



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

(43) Date of publication:
05.07.2023 Bulletin 2023/27

(51) International Patent Classification (IPC):
F25D 11/02^(2006.01)

(21) Application number: **21868438.9**

(52) Cooperative Patent Classification (CPC):
**F25D 11/02; F25D 17/04; F25D 23/02; F25D 23/04;
F25D 25/02; F25D 29/00**

(22) Date of filing: **31.08.2021**

(86) International application number:
PCT/CN2021/115629

(87) International publication number:
WO 2022/057611 (24.03.2022 Gazette 2022/12)

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

(72) Inventors:
• **LI, Jiaming**
Qingdao, Shandong 266101 (CN)
• **ZHANG, Hao**
Qingdao, Shandong 266101 (CN)
• **LYU, Peng**
Qingdao, Shandong 266101 (CN)
• **CUI, Zhanpeng**
Qingdao, Shandong 266101 (CN)

(30) Priority: **15.09.2020 CN 202010969235**

(71) Applicants:
• **Qingdao Haier Refrigerator Co., Ltd.**
Laoshan District
Qingdao
Shandong 266101 (CN)
• **Haier Smart Home Co., Ltd.**
Qingdao, Shandong 266101 (CN)

(74) Representative: **Ziebig Hengelhaupt Intellectual
Property Attorneys**
Patentanwaltskanzlei PartGmbB
Leipziger Straße 49
10117 Berlin (DE)

(54) **REFRIGERATOR PROVIDED WITH SEALED DRAWER ON DOOR BODY**

(57) A refrigerator provided with a sealed drawer on a door body. The refrigerator comprises: a refrigerator body, which defines a first storage space; a first door, which is pivotally arranged at a front portion of the refrigerator body and configured to open or close the first storage space; a sealed barrel, which is arranged in the first door and forms an opening at the side away from the first storage space; a drawable box arranged in the sealed barrel in a drawable manner via the opening; and a ventilation device, which is arranged in the sealed barrel and configured such that an internal space of the sealed barrel is in communication with the first storage space when being started, so as to achieve gas exchange between the internal space of the sealed barrel and the first storage space. According to the solution of the present invention, the sealed drawer for storing certain precious goods (various dry goods, such as tea and Chinese wolfberry fruits) is configured to be on the door body, so as to prolong the shelf life of food materials, improve the freshness-keeping effect, and meet the refined require-

ment of users for classified storage of an intelligent refrigerator.

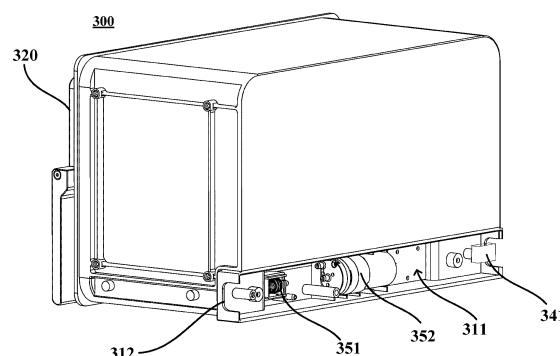


Fig. 5

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a refrigerator, and particularly to a refrigerator provided with a sealed drawer on a door body.

BACKGROUND OF THE INVENTION

[0002] In an existing refrigerator, a storage space is generally formed by a refrigerator body, and is opened and closed through a door body. Such conventional spatial structure causes inflexibility of space division. Especially for a large-capacity refrigerator, the storage space cannot be fully used. In addition, it is likely to cause cold energy leakage when a user opens or closes the door body to take and put objects.

[0003] To fully use the space of the refrigerator, door-in-door structures have emerged in the prior art, that is, a door body includes an inner-layer door (or referred to as a main door body, a first door) and an outer-layer door (or referred to as an outer door body, a second door). The inner-layer door is configured to seal the space of a refrigerator body, and the inner-layer door itself includes a storage space as well. The outer-layer door is configured to seal the storage space on the inner-layer door. When needing to take or put objects on the inner-layer door, a user just needs to open the outer-layer door. This improves the layout flexibility of the storage spaces.

[0004] However, in an existing door-in-door type refrigerator, a storage space on the inner-layer door is generally in direct communication with a storage space of the refrigerator body, and after the outer-layer door is opened, it is still likely to cause cold energy leakage of the storage space of the refrigerator body. In addition, smell in the storage space of the inner-layer door and smell in the storage space of the refrigerator body are likely to be mixed. The door body is opened more frequently than the storage space of the refrigerator body, which may easily cause decline in quality of objects stored.

BRIEF DESCRIPTION OF THE INVENTION

[0005] One purpose of the present invention is to provide a refrigerator provided with a sealed and separate sealed drawer on a door body so as to preserve special food materials.

[0006] A further purpose of the present invention is to prolong the shelf life of food materials and improve a preservation effect.

[0007] In particular, the present invention provides a refrigerator provided with a sealed drawer on a door body, and the refrigerator includes:

a refrigerator body, inside which a first storage space is defined;

a first door, pivotally disposed at a front portion of the refrigerator body and configured to open and close the first storage space;

a sealed barrel, disposed inside the first door and provided with an opening on one side away from the first storage space;

a drawable box, disposed inside the sealed barrel in a drawable way via the opening; and

a ventilating device, disposed inside the sealed barrel and configured to allow communication between an internal space of the sealed barrel and the first storage space when turned on, thus realizing air exchange between the internal space of the sealed barrel and the first storage space.

[0008] Optionally, the refrigerator further includes: a first humidity detection device, disposed inside the first storage space and configured to detect an air humidity in the first storage space; and a second humidity detection device disposed inside the sealed barrel and configured to detect air humidity in the sealed barrel. In addition, the ventilating device is further configured to be turned on when the air humidity in the sealed barrel is higher than the air humidity in the first storage space.

[0009] Optionally, the refrigerator further includes: an air exhausting device, disposed inside the sealed barrel and configured to be turned on to vacuumize the sealed barrel when the air humidity in the sealed barrel is lower than the air humidity in the first storage space.

[0010] Optionally, the sealed barrel is provided with an accommodating cavity in one side close to the first storage space; the accommodating cavity is separated from an area where the drawable box is located by a partition wall; and the air exhausting device and the ventilating device are disposed inside the accommodating cavity.

[0011] Optionally, the air exhausting device includes: a one-way valve, disposed on the partition wall and configured to allow only the air in the area where the drawable box is located to flow toward the accommodating cavity; and a vacuum pump, transversely disposed inside the accommodating cavity and connected to one side of the one-way valve located in the accommodating cavity by an air exhausting pipe.

[0012] Optionally, the ventilating device includes: a ventilation valve, disposed on a wall, toward the first storage space, of the accommodating cavity; and a ventilation pipe, extending from the ventilation valve to the partition wall and in communication with the area where the drawable box is located.

[0013] Optionally, the refrigerator further includes: a second door, pivotally disposed on one side of the first door away from the refrigerator body; and a door opening and closing detector, configured to sense an open/close state of the first door and the second door. In addition, the air exhausting device is further configured to be turned on only when the first door and the second door are both closed.

[0014] Optionally, the refrigerator further includes: a

sealing element, disposed at a position where a panel of the drawable box faces the sealed barrel, where the sealing element is extruded by the panel of the drawable box and the sealed barrel when the drawable box is closed, so as to seal a gap between the panel of the drawable box and the sealed barrel.

[0015] Optionally, the refrigerator further includes: a locking element, where the locking element is configured to limit positions of the panel of the drawable box and the sealed barrel when the drawable box is closed, and includes: limiting posts, extending from front ends disposed at two sides of the sealed barrel to the panel of the drawable box; and limiting grooves, formed on two sides of the panel of the drawable box and configured to cooperate with the limiting posts to lock the position of the drawable box.

[0016] Optionally, the drawable box further includes a pivoting handle, where the pivoting handle includes:

two pivoting arms, with one ends pivotally connected to two sides of a front panel of the drawable box within a set rotating angle, respectively; and pull rods, connected to the other ends of the two pivoting arms and configured to be held by a user to apply a force for pulling the drawable box after the pivoting arms rotate to a set angle.

[0017] According to the refrigerator provided with a sealed drawer on a door body in the present invention, the sealed barrel is disposed inside the first door, and the drawable box is disposed inside the sealed barrel in a drawable way via the opening, such that a sealed drawer for storing certain precious goods (various dried products, for example, tea and Chinese wolfberry fruits) is formed on the door body. In addition, a ventilating device may be disposed inside the sealed barrel that enables the sealed drawer to be in communication with the refrigerator body when turned on so as to reduce a humidity in the sealed drawer when the humidity in the sealed drawer is relatively high, thereby prolonging shelf life of food materials, improving a preservation effect, and meeting requirements of users on classified storage refinement of intelligent refrigerators.

