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(54) INNER COMPARTMENT FOR REFRIGERATOR AND REFRIGERATOR HAVING SAID COMPARTMENT

(57) An inner compartment (200) for a refrigerator (10) and a refrigerator (10) having said compartment. The inner compartment (200) is sensibly partitioned and is provided with a first cooling area (210) and a second cooling area (220), and the first cooling area (210) and the second cooling area (220) are each used for installing an evaporator. Greater space utilization of the inner compartment (200) is achieved, and different evaporators may be simultaneously assembled to the same inner compartment (200), which facilitates integration of the refrigerator (10).

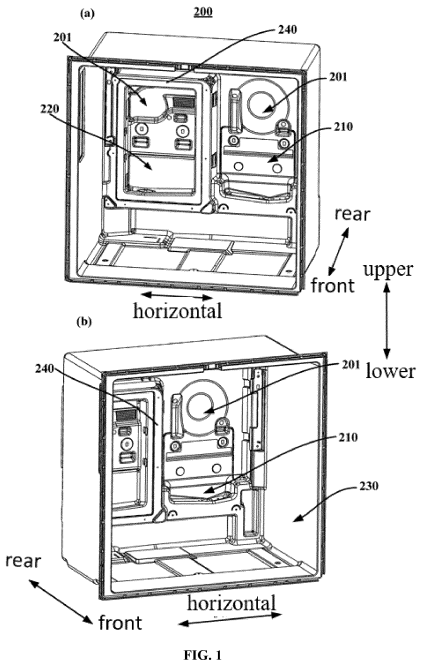

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to refrigeration equipment, particularly to an inner liner for a refrigerator and a refrigerator having the same.

BACKGROUND ART

[0002] For multi-system refrigerators, such as dual-system or triple-system refrigerators, multiple evaporators are typically required to create different temperature zone environments. Generally, evaporators need to be installed on the inner liner of the refrigerator. In existing refrigerators, one inner liner can usually only accommodate one evaporator, resulting in poor integration. For inner liners with larger volumes, their space cannot be fully utilized.

[0003] The above information disclosed in this background section is only for enhancing the understanding of the background of the present application and therefore may contain information that does not constitute prior art known to those skilled in the art.

SUMMARY OF THE INVENTION

[0004] One objective of the present invention is to overcome at least one technical deficiency in the prior art and provide an inner liner for a refrigerator and a refrigerator having the same.

[0005] A further objective of the present invention is to provide a dual-evaporator inner liner, improving space utilization of the inner liner and enhancing the integration of the refrigerator.

[0006] Another further objective of the present invention is to fully leverage the spatial advantages of the refrigerating compartment liner, improving the refrigeration performance of the refrigerator.

[0007] Yet another further objective of the present invention is to simplify the cold supply structure of the door-mounted ice-making module.

[0008] According to an aspect of the present invention, there is provided an inner liner for a refrigerator, wherein, the inner liner comprises a first cooling zone and a second cooling zone, the first cooling zone and the second cooling zone are each configured to install an evaporator.

[0009] Optionally, wherein the inner liner is a refrigerating compartment liner.

[0010] Optionally, wherein the first cooling zone is formed as a refrigerating cooling zone for installing a refrigerating evaporator; and the second cooling zone is formed as an ice-making cooling zone for installing an ice-making evaporator, or formed as a variable temperature cooling zone for installing a variable temperature evaporator.

[0011] Optionally, wherein the first cooling zone and the second cooling zone are thermally isolated from each other, and are arranged side by side horizontally on the rear wall of the inner liner.

[0012] Optionally, wherein the rear wall of the inner liner comprises a protruding annular protrusion on its inner side, thereby forming the second cooling zone within it; the protruding annular protrusion is integrally formed with the rear wall of the inner liner; and the protruding annular protrusion is made of thermal insulation material; the first cooling zone is arranged on one side of the protruding annular protrusion.

