923, the holding structure 120 penetrates in the avoidance hole 923, and part of the holding structure 120 is exposed outside the housing 9 to drive the rotary sealing member 10 to rotate through the holding structure 120.

[0160] In other words, the user can hold the holding structure 120 to drive the rotary sealing member 10 to rotate relative to the housing 9, so as to adjust the air outlet direction, which makes the adjustment process of the air outlet direction simple and convenient.

[0161] For example, the holding structure 120 may be, for example, a holding rod, a holding knob and the like. The avoidance hole 923 is specifically arranged on the top cover 92.

[0162] In practice, for example, a first mounting hole 1203 may be arranged in the holding structure 120 and a second mounting hole 1014 may be arranged in the rotary sealing member 10. The holding structure 120 and the rotary sealing member 10 are connected together by a screws passing through the first mounting hole 1203 and the second mounting hole 1014 in turn. The holding structure 120 is specifically connected with the top sealing member 101.

[0163] In some embodiments, referring to FIG. 15 to FIG. 24, an edge of the avoidance hole 923 is circumferentially provided with an annular extension wall 924 extending towards a direction away from the housing 9, and the annular extension wall 924 is arranged around a periphery of part of the holding structure 120.

[0164] By surrounding the annular extension wall 924 on the periphery of part of the holding structure 120, it may increase a shielding area of the housing 9 to the holding structure 120 in the vertical direction to a certain extent, which may cause that relative cutting of the housing 9 and the holding structure 120 in the circumferential direction can be avoided to a certain extent when the holding structure 120 drives the rotary sealing member 10 to rotate relative to the housing 9, and thus have a better protection for the housing 9 and the holding structure 120 and is more stably rotation of the holding structure 120 relative to the housing 9.

[0165] Referring to FIG. 15 to FIG. 24, the holding structure 120 is further provided with an annular protrusion part 1202 with a bottom opening. When the holding structure 120 is connected with the rotary sealing mem-

ber 10, the annular protrusion part 1202 is arranged around a periphery of the annular extension wall 924, which may improve the stability of the holding structure 120 when rotating relative to the housing 9 to a certain extent.

[0166] In some embodiments, referring to FIG. 17 to FIG. 24, a limiting structure 140 is arranged between the holding structure 120 and the rotary sealing member 10, and the limiting structure 140 is used for limiting relative movement between the rotary sealing member 10 and the holding structure 120.

[0167] That is to say, the arrangement of the limiting structure 140 can prevent the rotary sealing member 10 and the holding structure 120 from moving relative to each other to a certain extent, which may ensure the synchronization and stability when the two move, and further improve the convenience and stability of the adjustment of the air outlet direction and have a better effect of adjustment of the air outlet direction.

[0168] In some embodiments, referring to FIG. 17 to FIG. 19, the limiting structure 140 comprises a limiting hole 1013 arranged on the rotary sealing member 10 and a limiting protrusion 1201 arranged on the holding structure 120, and the limiting protrusion 1201 passes through the avoidance hole 923 and extends into the limiting hole 1013.

[0169] In this way, through the matching of the limiting protrusion 1201 and the limiting hole 1013, it may avoid the relative movement of the rotary sealing member 10 and the holding structure 120 to a certain extent, improve the movement synchronization of the two, and have a more stable adjustment of the air outlet direction and a better effect of the adjustment.

[0170] Certainly, in some other embodiments, the limiting structure 140 may also comprise a limiting hole arranged on the holding structure 120, and a limiting protrusion is arranged on the rotary sealing member 10. The limiting protrusion passes through the avoidance hole 923 and extends into the limiting hole.

[0171] It should be noted that relational terms herein such as "first", "second", and the like, are used merely to distinguish one entity or operation from another entity or operation, and do not necessarily require or imply there is any such relationship or order between these entities or operations. Furthermore, the terms "including", "comprising" or any variations thereof are intended to embrace a non-exclusive inclusion, such that a process, method, article, or device comprising a plurality of elements comprises not only those elements but also comprises other elements not expressly listed, or also incudes elements inherent to such a process, method, article, or device. In the absence of further limitation, an element defined by the phrase "comprising one ..." does not exclude the presence of additional identical element in the process, method, article, or device.

The above are only detailed description of the embodiments of the present disclosure, so that those skilled in the art can understand or achieve the embodiments of the present disclosure. Various modifications to these embodiments will be apparent to those skilled in the art, and the generic principles defined herein may be embodied in other embodiments without departing from the spirit or scope of the present disclosure. Therefore, the embodiments of the present disclosure will not to be limited to these embodiments shown herein, but is to be in conformity with the widest scope consistent with the principles and novel features disclosed herein.

Claims

1. An air treatment device, comprising a housing (9, 1), wherein the housing (9, 1) is provided with an air inlet (911, 111), a top of the housing (9, 1) is provided with a first air outlet (921, 121) connected with the air inlet (911, 111), and a side part of the housing (9, 1) is provided with a second air outlet (912, 112) connected with the air inlet (911, 111); and
the housing (9, 1) is provided with a sealing structure (2), and the sealing structure (2) is movable relative to the housing (9, 1) to adjust opening and closing states of at least one of the first air outlet (921, 121) and the second air outlet (912, 112).

2. The air treatment device according to claim 1, wherein the sealing structure (2) is movable upward and downward relative to the housing (9, 1) to adjust the opening and closing states of at least one of the first air outlet (921, 121) and the second air outlet (912, 112).

3. The air treatment device according to claim 2, wherein an elastic member (3) is arranged between the housing (9, 1) and the sealing structure (2); and
an end of the elastic member (3) is fixed relative to the housing (9, 1), and an other end of the elastic member (3) is fixed relative to the sealing structure (2), so that the sealing structure (2) moves upward under an elastic force of the elastic member (3) to open at least part of the first air outlet (921, 121).