[0018] Further, according to the refrigerator provided with a sealed drawer on a door body in the present invention, the humidity detection devices are used to detect the humidity in the first storage space of the refrigerator body and the humidity in the sealed barrel respectively, and the ventilating device and the air exhausting device are used to reduce the humidity of the sealed drawer. That is, the humidity in the drawer is reduced by using a vacuum dehumidification technology when the drawable box is closed, so that the interior of the drawer is kept dry, which is conducive to preservation of precious goods.

[0019] More further, the sealed drawer is sealed by extrusion of a sealing element (such as a silicone rubber sealing gasket), and can be conveniently sealed and un-

locked by using the pivoting handle based on structural improvement. This facilitates operation of users.

[0020] Specific embodiments of the present invention are described below in detail with reference to the accompanying drawings, and persons skilled in the art can more clearly understand the above and other purposes, advantages and features of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] Some specific embodiments of the present invention are described below in detail in an exemplary and unlimited way with reference to the accompanying drawings. The same or similar components or parts are indicated by the same reference numerals in the drawings. Persons skilled in the art should understand that these drawings are not necessarily drawn to scale. In the drawings:

FIG. 1 is a schematic perspective view of a refrigerator provided with a storage space on a door body according to an embodiment of the present invention;

FIG. 2 is a schematic diagram from one perspective of a door body in a refrigerator provided with a storage space on the door body according to an embodiment of the present invention;

FIG. 3 is a schematic diagram from another perspective of a door body in a refrigerator provided with a storage space on the door body according to an embodiment of the present invention;

FIG. 4 is a schematic diagram of a sealed drawer in a refrigerator according to an embodiment of the present invention;

FIG. 5 is a schematic diagram from another perspective of a sealed drawer in a refrigerator according to an embodiment of the present invention;

FIG. 6 is a schematic block diagram of exhausting and ventilating members in a refrigerator according to an embodiment of the present invention;

FIG. 7 is a schematic diagram of a closed drawable box in a refrigerator according to an embodiment of the present invention;

FIG. 8 shows a form of a sealing element in a state shown in FIG. 7;

FIG. 9 is a schematic diagram of a pulled-out drawable box in a refrigerator according to an embodiment of the present invention;

FIG. 10 shows a form of a sealing element in a state shown in FIG. 9;

FIG. 11 is a state diagram of a locking element when a drawable box in a refrigerator according to an embodiment of the present invention is pulled out; and FIG. 12 is a state diagram of a locking element when a drawable box in a refrigerator according to an embodiment of the present invention is closed.

DETAILED DESCRIPTION

[0022] The orientations or positional relationships indicated by the terms "up", "down", "front", "rear", "top", "bottom" and the like are based on the orientations or positional relationships shown in the accompanying drawings. Such terms are intended merely for the ease and brevity of description of the present invention without indicating or implying that the apparatuses or components mentioned must have specified orientations or must be constructed and manipulated in the specified orientations, and therefore shall not be construed as any limitation on the present invention. That is, if the embodiments of the present invention involve orientation indication (such as up, down, front, rear, top, bottom.....), the orientation indication is merely for explaining a relative positional relationship between members in a certain posture (for example, as shown in the accompanying drawings, or as a normal use state of the refrigerator). In addition, the terms "first" and "second" are merely for the purpose of description, and shall not be understood as any indication or implication of relative importance or any implicit indication of the number of technical features indicated.

[0023] FIG. 1 is a schematic perspective view of a refrigerator 10 provided with a storage space on a door body 11 according to an embodiment of the present invention. The refrigerator 10 provided with a storage space on a door body 11 may generally include a refrigerator body 12 and the door body 11.

[0024] At least a first storage space (shielded by the door body 11 and unshown in the figure) is defined inside the refrigerator body 12, where the first storage space includes a forward opening. Generally, at least one storage space with an open front side is defined inside the refrigerator body 12. Usually, a plurality of storage spaces are defined in the refrigerator body 12, where the storage spaces may be classified into a refrigeration chamber, a freezing chamber, a variable-temperature chamber and the like according to refrigeration temperatures and functions. Specific quantity and function of the storage space may be configured according to predetermined requirements. The first storage space may be one or more of a plurality of storage spaces defined by the refrigerator body 12.

[0025] The door body 11 is disposed on a front side of the refrigerator body 12 to open and close a storage chamber. For example, the door body 11 may be disposed on one side of a front portion of the refrigerator body 12 by means of hinging, to pivotally open and close the refrigerator body 12. The door body 11 may be configured according to layout of the refrigerator body 12. A layout structure of the refrigerator body 12 may be configured according to functions and requirements of the refrigerator, for example, the refrigerator body 12 may be configured as a side-by-side door type, a T type (cross door), a French type (four-door, or multi-door), or other types.

[0026] The door body 11 may include a first door 200 (or referred to as a main door body or an inner-layer door) and a second door 110 (or referred to as a front door body or an outer-layer door). The first door 200 may be pivotally disposed at a front portion of the forward opening, and a second storage space 210 may be defined in the first door 200. The second door 110 may be pivotally disposed on one side of the first door 200 away from the refrigerator body 12, and is configured to open and close the opening of the second storage space 210. When the second door 110 is separately opened, the second storage space 210 may be exposed. In addition, the second door 110 and the first door 200 may be opened simultaneously to expose the first storage space defined by the refrigerator body 12. Since hinges and rotating structures of double-layer doors are well known to persons skilled in the art, they are not described in detail again in this embodiment.

[0027] In the refrigerator 10 provided with a storage space on the door body 11 in this embodiment, the first storage space defined by the refrigerator body 12 includes a forward opening, and is sealed by a double-layer door (or referred to as a door-in-door). FIG. 2 is a schematic diagram from one perspective of a door body 11 in a refrigerator 10 provided with a storage space on the door body 11 according to an embodiment of the present invention. FIG. 3 is a schematic diagram from another perspective of a door body 11 in a refrigerator 10 provided with a storage space on the door body 11 according to an embodiment of the present invention. FIG. 2 and FIG. 3 respectively show a front side structure and a rear side structure of a door body 11 when a second door 110 is open.

[0028] In the refrigerator 10 in this embodiment, the second storage space 210 and the first storage space are independent of each other. When the second door 110 is separately opened, cold energy leakage of the first storage space can be avoided. Smell in the first storage space and smell in the second storage space 210 can also be prevented from being mixed during normal storage.

[0029] The first door 200 is provided with an air supply port 223 on one side toward the forward opening, and low-temperature air in the first storage space is introduced into the second storage space 210 via the air supply port 223, so as to implement refrigeration inside the second storage space 210. A fan and a sterilization device may be additionally disposed at the air supply port 223, so as to meet a refrigeration requirement of the second storage space 210.

[0030] The second storage space 210 may be divided into a plurality of storage areas. The quantity and structure of the storage areas may be configured according to a storage requirement. In some embodiments, at least one of the storage areas may be configured as a sealed drawer 300, where the sealed drawer 300 may be configured to implement dry-area storage, preservation and the like. One or more sealed drawers 300 may be pro-

vided, and a specific quantity thereof may be configured according to the storage requirement.

[0031] In the refrigerator 10 in this embodiment, the second storage space 210 and the first storage space behind can both be configured as a refrigeration storage space. By space division, storage requirements for different objects are met.

[0032] The sealed drawer 300 includes a sealed barrel 310, and a drawable box 320 that is disposed inside the sealed barrel 310 in a drawable way. The sealed barrel 310 is disposed inside the first door 200 and provided with an opening on one side away from the first storage space, that is, the opening is located on one side, facing the second door 110, of the first door 200. The drawable box 320 is disposed inside the sealed barrel 310 in a drawable way via the opening.

[0033] FIG. 4 is a schematic diagram of a sealed drawer 300 in a refrigerator 10 according to an embodiment of the present invention. FIG. 5 is a schematic diagram from another perspective of a sealed drawer 300 in a refrigerator 10 according to an embodiment of the present invention. FIG. 6 is a schematic block diagram of exhausting and ventilating members in a refrigerator 10 according to an embodiment of the present invention.

[0034] The refrigerator 10 is provided with a ventilating device 340, where the ventilating device 340 is disposed inside the sealed barrel 310 and configured to allow communication between an internal space of the sealed barrel 310 and the first storage space when turned on, thus realizing air exchange between the internal space of the sealed barrel 310 and the first storage space.

