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# (54) REFRIGERATOR WITH BOTTOM-ARRANGED HEAT DISSIPATION COMPARTMENT

(57) Embodiments of the present disclosure provide a refrigerator with a heat dissipation compartment at a bottom. The refrigerator comprises a cabinet, a fixed bracket, a heat dissipation fan, and a condenser. The bottom rear of the cabinet has a heat dissipation compartment. The fixed bracket divides the heat dissipation compartment into a first and a second heat dissipation chamber in a transverse direction of the cabinet. The fixed bracket is provided with a fan fixing structure on one side facing the first heat dissipation chamber and a condenser fixing structure on one side facing the second heat dissipation chamber. In this refrigerator, the fixed bracket, the heat dissipation fan, and the condenser form an integrated air duct structure, and the arrangement of the components in the heat dissipation compartment is more compact, and the assembly process is simpler and more efficient.

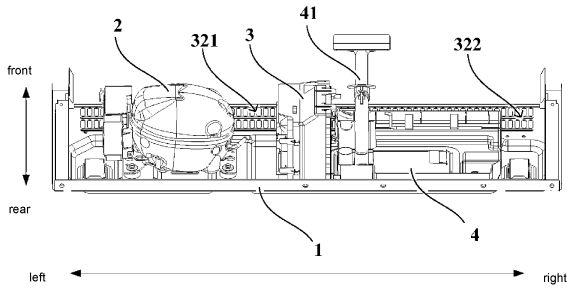


FIG.4

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## Description

### TECHNICAL FIELD

**[0001]** The present disclosure relates to the technical field of refrigeration equipment, and in particular relates to a refrigerator with a heat dissipation compartment at a bottom of the refrigerator.

### BACKGROUND

**[0002]** In some prior art refrigerators, especially built-in refrigerators, a condenser, a compressor, and an evaporating dish are arranged in a heat dissipation compartment at the bottom of a cabinet. A heat dissipation fan draws in ambient air from the outside of the refrigerator and induces the air to flow in the heat dissipation compartment, convectively dissipating heat to the condenser and the compressor through convection heat dissipation.

**[0003]** For the above-mentioned refrigerators, the space of the heat dissipation compartment is limited, and a count of heat generating components arranged is relatively large, resulting in a messy arrangement of the components in the heat dissipation compartment, occupying a large space, and lowering the heat dissipation efficiency. Additionally, the assembly process becomes complicated and time-consuming as numerous parts need to be assembled separately, leading to a decrease in production efficiency.

**[0004]** For an evaporator bottom-mounted refrigerator, the height of the heat dissipation compartment is about 20 mm smaller than that of a conventional refrigerator, exacerbating the aforementioned technical issue.

### SUMMARY

**[0005]** One object of the present disclosure is to provide a refrigerator with a heat dissipation compartment at a bottom of the refrigerator. The refrigerator has a more compact structure.

**[0006]** A further object of the present disclosure is to improve the efficiency of assembling the components in a heat dissipation compartment of a refrigerator.

**[0007]** In order to realize the above purposes, the present disclosure provides a refrigerator with a heat dissipation compartment at a bottom of the refrigerator. The refrigerator comprises:

a cabinet with a heat dissipation compartment at a bottom rear thereof;

a fixed bracket disposed in a middle of the heat dissipation compartment along a transverse direction, divides the heat dissipation compartment into a first heat dissipation chamber and a second heat dissipation chamber along the transverse direction of the cabinet, and the fixed bracket is provided with a fan fixing structure on one side of the fixed bracket facing the first heat dissipation chamber and a condenser fixing structure on one side of the fixed bracket facing the second heat dissipation chamber;

a heat dissipation fan, mounted on the fan fixing structure, is configured to induce the formation of a heat dissipation airflow that enters from outside of the cabinet and passes through the first heat dissipation chamber and the second heat dissipation chamber and then discharges from the cabinet; and

a condenser, mounted on the condenser fixed structure, is cooled utilizing the heat dissipation airflow.

**[0008]** Optionally, the fixed bracket includes:

a bracket body which is in a shape of a square cylinder extends along the transverse direction of the cabinet, the fan fixing structure includes a plurality of fan fixing jaws extending from the bracket body towards the first heat dissipation chamber, utilizing the fan fixing jaws to snap into a casing of the heat dissipation fan, and a portion of the casing of the heat dissipation fan is embedded in the bracket body.

**[0009]** Optionally, an inner cylinder cross-section of one end of the bracket body facing the first heat dissipation chamber is adapted to a shape of the casing of the heat dissipation fan to avoid incorrect installation of the heat dissipation fan, and

a vibration-damping foam is provided between the casing of the heat dissipation fan and an inner cylinder wall of the bracket body.

**[0010]** Optionally, one or more winding snaps are provided at an outer periphery of one side of the bracket body facing the first heat dissipation chamber and are used for wrapping an excessively long cable of the heat dissipation fan.

**[0011]** Optionally, the condenser is a microchannel condenser, and

the condenser fixing structure includes a plurality of condenser fixing jaws extending from the bracket body towards the second heat dissipation chamber, utilizing the condenser fixing jaws to snap into the microchannel condenser.

**[0012]** Optionally, the fixed bracket further comprises:

a windshield extending from a front end of the bracket body, and used for sealing off front areas of the first heat dissipation chamber and the second heat dissipation chamber.

**[0013]** Optionally, the fixed bracket further comprises:

an installation snap provided at a bottom of the fixed bracket and used for snapping to a bottom plate of the heat dissipation compartment; and

a fixation screw post provided at a rear portion of the fixed bracket and used for fixing with a rear wall panel of the heat dissipation compartment by screws.

**[0014]** Optionally, the refrigerator further comprises:

a compressor mounted in the first heat dissipation chamber;

an evaporating dish mounted in the second heat dissipation chamber and used for receiving water discharged from a drain pipe connected to a cooling chamber; and

the heat dissipation airflow sequentially flows through the compressor, the heat dissipation fan, the condenser, and the evaporating dish.

**[0015]** Optionally, a top portion of the fixed bracket is provided with a guide groove for making a refrigeration line connecting the compressor as well as the condenser to pass through.

**[0016]** Optionally, a bottom plate of the heat dissipation compartment is provided with a heat dissipation air inlet port and a heat dissipation air exhaust port in front portions of the first heat dissipation chamber and the second heat dissipation chamber, respectively.

**[0017]** Based on the foregoing description, the person skilled in the art is able to understand that, in the foregoing technical solutions of the present disclosure, the fixed bracket is provided in a transverse central portion of the heat dissipation compartment, fixed bracket is provided with the fan fixing structure and the condenser fixing structure on two sides respectively, which are used for assembling the heat dissipation fan and the condenser, respectively. The heat dissipation fan and the condenser are assembled into an integrated component by the fixed bracket, so that the heat dissipation fan and the condenser occupy less space. The arrangement structure of the components in the heat dissipation compartment is more compact, which provides more space for the compressor and the evaporating dish, and the heat dissipation airflow all passes through an air duct structure formed by the bracket body, and performs full heat exchange with the condenser, which is conducive to improving the heat dissipation efficiency.

**[0018]** Furthermore, in the refrigerator with a heat dissipation compartment at a bottom of the refrigerator, the bracket body of the fixed bracket, which is in the shape of a square cylinder, is assembled with the heat dissipation fan and the condenser respectively on both sides by a snap-in structure, so that the heat dissipation fan and the condenser are preassembled as a integrated part, and the assembly process is greatly simplified and the assembly efficiency is improved. When it is necessary to disassemble, the disassemble process is simple, and the damage to the components is small.

**[0019]** Furthermore, the refrigerator of the present disclosure with a heat dissipation compartment at a bottom of the refrigerator improves the mute effect and the electrical safety performance through the improvement of the structural details such as the vibration-damping foam and the winding snaps.

**[0020]** The refrigerator of the present disclosure with a heat dissipation compartment at a bottom of the refrigerator, in particular, can be an evaporator bottom-mounted refrigerator, and the height requirement of the heat dissipation compartment is greatly reduced.

