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(71) Applicants:
• **GD Midea Air-Conditioning Equipment Co., Ltd.**
Foshan, Guangdong 528311 (CN)
• **Midea Group Co., Ltd.**
Foshan, Guangdong 528311 (CN)

(72) Inventor: **LU, Shaozhang**
Foshan, Guangdong 528311 (CN)

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(74) Representative: **RGTH**
Patentanwlte PartGmbB
Neuer Wall 10
20354 Hamburg (DE)

(54) **AIR DUCT ASSEMBLY AND MOBILE AIR CONDITIONER**

(57) Disclosed are an air pipe assembly and a mobile air conditioner, wherein the air pipe assembly includes a first air pipe (100) and a second air pipe (200), the second air pipe (200) is sleeved on the first air pipe (100), so that a first air duct (110) is formed in the first air pipe (100), and a second air duct (210) is formed between the first air pipe (100) and the second air pipe (200). The first air pipe (100) is capable of independently stretching and extending to out of the second air pipe (200), allowing the first air duct (110) and the second air duct (210) to be communicated with an outdoor environment at the same time, to realize air intake and air exhaust through the dual air pipes with the outdoor environment. Alternatively, the first air duct (110) can be switched to communicate with the outdoor environment and the second air duct (210) is communicated with an indoor environment, so that air is inhaled from the indoor environment and exhausted to the outdoor environment.

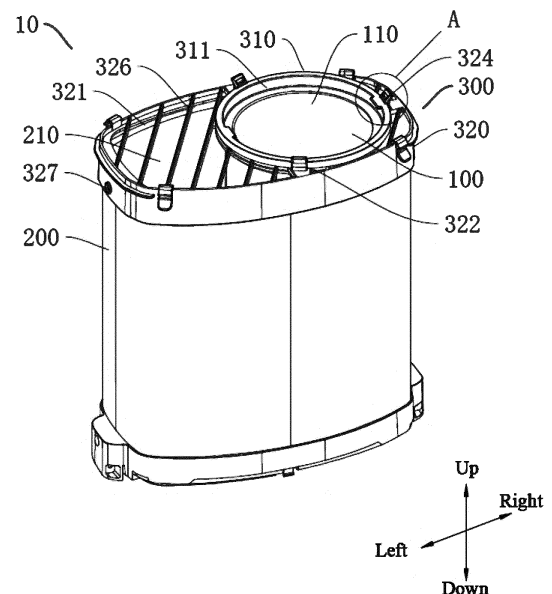


Fig. 2

Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to Chinese patent application No. 202010734728.2 filed July 27, 2020 and titled "Air Pipe Assembly and Mobile Air Conditioner" and Chinese patent application No. 202021514357.9 filed July 27 2020 and titled "Air Pipe Assembly and Mobile Air Conditioner", and the patent applications are incorporated herein in their entirety by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to the field of household appliance technologies, and more particularly, to an air pipe assembly and a mobile air conditioner.

BACKGROUND

[0003] In a mobile air conditioner, a retractable air intake pipe and an air exhaust pipe are usually used to communicate with an outdoor environment for air intake and air exhaust respectively, for the purpose of outdoor heat exchange. In the related art, the air intake pipe may also be used to inhale air from an indoor environment, while the air exhaust pipe is communicated with the outdoor environment to exhaust air, such that the indoor turbid air can be exhausted while exchanging heat. However, the existing air intake pipe and air exhaust pipe structurally cannot be applied to the heat exchanges for the air intakes from the two environments, they have poor flexibility, and cannot meet use requirements.

SUMMARY

[0004] The present disclosure aims at solving at least one of the technical problems in the related art. Therefore, the present disclosure provides an air pipe assembly and a mobile air conditioner, which can use dual air pipes or a single air pipe to communicate with an outdoor environment, and have reasonable structure, higher use flexibility and more practicality and reliability.

[0005] According to a first aspect of the present disclosure, an air pipe assembly is for a mobile air conditioning, and includes:

a first air pipe, wherein a first air duct is formed in an inner side of the first air pipe; and

a second air pipe, wherein the second air pipe is sleeved on an outer side of the first air pipe, so that a second air duct is formed between the first air pipe and the second air pipe;

wherein, the first air pipe is capable of extending to an exterior of the second air pipe, so that the air pipe assembly is capable of having a first state in which

both the first air duct and the second air duct are communicated with an outdoor environment and a second state in which only the first air duct is communicated with the outdoor environment.

[0006] The air pipe assembly according to the embodiment of the present disclosure at least has the following beneficial effects.

[0007] The first air pipe and the second air pipe are combined to form a pipe-in-pipe structure, so that the first air duct is formed in the first air pipe, and the second air duct is formed between the first air pipe and the second air pipe to realize separation of air intake and air exhaust. The first air pipe is capable of independently stretching and extending to the exterior of the second air pipe, and when in use, the first air duct and the second air duct are capable of being communicated with the outdoor environment at the same time, so that the air intake and air exhaust through the dual air pipes with the outdoor environment are realized, and a refrigeration effect is good. Alternatively, the first air duct can be switched to communicate with the outdoor environment and the second air duct can be communicated with an indoor environment, so that air can be inhaled from the indoor environment and exhausted to the outdoor environment to offer a fresh air effect to indoor environment, to meet the use demand of users. The air pipe assembly has simple and reasonable structure and higher use flexibility, and is more practical and reliable.

[0008] According to some embodiments of the present disclosure, an air pipe joint is further included, wherein the air pipe joint is respectively connected with the first air pipe and the second air pipe.

[0009] According to some embodiments of the present disclosure, an air pipe joint is further included, wherein the air pipe joint includes a first connector for being connected the first air pipe and a second connector for being connected the second air pipe, and the first connector is detachably connected with the second connector.

[0010] According to some embodiments of the present disclosure, a limiting portion is arranged on an inner side of the second connector, the limiting portion defines a limiting hole matched with the first air pipe, and the limiting portion is connected with the first connector.

[0011] According to some embodiments of the present disclosure, the limiting portion is provided with a first buckle along a periphery of the limiting hole, and the first buckle is snapped with an edge of the first connector.

[0012] According to some embodiments of the present disclosure, the first connector includes a first snap ring connected with a port of the first air pipe, and a second snap ring snapped with the first buckle is arranged on an upper side of the first snap ring.

[0013] According to some embodiments of the present disclosure, the air pipe joint further includes a third connector, one end of the third connector is connected with the first connector, and another end of the third connector extends towards an outer side of the first air pipe to form

a third air pipe.

[0014] According to some embodiments of the present disclosure, the second snap ring is provided with a bump on an inner side of the second snap ring, and the third connector is provided with a neck corresponding to the bump.

[0015] According to some embodiments of the present disclosure, the first connector is eccentrically arranged on an inner side of the second connector.

[0016] According to some embodiments of the present disclosure, the air pipe joint further includes a fourth connector, the fourth connector is provided with a slot connected with an end portion of the second air pipe, and the fourth connector is connected with the second connector.

[0017] According to some embodiments of the present disclosure, the fourth connector includes a first buckling piece and a second buckling piece, and the first buckling piece is connected with the second buckling piece, so that the slot is formed between the first buckling piece and the second buckling piece.

[0018] According to some embodiments of the present disclosure, the second air pipe is provided with a positioning rib in a port of the second air pipe, and a positioning groove matched with the positioning rib is formed in the slot.

[0019] According to some embodiments of the present disclosure, a positioning piece is arranged in the second air duct, the positioning piece includes a positioning portion sleeved on an outer side of the first air pipe, and the positioning portion extends towards the second air pipe and forms with a supporting portion abutting against an inner side wall of the second air pipe.

[0020] According to some embodiments of the present disclosure, the first air pipe is provided with an annular groove on an outer side of the first air pipe for accommodating the positioning portion.

[0021] According to some embodiments of the present disclosure, the positioning portion and the supporting portion are made of elastic ferrules.

[0022] A mobile air conditioner according to an embodiment of a second aspect of the present disclosure includes the air pipe assembly according to the embodiments of the first aspect.

[0023] According to some embodiments of the present disclosure, an air conditioner body is further included, wherein the air conditioner body is provided with a condenser, an air intake chamber for mounting the condenser, and an air inlet and an air outlet communicated with the air intake chamber, the air inlet is connected with the second air pipe, and the air outlet is connected with the first air pipe.

[0024] The mobile air conditioner according to the embodiments of the present disclosure at least has the following beneficial effects: by employing the above air pipe assembly to perform air intake and air exhaust, the mobile air conditioner realizes the separation of air intake and exhaust, i.e. having a first state in which both the first air

duct and the second air duct are communicated with the outdoor environment and a second state in which the first air duct is communicated with the outdoor environment alone and the second air duct is communicated with the indoor environment; the mobile air conditioner meets the use demand of users, has simple and reasonable structure and higher use flexibility, and is more practical and reliable.

[0025] Additional features and advantages of the disclosure will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by the practice of the disclosure.

BRIEF DESCRIPTION OF DRAWINGS

[0026] The disclosure will be further explained with reference to the accompanying drawings and embodiments hereinafter, wherein:

FIG. 1 is a schematic structural diagram of an air pipe assembly according to an embodiment of the present disclosure;

FIG. 2 is a schematic structural diagram of an air pipe assembly according to another embodiment of the present disclosure;

FIG. 3 is a schematic diagram of a single air duct outdoor air exhaust using state of an air pipe assembly according to an embodiment of the present disclosure;

FIG. 4 is an enlarged schematic structural diagram of a portion A in FIG. 2;

FIG. 5 is an enlarged schematic structural diagram of a portion B in FIG. 3;

FIG. 6 is a schematic diagram showing an installation structure of a third connector of the air pipe assembly according to the embodiment of the present disclosure;

FIG. 7 is a schematic diagram showing a decomposition structure of a fourth connector of the air pipe assembly according to the embodiment of the present disclosure;

FIG. 8 is an installation sectional view of the embodiment of the fourth connector shown in FIG. 7;

FIG. 9 is a schematic diagram showing an installation structure of a positioning piece of the air pipe assembly according to the embodiment of the present disclosure;

FIG. 10 is a schematic diagram showing a decomposition structure of the air pipe assembly according

to the embodiment of the present disclosure;

FIG. 11 is a schematic structural diagram of a mobile air conditioner according to an embodiment of the present disclosure; and

FIG. 12 is a schematic diagram of a single air duct outdoor air exhaust using state of the mobile air conditioner according to the embodiment of the present disclosure.