[0035] The refrigerator 10 according to the present invention preferably adopts air cooling for refrigeration, and the humidity in the first storage space may be reduced during refrigeration of the first storage space. Therefore, the ventilating device 340 may be turned on when the air humidity in the sealed barrel 310 is higher than the air humidity in the first storage space, so as to reduce the air humidity in the sealed barrel 310.

[0036] In this embodiment, humidity detection devices may be used to detect the humidity in the refrigerator body 12 and the first door 200. A first humidity detection device 331 is disposed inside the first storage space and configured to detect the air humidity in the first storage space. A second humidity detection device 332 is disposed inside the sealed barrel 310 and configured to detect the air humidity in the sealed barrel 310. The ventilating device 340 is further configured to be turned on when the air humidity in the sealed barrel 310 is higher than the air humidity in the first storage space. Thus, when the humidity in the sealed drawer 300 is relatively high, the sealed drawer 300 exchanges air with the first storage space so as to reduce the humidity in the sealed drawer 300, thereby prolonging shelf lives of food materials and improving a preservation effect.

[0037] To further meet the requirement of the sealed drawer 300 for storing tea or other dry products and precious goods, the refrigerator 10 according to this embod-

iment may further be provided with an air exhausting device 350. The air exhausting device 350 is disposed inside the sealed barrel 310 and configured to be turned on when the air humidity in the sealed barrel 310 is lower than the air humidity in the first storage space, so as to vacuumize the sealed barrel 310.

[0038] To increase an available volume of the sealed barrel 310, a structure of the sealed barrel 310 of the refrigerator according to this embodiment is further optimized. The sealed barrel 310 is provided with an accommodating cavity in one side close to the first storage space; the accommodating cavity is separated from an area where the drawable box 320 is located by a partition wall; and the air exhausting device 350 and the ventilating device 340 are disposed inside the accommodating cavity. To show the internal structure of the accommodating cavity, a rear wall of the accommodating cavity is specially hidden in FIG. 5. The accommodating cavity may be in a long strip shape, is disposed at the top or bottom of the sealed barrel 310, and provides an internal space for mounting the air exhausting device 350 and the ventilating device 340. The partition wall 312 may be provided with a through hole for connecting the air exhausting device 350 and the ventilating device 340 to the interior of the sealed barrel 310.

[0039] The air exhausting device 350 may include a one-way valve 351 and a vacuum pump 352. The one-way valve 351 is disposed on the partition wall 312 and configured to allow only the air in the area where the drawable box 320 is located to flow toward the accommodating cavity, such that external air is prevented from entering the sealed barrel 310 via the partition wall 312. The vacuum pump 352 is transversely disposed inside the accommodating cavity and connected to one side, located in the accommodating cavity, of the one-way valve 351 by an air exhausting pipe (unshown in the figure).

[0040] The ventilating device 340 may include: a ventilation valve 341, disposed on a wall, toward the first storage space, of the accommodating cavity; and a ventilation pipe (unshown in the figure), extending from the ventilation valve 341 to the partition wall 312 and in communication with the area where the drawable box 320 is located.

[0041] The ventilating device 340 and the air exhausting device 350 are both configured to be turned on only when the first door 200 and the second door 110 are both closed, so as to prevent external air introduced after the door is opened from affecting humidity detection results of the first humidity detection device 331 and the second humidity detection device 332. The refrigerator according to this embodiment may further be provided with a door opening and closing detector 333. The door opening and closing detector 333 is configured to sense an open/close state of the first door 200 and the second door 110, so as to provide the open/close state of the first door 200 and the second door 110 for the ventilating device 340 and the air exhausting device 350. The door opening and

closing detector 333 may detect opening and closing actions of the first door 200 and the second door 110 by means such as a contact switch, a Hall element, and a magnetosensitive element.

[0042] An operating principle of the refrigerator according to this embodiment for maintaining the humidity of the sealed barrel 310 includes: determining that the first door 200 and the second door 110 are both closed; acquiring an air humidity in the first storage space detected by the first humidity detection device 331 and an air humidity in the sealed barrel 310 detected by the second humidity detection device 332; comparing the air humidity in the first storage space with the air humidity in the sealed barrel 310; and if the air humidity in the first storage space is higher than the air humidity in the sealed barrel 310, closing the ventilation valve 341 and starting the vacuum pump 352 to exhaust air from the sealed drawer 300. When the air humidity in the sealed barrel 310 is higher than that in a refrigeration chamber, the ventilation valve 341 is opened, and the vacuum pump 352 is started to exchange air for the drawer 300. Air exhausting and/or ventilation can both be performed according to a preset time duration or started and stopped according to a temperature.

[0043] The comparison between the air humidity in the first storage space and the air humidity in the sealed barrel 310, and the control on the ventilating device 340 and the air exhausting device 350 can both be implemented by one controller.

[0044] In this embodiment, the humidity detection devices are used to detect the humidity in the first storage space of the refrigerator body 12 and the humidity in the sealed barrel 310 respectively, and the ventilating device 340 and the air exhausting device 350 are used to reduce the humidity of the sealed drawer 300. That is, the humidity in the drawer 300 is reduced by using a vacuum dehumidification technology when the drawable box 320 is closed, so that the interior of the drawer 300 is kept dry, which is conducive to preservation of precious goods.

[0045] In this embodiment, in order to guarantee a sealing effect, a sealing structure for the sealed drawer 300 is also improved. FIG. 7 is a schematic diagram of a closed drawable box 320 in a refrigerator 10 according to an embodiment of the present invention; and FIG. 8 shows a form of a sealing element 324 in a state shown in FIG. 7. FIG. 9 is a schematic diagram of a pulled-out drawable box 320 in a refrigerator 10 according to an embodiment of the present invention; and FIG. 10 shows a form of a sealing element 324 in a state shown in FIG. 9.

[0046] It can be seen from FIG. 7 to FIG. 10 that the sealing element 324 is disposed at a position where a panel of the drawable box 320 faces the sealed barrel 310, and the sealing element 324 is extruded by the panel of the drawable box 320 and the sealed barrel 310 when the drawable box 320 is closed, so as to seal a gap between the panel of the drawable box 320 and the sealed barrel 310. The sealing element 324 may use a silicone

rubber sealing gasket embedded into a slot formed in a front panel of the drawable box 320. After the drawable box 320 is closed, the gap between the drawable box 320 and the sealed barrel 310 is sealed under the extrusion of the front panel of the drawable box 320 and the sealed barrel 310.

[0047] To facilitate operation of a user and prevent a situation that the drawable box 320 is difficult to open in a sealed state, the drawable box 320 may further include a pivoting handle 321. The pivoting handle 321 includes two pivoting arms 322 and pull rods 323. One ends of the two pivoting arms 322 are pivotally connected to two sides of the front panel of the drawable box 320 within a set rotating angle; and the pull rods 323 are connected to the other ends of the two pivoting arms 322 and configured to be held by a user to apply a force for pulling the drawable box 320 after the pivoting arms 322 rotate to a set angle. The pivoting handle 321 may be attached to the front side of the panel of the drawable box 320 in a normal state, and may be basically perpendicular to the panel of the drawable box 320 after pulled and reversed by a user, so as to facilitate force application of the user. The set rotating angle of the pivoting handle 321 may be limited by an angle limiting member, for example, an included angle between the pivoting handle 321 and the panel of the drawable box 320 is limited to be 0-90 degrees.

[0048] FIG. 11 is a state diagram of a locking element 325 when a drawable box 320 is pulled out in a refrigerator 10 according to an embodiment of the present invention; and FIG. 12 is a state diagram of the locking element 325 when the drawable box 320 is closed in a refrigerator 10 according to an embodiment of the present invention.

[0049] To further improve tightness, the refrigerator further includes a locking element 325 configured to limit the positions of the panel of the drawable box 320 and the sealed barrel 310 when the drawer 300 is closed. The locking element 325 may be linked with the pivoting handle 321, and performs unlocking when the pivoting handle 321 is pulled out; and the positions of the sealed barrel 310 and the drawable box 320 are locked when the pivoting handle 321 is put back.