[0013] Optionally, wherein the upper sections of the first cooling zone and the second cooling zone each form an air circulation zone for installing a fan; and the first cooling zone is configured so that the installed evaporator is positioned below its upper section, and the second cooling zone is configured so that the installed evaporator is positioned below its upper section.

[0014] According to another aspect of the present invention, there is also provided a refrigerator, wherein, the refrigerator comprising: an inner liner, the inner liner comprises a first cooling zone and a second cooling zone, the first cooling zone and the second cooling zone are each configured to install an evaporator.

[0015] Optionally, wherein the refrigerator comprises a first cold storage compartment formed inside the inner liner and a second cold storage compartment located outside the inner liner; and the refrigerator further comprises: a first evaporator, installed in the first cooling zone, configured to supply cold to the first cold storage compartment; and a second evaporator, installed in the second cooling zone, configured to supply cold to the second cold storage compartment.

[0016] Optionally, wherein the first evaporator is a refrigerating evaporator; the second evaporator is an ice-making evaporator; the refrigerator further comprises a door; and the second cold storage compartment is an ice-making area set in the door, configured to receive cold supplied by the second evaporator and make ice.

[0017] Optionally, wherein, the refrigerator further comprising: a first air duct, connecting between the first cooling zone and the first cold storage compartment, configured to guide the cooling air flow passing through the first evaporator to the first cold storage compartment, and guide the return air flow passing through the first cold storage compartment to the first cooling zone; and a second air duct, connecting between the second cooling zone and the second cold storage compartment, configured to guide the cooling air flow passing through the second evaporator to the second cold storage compartment, and guide the return air flow passing through the second cold storage compartment to the second cooling zone.

[0018] Optionally, wherein, the refrigerator further comprising: a first fan, installed in the first cooling zone and positioned above the first evaporator, configured to promote air circulation flowing through the first evaporator, the first air duct, and the first cold storage compart-

ment; and a second fan, installed in the second cooling zone and positioned above the second evaporator, configured to promote air circulation flowing through the second evaporator, the second air duct, and the second cold storage compartment.

[0019] Optionally, wherein, the refrigerator further comprising: a first front panel, arranged at the front of the first cooling zone and the second cooling zone, to separate the first cold storage compartment from the first cooling zone and the second cooling zone; and a second front panel, arranged at the front of the second cooling zone, positioned behind the first front panel, and closing the forward opening of the first cooling zone; and the first front panel and the second front panel each have a thermal insulation layer.

[0020] The inner liner for a refrigerator and the refrigerator having the same according to the present invention provide a dual-evaporator inner liner through rational zoning of the inner liner. As the inner liner simultaneously defines a first cooling zone and a second cooling zone, with each cooling zone used for installing an evaporator, the space utilization of the inner liner is improved. Different evaporators can be simultaneously installed in the same inner liner, which is conducive to enhancing the integration of the refrigerator.

[0021] Furthermore, due to the large volume of the refrigerating compartment liner, when it is selected as the dual-evaporator inner liner, it can fully utilize its spatial advantages, meeting the space assembly requirements of two cooling zones. The layout of the refrigerator's cooling supply structure is also adjusted, which is beneficial for improving the refrigeration performance of the refrigerator and allows other inner liners of the refrigerator to release more storage space.

[0022] Moreover, when the first cooling zone forms a refrigerating cooling zone for installing a refrigerating evaporator, and the second cooling zone forms an ice-making cooling zone for installing an ice-making evaporator, the distance between the second cooling zone and the door-mounted ice-making module is shorter. There is no need to arrange excessively long cooling supply pipes between them, which is conducive to simplifying the cold supply structure of the door-mounted ice-making module.