[0027] Reference numerals:

10 refers to air pipe assembly;

20 refers to mobile air conditioner, and 21 refers to air conditioner body;

100 refers to first air pipe, and 110 refers to first air duct;

200 refers to second air pipe, 210 refers to second air duct, and 220 refers to positioning rib;

300 refers to air pipe joint, 310 refers to first connector, 311 refers to first through hole, 312 refers to first snap ring, 313 refers to second snap ring, 314 refers to second buckle, 315 refers to bump, 320 refers to second connector, 321 refers to second through hole, 322 refers to limiting portion, 323 refers to limiting hole, 324 refers to first buckle, 325 refers to buckling position, 326 refers to connecting rib, and 327 refers to connecting hole;

400 refers to third connector, 410 refers to third air pipe, 411 refers to neck, and 420 refers to ferrule;

500 refers to fourth connector, 510 refers to first buckling piece, 511 refers to clamping hole, 512 refers to mounting hole, 520 refers to second buckling piece, 521 refers to insertion block, 522 refers to erection column, and 530 refers to slot;

600 refers to positioning piece, 610 refers to positioning portion, 620 refers to supporting portion, and 621 refers to bending section; and

700 refers to erection joint, and 710 refers to protective screening.

DETAILED DESCRIPTION

[0028] The embodiments of the disclosure will be described in detail hereinafter. Examples of the embodiments are shown in the accompanying drawings. The same or similar reference numerals throughout the drawings denote the same or similar elements or elements having the same or similar functions. The embodiments

described below with reference to the accompanying drawings are exemplary and are only intended to explain the disclosure, but should not be understood as limiting the disclosure.

[0029] In the description of the disclosure, it is to be understood that the orientation or positional relationship related to orientation descriptions indicated by upper, lower, left, right, etc., is based on the orientation or positional relationship shown the drawings, which is only for the convenience of describing the disclosure and simplifying the description, and is not intended to indicate or imply that the indicated devices or elements must have a specific orientation, and be constructed and operated in a specific orientation, and therefore cannot be construed as a limitation to the disclosure.

[0030] In the description of the disclosure, if first and second are described, the descriptions are used for the purpose of distinguishing the technical features only, and cannot be understood as indicating or implying relative importance, or implicitly indicating the number of technical features indicated thereby, or implicitly indicating the order of technical features indicated thereby.

[0031] In the description of the disclosure, unless otherwise explicitly defined, words such as setting, installing and connecting should be understood in a broad sense, and those skilled in the art can reasonably determine the specific meanings of the above words in the disclosure in combination with the specific contents of the technical solutions.

[0032] With reference to FIG. 1 to FIG. 10, an air pipe assembly 10 according to an embodiment of the present disclosure will be described hereinafter, which is for a mobile air conditioner 20.

[0033] As shown in FIG. 1, the air pipe assembly 10 according to the embodiment includes a first air pipe 100 and a second air pipe 200, the second air pipe 200 is sleeved on an outer side of the first air pipe 100, the first air pipe 100 is an inner pipe and the second air pipe 200 is an outer pipe, thus forming a pipe-in-pipe structure. A first air duct 110 is formed in the first air pipe 100, and a second air duct 210 is formed between the first air pipe 100 and the second air pipe 200.

[0034] In this embodiment, the first air pipe 100 is used for air exhaust and the second air pipe 200 is used for air intake. At this time, the first air duct 110 is an air exhaust duct and the second air duct 210 is an air intake duct. Alternatively, the first air pipe 100 may be used for air intake and the second air pipe 200 may be used for air exhaust. At this time, the first air duct 110 is the air intake duct and the second air duct 210 is the air exhaust duct. In this way, the pipe-in-pipe structure can separate the air intake from the air exhaust, and avoid air crossing between the first air duct 110 and the second air duct 210.

[0035] The first air pipe 100 can be independently stretched from inside to outside of the second air pipe 200, so that the air pipe assembly 10 can be switched between different use states. Specifically, as shown in FIG. 1, when in use, a lower end of the first air pipe 100

is connected with an air outlet of the mobile air conditioner 20, and a lower end of the second air pipe 200 is connected with an air inlet of the mobile air conditioner 20, and upper ends of the first air pipe 100 and the second air pipe 200 are stretched and directly connected to a window, so that the first air duct 110 and the second air duct 210 can be communicated with an outdoor environment at the same time. At this time, the air pipe assembly 10 is in a first state. Outdoor air enters the mobile air conditioner 20 through the second air duct 210, and the air exchanges heat with a condenser and then is exhausted to the outdoor environment through the first air duct 110, thus realizing an outdoor heat exchange process of the mobile air conditioner 20. Both the air intake and the air exhaust are completed through the outdoor environment, which does not affect an indoor environment and has a good refrigeration effect.

[0036] With reference to FIG. 1, the first air pipe 100 can be stretched independently from the inside to the outside of the second air pipe 200, so that the first air pipe 100 can be directly connected to the window. At this time, there is no need to stretch the second air pipe 200, so that the first air duct 110 is communicated with the outdoor environment and the second air duct 210 is communicated with the indoor environment. At this time, the air pipe assembly 10 is in a second state. Indoor air enters the mobile air conditioner 20 through the second air duct 210, and the air exchanges heat with the condenser and then is exhausted to the outdoor environment through the first air duct 110, thus realizing the heat exchange process, beneficial to exhausting indoor turbid air, providing a fresh air effect for indoor air. Both the two states can realize the heat exchange between the mobile air conditioner 20 and the outdoor environment.

[0037] With reference to FIG. 2, in some embodiments, the air pipe assembly 10 according to the embodiments includes the first air pipe 100, the second air pipe 200 and an air pipe joint 300. The first air pipe 100 and the second air pipe 200 are respectively connected with the air pipe joint 300. As shown in FIG. 2, the air pipe joint 300 is connected to ports of the first air pipe 100 and the second air pipe 200, and both the first air pipe 100 and the second air pipe 200 are located on a same side of the air pipe joint 300. The first air pipe 100 and the second air pipe 200 can be moved together with the air pipe joint 300, offering convenience to directly connect the air pipe joint 300 to the window, so that the first air duct 110 and the second air duct 210 can be communicated with the outdoor environment at the same time. The first air pipe 100 may also be taken out from the air pipe joint 300 and stretched to the outside alone, that is, the first air pipe 100 and the air pipe joint 300 are connected by a detachable structure.

[0038] For example, a buckle may be arranged at an end portion of the first air pipe 100, and the first air pipe 100 is directly snapped on the air pipe joint 300 through the buckle, providing convenience to separate the first air pipe 100 from the air pipe joint 300 and then stretch

the first air pipe 100 independently without affecting a connection structure between the second air pipe 200 and the air pipe joint 300. The first air pipe 100 and the air pipe joint 300 may also be connected by means of screws. For another example, the air pipe joint 300 may be divided into two joints, and the two joints may be split and connected with the first air pipe 100 and the second air pipe 200 respectively, so that the first air pipe 100 can be independently stretched to an exterior. It should be noted that the first air pipe 100 and the second air pipe 200 are not limited to the connection structure of the embodiment shown in FIG. 2. For example, the air pipe joint 300 is located in the second air duct 210, and the first air pipe 100 and the second air pipe 200 are respectively connected to two ends of the air pipe joint 300.

[0039] With reference to FIG. 2, the air pipe assembly 10 according to the embodiment includes the first air pipe 100, the second air pipe 200 and the air pipe joint 300. The first air pipe 100 and the second air pipe 200 are respectively connected with the air pipe joint 300, and the first air pipe 100 is located inside the second air pipe 200, thus forming a pipe-in-pipe structure. The first air duct 110 is formed in the first air pipe 100, the second air duct 210 is formed between the first air pipe 100 and the second air pipe 200, the air pipe joint 300 is provided with a first through hole 311 communicated with the first air duct 110 and a second through hole 321 communicated with the second air duct 210.

[0040] With reference to FIG. 2, the first air pipe 100 is an inner pipe, the second air pipe 200 is an outer pipe, and the second air pipe 200 has a pipe diameter of larger than a pipe diameter of the first air pipe 100, so that a gap is formed between the first air pipe 100 and the second air pipe 200 to define the second air duct 210. The first air duct 110 and the second air duct 210 are separated, so that the first air duct 110 and the second air duct 210 can ventilate at the same time without affecting each other. Through the pipe-in-pipe structure, the air intake and air exhaust can be separated, so that the air crossing between the first air duct 110 and the second air duct 210 is avoided, and the air pipe assembly can be more flexible to install and more convenient to use.

[0041] With reference to FIG. 2, the air pipe joint 300 includes a first connector 310 and a second connector 320. The first connector 310 is connected with a port of the first air pipe 100, the second connector 320 is connected with a port of the second air pipe 200, and the first connector 310 is located within the second connector 320, so that the first air pipe 100 is connected with the second air pipe 200 to form a pipe-in-pipe structure.

[0042] It can be understood that the first connector 310 is matched with a shape of the port of the first air pipe 100 and the second connector 320 is matched with a shape of the port of the second air pipe 200. The first connector 310 is provided with the first through hole 311 communicating with the first air duct 110, while the second connector 320 is provided with the second through hole 321 communicated with the second air duct 210.

The first air pipe 100 and the second air pipe 200 are not limited to cylindrical pipes, so that the air pipe joint 300 can connect the first air pipe 100 and the second air pipe 200 at the same time.

[0043] With reference to FIG. 2 and FIG. 3, the first connector 310 and the second connector 320 are connected by a detachable structure, that is, the first connector 310 is detachable from the second connector 320. For example, the first connector 310 is directly connected to an inner side wall of the second connector 320 by a connection like screw connection, thread connection, buckling, which is convenient for disassembly and assembly.