[0050] The locking element 325 may be a structure provided with limiting posts 326 and limiting grooves 327 cooperating with each other. The limiting posts 326 extend from front ends disposed at two sides of the sealed barrel 310 toward the panel of the drawable box 320; and the limiting grooves 327 are formed on two sides of the panel of the drawable box 320 and configured to cooperate with the limiting posts 326 to lock the position of the drawable box 320. Each of the limiting grooves 327 includes a horizontal section toward the sealed barrel 310, where the horizontal sections are for the limiting posts 326 to enter in a pulling direction of the drawable box 320; each of the limiting grooves 327 is provided with an accommodating groove in the tail end along a height direction; and each of the limiting posts 326 enters the

corresponding accommodating groove along the height direction after reaching the tail end of the corresponding horizontal section, thus realizing locking. When the drawable box 320 is pulled out, a user lifts the pivoting handle 321, the limiting posts 326 are released from the accommodating grooves and can be released from the accommodating grooves along the pulling direction of the drawable box 320. There may be a plurality of groups of locking elements 325, and two sides of the sealed barrel 310 may be each provided with a plurality of groups of locking elements 325.

[0051] With the above structure, the sealed drawer 300 is sealed by extrusion of a sealing element (such as a silicone rubber sealing gasket), and can be conveniently sealed and unlocked by using the pivoting handle 321 based on structural improvement. This facilitates operation of users.

[0052] In conclusion, it should be learned by those skilled in the art that although various exemplary embodiments of the present invention have been illustrated and described in detail herein, many other variations or modifications consistent with the principles of the present invention may be directly determined or derived from the disclosure of the present invention without departing from the spirit and scope of the present invention. Therefore, the scope of the present invention should be construed and considered as covering all these other variations or modifications.

Claims

1. A refrigerator provided with a sealed drawer on a door body, comprising:

a refrigerator body that defines a first storage space;
 a first door, pivotally disposed at a front portion of the refrigerator body and configured to open and close the first storage space;
 a sealed barrel, disposed inside the first door and provided with an opening on one side away from the first storage space;
 a drawable box, disposed inside the sealed barrel in a drawable way via the opening; and
 a ventilating device, disposed inside the sealed barrel and configured to allow communication between an internal space of the sealed barrel and the first storage space when turned on, thus realizing air exchange between the internal space of the sealed barrel and the first storage space.

2. The refrigerator provided with a sealed drawer on a door body according to claim 1, further comprising:

a first humidity detection device, disposed inside the first storage space and configured to detect

an air humidity in the first storage space; and a second humidity detection device, disposed inside the sealed barrel and configured to detect an air humidity in the sealed barrel; and the ventilating device is further configured to be turned on when the air humidity in the sealed barrel is higher than the air humidity in the first storage space.

3. The refrigerator provided with a sealed drawer on a door body according to claim 2, further comprising: an air exhausting device, disposed inside the sealed barrel and configured to be turned on to vacuumize the sealed barrel when the air humidity in the sealed barrel is lower than the air humidity in the first storage space.

4. The refrigerator provided with a sealed drawer on a door body according to claim 3, wherein

the sealed barrel is provided with an accommodating cavity in one side close to the first storage space; the accommodating cavity is separated from an area where the drawable box is located by a partition wall; and the air exhausting device and the ventilating device are disposed inside the accommodating cavity.

5. The refrigerator provided with a sealed drawer on a door body according to claim 4, wherein the air exhausting device comprises:

a one-way valve, disposed on the partition wall and configured to allow only the air in the area where the drawable box is located to flow toward the accommodating cavity; and
 a vacuum pump, transversely disposed inside the accommodating cavity and connected to one side of the one-way valve located in the accommodating cavity by an air exhausting pipe.

6. The refrigerator provided with a sealed drawer on a door body according to claim 4, wherein the ventilating device comprises:

a ventilation valve, disposed on a wall of the accommodating cavity toward the first storage space; and
 a ventilation pipe, extending from the ventilating valve to the partition wall and in communication with the area where the drawable box is located.

7. The refrigerator provided with a sealed drawer on a door body according to claim 3, further comprising:

a second door, pivotally disposed on one side of the first door away from the refrigerator body;

and

a door opening and closing detector, configured to sense an open/close state of the first door and the second door; and

the air exhausting device is further configured to be turned on only when the first door and the second door are both closed. 5

8. The refrigerator provided with a sealed drawer on a door body according to claim 1, further comprising: a sealing element, disposed at a position where a panel of the drawable box faces the sealed barrel, wherein the sealing element is extruded by the panel of the drawable box and the sealed barrel when the drawable box is closed, so as to seal a gap between the panel of the drawable box and the sealed barrel. 10 15

9. The refrigerator provided with a sealed drawer on a door body according to claim 8, further comprising: a locking element, configured to limit the positions of the panel of the drawable box and the sealed barrel when the drawable box is closed, and comprising: 20

limiting posts, extending from front ends disposed at two sides of the sealed barrel toward the panel of the drawable box; and 25

limiting grooves, formed on two sides of the panel of the drawable box and configured to cooperate with the limiting posts to lock the position of the drawable box. 30

10. The refrigerator provided with a sealed drawer on a door body according to claim 8 or 9, wherein the drawable box further comprises: a pivoting handle, comprising: 35

two pivoting arms, with one ends pivotally connected to two sides of a front panel of the drawable box within a set rotating angle, respectively; and 40

pull rods, connected to the other ends of the two pivoting arms and configured to be held by a user to apply a force for pulling the drawable box after the pivoting arms rotate to a set angle. 45