4. The air treatment device according to claim 3, wherein the housing (9, 1) is provided with a first locking member (124), the sealing structure (2) is provided with a second locking member (231), the first locking member (124) cooperates with the second locking member (231) to lock the sealing structure (2) on the housing (9, 1) when the sealing structure (2) moves downward to cover at least part of the first air outlet (921, 121); and
the first locking member (124) is a locking groove provided on one of the housing (9, 1) and the sealing structure (2), and the second locking member (231) is a locking cam provided on the other one of the housing (9, 1) and the sealing structure (2), which can be clamped into the locking groove.

5. The air treatment device according to claim 4, wherein the sealing structure (2) comprises a top sealing member (21, 101), a side sealing member (22, 102) and a connecting bracket (23); wherein the top sealing member (21, 101) is located outside the housing (9, 1) and is movable upward and downward relative to the housing (9, 1) to adjust the opening and closing states of the first air outlet (921, 121); the side sealing member (22, 102) is located inside the housing (9, 1) and is movable upward and downward relative to the housing (9, 1) to adjust the opening and closing states of the second air outlet (912, 112); and the top sealing member (21, 101) is arranged on a top of the connecting bracket (23), the top of the housing (9, 1) is provided with an avoidance hole (923, 125), and the connecting bracket (23) penetrates through the avoidance hole (923, 125) to connect with the side sealing member (22, 102);

the connecting bracket (23) is provided with a hollow cavity (233) with a bottom opening, and the elastic member (3) is located in the hollow cavity (233);
the second locking member (231) is arranged in the hollow cavity (233); and
the hollow cavity (233) is internally provided with a guide post (4), and the elastic member (3) is a spring sleeved on the guide post (4).

6. The air treatment device according to any one of claims 2 to 4, wherein the sealing structure (2) comprises a top sealing member (21, 101) and a side sealing member (22, 102);

the top sealing member (21, 101) is located outside the top of the housing (9, 1) and moves upward and downward relative to the housing (9, 1) to adjust the opening and closing states of the first air outlet (921, 121); and
the side sealing member (22, 102) is located inside the housing (9, 1) and is movable upward and downward relative to the housing (9, 1) to adjust the opening and closing states of the second air outlet (912, 112).

7. The air treatment device according to claim 6, wherein the top sealing member (21, 101) is a sealing plate;

and/or, the first air outlet (921, 121) is located in an area surrounded by a projection of the top sealing member (21, 101) on the top of the housing (9, 1);
and/or, at least two first air outlets (921, 121) are arranged, and the at least two first air outlets (921, 121) are arranged at intervals along a circumferential direction of the top of the housing (9, 1); or wherein the side sealing member (22, 102) is an annular sealing plate, and the annular sealing plate is annularly arranged along a circumferential direction of an inner wall of the housing (9, 1);
and/or, a height dimension of a projection of the side sealing member (22, 102) on a vertical plane is not less than a height dimension of a projection of an opening area of the second air outlet (912, 112) on the vertical plane;
and/or, at least two second air outlets (912, 112) are arranged, and the at least two second air outlets (912, 112) are arranged at intervals along a circumferential direction of the housing (9, 1).

8. The air treatment device according to claim 6, wherein the top sealing member (21, 101) and the side sealing member (22, 102) are connected via a connecting bracket (23); and
the top sealing member (21, 101) is arranged on a top of the connecting bracket (23), the top of the housing (9, 1) is provided with an avoidance hole (923, 125), and the connecting bracket (23) penetrates through the avoidance hole (923, 125) to be connected with the side sealing member (22, 102).

9. The air treatment device according to claim 8, wherein the housing (9, 1) comprises a hollow barrel body (91, 11) with an opening at the top and a top cover (92, 12) covered on the opening, at least part of the air inlet (911, 111) is arranged on the barrel body (91, 11), and at least part of the second air outlet (912, 112) is arranged on a side wall of the barrel body (91, 11); and the top cover (92, 12) is provided with a containing groove (123) depressed in a direction away from the top sealing member (21, 101), part of the connecting bracket (23) is located in the containing groove (123), and the connecting bracket (23) is movable upward and downward along the containing groove (123), the avoidance hole (923, 125) is arranged on a bottom of the containing groove (123), and at least part of the first air outlet (921, 121) is located outside the containing groove (123); and
the connecting bracket (23) comprises a bracket body (234) and a supporting platform (235) arranged on a top of the bracket body (234), the top sealing member (21, 101) is arranged on the supporting platform (235), and the bracket body (234) is located in the containing groove (123); and a bottom surface of the supporting platform (235) matches with a top surface of the top cover (92, 12) in shape.

10. The air treatment device according to claim 8, wherein the connecting bracket (23) is provided with a connecting protrusion part (232) extending in a direction towards the side sealing member (22, 102), the connecting protrusion part (232) penetrates through the avoidance hole (923, 125), and the side sealing member (22, 102) is provided with a position-

ing hole (221) for insertion of the connecting protrusion part (232).

11. The air treatment device according to claim 10, wherein the side sealing member (22, 102) is an annular sealing plate, and the annular sealing plate is annularly arranged along a circumferential direction of an inner wall of the housing (9, 1);
a bottom of the annular sealing plate is connected with a connecting plate (222), a ventilation gap (223) communicated with the air inlet (911, 111) is formed between the connecting plate (222) and an inner cavity of the annular sealing plate, and the positioning hole (221) is arranged on the connecting plate (222).

12. The air treatment device according to claim 6, wherein the top sealing member (21, 101) is provided with a lifting part (5) for lifting;
and/or, the housing (9, 1) comprises a hollow barrel body (91, 11) with an opening at the top and a top cover (92, 12) covered on the opening, the top cover (92, 12) is provided with a concave cavity (122) depressed downward, the first air outlet (921, 121) is arranged on a cavity wall of the concave cavity (122), and when the top sealing member (21, 101) moves downward to shield the first air outlet (921, 121), a top surface of the top sealing member (21, 101) does not protrude out of a top edge of the top cover (92, 12).