[0044] It can be understood that the second air pipe 200 is connected with the second connector 320, and the first air pipe 100 is connected with the first connector 310. As shown in FIG. 2, when the first connector 310 is connected with the second connector 320, the air pipe joint 300 is an integral structure. The first air pipe 100 and the second air pipe 200 may be moved together with the air pipe joint 300, which is convenient to directly connect the air pipe joint 300 to the window, so that the first air duct 110 and the second air duct 210 are communicated with the outdoor environment at the same time. At this time, the air pipe assembly 10 is in a first state. As shown in FIG. 3, when the first connector 310 is separated from the second connector 320, the first air pipe 100 may be moved with the first connector 310 along. In this way, the first air pipe 100 is stretched from the inside to the outside of the second air pipe 200, so that the first air pipe 100 can be connected to the window along, the first air duct 110 is communicated with the outdoor environment, and the second air duct 210 is communicated with the indoor environment. At this time, the air pipe assembly 10 is in a second state. It should be noted that the outdoor environment refers to an exterior outside of a space where the mobile air conditioner is located. For example, the mobile air conditioner cools the room, and an environment outside the room is the outdoor environment. Taking the first air duct 110 as an air exhaust channel and the second air duct 210 as an air intake channel as an example for illustration, during installation and use, as shown in FIG. 2, the lower end of the first air pipe 100 is connected with the air outlet of the mobile air conditioner 20, the lower end of the second air pipe 200 is connected with the air inlet of the mobile air conditioner 20, and the upper ends of the first air pipe 100 and the second air pipe 200 are communicated with the outdoor environment at the same time through the air pipe joint 300. The outdoor air enters the mobile air conditioner 20 through the second air duct 210, and the air exchanges heat with the condenser and then is exhausted to the outdoor environment through the first air duct 110, thus realizing the outdoor heat exchange process of the mobile air conditioner 20. Both the air intake and the air exhaust are completed through the outdoor environment, which does not affect the indoor environment and has a good refrigeration effect. When it is necessary to switch

the mobile conditioner to inhale air from the indoor environment and exhaust air to the outdoor environment, as shown in FIG. 3, the first air pipe 100 is stretched out and communicated with the outdoor environment, the indoor air enters the mobile air conditioner 20 through the second air duct 210, and the air exchanges heat with the condenser and then is exhausted to the outdoor environment through the first air duct 110 to realize the heat exchange process, which is beneficial to exhausting the indoor turbid air, and makes the indoor air have a fresh air effect, so that the air pipe assembly has high use flexibility. The users may select different states to work according to actual needs, thus having better use experience.

[0045] It should be noted that in the embodiment, the air inlet and the air outlet of the mobile air conditioner 20 refer to openings used for air intake and air exhaust to exchange heat with the condenser. Both the first air pipe 100 and the second air pipe 200 may be telescopic corrugated pipes. The first air pipe 100 and the second air pipe 200 may be telescopic synchronously, or the first air pipe 100 may be stretched along, thus meeting the use demands that the dual air ducts are communicated with the outdoor environment or the single air duct is communicated with the outdoor environment.

[0046] With reference to FIG. 3, in some embodiments, a limiting portion 322 is arranged on an inner side of the second connector 320, the limiting portion 322 is fixedly connected with the second connector 320, and a limiting hole 323 matched with the first air pipe 100 is arranged on the limiting portion 322. It can be understood that, the second through hole 321 is located on the inner side of the second connector 320 and delimited by the limiting portion 322, so that the second through hole 321 can be separated from the limiting hole 323. The first air pipe 100 can pass through the limiting portion 323 freely, which is convenient to stretch the first air pipe 100 from the inner side of the second air pipe 200. Meanwhile, the limiting hole 323 plays a positioning role on the first air pipe 100, which avoids the first air pipe 100 from displacement to affect ventilation of the second through hole 321, and realizes a reliable structure.

[0047] With reference to FIG. 2 and FIG. 3, the first connector 310 and the limiting portion 322 are detachably connected. When the first connector 310 is connected with the limiting portion 322, the first connector 310 and the second connector 320 can be assembled into the integrated air pipe joint 300. When the first connector 310 is separated from the limiting portion 322, the first connector 310 can be separated from the second connector 320, thereby stretching the first air pipe 100 out. The first connector 310 and the limiting portion 322 may be connected by means of screw connection, buckling, etc. For example, the first connector 310 and the limiting portion 322 are connected by a screw, and the first connector 310 and the limiting portion 322 can be detached by removing the screw, which is simple to operate and reasonable and practical in structure.

[0048] It should be noted that the limiting portion 322 is arranged at the position of the second through hole 321. In order to reduce the influence of the limiting portion 322 on the ventilation of the second through hole 321, in the embodiment, the limiting portion 322 has an annular structure with the limiting hole 323 on the inner side of the limiting portion 322 and the second through hole 321 on the outer side. The limiting hole 323 has an aperture designed to be capable of passing through the first air pipe 100 and capable of limiting the first connector 310 to pass at the same time, so that the limiting portion 322 supports the first connector 310 and is convenient for disassembly and assembly.

[0049] With reference to FIG. 3, FIG. 4 and FIG. 5, in some embodiments, the first connector 310 is annular, an outer diameter of the first connector 310 is larger than the aperture of the limiting hole 323, and the first connector 310 is connected with the limiting portion 322 by buckling. Specifically, the limiting portion 322 is provided with a first buckle 324, and the first buckle 324 is configured to extend towards an upper part of the limiting hole 323. The first buckle 324 is distributed along a periphery of the limiting hole 323. When the first connector 310 is correspondingly placed on the limiting portion 322, the first connector 310 is snapped with an edge of the first connector 310 through the first buckle 324, so that the first connector 310 and the limiting portion 322 are snapped together, which is convenient and quick to operate.

[0050] It can be understood that, as shown in FIG. 5, the first buckle 324 is arranged close to the limiting hole 323, so that a buckling position 325 is formed between the first buckle 324 and an upper end face of the limiting portion 322, and the edge of the first connector 310 is matched with the buckling position 325, so that the first buckle 324 can be snapped onto the edge of the first connector 310. In the embodiment, three symmetrically distributed first buckles 324 are arranged on the limiting portion 322, and the first connector 310 is fastened by the three first buckles 324 at the same time, so that the structure is firm and stable. Of course, the number of the first buckles 324 is not limited to the number shown in the embodiment. In addition, the first buckle 324 and the limiting portion 322 are integrally formed by injection molding, which are stable and reliable in structure.

[0051] With reference to FIG. 3, in some embodiments, the first connector 310 includes a first snap ring 312 and a second snap ring 313, wherein the second snap ring 313 is located above the first snap ring 312, and the first snap ring 312 and the second snap ring 313 are integrally formed. The first snap ring 312 is connected with an end portion of the first air pipe 100, and the first buckle 324 is snapped with an edge of the second snap ring 313.

[0052] With reference to FIG. 3 and FIG. 4, specifically, a second buckle 314 is arranged at an inner side of the first snap ring 312, and a first annular groove (not shown in the figure) matched with the second buckle 314 is arranged on an outer side wall of the first air pipe 100.

During installation, the second snap ring 313 is snapped in the first annular groove outside the first air pipe 100 through the second buckle 314 to connect the first connector 310 to the first air pipe 100. An outer diameter of the first snap ring 312 is smaller than an aperture of the limiting hole 323, and an outer diameter of the second snap ring 313 is larger than the aperture of the limiting hole 323, so that the first snap ring 312 can be inserted into the limiting hole 323, and the second snap ring 313 abuts against the limiting portion 322, and the first connector 310 is fixed on the limiting portion 322 by buckling the first buckle 324 on the edge of the second snap ring 313, thus realizing quick assembly, and facilitating disassembly and separation. It can be understood that, in some other embodiments, the first snap ring 312 and the first air pipe 100 may also be connected by screws, rivets, clamps and other structures.

[0053] The first annular groove is formed by a corrugated structure of a pipe wall of the first air pipe 100, and a second ring groove is formed on a side wall of the second air pipe 200. The corrugated structure enables the first air pipe 100 and the second air pipe 200 to stretch or contract. The first annular groove is distributed on a side wall of the first air pipe 100, and the second annular groove is distributed on the side wall of the second air pipe 200. Structures of the first annular groove and the second annular groove are not shown in the drawings.

[0054] With reference to FIG. 6, in some embodiments, the air pipe joint 300 includes the first connector 310, the second connector 320 and a third connector 400, wherein the third connector 400 has an annular structure, a lower end of the third connector 400 is connected with the first connector 310, and an upper end of the third connector 400 extends vertically upwards to form a third air pipe 410. A third air duct is formed in the third air pipe 410 and communicated with the first air duct 110. During air exhaust, hot air passes through the first air duct 110 and the third air duct and then is exhausted to the outdoor environment.

[0055] It can be understood that when the first connector 310 is used in combination with the second connector, the first through hole 311 and the second through hole 321 are located on a same plane. By adding the third air pipe 410 extending outward at the first through hole 311, an air outlet port of the third air duct 410 is separated from the second through hole 321 by a certain distance, which prevents the second air duct 210 from sucking the hot air back when the first air duct 110 exhausts air, and prevents air crossing between the first air duct 110 and the second air duct 210. In the embodiment, the third air pipe 410 has a height set to be at least 30 mm, which effectively plays a role of preventing air crossing.

[0056] It should be noted that when the first air duct 110 is used alone to connect with the outdoor environment, since the first air duct 110 is separated from the second air duct 210, air crossing between the two air ducts is avoided, so it is unnecessary to install the third connector 400.

[0057] In some embodiments, the third connector 400 and the first connector 310 are connected by a detachable structure. Specifically, with reference to FIG. 6 and FIG. 10, the second snap ring 313 is provided with a bump 315 on an inner side of the second snap ring 313, protruding inwards along a radial direction, a ferrule 420 is formed at the lower end of the third connector 400 downwardly extending, and the ferrule 420 is provided with a neck 411 on a side wall of the ferrule 420 matched with the bump 315. During installation, the ferrule 420 of the third connector 400 is inserted into the second snap ring 313, making the bump 315 correspond to an opening position of the neck 411, and then the third connector 400 is rotated, and the bump 315 is inserted into the neck 411 for locking, so that the third connector 400 is fixed on the first connector 310, which is convenient for installation and disassembly and does not affect the ventilation of the first air duct 110.

[0058] With reference to FIG. 2 and FIG. 3, in some embodiments, the first connector 310 is eccentrically arranged in the second connector 320, so that the first air pipe 100 can be eccentrically arranged in the second air pipe 200. In the related art, some pipe-in-pipe structures are concentrically arranged, but the inner pipe is unevenly stressed and unstable, so the inner pipe is easy to move inside relative to the outer pipe. When being moved, the inner pipe is easy to block the air duct, resulting in blocked ventilation between the outer pipe and the inner pipe, thus affecting the operation of the mobile air conditioner 20 and easily generating noise. According to the embodiment an eccentric structure is adopted, which can position the second air duct 210 at one side of the first air pipe 100 for ventilation, so that the first air pipe 100 is mainly affected by a wind force from one side, which is beneficial to reducing a wind resistance, reduce the movement of the first air pipe 100, and further reduce the influence of the first air pipe 100 on the ventilation of the second air pipe 200.

[0059] With reference to FIG. 2 and FIG. 3, the first air pipe 100 is a cylindrical pipe, and the second air pipe 200 is an elliptical pipe. The first air pipe 100 is eccentrically arranged at one side of the second air pipe 200, so that the second air duct 210 has enough space for ventilation without affecting the ventilation effect. The first connector 310 and the second connector 320 have shapes respectively matched with shapes of ports of the corresponding air pipes, thus ensuring the connection stability of the structure. In addition, connecting ribs 326 are arranged in the second connector 320, and the connecting ribs 326 are uniformly arranged in the second through hole 321 to form a grid structure. The grid structure can reinforce the second connector 320 and the limiting portion 322, and can effectively prevent impurities from entering the second air duct 210 through the second through hole 321.