50

55

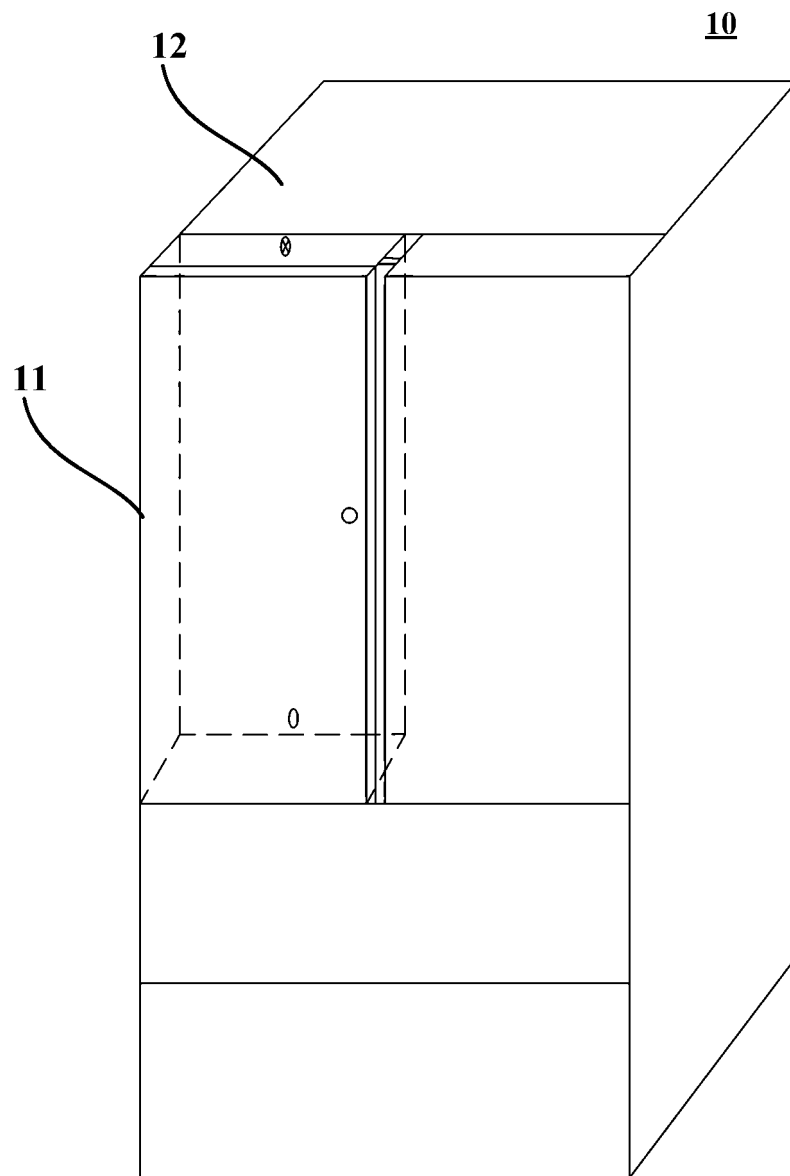


Fig. 1

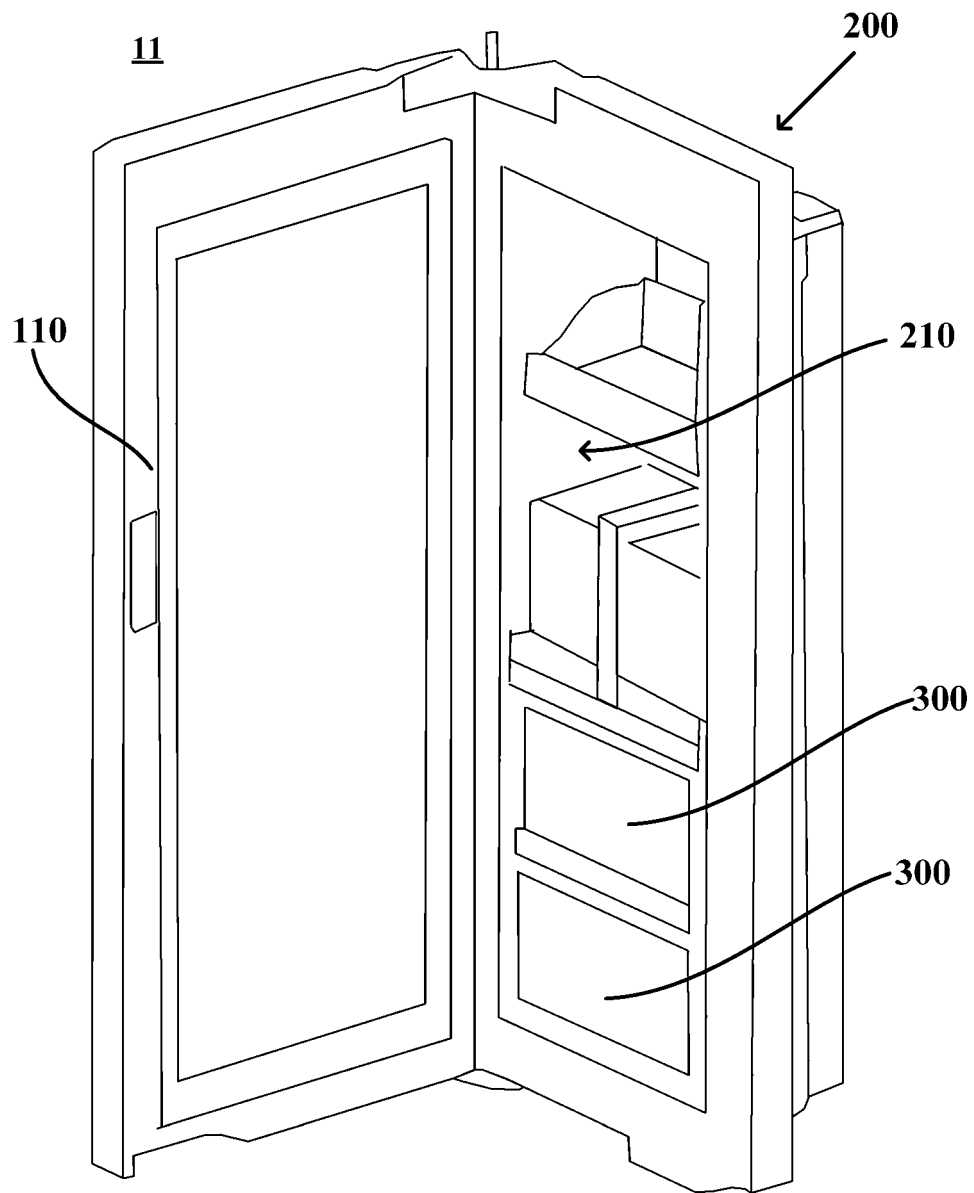


Fig. 2

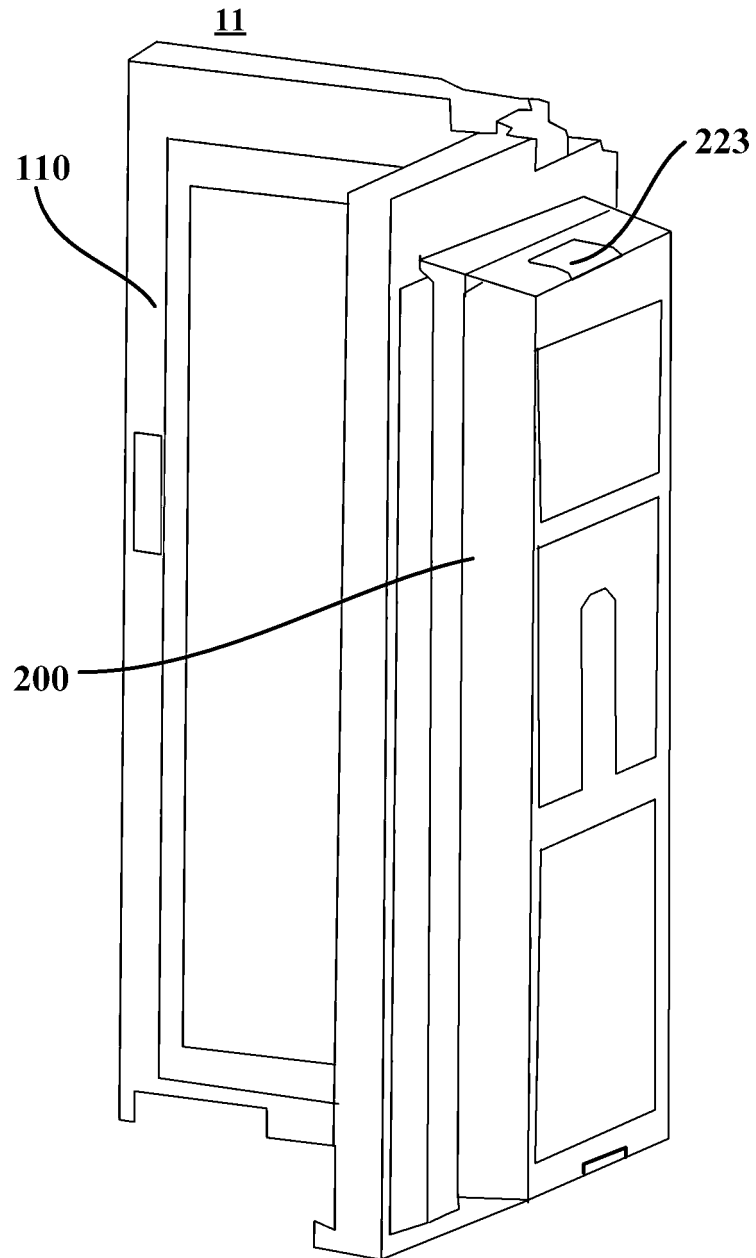


Fig. 3

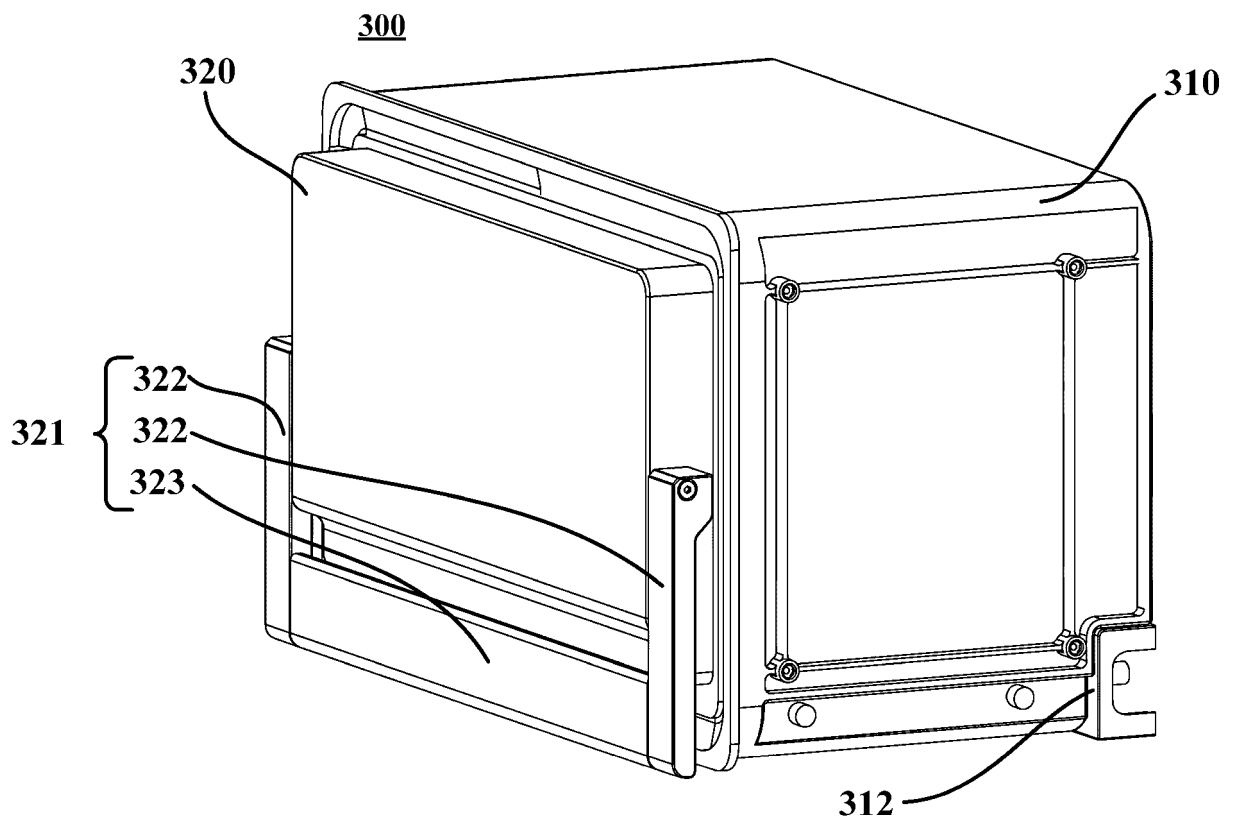


Fig. 4

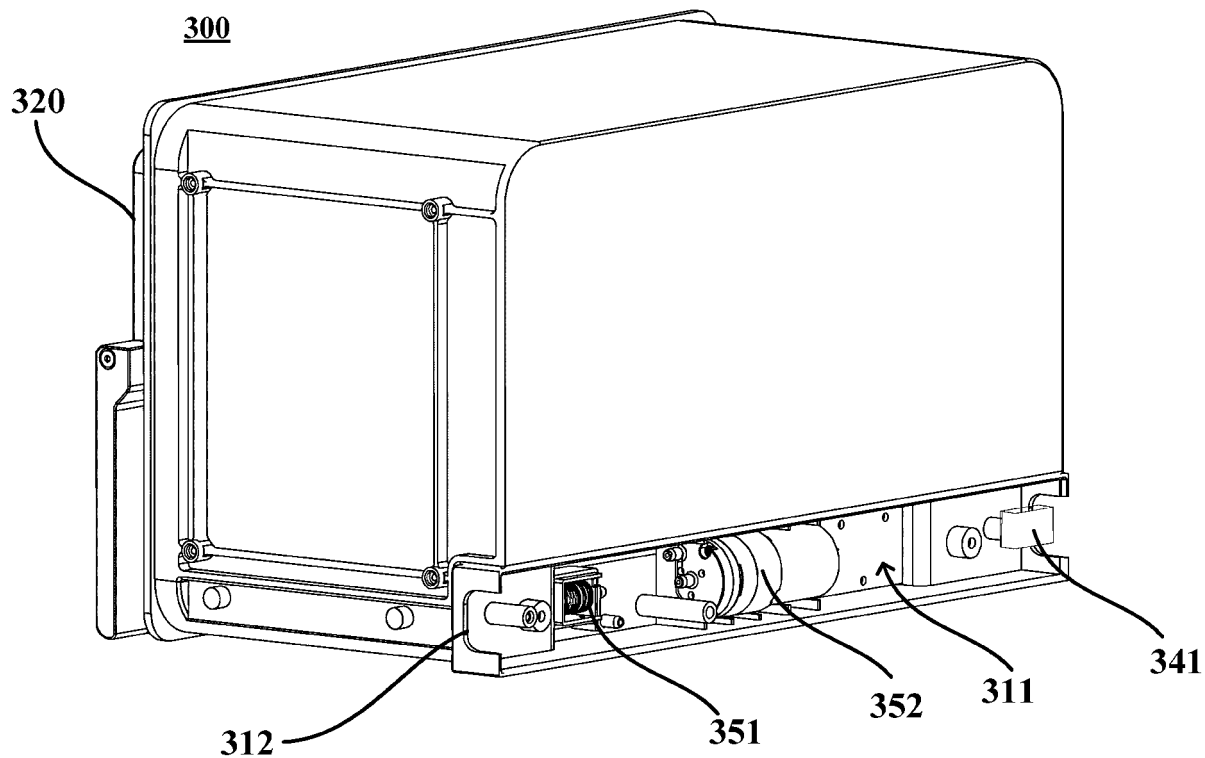


Fig. 5

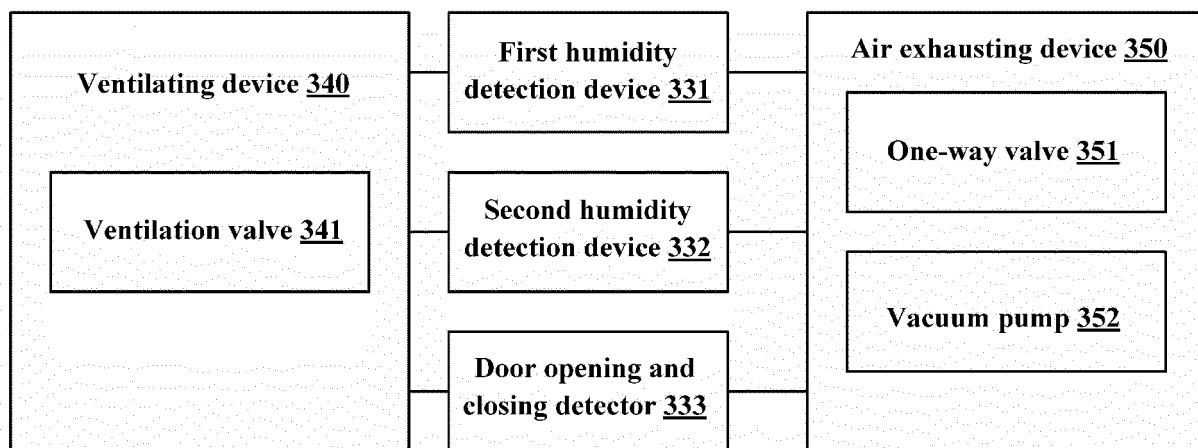


Fig. 6

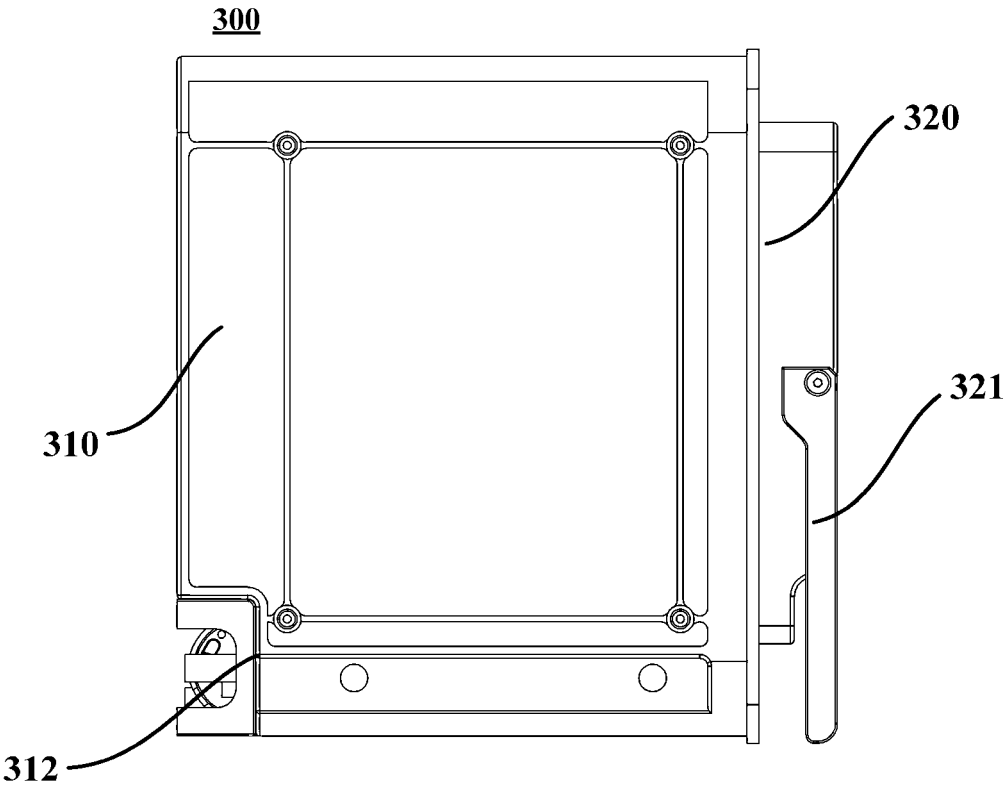


Fig. 7

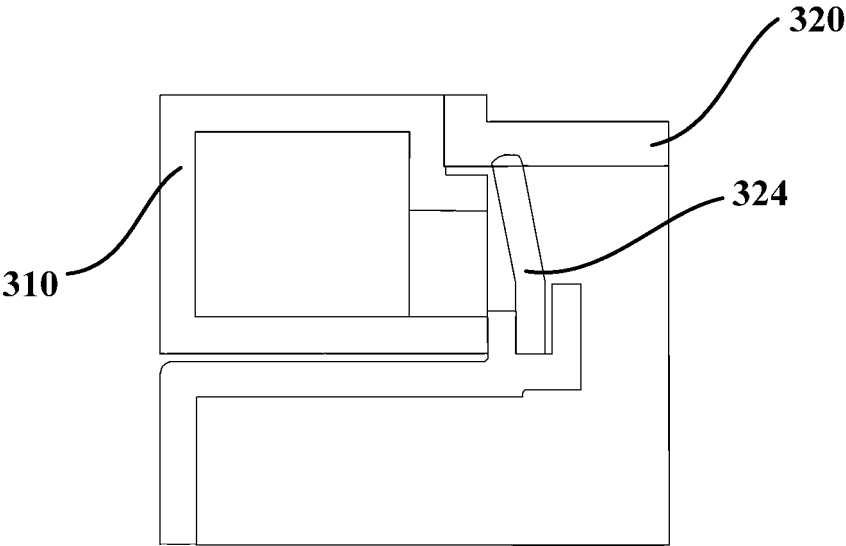


Fig. 8

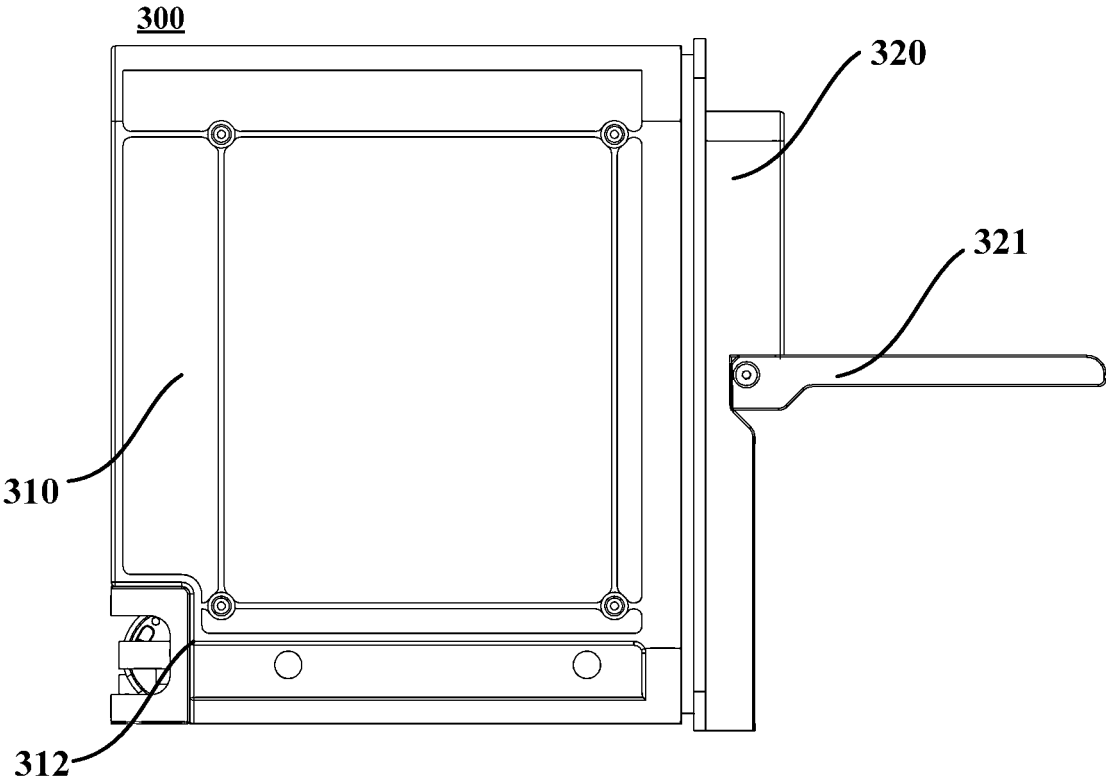


Fig. 9

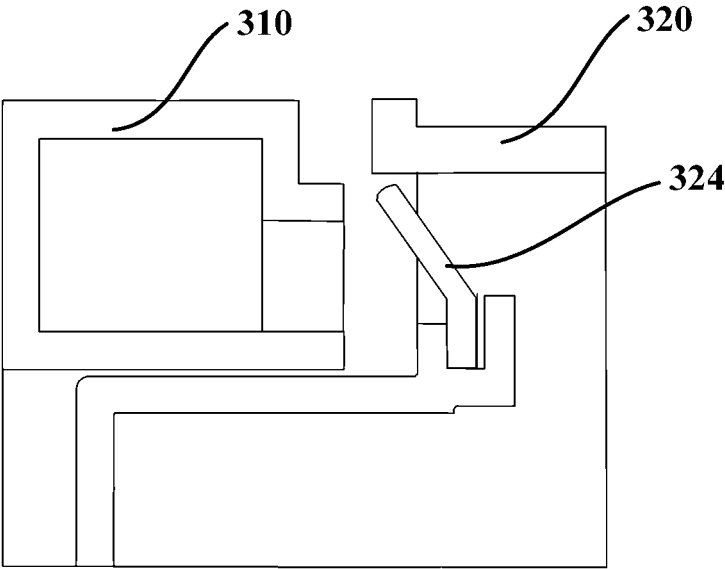


Fig. 10

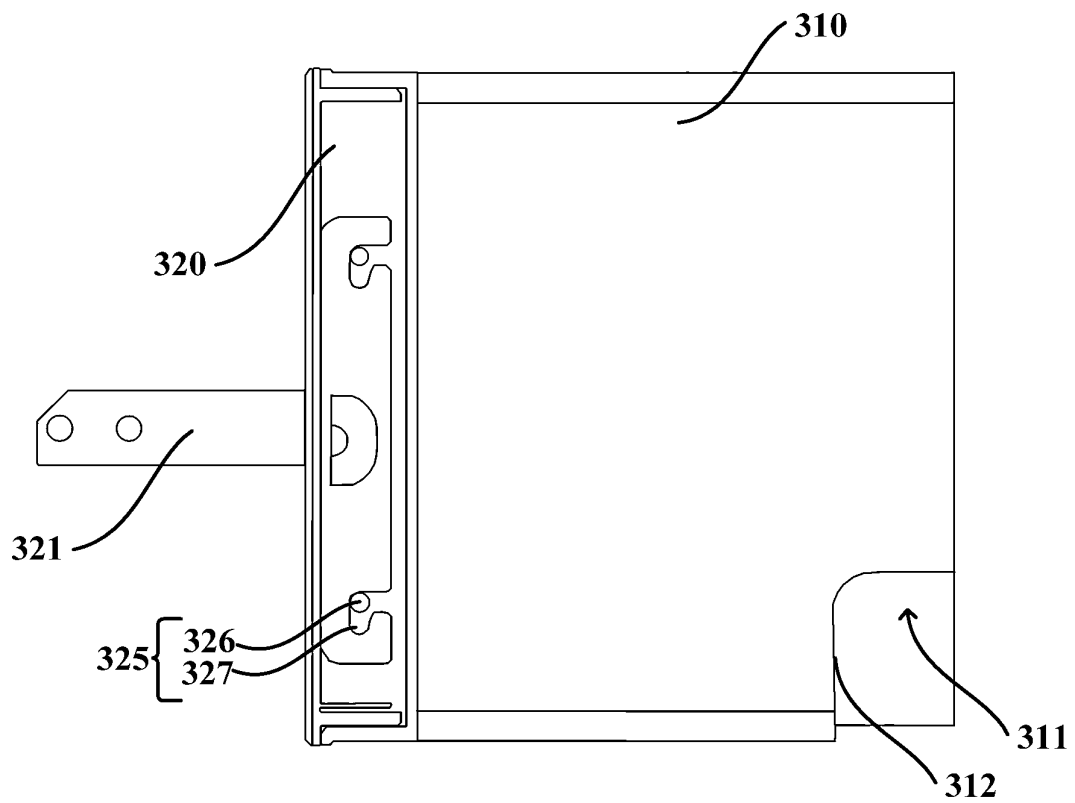


Fig. 11

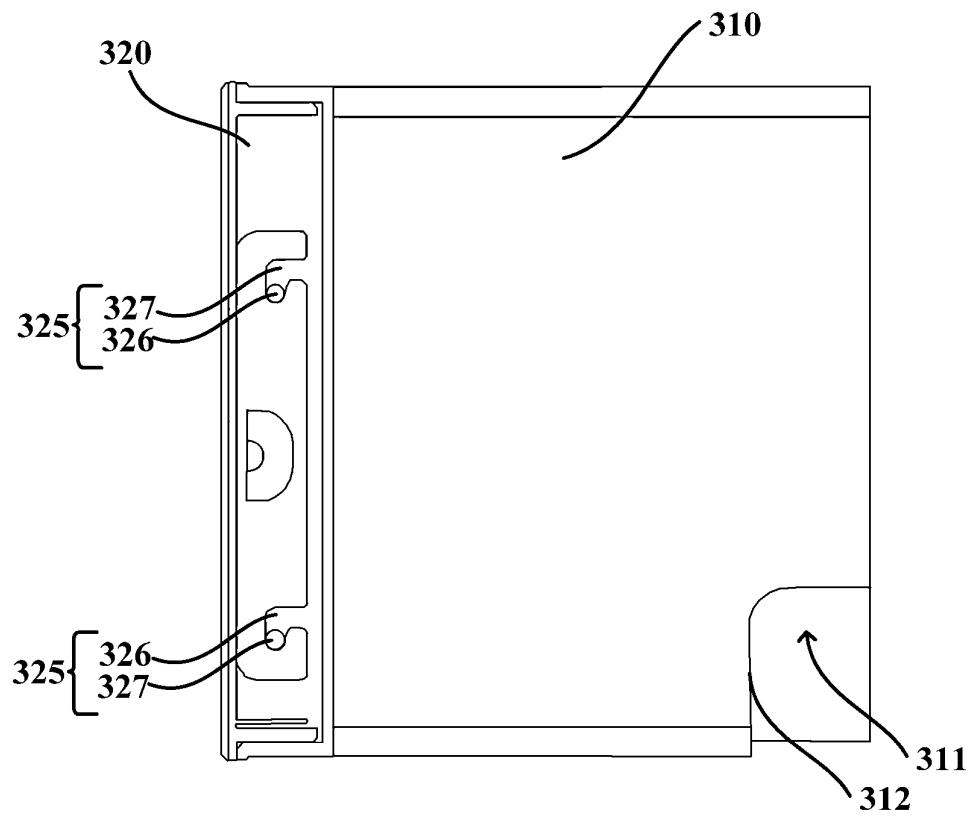


Fig. 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/115629

A. CLASSIFICATION OF SUBJECT MATTER F25D 11/02(2006.01)i According to International Patent Classification (IPC) or to both national classification and IPC																		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) F25D Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched																		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) SIPOABS, DWPI, CNABS, CNTXT, CNKI: 冰箱, 门, 密封, 抽屉, 抽拉, 通风, 通气, 换气, 阀, 管, 通道, 湿度, 传感, 开关, 闭合, 开启, 感应, 检测, 限位, 干簧管, Refrigerator, door, seal, drawer, draw, vent, valve, pipe, channel, passage, humidity, sensor, close, open, sense, detect, limit, reed																		