13. The air treatment device according to any one of claims 1 to 5, wherein the housing (9, 1) is a hollow cylindrical housing (9, 1);

the housing (9, 1) comprises a hollow cylindrical barrel body (91, 11) with an opening at the top and a top cover (92, 12) covered on the opening, at least part of the air inlet (911, 111) is arranged on a bottom part of a side wall of the barrel body (91, 11), at least part of the first air outlet (921, 121) is arranged on the top cover (92, 12), and at least part of the second air outlet (912, 112) is arranged on a top of the side wall of the barrel body (91, 11); and
the top cover (92, 12) is provided with a concave cavity (122) depressed downward, the first air outlet (921, 121) is arranged on a cavity wall of the concave cavity (122), and the first air outlet (921, 121) is obliquely extended along a direction from a center of the concave cavity (122) to an edge of the concave cavity (122).

14. The air treatment device according to any one of claims 1 to 5, wherein the housing (9, 1) is internally provided with a heating member (6), and the heating member (6) is located in an air flow channel formed between the air inlet (911, 111) and the first air outlet (921, 121) and/or the second air outlet (912, 112); and
the air treatment device is a heater.

15. An air treatment device, comprising a housing (9, 1), wherein the housing (9, 1) is provided with an air inlet (911, 111), a top of the housing (9, 1) is provided with an first air outlet (921, 121) communicated with the air inlet (911, 111), and a side part of the housing (9, 1) is provided with a second air outlet (912, 112) communicated with the air inlet (911, 111); and
the housing (9, 1) is provided with a rotary sealing member (10), and the rotary sealing member (10) moves relative to the housing (9, 1) to adjust opening and closing states of at least one of the first air outlet (921, 121) and the second air outlet (912, 112).