**[0021]** The foregoing, as well as other objects, advantages, and features of the present disclosure will be made more apparent to those skilled in the art according to the detailed description of specific embodiments of the present disclosure hereinafter in conjunction with the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0022]** In order to more clearly illustrate the technical solution of the present disclosure, some embodiments of the present disclosure will be described later with reference to the accompanying drawings. It should be appreciated by those skilled in the art that the same appendix marking identifies the same or similar components or portions as indicated in different appendix drawings; and that the appendix drawings of the present disclosure are not necessarily drawn to scale with each other.

**[0023]** In the accompanying drawings:

FIG. 1 is a front upper axonometric view of the partial bottom structure of a refrigerator with a heat dissipation compartment at a bottom of the refrigerator according to some embodiments of the present disclosure;

FIG. 2 is a rear-upper axonometric view of the partial bottom structure shown in FIG. 1;

FIG. 3 is a sectional view of the partial bottom structure in FIG. 2 along the A-A direction;

FIG. 4 is a schematic diagram illustrating the distribution of the main components within a heat dissipation compartment of a refrigerator according to some embodiments of the present disclosure;

FIG. 5 is a schematic view from an angle of the assembly structure of a fixed bracket with a heat dissipation fan and a condenser in a refrigerator according to some embodiments of the present disclosure;

FIG. 6 is a schematic view from one angle of a fixed bracket in a refrigerator according to some embodiments of the present disclosure;

FIG. 7 is a schematic view from another angle of the assembly structure of a fixed bracket with a heat dissipation fan and a condenser in a refrigerator according to some embodiments of the present disclosure;

FIG. 8 is a schematic view from another angle of a fixed bracket in a refrigerator according to some embodiments of the present disclosure; and

FIG. 9 is a structural exploded view of an assembly structure of a fixed bracket of a refrigerator with a heat dissipation fan and a condenser according to some embodiments of the present disclosure.

## DETAILED DESCRIPTION

**[0024]** It should be understood by those skilled in the art that the embodiments described herein below are only a portion of the embodiments of the present disclosure and not the entirety of the present disclosure, and that

this portion of the embodiments is intended to be used for explaining the technical principles of the present disclosure and is not intended to limit the scope of protection of the present disclosure. Based on the embodiments provided in the present disclosure, all other embodiments obtained by a person of ordinary skill in the art without creative labor should still fall within the scope of protection of the present disclosure.

**[0025]** It should be noted that in the description of the present disclosure, the terms "center", "up", "down", "top", "bottom", "left", "right , "vertical", "horizontal", "inside", "outside" and other terms indicating orientation or positional relationships are based on the orientation or positional relationships shown in the accompanying drawings, which are merely for ease of description and do not indicate or imply that the device or element must have a particular orientation, be constructed and operated in a particular orientation, and therefore are not to be construed as limitations to the present disclosure. Furthermore, the terms "first", "second", "third" are used for descriptive purposes only and are not to be construed as indicating or implying the importance thereof.

**[0026]** In addition, it should be no
ted that in the description of the present disclosure, unless otherwise expressly provided and limited, the terms "mounting", "connected", "attached" should be understood in a broad sense, for example, as a fixed connection, a removable connection, or a connection in one piece; a mechanical connection, or an electrical connection; a direct connection, or an indirect connection through an intermediate medium, or a connection within two elements. For those skilled in the art, the specific meanings of the above terms in the present disclosure may be understood according to the specific circumstances.

**[0027]** FIG. 1 is a front upper axonometric view of a partial bottom structure of a refrigerator with a heat dissipation compartment at a bottom of the refrigerator according to some embodiments of the present disclosure; FIG. 2 is a rear upper axonometric view of the partial bottom structure illustrated in FIG. 1; FIG. 3 is the sectional view of the partial bottom structure shown in FIG. 2 along the A-A direction.

**[0028]** As shown in FIG. 1 to FIG. 3, in some embodiments of the present disclosure, a refrigerator mainly includes a cabinet 1, a compressor 2, a fixed bracket 3, an evaporating dish 4, and an evaporator 5.

**[0029]** Continuing to refer to FIG. 1 to FIG. 3, the cabinet 1 defines one or more storage compartments 11, a heat dissipation compartment 12, and a cooling chamber 13. A count of the storage compartments 11 is not limited to the two shown in FIG. 1 and FIG. 2, and may be any other number, such as one, three, five, eight, or the like. When there is one storage compartment 11, the storage compartment 11 may be a freezer compartment, a variable temperature compartment, or a refrigeration compartment. When there are two or more storage compartments 11, the multiple storage compartments 11 comprise at least one of a freezer compartment, a variable temperature compartment, and a refrigeration compartment. In the specific implementation of the technical solution of the present disclosure, the person skilled in the art may configure the count and functions of the storage compartments 11 as desired.

**[0030]** Continuing with reference to FIG. 1 to FIG. 3, a rear bottom of the cabinet 1 has a heat dissipation compartment 12. In some embodiments, the cooling chamber 13 may be provided at front of the heat dissipation compartment, thereby realizing a evaporator bottom-mounted refrigerator. The cooling chamber 13 occupies a bottom area of the inner liner, elevating the storage compartment 11, reducing the degree of bending for users when picking up and placing items in the storage compartment 11, and enhancing the user's experience. The evaporator 5 is installed inside the cooling chamber 13 to provide cooling to the interior of the storage compartment 11.

**[0031]** The heat dissipation compartment 12 is divided into a first heat dissipation chamber 121 and a second heat dissipation chamber 122 by the fixed bracket 3, in order to divide the space for arranging the different components respectively.

**[0032]** FIG. 4 is a schematic diagram illustrating the distribution of main components in the heat dissipation compartment 12 of a refrigerator according to some embodiments of the present disclosure. The compressor 2, the fixed bracket 3, and the evaporating dish 4 are arranged in the heat dissipation compartment 12 sequentially along a transverse direction of the refrigerator from left to right.

**[0033]** The fixed bracket 3 is provided in the middle of the heat dissipation compartment 12 along the transverse direction, divides the heat dissipation compartment 12 into the first heat dissipation chamber 121 and the second heat dissipation chamber 122 along the transverse direction of the cabinet 1. A fan fixing structure is provided on one side of the fixed bracket 3 facing the first heat dissipation chamber 121, and a condenser fixing structure is provided on one side of the fixed bracket 3 facing the second heat dissipation chamber 122. The compressor 2 and the evaporating dish 4 are provided in the first and second heat dissipation chamber 121 and 122, respectively.

**[0034]** The compressor 2 is located in the first heat dissipation chamber and is connected to a condenser, which is obscured by the fixed bracket 3 and not shown in FIG. 4, via a refrigeration line not shown in FIG. 4.

**[0035]** The evaporating dish 4 is installed in the second heat dissipation chamber 122 to receive water discharged from a drain pipe 41 connected to the cooling chamber 13. An upper end of the drain pipe 41 is connected to a bottom of the cooling chamber 13, and a lower end of the drain pipe 41 extends above the evaporating dish 4. The drain pipe 41 is used to discharge defrost water of the refrigerator into the evaporating dish 4, and the evaporating dish 4 is used to evaporate the

water into the ambient air.

**[0036]** A bottom plate of the heat dissipation compartment 12 is provided with a heat dissipation air inlet port 321 and a heat dissipation air exhaust port 322 at front portions of the first heat dissipation chamber 121 and the second heat dissipation chamber 122, respectively. The ambient air below the refrigerator enters the heat dissipation compartment 12 from the heat dissipation air inlet port 321, exchanges heat with the compressor 2, and then accelerates the evaporation of water in the evaporating dish 4 after passing through the heat dissipation fan and the condenser, and is then discharged back to the lower part of the refrigerator from the heat dissipation air exhaust port 322. The heat dissipation airflow is smooth, which improves the heat dissipation efficiency of each component. Isolation members for isolating the heat dissipation air inlet port 321 and the heat dissipation air exhaust port 322 may be further provided on a lower surface of the bottom plate of the refrigerator to avoid the discharged heat dissipation air from being reabsorbed.