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>PX</td> <td>CN 212378332 U (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 19 January 2021 (2021-01-19) claims 1-10, figures 1-12</td> <td>1-10</td> </tr> <tr> <td>X</td> <td>CN 102494480 A (HEFEI MIDEA & ROYALSTAR FRIDGE CO., LTD. et al.) 13 June 2012 (2012-06-13) claims 1-7, description paragraphs 0018-0033, figures 1-2</td> <td>1, 8-10</td> </tr> <tr> <td>Y</td> <td>CN 102494480 A (HEFEI MIDEA & ROYALSTAR FRIDGE CO., LTD. et al.) 13 June 2012 (2012-06-13) claims 1-7, description paragraphs 0018-0033, figures 1-2</td> <td>2-7</td> </tr> <tr> <td>Y</td> <td>CN 104949466 A (HEFEI HUALING CO., LTD. et al.) 30 September 2015 (2015-09-30) description, paragraphs 0047-0048, figures 1-8</td> <td>2-7</td> </tr> <tr> <td>X</td> <td>CN 102494483 A (HEFEI MIDEA & ROYALSTAR FRIDGE CO., LTD. et al.) 13 June 2012 (2012-06-13) claims 1-11, description paragraphs 0025-0045, figures 1-5</td> <td>1, 8-10</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	PX	CN 212378332 U (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 19 January 2021 (2021-01-19) claims 1-10, figures 1-12	1-10	X	CN 102494480 A (HEFEI MIDEA & ROYALSTAR FRIDGE CO., LTD. et al.) 13 June 2012 (2012-06-13) claims 1-7, description paragraphs 0018-0033, figures 1-2	1, 8-10	Y	CN 102494480 A (HEFEI MIDEA & ROYALSTAR FRIDGE CO., LTD. et al.) 13 June 2012 (2012-06-13) claims 1-7, description paragraphs 0018-0033, figures 1-2	2-7	Y	CN 104949466 A (HEFEI HUALING CO., LTD. et al.) 30 September 2015 (2015-09-30) description, paragraphs 0047-0048, figures 1-8	2-7	X	CN 102494483 A (HEFEI MIDEA & ROYALSTAR FRIDGE CO., LTD. et al.) 13 June 2012 (2012-06-13) claims 1-11, description paragraphs 0025-0045, figures 1-5	1, 8-10