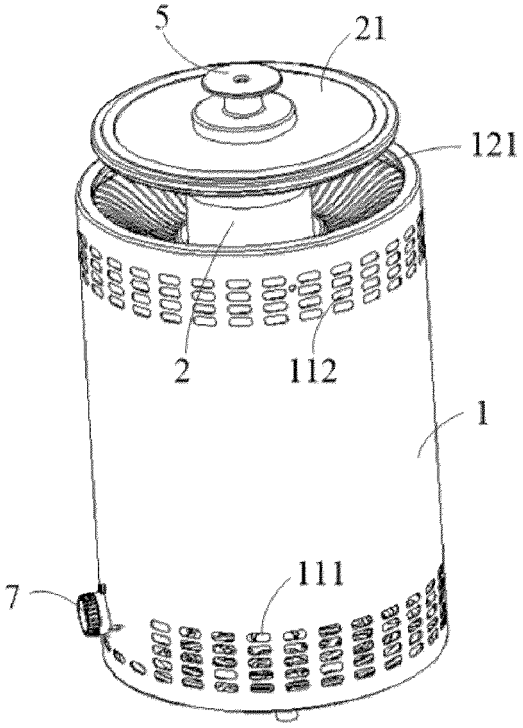

FIG. 1

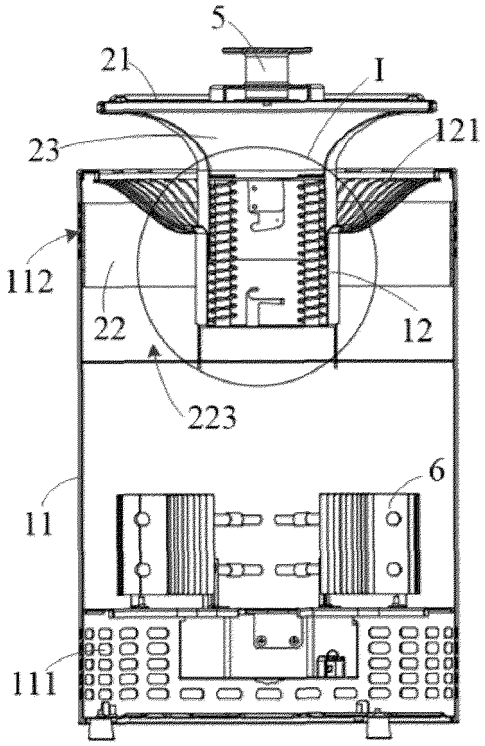

FIG. 2

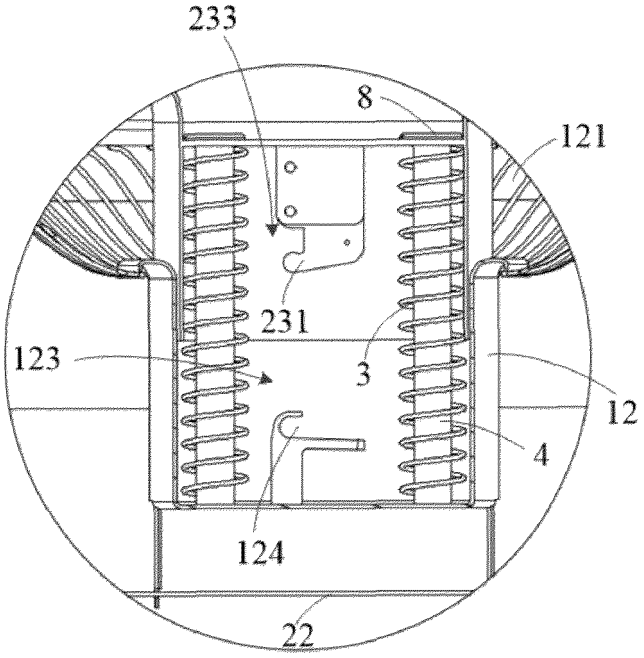

FIG. 3

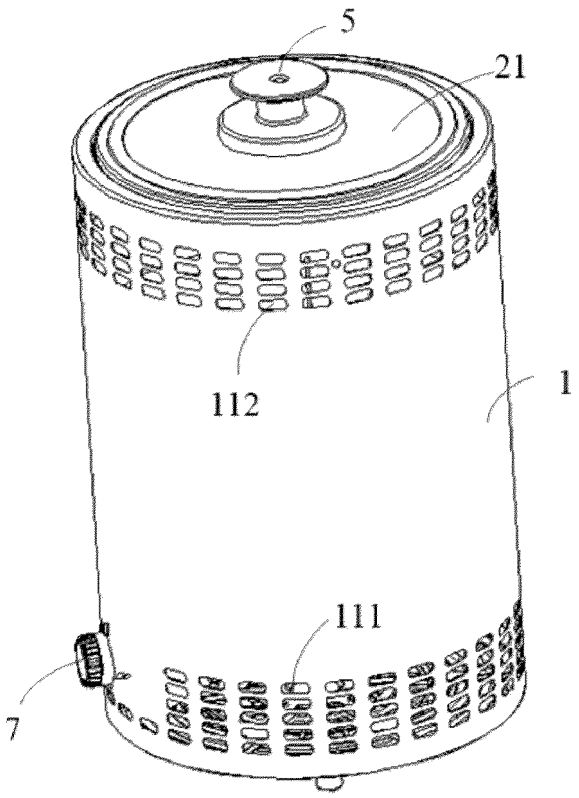

FIG. 4