**[0037]** The construction of the fixed bracket 3 and the assembly structure of the fixed bracket 3 with a heat dissipation fan 32 and a condenser 31 are described below in conjunction with FIG. 5 - FIG. 9. FIG. 5 is a schematic view from an angle of the assembly structure of the fixed bracket 3 with the heat dissipation fan 32 and the condenser 31 in a refrigerator according to some embodiments of the present disclosure; FIG. 6 is a schematic view from an angle of the fixed bracket 3 in a refrigerator according to some embodiments of the present disclosure. The orientations of the views shown in FIG. 5 and FIG. 6 are the same. FIG. 7 is a schematic view from another angle of the assembly structure of the fixed bracket 3 with the heat dissipation fan 32 and the condenser 31 in a refrigerator according to some embodiments of the present disclosure; FIG. 8 is a schematic view from another angle of the fixed bracket 3 in a refrigerator according to some embodiments of the present disclosure; and the views shown in FIG. 7 and FIG. 8 have the same orientation. FIG. 9 is a structural exploded view of an assembly structure of a fixed bracket with a heat dissipation fan and a condenser in a refrigerator according to some embodiments of the present disclosure.

**[0038]** The fixed bracket 3 forms a pre-assembled integrated component with the heat dissipation fan 32, and forms an air duct structure for heat dissipation airflow to pass through, so that the airflow flows through the condenser 31 entirely, which improves the heat dissipation efficiency, makes the structure more compact and simplifies the assembly process.

**[0039]** The fixed bracket 3 is positioned in the middle of the transverse direction of the heat dissipation compartment 12, divides the heat dissipation compartment 12 into the first heat dissipation chamber 121 and the second heat dissipation chamber 122 along the transverse direction of the cabinet. The fixed bracket 3 is equipped with a fan fixing structure on one side facing the first heat dissipation chamber, and a condenser fixing structure on one side facing the second heat dissipation chamber. In other words, the fan fixing structure is oriented facing the compressor 2, while the condenser fixing structure is oriented facing the evaporating dish 4. The fixed bracket 3 is positioned along a front-rear direction.

**[0040]** The heat dissipation fan 32 is mounted on the fan fixing structure to induce the formation of a heat dissipation airflow that enters from outside of the cabinet, passes through the first heat dissipation chamber 121 and the second heat dissipation chamber 122, and then discharges from the cabinet. The condenser 31 is mounted on the condenser fixing structure and utilizes the heat dissipation airflow for cooling. The airflow passes sequentially through the compressor 2, the condenser 31, and the evaporating dish 4 to dissipate heat sequentially from the various components, which improves the heat dissipation efficiency.

**[0041]** The fixed bracket 3 is provided with a fan fixing structure and a condenser fixing structure on both sides respectively, for assembling the heat dissipation fan 32 and the condenser 31 to form a integrated air duct structure, so as to enable the heat dissipation fan 32 and the condenser 31 to occupy less space. The arrangement structure of the components in the heat dissipation compartment is more compact, providing a larger arrangement space for the compressor 2 as well as the evaporating dish 4, which is conducive to improving the heat dissipation efficiency. Compared with the prior art embodiments in which a condenser is provided above the evaporating dish 4, the structure of the present embodiments reduces the dimensions of the height direction of the heat dissipation compartment 12.

**[0042]** The fixed bracket 3 includes a bracket body 33 and a windshield 34. The bracket body 33 is in the shape of a square cylinder and extends in the transverse direction of the cabinet 1, i.e., along a left-right direction. The cylindrical shape of the bracket body is used to allow the heat dissipation airflow to pass through. The windshield 34 extends from a front end of the bracket body 33, and seals off the front regions of the first heat dissipation chamber 121 and the second heat dissipation chamber 122, thus preventing the dissipation airflow from recirculating, and only allowing airflow to be blown from the inside of the cylinder of the bracket body 33.

**[0043]** The fan fixing mechanism includes a plurality of fan fixing jaws 331 extending from the bracket body 33 toward the first heat dissipation chamber 121 to secure a casing of the heat dissipation fan 32, and a portion of the casing of the heat dissipation fan 32 is embedded in the bracket body.

**[0044]** The inner cylinder cross-section of one end of the bracket body 33 facing the first heat dissipation chamber 121 is adapted to match the outer shape of the casing of the heat dissipation fan 32 to avoid incorrect installation of the heat dissipation fan 32. That is, the bracket body 33 is designed to match the heat dissipation fan 32 by disposing matching structures such as convex ribs,

grooves, or the like at a part of the bracket body 33 matching the heat dissipation fan 32. If the heat dissipation fan 32 is not assembled in the pre-designed direction, it will not fit due to structural interference, thus avoiding assembly errors. The above-mentioned fan matching structure confines the installation space for the heat dissipation fan 32 to a square cylindrical space. The heat dissipation fan 32 has an anti-misinsertion structure. The fan fixing jaws 331 secure the heat dissipation fan 32, and for disassembly, the heat dissipation fan 32 may be removed by toggling the fan fixing jaws 331, making both installation and disassembly extremely convenient.

**[0045]** The construction and positions of the fan fixing jaws 331 may be set based on the structure of the casing of the heat dissipation fan 32; for example, it may be positioned to protrude from a peripheral wall of the bracket body 33 toward the compressor 2. The heat dissipation fan 32 is assembled to the bracket body 33 via a snap-fit structure, facilitating disassembly and assembly while reducing the manufacturing process and improving assembly efficiency.

**[0046]** A vibration-damping foam (not shown in the figures) is placed between the casing of the heat dissipation fan 32 and the inner cylinder wall of the bracket body 33. The vibration-damping foam serves to reduce the vibrations generated during the rotation of the heat dissipation fan 32 and also enhances the sealing between the casing of the heat dissipation fan 32 and the bracket body 33. In a preferably embodiments, the heat dissipation fan 32 may be an axial flow fan, of which the axis extends along the left-right direction, and air blowing direction is from the first heat dissipation chamber 121 through the bracket body 33 to the second heat dissipation chamber 122.

**[0047]** The bracket body 33 is provided with one or more winding snaps 332 at an outer periphery of one side facing the first heat dissipation chamber 121 for wrapping the excessively long cable of the heat dissipation fan 32. The winding snaps protrude from the peripheral wall of the bracket body 33 for winding the cable. The cable of the heat dissipation fan 32 is too long, and if placed inside the heat dissipation compartment 12, it may result in disarray of components and a possible decrease in reliability during long-term use. The present embodiments solve the above cable arrangement problem by utilizing winding snaps. After the heat dissipation fan 32 is installed on the bracket body 33, the cable of the heat dissipation fan 32 is wrapped around the winding snaps 332 for one or several turns to avoid excessive length of the cable of the fan. Eventually, the cable is guided through the winding snaps 332 and a terminal is connected to a socket at the top of the heat dissipation compartment 12, thus preventing the cable of the heat dissipation fan 32 from being burned while soldering a piping of the condenser 31. The cable of fan is wound in a way that is quick and easy to use, and avoids the safety risks that might occur.

**[0048]** The condenser fixing structure includes a plurality of condenser fixing jaws 337 extending from the bracket body 33 facing the second heat dissipation chamber 122 to hold the condenser 31 using the condenser fixing jaws 337. In a preferable embodiment, the condenser 31 may include a microchannel condenser, thereby saving the space occupied by the condenser 31 and facilitating fitment with the bracket body 33. Gaps between the microchannels of the microchannel condenser are aligned with the direction of the heat dissipation airflow, and all the heat dissipation airflow needs to pass through the condenser 31, thereby enhancing the heat exchange efficiency.

**[0049]** The structure and position of the condenser fixing jaw 337 may be set according to the structure of the condenser 31. For example, the condenser fixing jaw 337 may extend from the upper and lower portions of the bracket body 33. At least a portion of the condenser 31 is embedded inside the bracket body 33 to facilitate airflow to pass through. In other words, the shape of the condenser 31 is designed to fit the inner cylinder of the bracket body 33 facing the second heat dissipation chamber 122, thereby improving the efficiency of the heat dissipation airflow passing through the condenser 31 and making the structure more compact. The condenser 31 is assembled with the bracket body 33 through a snap-fit structure, which facilitates disassembly and assembly, reduces the process, and improves the assembly efficiency. The condenser 31 is integrally embedded in the bracket body 33 and located inside the air duct, making full use of the heat dissipation airflow and also avoiding occupying the space of the evaporating dish 4.

**[0050]** During assembly, the condenser 31, the heat dissipation fan 32, and the fixed bracket 3 may be pre-assembled to form a pre-assembled integrated component, and then installed as a whole inside the cabinet 1.