[0060] With reference to FIG. 8 and FIG. 10, in some embodiments, the air pipe joint 300 includes the first connector 310, the second connector 320 and a fourth connector 500. The first air pipe 100 is connected to the first

connector 310, and the second connector 320 is sleeved on an end portion of the second air pipe 200, wherein the fourth connector 500 is provided with a slot 530, and a pipe wall of the second air pipe 200 is fixed in the slot 530. The fourth connector 500 is connected with the second air pipe 200, and the second connector 320 is fixedly connected with the fourth connector 500 at the same time, so that the second air pipe 200 is installed on the second connector 320, and the structure is firm and reliable, thus ensuring the reliability of the air duct assembly 10 in use and effectively preventing the second air pipe 200 from falling off.

[0061] With reference to FIG. 7 and FIG. 8, in some embodiments, the fourth connector 500 includes a first buckling piece 510 and a second buckling piece 520. When the first buckling piece 510 is connected with the second buckling piece 520, a slot 530 is formed between the first buckling piece 510 and the second buckling piece 520. The first buckling piece 510 and the second buckling piece 520 may be connected by a split structure or an integrated structure. As shown in FIG. 7, taking the split structure as an example, the first buckling piece 510 is provided with a clamping hole 511 at one end of the first buckling piece 510, and the second buckling piece 520 is provided with an insertion block 521 at one end of the second buckling piece 520 matched with the clamping hole 511, and the insertion block 521 may be inserted into the clamping hole 511 for connection. During assembly, a side wall of an end portion of the second air pipe 200 is placed in a position on the first buckling piece 510 corresponding to the slot 530, and then the insertion block 521 of the second buckling piece 520 is inserted into the clamping hole 511 of the first buckling piece 510, thereby integrally connecting the first buckling piece 510 and the second buckling piece 520, and clamping the second air pipe 200 by the cooperation of the first buckling piece 510 and the second buckling piece 520. The fourth connector 500 and the second air pipe 200 are assembled together, and then the fourth connector 500 is installed on the second connector 320. The fourth connector 500 with the split structure provides convenience for processing and molding, simplifies a mold structure, and has a reliable and stable structure.

[0062] With reference to FIG. 7, the first buckling piece 510 and the second buckling piece 520 are fixed by a first fastening piece (not shown in the figure), and the fourth connector 500 is provided with two mounting holes 512 matched with the first fastening piece, and the mounting holes 512 penetrate through the slot 530. During installation, the first fastening piece passes through the mounting hole 512 and penetrates through the second air pipe 200. The fourth connector 500 and the second air pipe 200 are fixedly connected into a whole by the first fastening piece, thereby further preventing the second air pipe 200 from coming out of the slot 530 and improving the use reliability. It can be understood that the first fastening piece may also be a bolt, a rivet, a pin, etc.

[0063] With reference to FIG. 8 and FIG. 10, the second connector 320 is connected with the fourth connector 500 through a second fastening piece (not shown in the figure). The second fastening piece used in the embodiment is a screw, the second connector 320 is provided with a connecting hole 327 matched with the screw, the fourth connector 500 is provided with an erection column 522, and the erection column 522 is provided with a threaded hole matched with the screw. During assembly, the screw passes through the connecting hole 327, and then is screwed into the threaded hole, so that the second connector 320 is fixed with the fourth connector 500 are fixed, and the structure is more reliable and firmer. It can be understood that the second fastening piece may also be a rivet, a pin, etc., which can also achieve the purpose of fixing the second connector 320 and the fourth connector 500 into a whole.

[0064] With reference to FIG. 8, in some embodiments, the second air pipe 200 is provided with a positioning rib 220 at a port position of the end portion of the second air pipe 200, the positioning rib 220 may be an iron wire embedded in the pipe wall, and a positioning groove matched with the positioning rib 220 is formed in the slot 530. When the port of the second air pipe 200 is fixed in the slot 530, the positioning rib 220 is clamped in the positioning groove. It can be understood that the second air pipe 200 is made of a plastic material, and the strength of the second air pipe 200 can be improved by the positioning ribs 220, so that the connection between the second air pipe 200 and the fourth connector 500 is firmer and more reliable, and the second air pipe 200 is prevented from being loose or easily damaged due to excessive tensile strength.

[0065] It should be noted that the slot 530 has a first side wall and a second side wall arranged oppositely, and the first side wall and the second side wall in cooperation form the curved slot 530. For example, the slot 530 may be defined as V-shaped, S-shaped and other curved shapes, and the slot 530 shown in FIG. 8 is V-shaped. In this way, the slot 530 can be matched with a corrugated shape of the side wall of the second air pipe 200, so that the slot 530 can clamp the second air pipe 200 more firmly and the structural stability can be improved.

[0066] With reference to FIG. 9 and FIG. 10, in some embodiments, a positioning piece 600 is arranged in the second air duct 210. The positioning piece 600 includes a positioning portion 610 and a supporting portion 620. The positioning piece 600 is sleeved on an outer side of the first air pipe 100 through the positioning portion 610, so that the positioning piece 600 is snapped on the first air pipe 100 and prevented from falling off from the pipe body. Meanwhile, the positioning portion 610 extends toward the second air pipe 200 to form the supporting portion 620. The supporting portion 620 extends into the second air pipe 200 and abuts against the inner side wall of the second air pipe 200. The supporting portion 620 abutting against the inner side wall of the second air pipe

200 can be understood as that the supporting portion 620 abut against the inner side wall, so that the supporting portion 620 can support the second air pipe 200 and keep a certain space between the first air pipe 100 and the second air pipe 200.

[0067] For example, the positioning portion 610 may be a snap spring, the snap spring is matched with a pipe body of the first air pipe 100, and the positioning piece 600 is snapped on the first air pipe 100 by the snap spring buckling along a circumferential direction of the pipe body. For another example, the positioning portion 610 may be an elastic pipe clamp, and the elastic pipe clamp can clamp on the first air pipe 100 to prevent the positioning piece 600 from falling off from the pipe body.

[0068] It can be understood that the positioning piece 600 can position the first air pipe 100 and fix a relative position between the first air pipe 100 and the second air pipe 200. In operation, the first air duct 110 exhausts air and the second air duct 210 inhales air. Under the positioning action of the positioning piece 600, the first air pipe 100 can be prevented from moving inside the second air pipe 200, that is, the inner pipe can be positioned without moving, and the first air duct 110 and the second air duct 210 can be kept from deforming, thus effectively ensuring the smoothness of ventilation of the first air duct 110 and the second air duct 210, making the pipe-in-pipe structure more stable and reliable, being beneficial to reducing the resistance of air intake and air exhaust, and playing a role of noise reduction.

[0069] In some embodiments, the positioning portion 610 is matched with the first annular groove on the outer side of the first air pipe 100, so that the positioning portion 610 can be clamped in the first annular groove for fixing, and the first annular groove plays a role of limiting the positioning piece 600, thus making the positioning piece 600 firmer and preventing the positioning piece 600 from coming loose.

[0070] With reference to FIG. 9 and FIG. 10, in some embodiments, the positioning portion 610 and the supporting portion 620 are integrally formed by elastic ferrules bent, and the positioning portion 610 and the supporting portion 620 can be shaped according to the shapes, sizes and position relationships of the first air pipe 100 and the second air pipe 200. The ferrule of the embodiment is made of a steel wire with a certain carbon content, which has high enough strength, good elasticity and is not easy to bend. In this way, the positioning portion 610 formed by the ferrule bent has certain elasticity and can clamp the first air pipe 100. During installation, the ferrule can be directly expanded and sleeved on an outer side of the first air pipe 100 by the elasticity of the ferrule, and snapped onto the outer side of the first air pipe 100 by the positioning portion 610. Meanwhile, the second air pipe 200 is supported by the supporting portion 620, so that the installation is convenient and quick, the wind resistance is small, and the ventilation of the second air duct 210 is not affected.

[0071] With reference to FIG. 9, the ferrule has an

open-loop structure, and an opening is arranged at the position of the supporting portion 620, providing convenience for the ferrule to be expanded and sleeved on the outer side of the first air pipe 100. An end portion of the opening of the ferrule is bent to form a bending section 621, and the bending section 621 is beneficial to improving a supporting strength of the supporting portion 620 and making the supporting structure more stable. It can be understood that the ferrule may also adopt a closed-loop structure and may also play a role of supporting and positioning.

[0072] It should be noted that the positioning piece 600 may be arranged at different positions of the first air pipe 100 according to installation requirements, or more than two positioning pieces 600 may be arranged on the first air pipe 100, and the positioning pieces 600 are distributed along the pipe body of the first air pipe 100, so that the stability of the pipe-in-pipe structure can be further improved by positioning the first air pipe 100 at different positions, and the inner pipe can be effectively prevented from moving inside the outer pipe, so that the structure is more reliable.

[0073] In FIG. 11 and FIG. 12, a mobile air conditioner 20 according to an embodiment of the present disclosure is illustrated, which employs the air pipe assembly 10 of the foregoing embodiments.

[0074] With reference to FIG. 11, the mobile air conditioner according to the embodiment of the present disclosure includes an air conditioner body 21 and the air pipe assembly 10, wherein the air conditioner body 21 includes a condenser and an air exhaust assembly, the condenser and the air exhaust assembly are installed in an air intake chamber, and the condenser is configured to exchange heat with the outdoor environment. An air inlet of the air intake chamber is connected with the second air pipe 200, and an air outlet of the air intake chamber is connected with the first air pipe 100. According to the use requirements of different environments, an operation mode in which the first air duct 110 and the second air duct 210 are communicated with the outdoor environment at the same time, or an operation mode in which the first air duct 110 is communicated with the outdoor environment while the second air duct 210 is communicated with the indoor environment may be selected through the air pipe assembly 10.

[0075] With reference to FIG. 11, when in use, the air pipe joint 300 is directly pulled out to the window for connection, the first air duct 110 and the second air duct 210 are communicated with the outdoor environment at the same time, and the outdoor air enters the mobile air conditioner 20 through the second air duct 210. After the air exchanges heat with the condenser, the hot air is exhausted to the outdoor environment through the first air duct 110, thus realizing the outdoor heat exchange process of the mobile air conditioner 20. Both the air intake and the air exhaust are completed through the outdoor environment, which does not affect the indoor environment and has a good refrigeration effect.