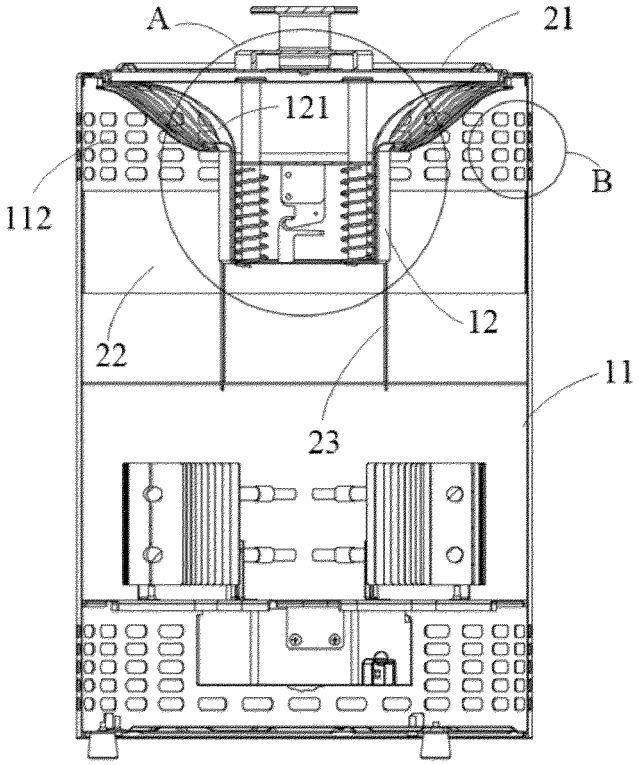

FIG. 5

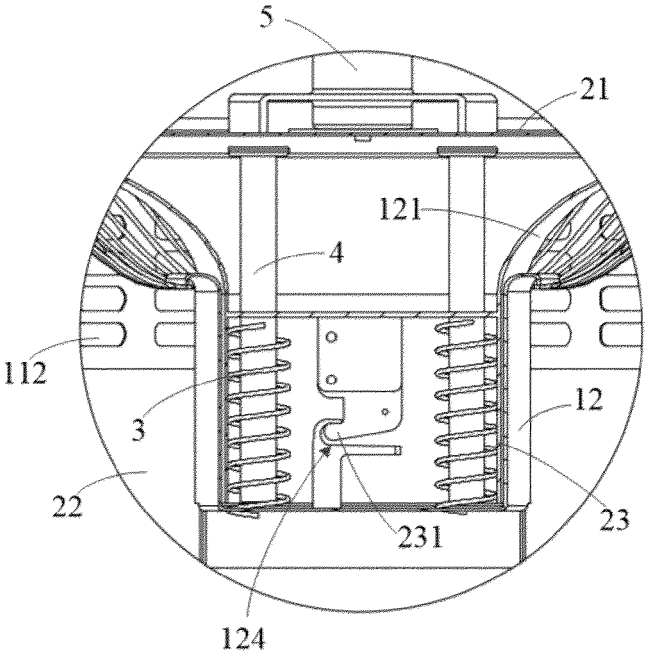

FIG. 6

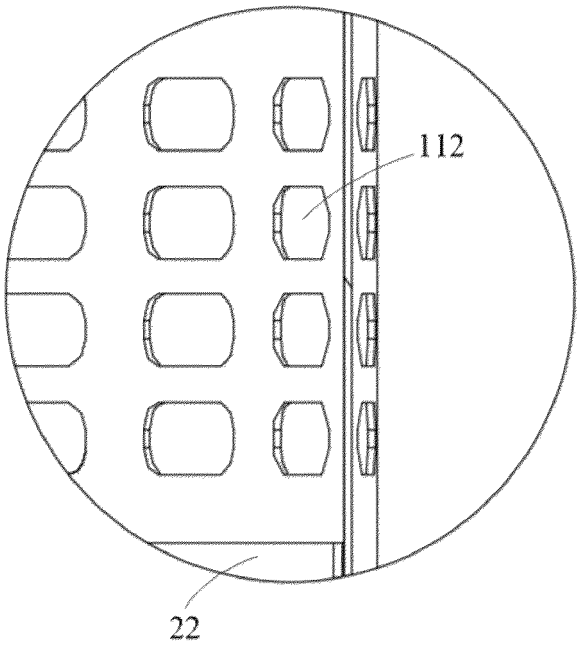

FIG. 7

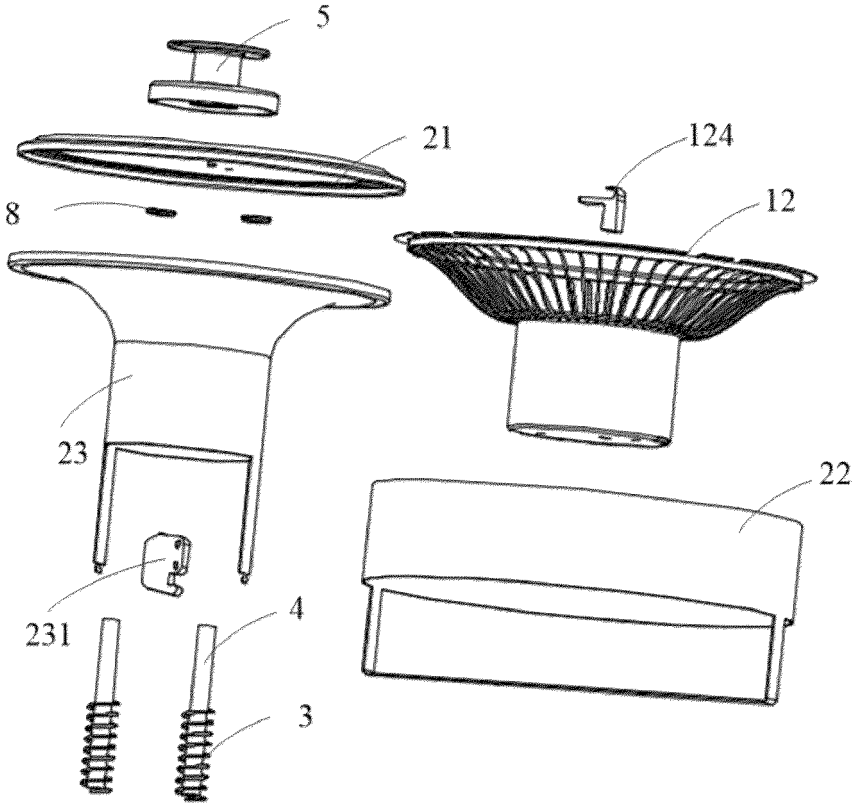

FIG. 8