**[0051]** The fixed bracket 3 may also be provided with an installation snap 334 and a fixation screw post 335. The installation snap 334 is located at the bottom of the fixed bracket 3 for snapping to the bottom plate of the heat dissipation compartment 12. The fixation screw post 335 is located at a rear portion of the fixed bracket 3 for fixing with a rear wall panel of the heat dissipation compartment 12 using the screws. The installation snaps 334 and the fixation screw posts 335 enable the fixed bracket 3 to be reliably assembled with the cabinet 1, and he disassembly and assembly process is simple, reducing the disassembly and assembly process.

**[0052]** The top portion of the fixed bracket 3 is also provided with a guide groove 336 for making the refrigeration line pass through, wherein the refrigeration line connects the compressor 2 and the condenser 31. The fixed bracket 3 may also be provided with a ribbed groove structure for lines and pipes connecting the first heat dissipation chamber 121 and the second heat dissipation chamber 122 to pass through, as needed.

**[0053]** A grille member may be disposed in the inside of the cylinder of the bracket body 33, which creates a space between the heat dissipation fan 32 and the condenser 31.

**[0054]** Based on the foregoing description, the person skilled in the art is able to understand that by arranging the compressor 2, the fixed bracket 3, and the evaporating dish 4 sequentially in the heat dissipation compartment 12 along the left-right direction of the cabinet 1, as compared to the prior art where a condenser is arranged inside a evaporating dish, the height of the heat dissipation compartment 12 is effectively reduced, which in turn frees up more space for the storage compartment 11 of the refrigerator, thereby making the storage compartment 11 have a larger storage space.

**[0055]** Further, by mounting the condenser 31 and the heat dissipation fan 32 on the fixed bracket 3, and assembling the heat dissipation fan 32 and the condenser 31 respectively with the bracket body 33 which is in the shape of a square cylinder at both sides through the snap-in structure, the air flowing into the heat dissipation compartment 12 all flow through the condenser 31 and cool the condenser 31, ensuring the cooling effect of the condenser 31.

**[0056]** To this point, the technical solution of the present disclosure has been described in conjunction with a plurality of previous embodiments, but it is readily understood by those skilled in the art that the scope of protection of the present disclosure is not limited to these specific embodiments. Without deviating from the technical principles of the present disclosure, the person skilled in the art may split and combine the technical solutions in each of the foregoing embodiments, or make equivalent alterations or replacements to the relevant technical features. Any changes, equivalent substitutions, improvements, etc. made within the technical concept and/or technical principles of the present disclosure fall within the scope of protection of the present disclosure.

## Claims

1. A refrigerator with a heat dissipation compartment at a bottom, comprising:

   a cabinet, having a heat dissipation compartment at bottom rear thereof;
   a fixed bracket, disposed in a middle of the heat dissipation compartment along a transverse direction, divides the heat dissipation compartment into a first heat dissipation chamber and a second heat dissipation chamber along the transverse direction of the cabinet, and the fixed bracket is provided with a fan fixing structure on one side of the fixed bracket facing the first heat dissipation chamber and a condenser fixing structure on one side of the fixed bracket facing the second heat dissipation chamber;
   a heat dissipation fan, mounted on the fan fixing structure, is configured to induce the formation of a heat dissipation airflow that enters from outside of the cabinet and passes through the first heat dissipation chamber and the second heat dissipation chamber and then discharges from the cabinet; and
   a condenser, mounted on the condenser fixing structure, is cooled utilizing the heat dissipation airflow.

2. The refrigerator of claim 1, wherein the fixed bracket comprises:
   a bracket body which is in a shape of a square cylinder extends along the transverse direction of the cabinet, the fan fixing structure comprises a plurality of fan fixing jaws extending from the bracket body towards the first heat dissipation chamber, utilizing the fan fixing jaws to snap into a casing of the heat dissipation fan, and a portion of the casing of the heat dissipation fan is embedded in the bracket body.

3. The refrigerator of claim 2, wherein

   an inner cylinder cross-section of one end of the bracket body facing the first heat dissipation chamber is adapted to a shape of the casing of the heat dissipation fan to avoid incorrect installation of the heat dissipation fan, and
   a vibration-damping foam is provided between the casing of the heat dissipation fan and an inner cylinder wall of the bracket body.

4. The refrigerator of claim 2, wherein
   one or more winding snaps are provided at an outer periphery of one side of the bracket body facing the first heat dissipation chamber and are used for wrapping an excessively long cable of the heat dissipation fan.

5. The refrigerator of claim 2, wherein

   the condenser is a microchannel condenser, and
   the condenser fixing structure comprises a plurality of condenser fixing jaws extending from the bracket body towards the second heat dissipation chamber, utilizing the condenser fixing jaws to snap into the microchannel condenser.

6. The refrigerator of claim 2, wherein the fixed bracket further comprises:
   a windshield, extending from a front end of the bracket body, and used for sealing off front areas of the first heat dissipation chamber and the second heat dissipation chamber.

7. The refrigerator of claim 2, wherein the fixed bracket further comprises:

   an installation snap, provided at a bottom of the

fixed bracket and used for snapping to a bottom plate of the heat dissipation compartment; and
a fixation screw post, provided at a rear portion of the fixed bracket and used for fixing with a rear wall panel of the heat dissipation compartment by screws.

**8.** The refrigerator of claim 1, further comprising:

a compressor, mounted in the first heat dissipation chamber;
an evaporating dish, mounted in the second heat dissipation chamber and used for receiving water discharged from a drain pipe connected to a cooling chamber; and
the heat dissipation airflow flows sequentially through the compressor, the heat dissipation fan, the condenser, and the evaporating dish.

**9.** The refrigerator of claim 8, wherein
a top portion of the fixed bracket is provided with a guide groove for making a refrigeration line connecting the compressor as well as the condenser to pass through.

**10.** The refrigerator of claim 1, wherein
a bottom plate of the heat dissipation compartment is provided with a heat dissipation air inlet port and a heat dissipation air exhaust port at front portions of the first heat dissipation chamber and the second heat dissipation chamber, respectively.