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																
PX	CN 212378332 U (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 19 January 2021 (2021-01-19) claims 1-10, figures 1-12	1-10																
X	CN 102494480 A (HEFEI MIDEA & ROYALSTAR FRIDGE CO., LTD. et al.) 13 June 2012 (2012-06-13) claims 1-7, description paragraphs 0018-0033, figures 1-2	1, 8-10																
Y	CN 102494480 A (HEFEI MIDEA & ROYALSTAR FRIDGE CO., LTD. et al.) 13 June 2012 (2012-06-13) claims 1-7, description paragraphs 0018-0033, figures 1-2	2-7																
Y	CN 104949466 A (HEFEI HUALING CO., LTD. et al.) 30 September 2015 (2015-09-30) description, paragraphs 0047-0048, figures 1-8	2-7																
X	CN 102494483 A (HEFEI MIDEA & ROYALSTAR FRIDGE CO., LTD. et al.) 13 June 2012 (2012-06-13) claims 1-11, description paragraphs 0025-0045, figures 1-5	1, 8-10																
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex. * Special categories of cited documents: “A” document defining the general state of the art which is not considered to be of particular relevance “E” earlier application or patent but published on or after the international filing date “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																		
Date of the actual completion of the international search 28 October 2021	Date of mailing of the international search report 04 November 2021																	
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 Facsimile No. (86-10)62019451	Authorized officer Telephone No.																	