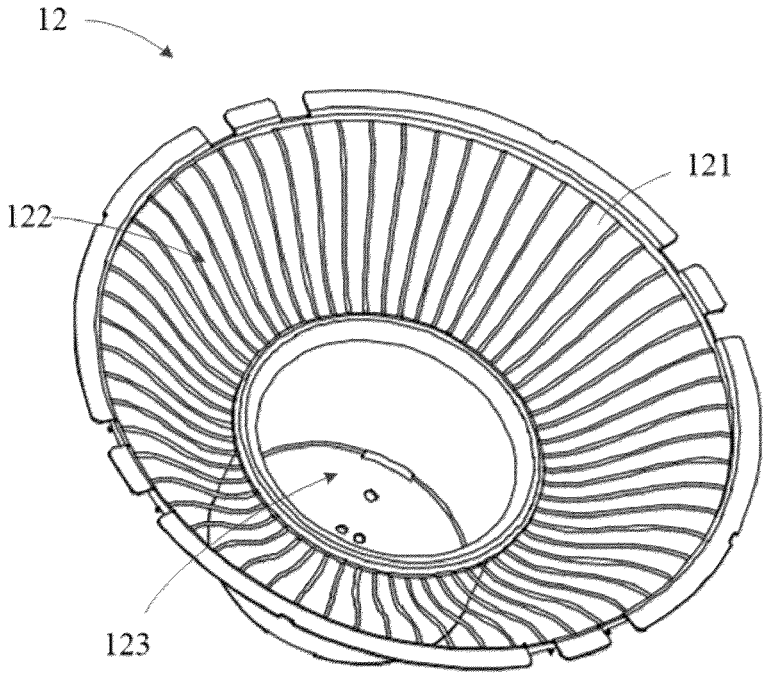

FIG. 9

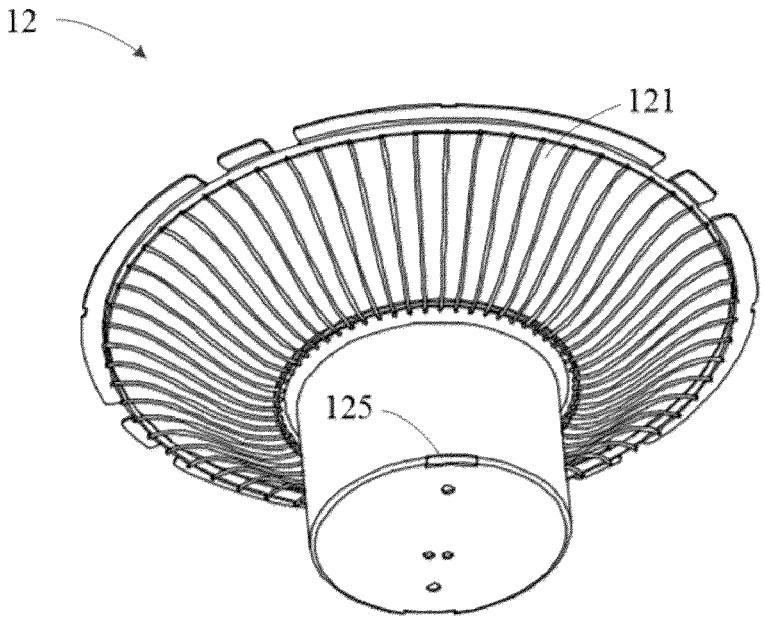

FIG. 10

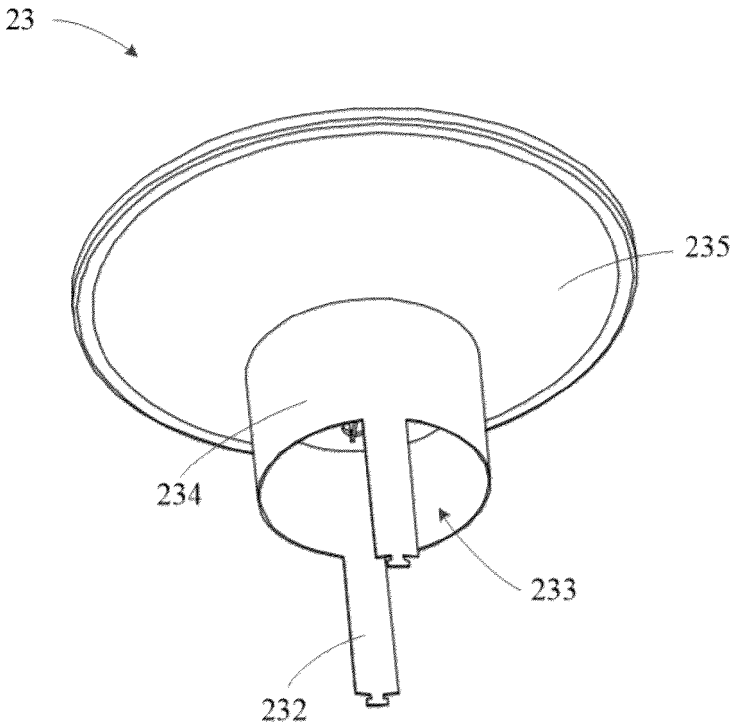

FIG. 11

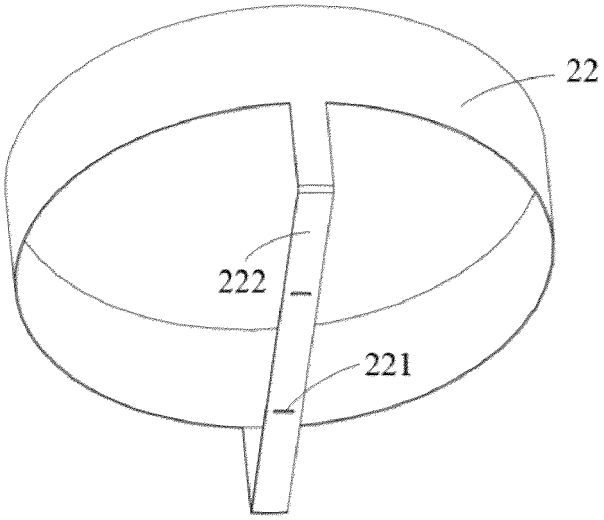

FIG. 12