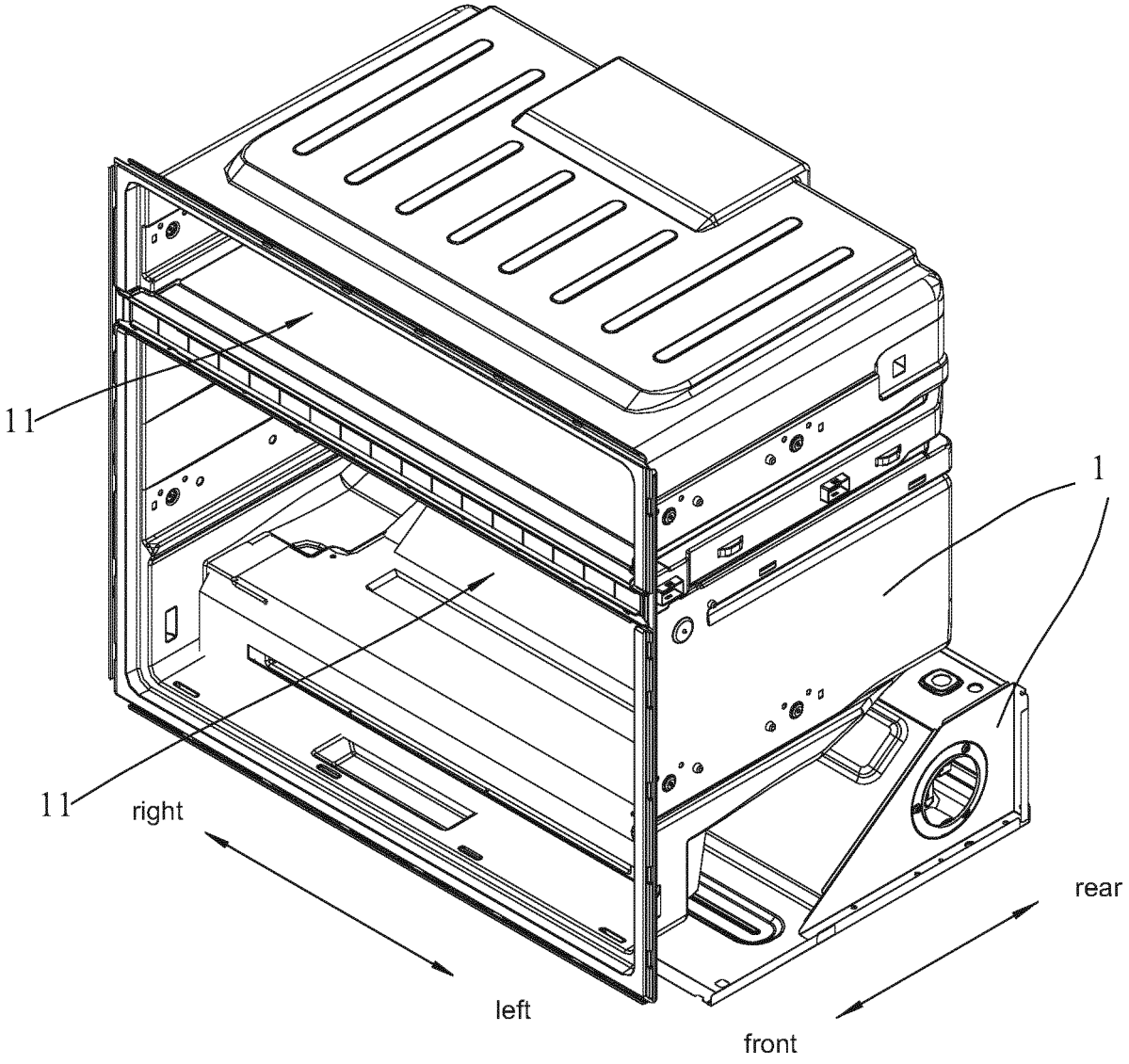


FIG.1

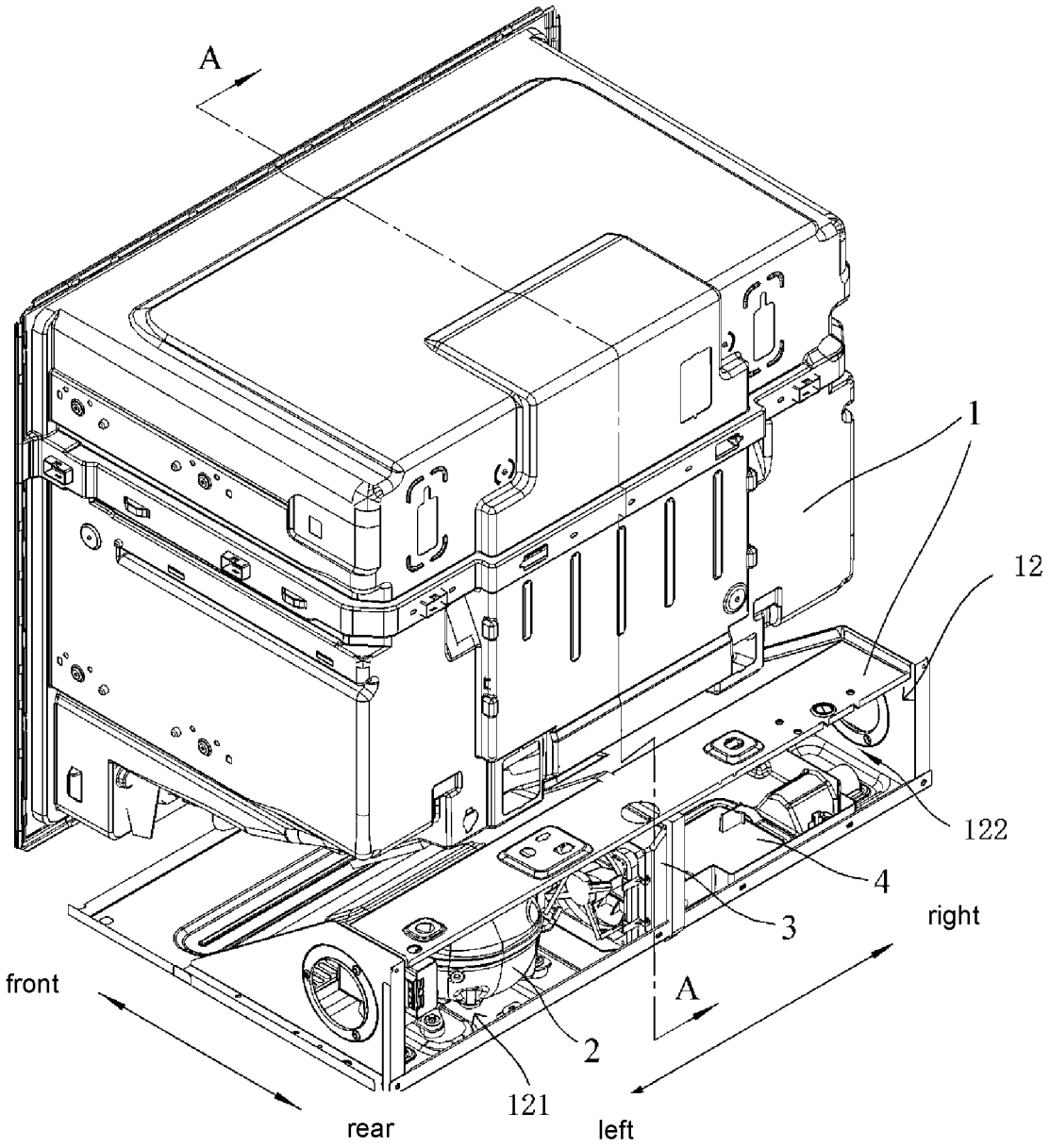


FIG.2

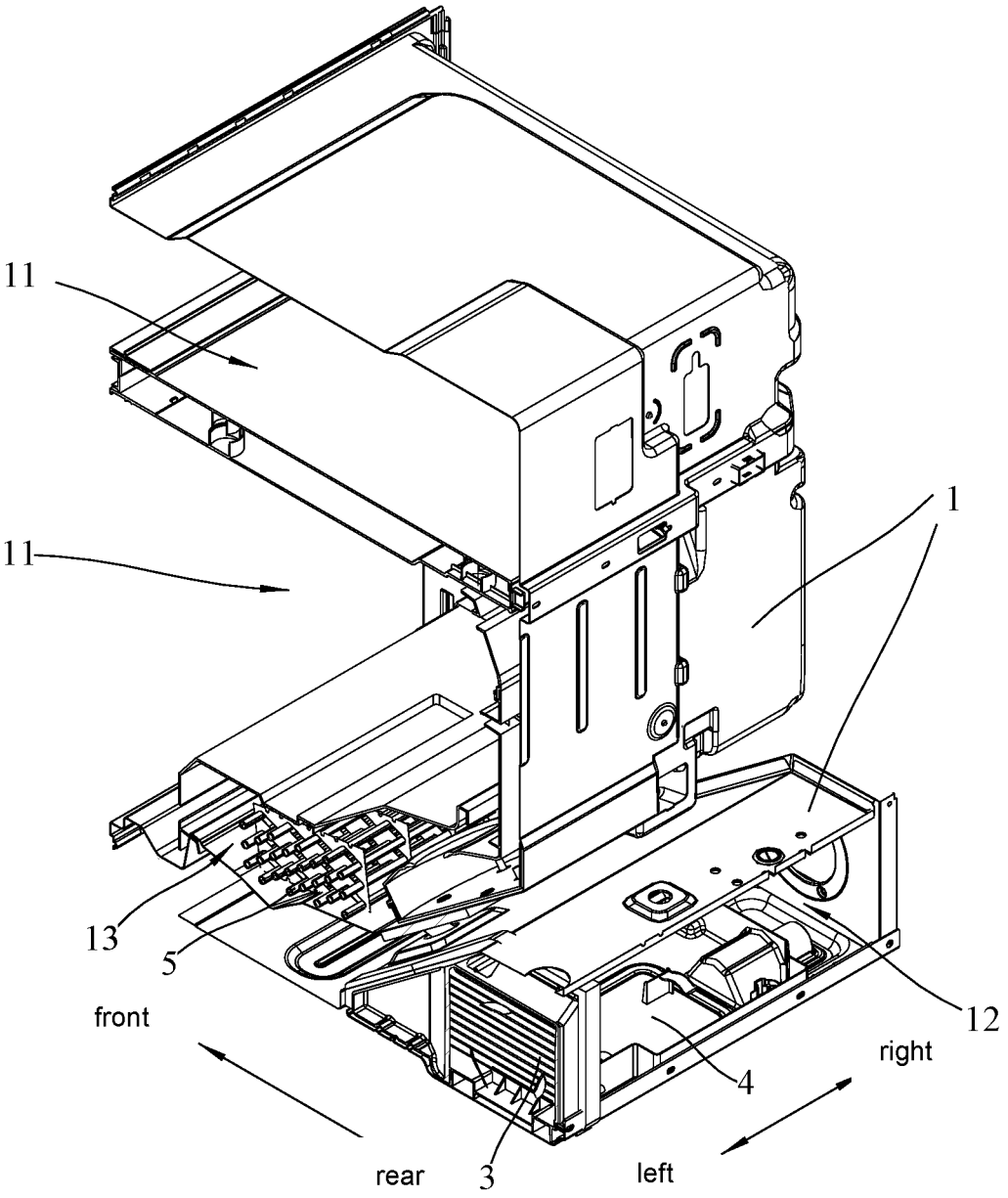


FIG.3

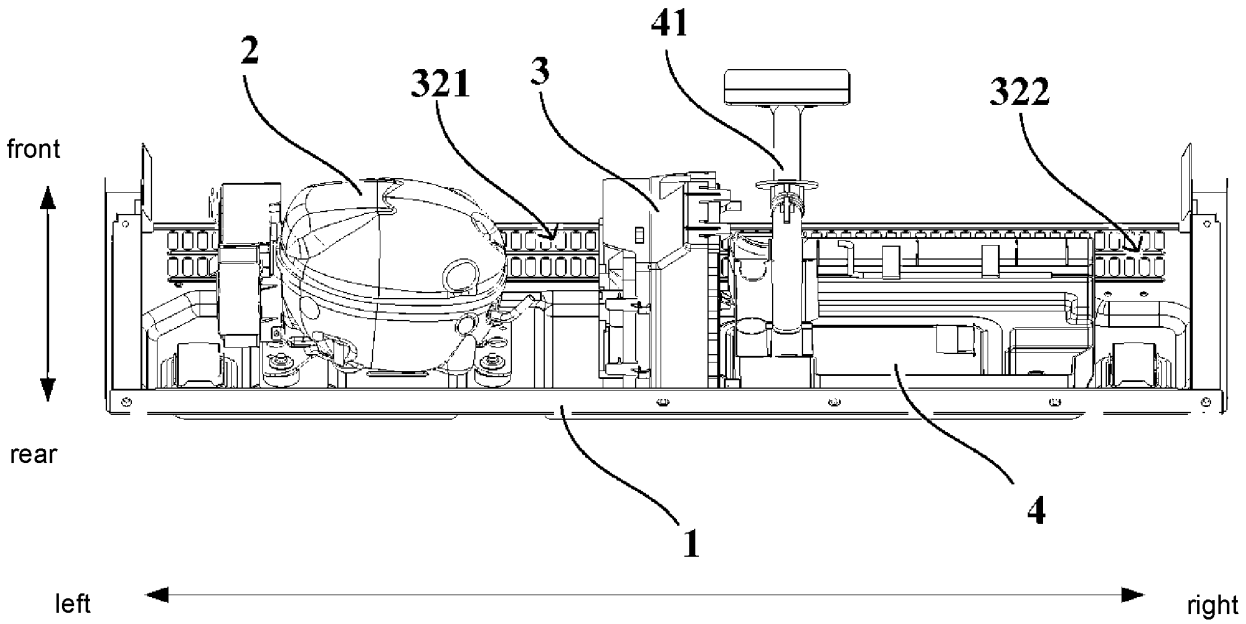


FIG.4

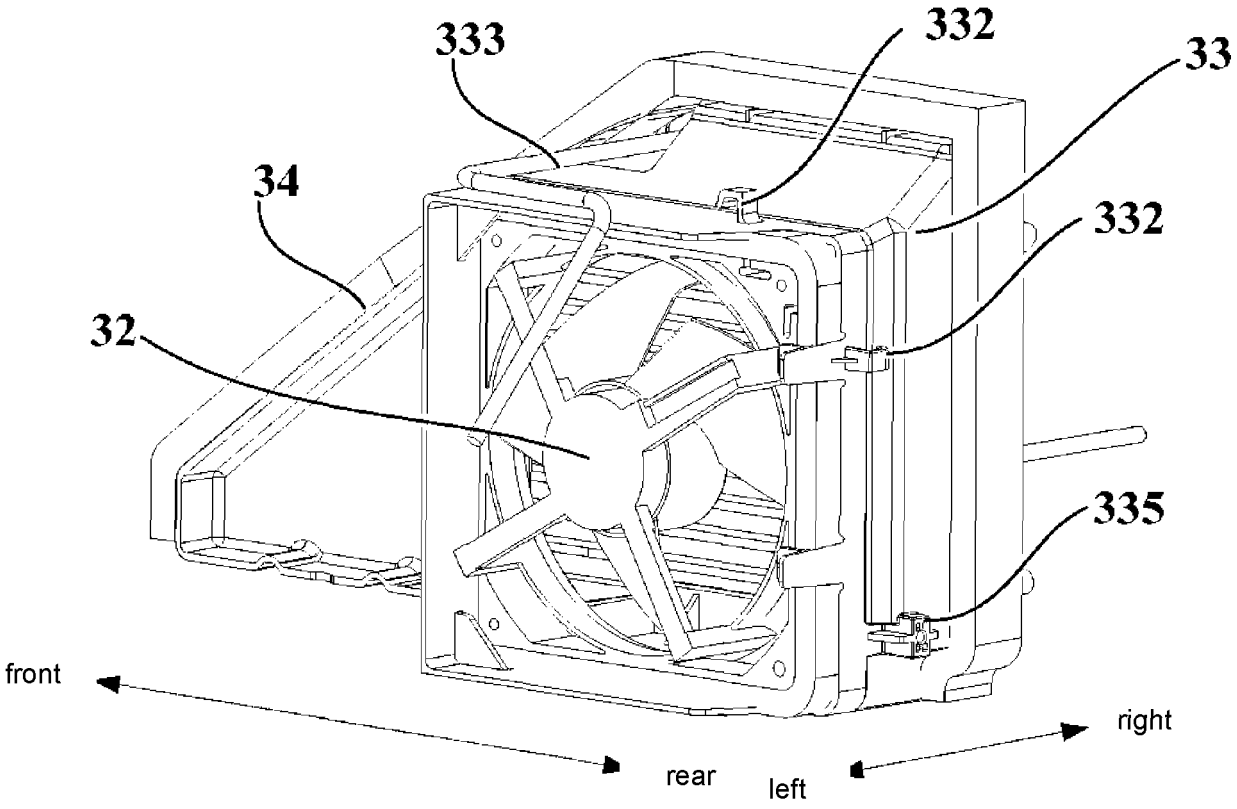


FIG.5

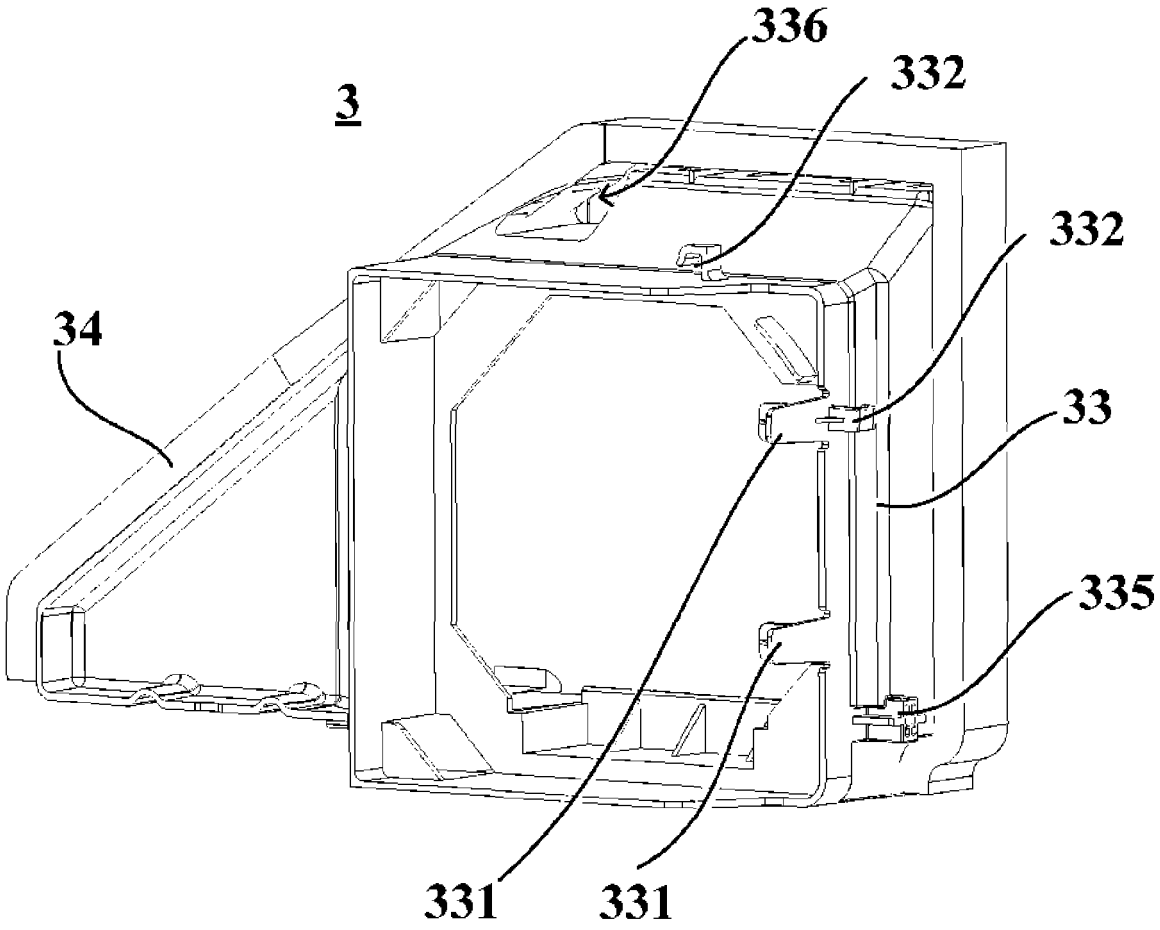


FIG.6

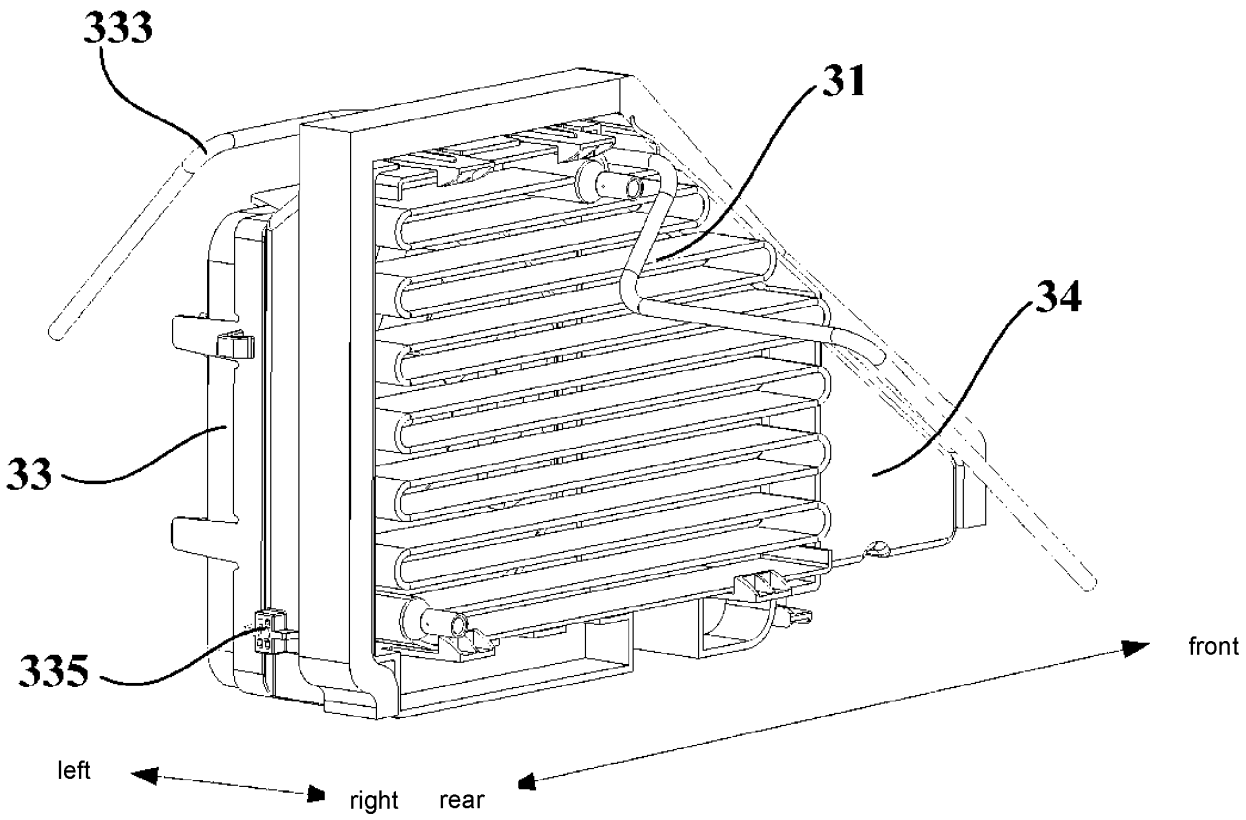


FIG.7

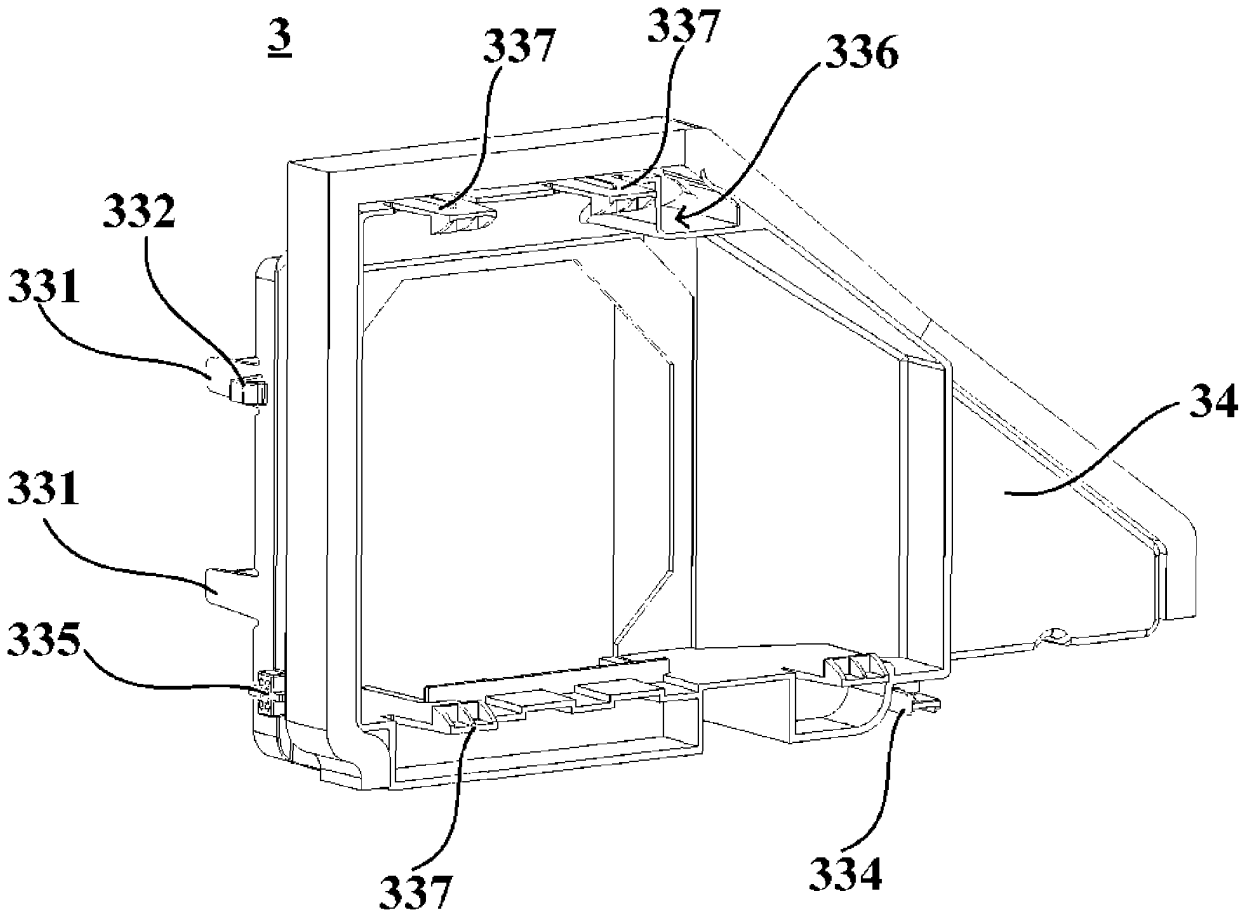


FIG.8

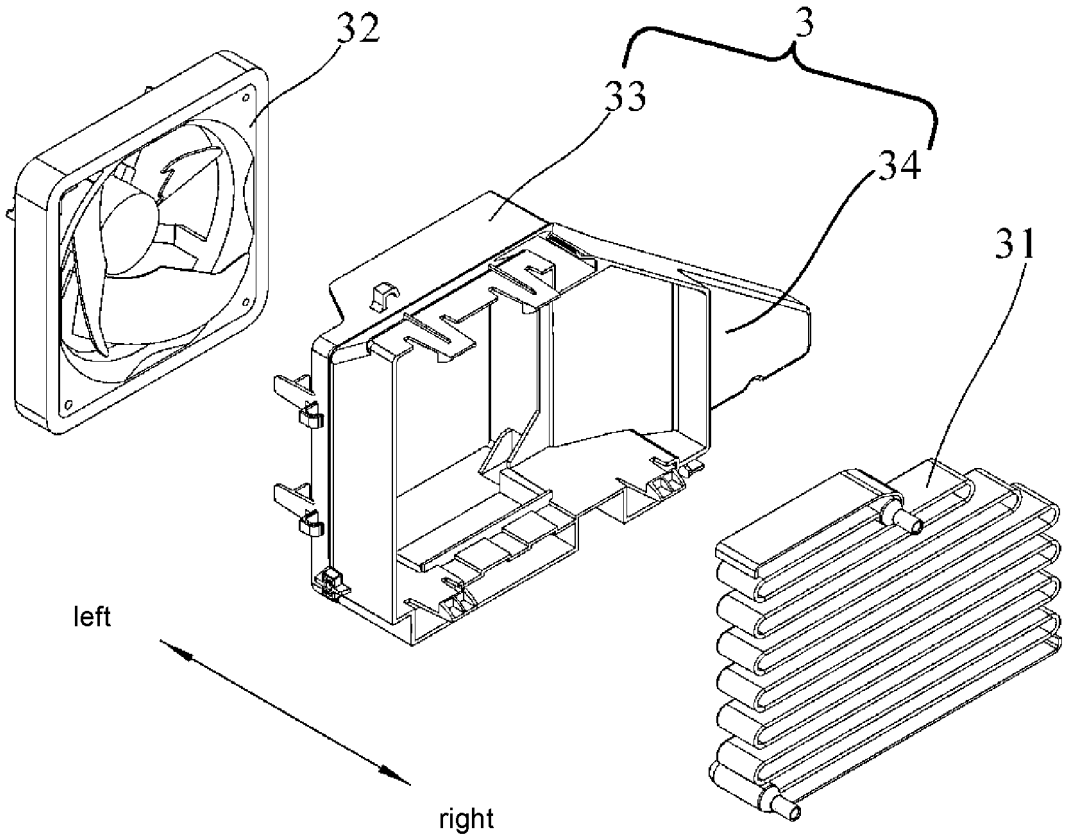


FIG.9

## INTERNATIONAL SEARCH REPORT

International application No.
**PCT/CN2022/108723**

**A. CLASSIFICATION OF SUBJECT MATTER**

F25D 11/00(2006.01)i; F25D 23/00(2006.01)i; F25D 21/14(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)

CNABS; CNTXT; VEN; CNKI; USTXT; EPTXT; WOTXT; 万方, WANFANG; 超星, CHAOXING, 读秀, DUXIU: 海尔, 冰箱, 机仓, 机械室, 风机, 风扇, 冷凝器, 架, 固定, 支撑, 支承, haier, refrigerator, chamber, room, blower, fan, condens+, bracket, frame, fix+, support+

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| PX | CN 216409410 U (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 29 April 2022 (2022-04-29)<br>description, paragraphs [0002]-[0076] and figures 1-9 | 1-10 |