[0076] With reference to FIG. 12, the first connector 310 is separated from the second connector 320, and the first air pipe 100 is separately pulled out and communicated with the outdoor environment. During operation, the indoor air enters the mobile air conditioner 20 through the second air duct 210. After the air exchanges heat with the condenser, the hot air is exhausted to the outdoor environment through the first air duct 110 to realize the heat exchange process, which is beneficial to exhausting the indoor turbid air, and makes the indoor environment have fresh air, so that the mobile air conditioner has high use flexibility, can meet different use requirements, and has better use experience. Structures of the condenser and the air exhaust assembly are not shown in the drawings. The specific structure of the air conditioner body 21 is easy to obtain by those having ordinary skills in the art, and will not be elaborated again.

[0077] It should be noted that, as shown in FIG. 10, the first air pipe 100 and the second air pipe 200 may be connected with the air conditioner body 21 through an erection joint 700. The erection joint is connected to lower ends of the first air pipe 100 and the second air pipe 200. The erection joint 700 can be matched with the pipe-in-pipe structure. In addition, a protective screening 710 may be arranged at the position of the erection joint 700. The protective screening 710 is respectively corresponding to the first air duct 110 and the second air duct 210. Sundries or Animals such as mice can be effectively prevented from entering the air conditioner body 21 through the protective screening 710, thus ensuring the normal operation of the mobile air conditioner 20.

[0078] The embodiments of the disclosure have been described in detail above with reference to the drawings, but the disclosure is not limited to the above embodiments, and various changes can be made without departing from the purpose of the disclosure within the scope of knowledge possessed by those of ordinary skills in the art.

Claims

1. An air pipe assembly for a mobile air conditioner, comprising:

a first air pipe, wherein a first air duct is formed in an inner side of the first air pipe; and
a second air pipe, wherein the second air pipe is sleeved on an outer side of the first air pipe, such that a second air duct is formed between the first air pipe and the second air pipe;
wherein, the first air pipe is capable of extending to an exterior of the second air pipe, such that the air pipe assembly is capable of having a first state in which both the first air duct and the second air duct are communicated with an outdoor environment, and having a second state in which only the first air duct is communicated with the

outdoor environment.

2. The air pipe assembly according to claim 1, further comprising an air pipe joint, the air pipe joint being connected to the first air pipe and the second air pipe respectively. 5
3. The air pipe assembly according to claim 1, further comprising an air pipe joint, wherein the air pipe joint comprises a first connector for being connected with the first air pipe and a second connector for being connected with the second air pipe, the first connector is detachably connected with the second connector. 10
4. The air pipe assembly according to claim 3, wherein a limiting portion is arranged on an inner side of the second connector, the limiting portion defines a limiting hole, the limiting hole matched with the first air pipe, the limiting portion is connected with the first connector. 15
5. The air pipe assembly according to claim 4, wherein the limiting portion is provided with a first buckle along a periphery of the limiting hole, the first buckle is snapped with an edge of the first connector. 20
6. The air pipe assembly according to claim 5, wherein the first connector comprises a first snap ring, the first snap ring being connected with a port of the first air pipe, a second snap ring snapped with the first buckle is arranged above the first snap ring. 25
7. The air pipe assembly according to claim 6, wherein the air pipe joint further comprises a third connector, an end of the third connector is connected with the first connector, an other end of the third connector extends towards an outer side of the first air pipe to form a third air pipe. 30
8. The air pipe assembly according to claim 7, wherein on an inner side of the second snap ring is provided with a bump, the third connector is provided with a groove corresponding to the bump. 35
9. The air pipe assembly according to claim 3, wherein the first connector is eccentrically arranged on the inner side of the second connector. 40
10. The air pipe assembly according to claim 3, wherein the air pipe joint further comprises a fourth connector, the fourth connector is provided with a slot, the slot being connected with an end portion of the second air pipe, the fourth connector is connected with the second connector. 45
11. The air pipe assembly according to claim 10, wherein the fourth connector comprises a first buckling piece and a second buckling piece, and the first buckling piece is connected with the second buckling piece, so that the slot is formed between the first buckling piece and the second buckling piece. 50
12. The air pipe assembly according to claim 11, wherein a port of the second air pipe is provided with a positioning rib, and a positioning groove matched with the positioning rib is formed in the slot. 55
13. The air pipe assembly according to claim 1, wherein a positioning piece is arranged in the second air duct, the positioning piece comprises a positioning portion sleeved on the outer side of the first air pipe, the positioning portion extends towards the second air pipe and forms a supporting portion abutting against an inner side wall of the second air pipe.
14. The air pipe assembly according to claim 13, wherein the outer side of the first air pipe is provided with an annular groove for accommodating the positioning portion.
15. The air pipe assembly according to claim 13, wherein the positioning portion and the supporting portion are made of elastic ferrules.
16. A mobile air conditioner, comprising the air pipe assembly according to any one of claims 1 to 15.
17. The mobile air conditioner according to claim 16, further comprising an air conditioner body, wherein the air conditioner body is provided with a condenser, an air intake chamber for mounting the condenser, and an air inlet and an air outlet being communicated with the air intake chamber, the air inlet is connected with a second air pipe, and the air outlet is connected with a first air pipe.