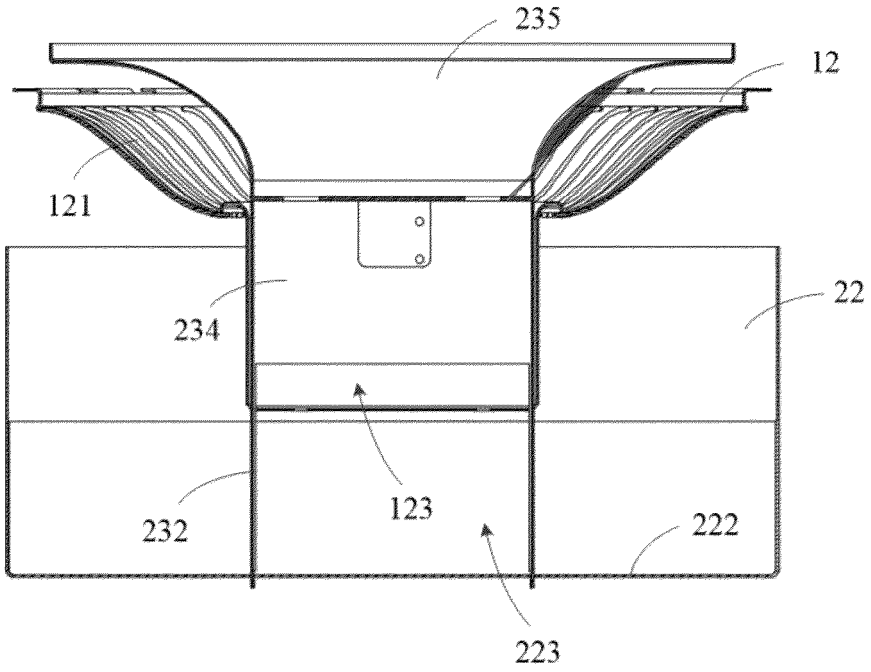

FIG. 13

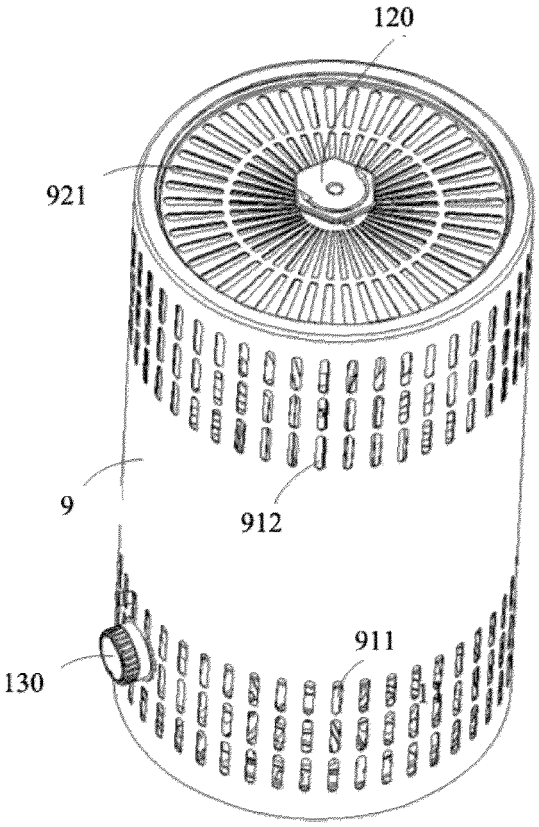

FIG. 14

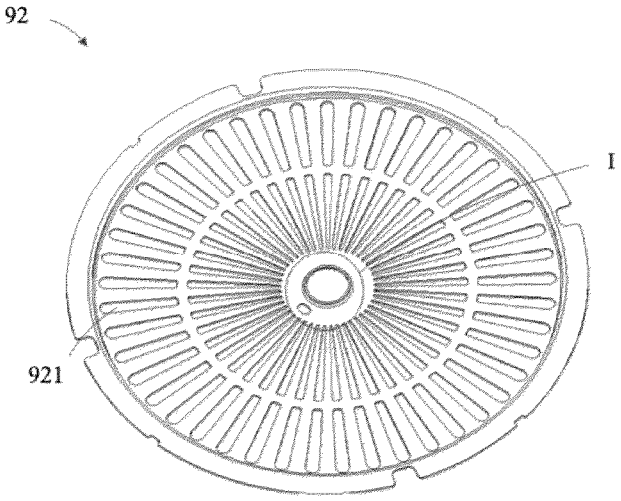

FIG. 15

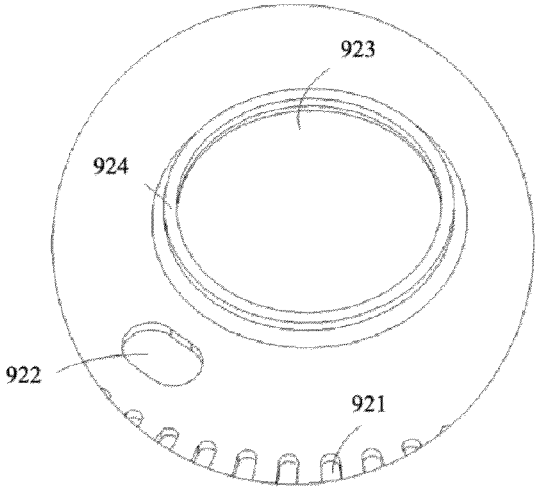

FIG. 16

]