| PX | CN 216557840 U (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 17 May 2022 (2022-05-17)<br>description, paragraphs [0002]-[0066], and figures 1-7 | 1-10 |
| X | CN 205980534 U (HEFEI MEILING CO., LTD.) 22 February 2017 (2017-02-22)<br>description, paragraphs [0002]-[0032], and figures 1-3 | 1-5, 7-10 |
| Y | CN 205980534 U (HEFEI MEILING CO., LTD.) 22 February 2017 (2017-02-22)<br>description, paragraphs [0002]-[0032], and figures 1-3 | 6 |
| X | CN 211650906 U (SKYWORTH GROUP CO., LTD.) 09 October 2020 (2020-10-09)<br>description, paragraphs [0002]-[0039], and figures 1-5 | 1-5, 7-10 |
| Y | CN 211650906 U (SKYWORTH GROUP CO., LTD.) 09 October 2020 (2020-10-09)<br>description, paragraphs [0002]-[0039], and figures 1-5 | 6 |

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

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| **19 September 2022** | **11 October 2022** |
| Name and mailing address of the ISA/CN<br>**China National Intellectual Property Administration (ISA/CN)**<br>**No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** | Authorized officer |
| Facsimile No. **(86-10)62019451** | Telephone No. |

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/108723

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | CN 111442589 A (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 24 July 2020 (2020-07-24)<br>description, paragraphs [0002]-[0041], and figures 1-6 | 1-5, 7-10 |
| Y | CN 111442589 A (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 24 July 2020 (2020-07-24)<br>description, paragraphs [0002]-[0041], and figures 1-6 | 6 |
| X | CN 205448461 U (TCL HOME APPLIANCES (HEFEI) CO., LTD.) 10 August 2016 (2016-08-10)<br>description, paragraphs [0002]-[0040], and figures 1-4 | 1-5, 7-10 |
| Y | CN 205448461 U (TCL HOME APPLIANCES (HEFEI) CO., LTD.) 10 August 2016 (2016-08-10)<br>description, paragraphs [0002]-[0040], and figures 1-4 | 6 |
| X | CN 206257849 U (HEFEI MIDEA REFRIGERATOR CO., LTD. et al.) 16 June 2017 (2017-06-16)<br>description, paragraphs [0002]-[0062], and figures 1-3 | 1-5, 7-10 |
| Y | CN 206257849 U (HEFEI MIDEA REFRIGERATOR CO., LTD. et al.) 16 June 2017 (2017-06-16)<br>description, paragraphs [0002]-[0062], and figures 1-3 | 6 |
| Y | CN 210625091 U (HEFEI SNOWKY ELECTRIC CO., LTD.) 26 May 2020 (2020-05-26)<br>description, paragraphs [0002]-[0017], and figure 1 | 6 |
| A | CN 209893740 U (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 03 January 2020 (2020-01-03)<br>entire document | 1-10 |

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**INTERNATIONAL SEARCH REPORT**
**Information on patent family members**

International application No.
**PCT/CN2022/108723**

| Patent document cited in search report | Publication date (day/month/year) | Patent family member(s) | Publication date (day/month/year) |
|---|---|---|---|
| CN 216409410 U | 29 April 2022 | None | |
| CN 216557840 U | 17 May 2022 | None | |
| CN 205980534 U | 22 February 2017 | None | |
| CN 211650906 U | 09 October 2020 | None | |
| CN 111442589 A | 24 July 2020 | None | |
| CN 205448461 U | 10 August 2016 | None | |
| CN 206257849 U | 16 June 2017 | None | |
| CN 210625091 U | 26 May 2020 | CN 110530099 A | 03 December 2019 |
| CN 209893740 U | 03 January 2020 | CN 111609625 A | 01 September 2020 |

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