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

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/115629

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 105444489 A (HISENSE RONSHEN (GUANGDONG) REFRIGERATORS CO., LTD.) 30 March 2016 (2016-03-30) claims 1-9, and figures 1-5	1, 8-10
A	CN 205641780 U (QINGDAO HAIER CO., LTD.) 12 October 2016 (2016-10-12) entire document	9-10
A	US 2017284729 A1 (LG ELECTRONICS INC.) 05 October 2017 (2017-10-05) entire document	1-10
A	CN 205300090 U (HISENSE RONSHEN (GUANGDONG) REFRIGERATORS CO., LTD.) 08 June 2016 (2016-06-08) entire document	1-10

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2021/115629

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 212378332 U	19 January 2021	None	
CN 102494480 A	13 June 2012	None	
CN 104949466 A	30 September 2015	None	
CN 102494483 A	13 June 2012	CN 102494483 B	16 April 2014
CN 105444489 A	30 March 2016	None	
CN 205641780 U	12 October 2016	None	
US 2017284729 A1	05 October 2017	KR 20170114580 A	16 October 2017
		CN 107270614 A	20 October 2017
		US 2019339000 A1	07 November 2019
		US 10900707 B2	26 January 2021
		EP 3702706 A1	02 September 2020
		EP 3702706 B1	04 August 2021
		EP 3686530 A1	29 July 2020
		EP 3686530 B1	28 July 2021
		US 10352612 B2	16 July 2019
		US 2019339001 A1	07 November 2019
		US 10914508 B2	09 February 2021
		EP 3228968 A1	11 October 2017
		EP 3228968 B1	18 March 2020
CN 205300090 U	08 June 2016	None	

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