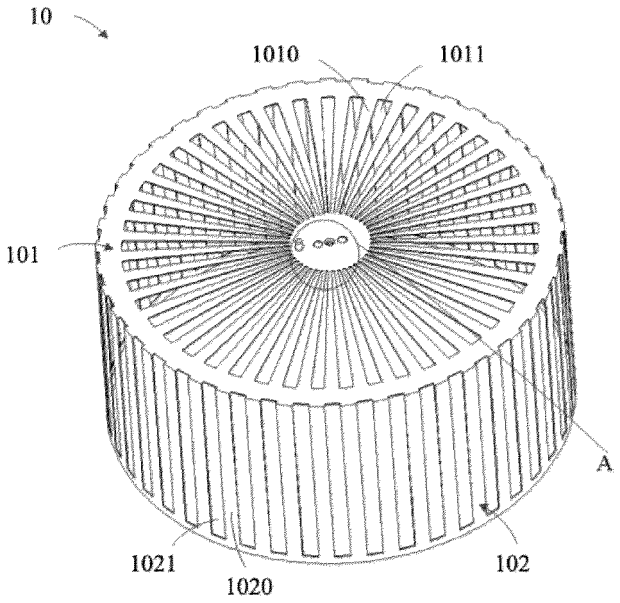
10
1010
1011
101
A
1021
1020
102

FIG. 17

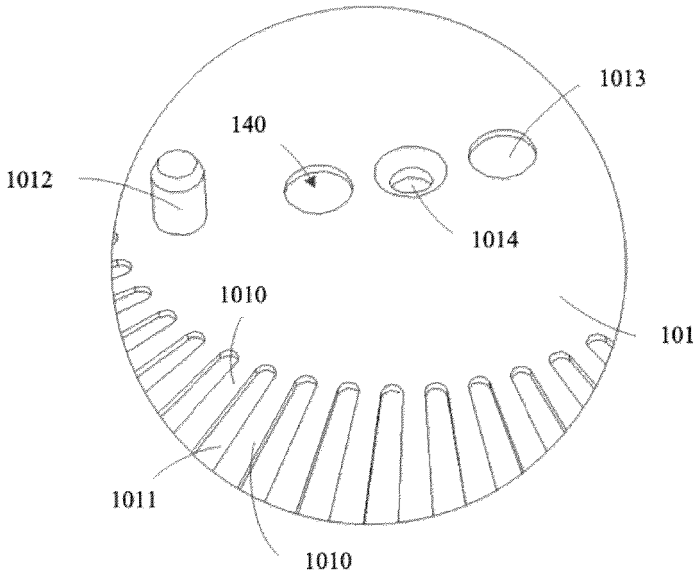
1013
140
1012
1014
1010
101
1011
1010

FIG. 18

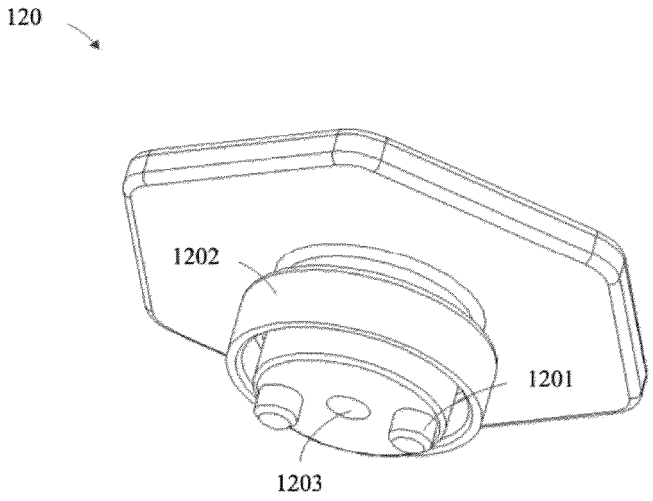

FIG. 19

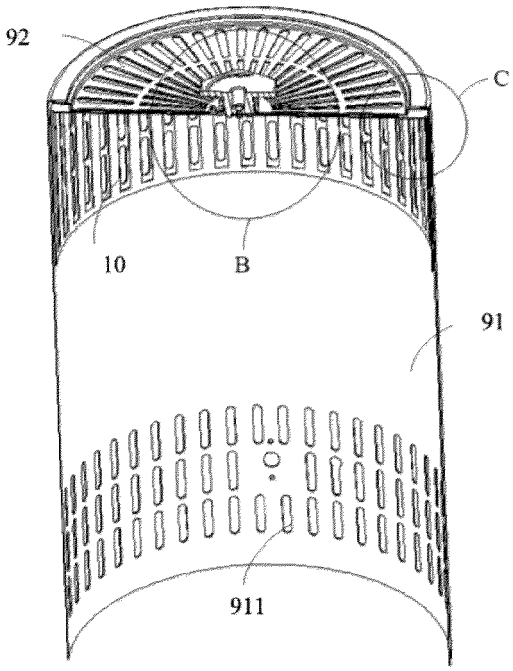

FIG. 20

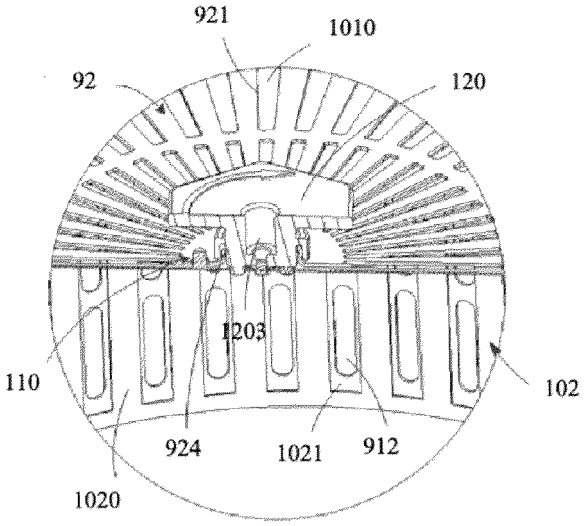

FIG. 21

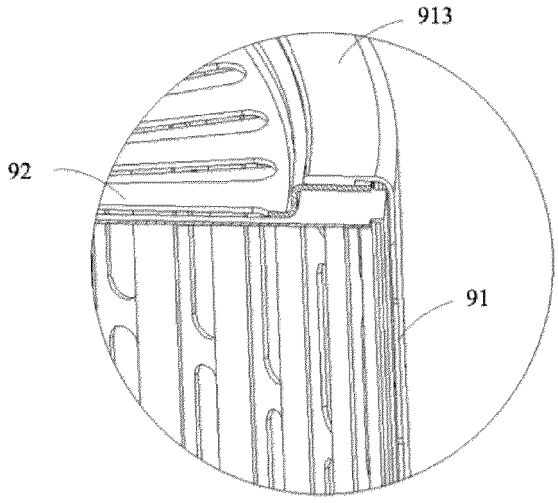

FIG. 22

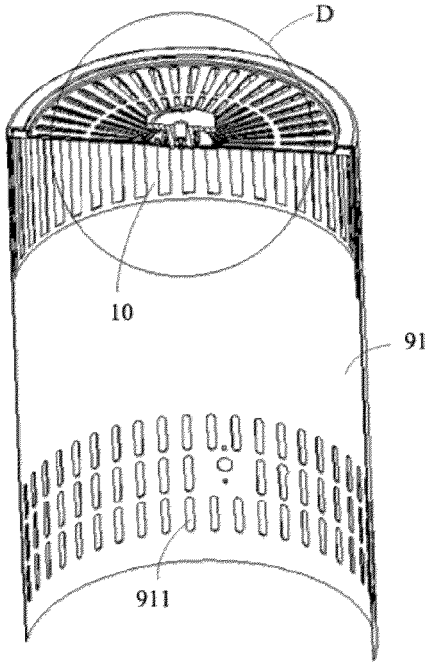

FIG. 23

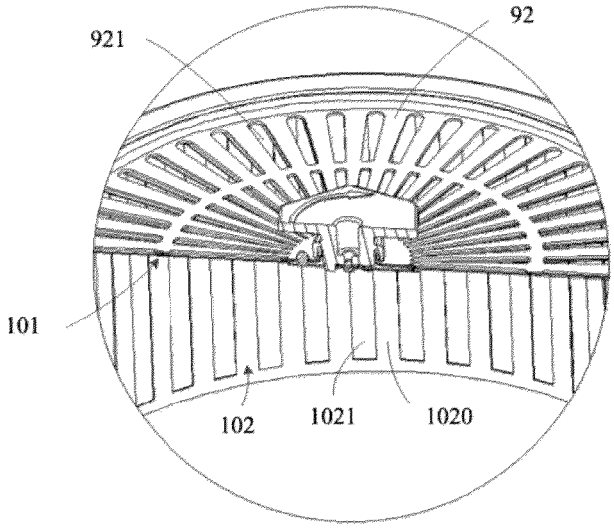

FIG. 24

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 24 19 7292

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	CN 114 051 575 A (COWAY CO LTD) 15 February 2022 (2022-02-15) * paragraph [0042] - paragraph [0164]; figures 1-11 *	1-4,13, 14 5-12	INV. F24H3/04 F24C7/00 F24H9/00 F24F1/0014
X	CN 105 333 531 A (WUHU MEIZHI AIR CONDITIONING EQUIPMENT CO LTD; MIDEA GROUP CO LTD) 17 February 2016 (2016-02-17) * paragraph [0022] - paragraph [0049]; figures 1-3 *	1	F24F13/10 F24F13/12
X	CN 106 152 461 A (WUHU MEIZHI AIR CONDITIONING EQUIPMENT CO LTD; MIDEA GROUP CO LTD) 23 November 2016 (2016-11-23) * paragraph [0019] - paragraph [0069]; figures 1-7 *	1,14,15	
X	US 2010/290765 A1 (LEE DONG-CHUL [KR]) 18 November 2010 (2010-11-18) * paragraph [0032] - paragraph [0102]; figures 1-8 *	1,14,15	
Y	CN 105 115 128 B (GREE ELECTRIC APPLIANCES INC) 2 November 2018 (2018-11-02) * paragraph [0033] - paragraph [0072]; figures 1-11 *	5-12	TECHNICAL FIELDS SEARCHED (IPC) F24H F24F F24C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 February 2025	Ast, Gabor

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 24 19 7292

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-02-2025

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CN 114051575 A	15-02-2022	CN 114051575 A	15-02-2022
		JP 7558212 B2	30-09-2024
		JP 2022540354 A	15-09-2022
		KR 20210003623 A	12-01-2021
		US 2022235954 A1	28-07-2022
		WO 2021002675 A1	07-01-2021
CN 105333531 A	17-02-2016	NONE	
CN 106152461 A	23-11-2016	NONE	
US 2010290765 A1	18-11-2010	KR 20090132674 A	31-12-2009
		US 2010290765 A1	18-11-2010
		WO 2009157694 A1	30-12-2009
CN 105115128 B	02-11-2018	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82