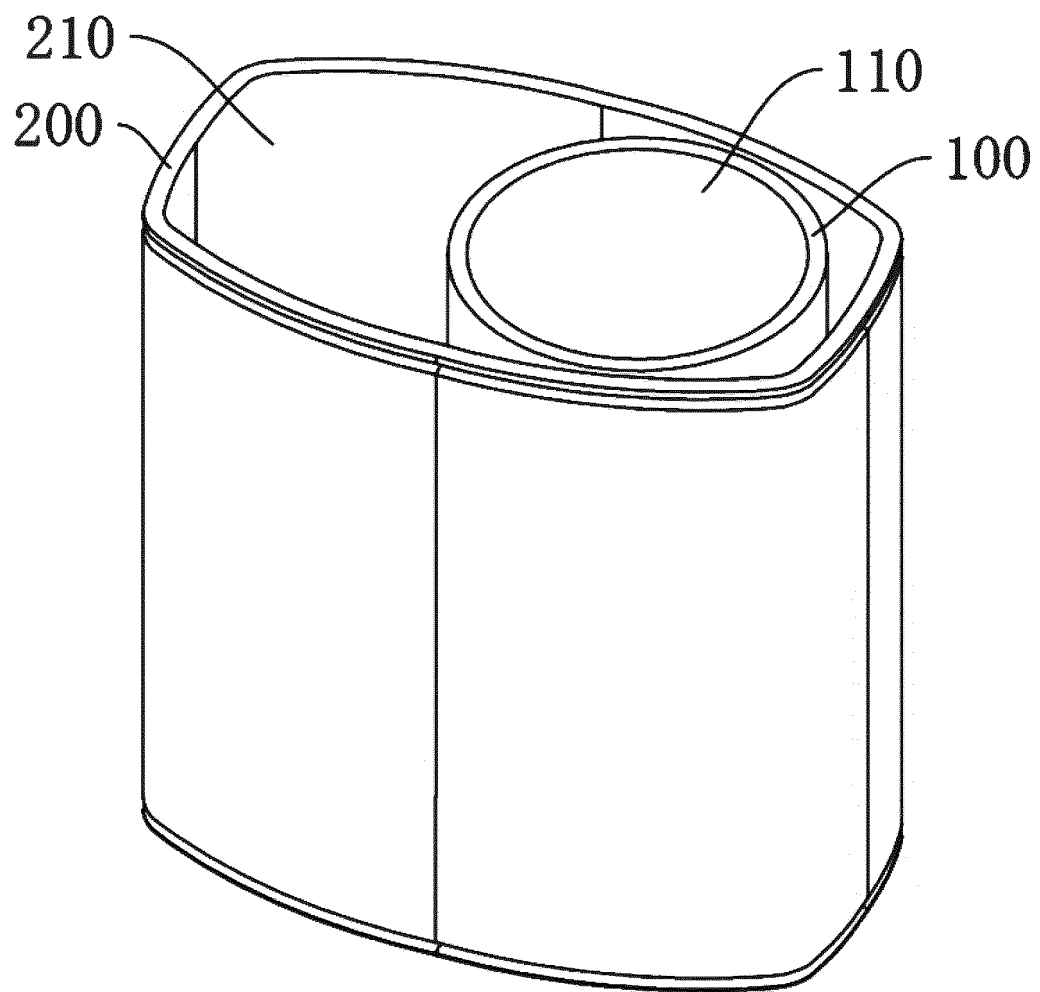


Fig. 1

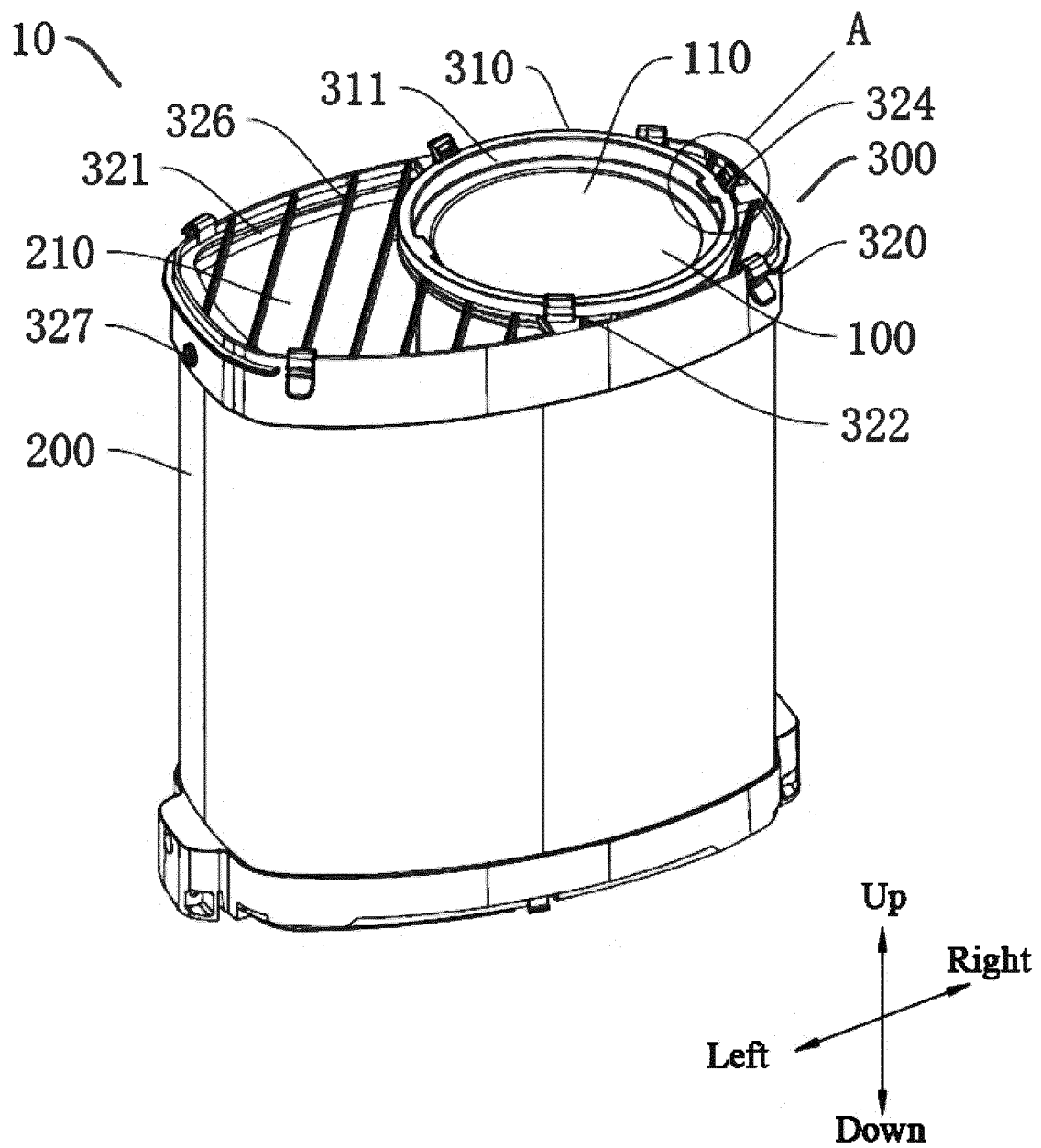


Fig. 2

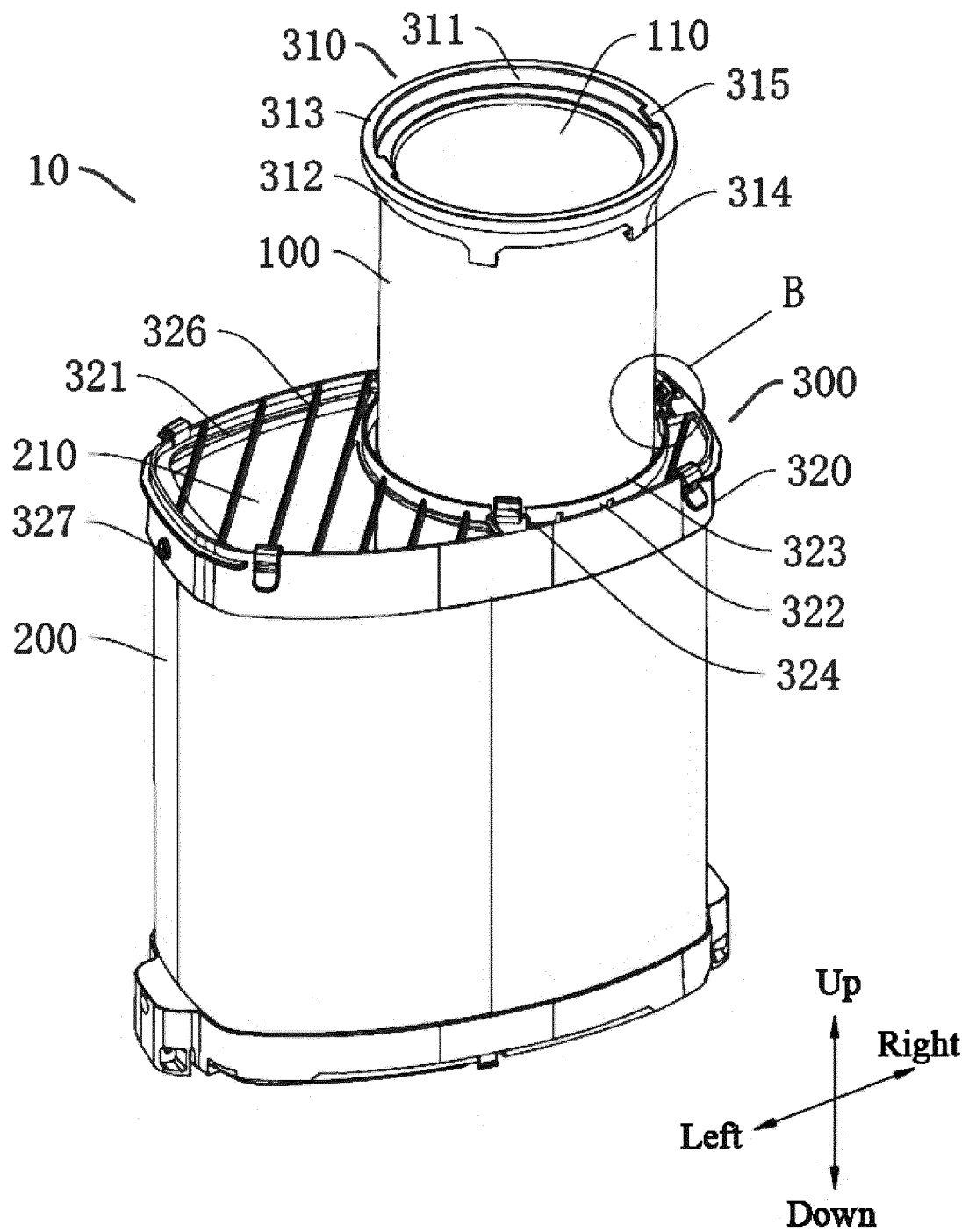


Fig. 3

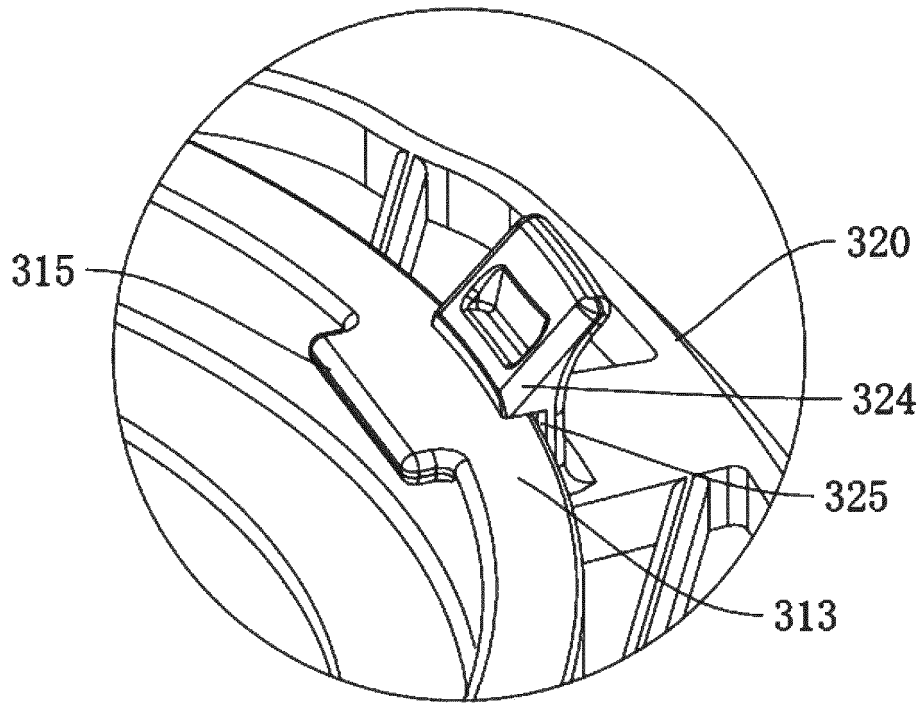


Fig. 4

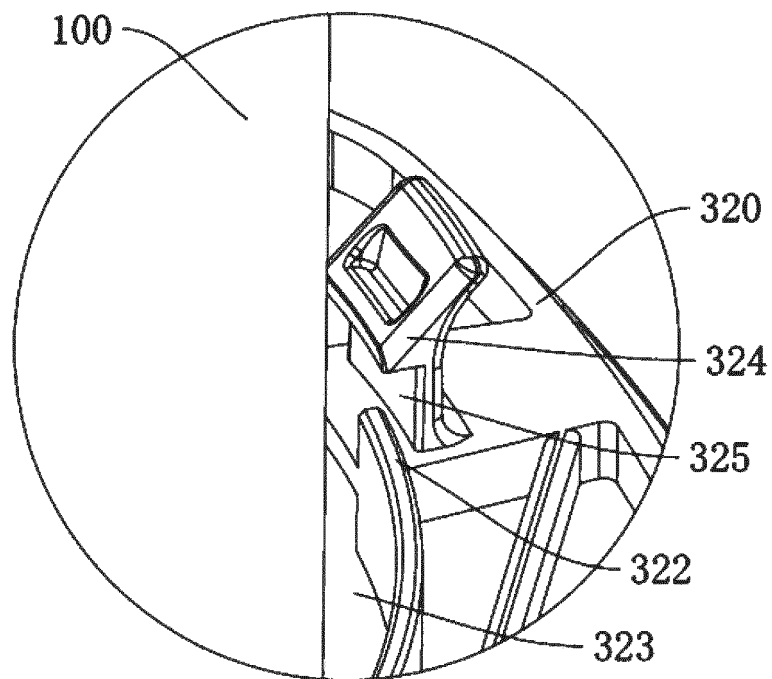


Fig. 5

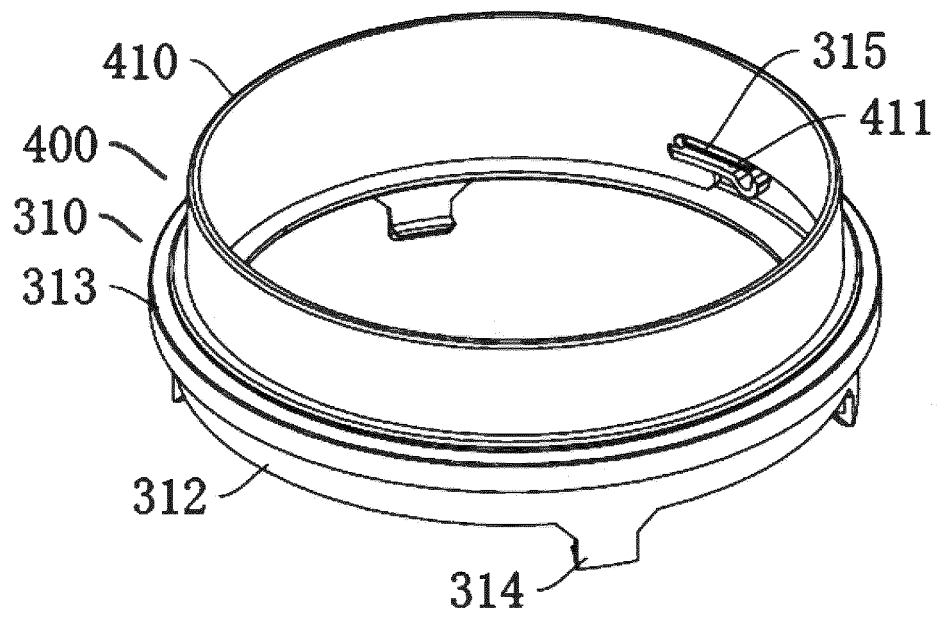


Fig. 6

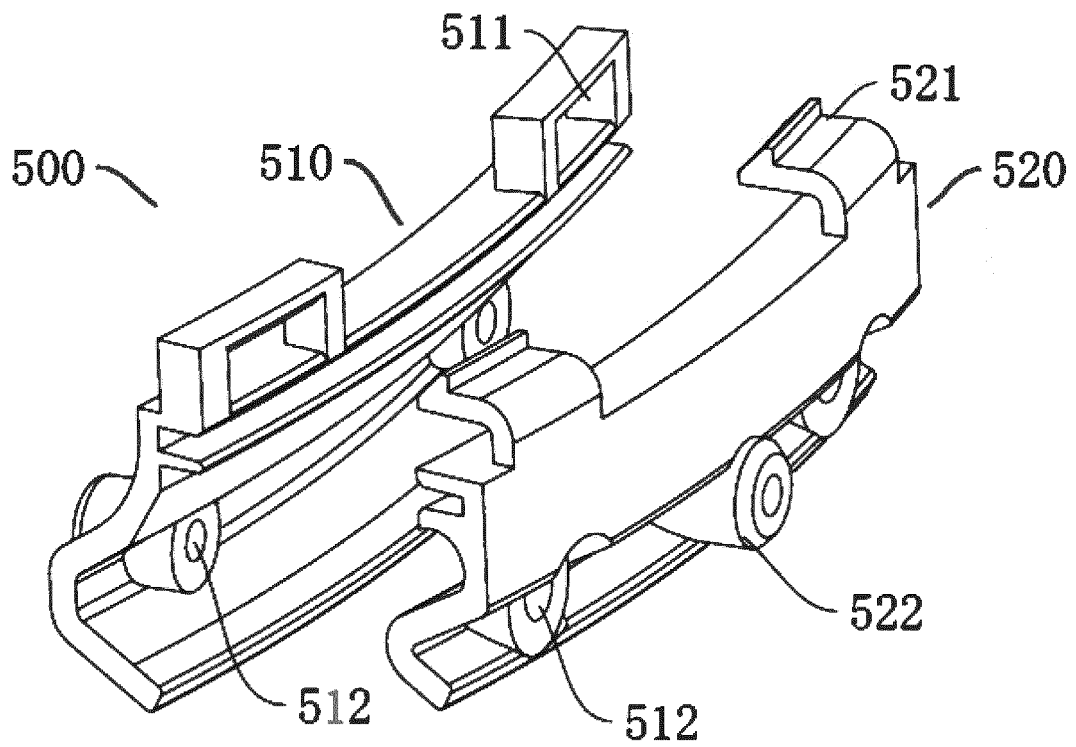


Fig. 7

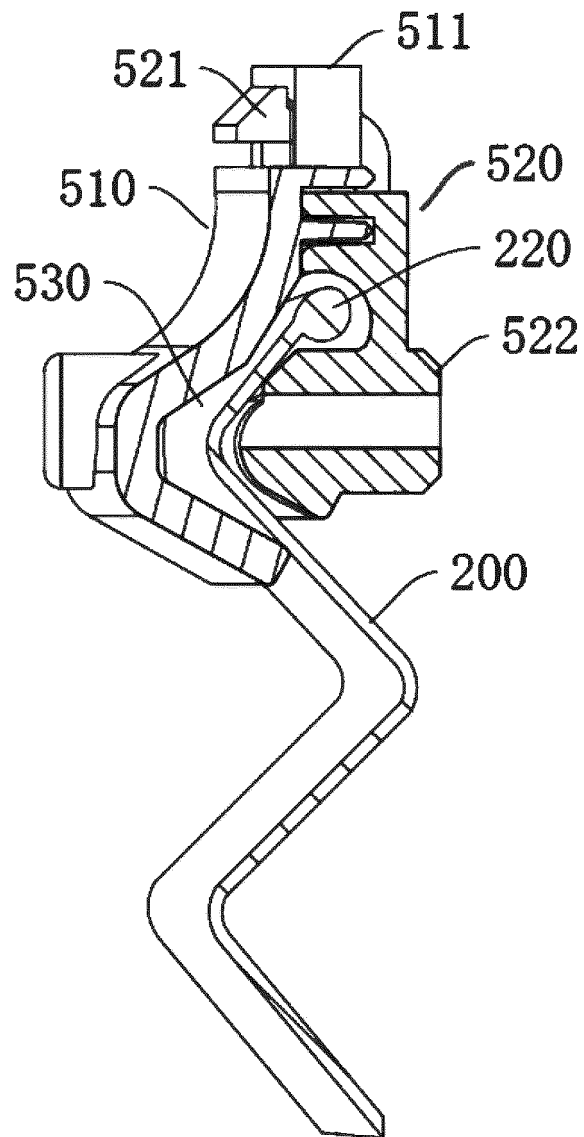


Fig. 8

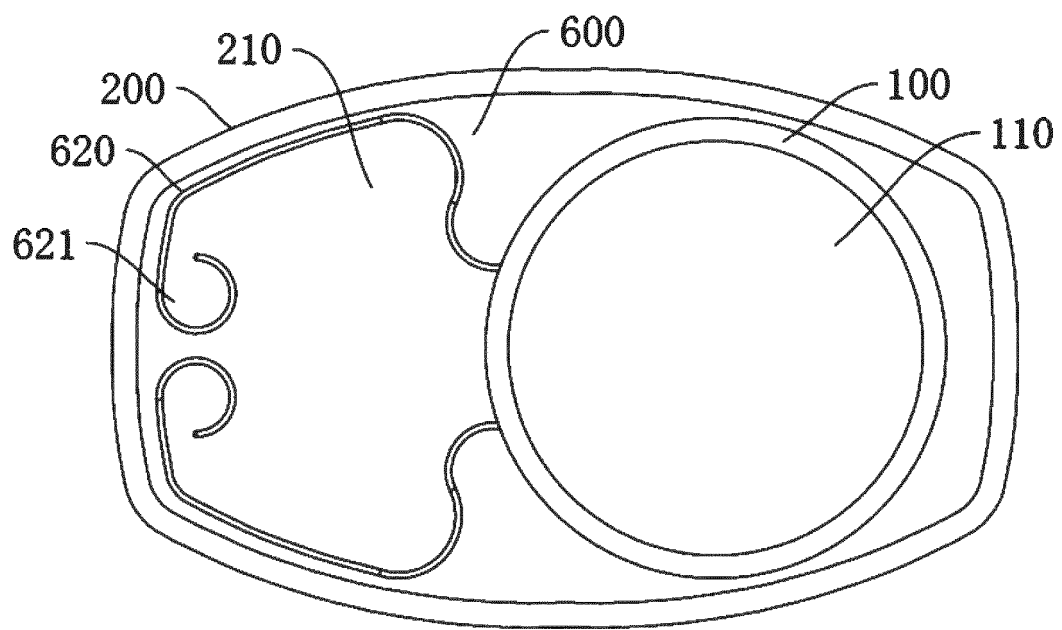


Fig. 9

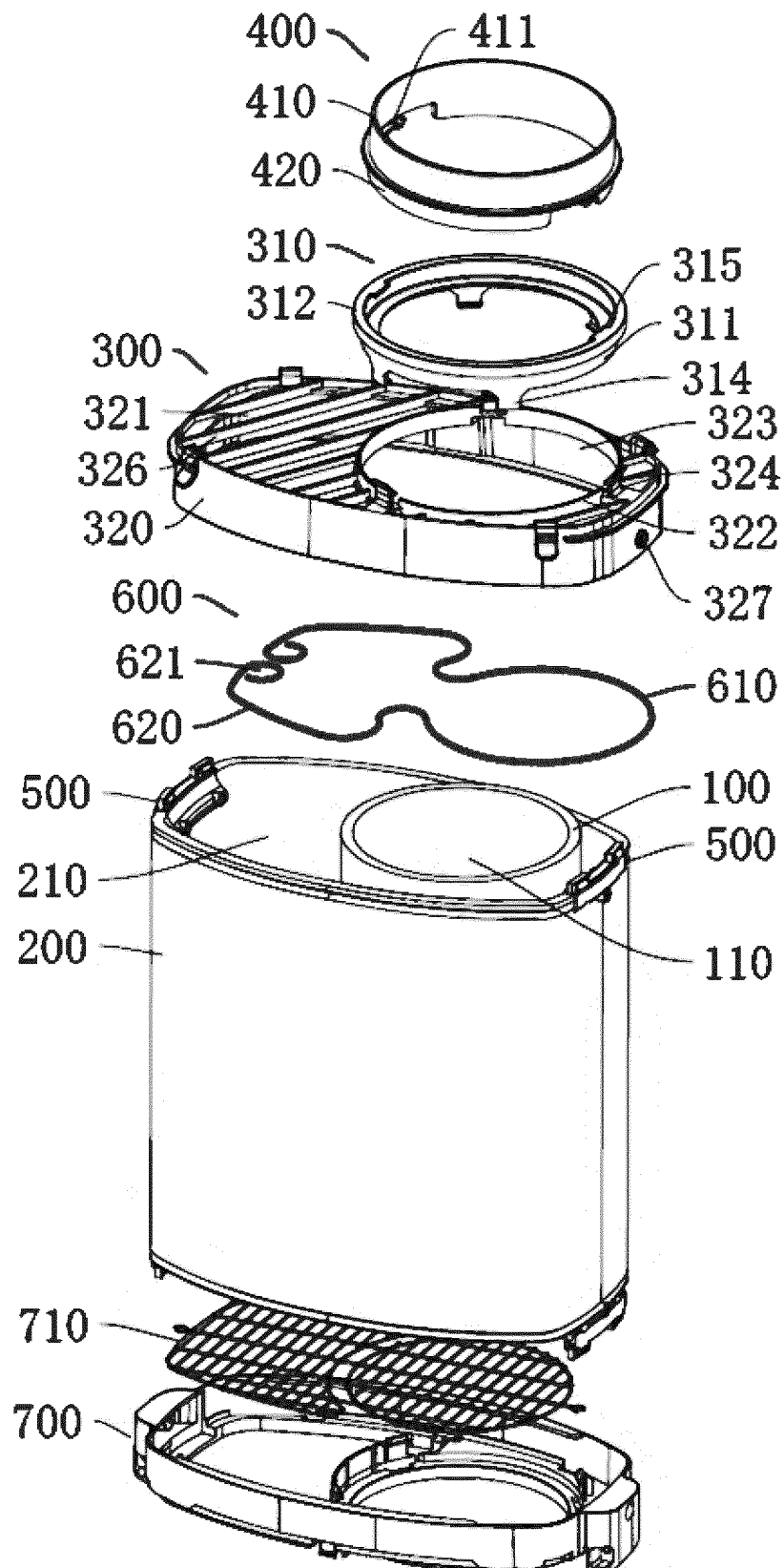


Fig. 10

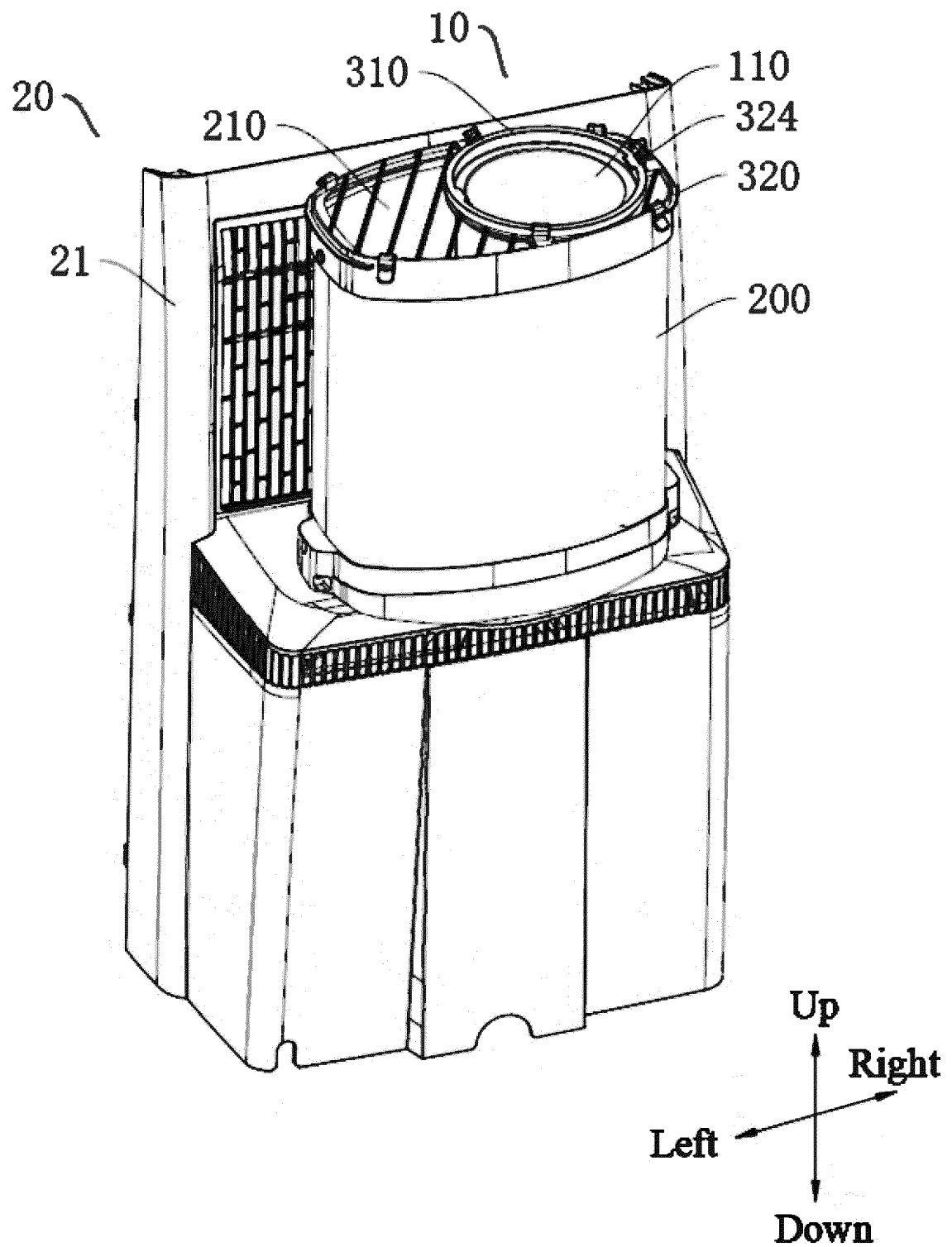


Fig. 11

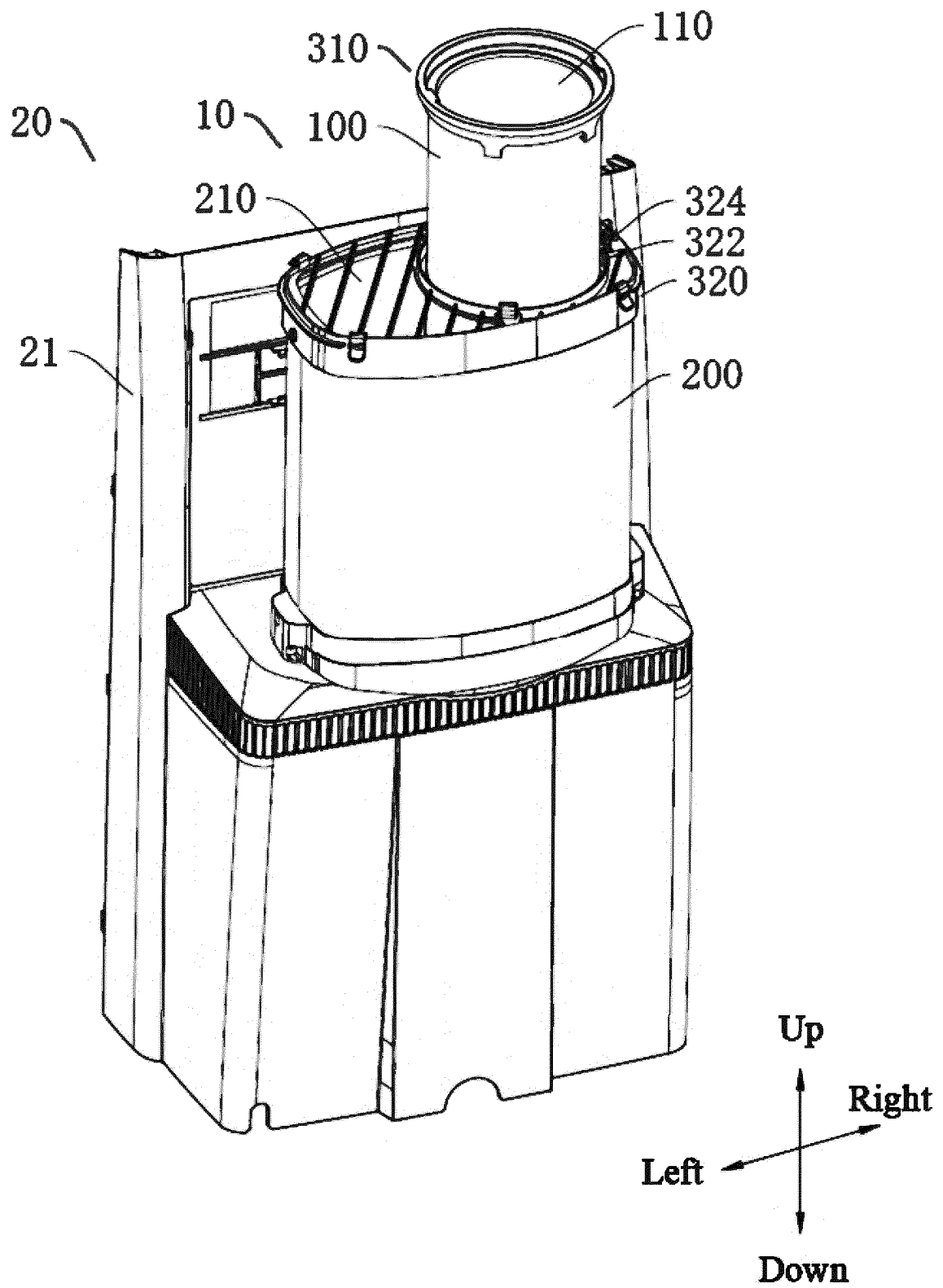


Fig. 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/118451

5	A. CLASSIFICATION OF SUBJECT MATTER F24F 13/02(2006.01)i; F24F 1/029(2019.01)i According to International Patent Classification (IPC) or to both national classification and IPC		
10	B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) F24F Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
15	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CNABS; CNTXT; VEN; USTXT; WOTXT; EPTXT; CNKI; SIPOABS; JPABS; 卢绍章, 移动, 空调, 空气调节, 风管, 风道, 管道, 伸缩, 伸展, 拉伸, 伸长, 进风, 排风, 套管, 套筒, 内管, 外管, 管中管, 室外, 室内, 限位, 卡扣, 防窜风, 扣接, 突出, 凸出, 延伸, 伸出, mov+, air 2d conditioner?, wind, air, pipe?, tube?, duct?, channel?, indoor?, outdoor?, flex+, extend+, stretch+, spread+		
20	C. DOCUMENTS CONSIDERED TO BE RELEVANT		
	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	Y	CN 111237888 A (GUANGDONG MEDIA REFRIGERATION EQUIPMENT CO., LTD.) 05 June 2020 (2020-06-05) description, paragraphs 37-50, and figures 1-4	1-17
25	Y	CN 2670801 Y (GUANGDONG KELON ELECTRICAL HOLDINGS CO., LTD.) 12 January 2005 (2005-01-12) description, page 5 line 1 to page 7 last line and figures 1-8	1-17
	Y	CN 107747803 A (AUX AIR CONDITIONER CO., LTD.) 02 March 2018 (2018-03-02) description, paragraphs 38-90, and figures 1-8	4-8, 16, 17
30	Y	CN 109425113 A (HONG KONG ZHONGHUA COAL GAS CO., LTD.) 05 March 2019 (2019-03-05) description, paragraphs 48-69, and figures 1-14	10-12, 16, 17
	A	JP 6-313597 A (PANASONIC SEIKO CORP.) 08 November 1994 (1994-11-08) entire document	1-17
35	☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
40	* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
45			
50	Date of the actual completion of the international search 16 April 2021		Date of mailing of the international search report 28 April 2021
55	Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088 China		Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2020/118451

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		HK 40003388 A0	09 April 2020
		HK 1248461 A2	12 October 2018
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REFERENCES CITED IN THE DESCRIPTION

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- CN 202021514357 [0001]