[0023] According to the detailed description of specific embodiments of the present invention in conjunction with the accompanying drawings below, those skilled in the art will have a better understanding of the above and other objectives, advantages, and features of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] Some specific embodiments of the present invention will be described in detail below with reference to the accompanying drawings in an exemplary rather than limiting manner. The same reference numerals in the drawings indicate the same or similar components or parts. Those skilled in the art should understand that these drawings are not necessarily drawn to scale. In the drawings:

FIG. 1 is a schematic structural diagram of an inner liner for a refrigerator according to an embodiment of the present invention;

FIG. 2 is a schematic structural diagram of a refrigerator according to an embodiment of the present invention;

FIG. 3 is a schematic front view of a partial structure of a refrigerator according to an embodiment of the present invention;

FIG. 4 is a schematic front view of a partial structure of a refrigerator according to another embodiment of the present invention;

FIG. 5 is a schematic structural diagram of a partial structure of a refrigerator according to an embodiment of the present invention;

FIG. 6 is a schematic front view of a partial structure of a refrigerator according to yet another embodiment of the present invention;

FIG. 7 is a schematic structural diagram of a partial structure of a refrigerator according to an embodiment of the present invention.

DETAILED DESCRIPTION

[0025] FIG. 1 is a schematic structural diagram of an inner liner 200 for a refrigerator 10 according to an embodiment of the present invention. FIG. 1(a) and (b) illustrate the structure of the inner liner 200 from two different perspectives. The inner liner 200 of this embodiment is designed to be assembled into the cabinet of the refrigerator 10, forming the body 110.

[0026] The inner liner 200 comprises a first cooling zone 210 and a second cooling zone 220, each of which is used for installing an evaporator. In other words, each cooling zone forms an evaporator installation area. The inner liner 200 of this embodiment can simultaneously accommodate two evaporators, forming a dual-evaporator inner liner 200.

[0027] The first cooling zone 210 and the second cooling zone 220 can be arranged on any wall of the inner liner 200, such as the rear wall, top wall, bottom wall, or side wall. Of course, depending on layout requirements, the first cooling zone 210 and the second cooling zone 220 can also be arranged on any different walls of the inner liner 200.

[0028] This embodiment provides a dual-evaporator inner liner 200 through rational zoning of the inner liner 200. As the inner liner 200 simultaneously defines the first cooling zone 210 and the second cooling zone 220, with each cooling zone used for installing an evaporator, the space utilization of the inner liner 200 is improved. Different evaporators can be simultaneously installed in the same inner liner 200, which is conducive to enhancing the integration of the refrigerator 10.

[0029] The type of inner liner 200 can be selected according to the actual assembly requirements of the refrigerator 10, such as a refrigerating compartment liner, freezing compartment liner 200, or variable temperature compartment liner 200. In some preferred embodiments, the inner liner 200 is a refrigerating compartment liner. The refrigerating compartment liner is used for assembling the refrigerating evaporator and forming the refrigerating compartment.

[0030] For most refrigerators 10, such as T-shaped refrigerators 10, the refrigerating compartment liner comprises a large volume. Due to the large volume of the refrigerating compartment liner, when it is selected as the dual-evaporator inner liner 200, it can fully utilize its spatial advantages, meeting the space assembly requirements of two cooling zones. The layout of the refrigerator's 10 cooling supply structure is also adjusted, which is beneficial for improving the refrigeration performance of the refrigerator 10 and allows other inner liners 200 of the refrigerator 10 to release more storage space.

[0031] Adopting the above solution, when it is necessary to provide cooling to different spaces, the refrigerator 10 can allow for the arrangement of more evaporators, thereby improving the temperature control effect of each space and preventing odor mixing.

[0032] It should be emphasized that, regarding the layout of evaporators, the existing technology typically places the refrigerating evaporator in the center of the rear wall of the refrigerating compartment liner. This leads to insufficient utilization of the rear wall space of the refrigerating compartment liner, limits the number of evaporators that can be installed in the refrigerator 10, and results in crowded space in other inner liners 200, unable to effectively release storage space. The inventor of present application creatively sets up the first cooling zone 210 and the second cooling zone 220 on the refrigerating compartment liner of the refrigerator 10, breaking through the constraints of existing technology. This provides a new approach for the rational layout of evaporators in multi-system refrigerators 10, while also solving multiple technical problems such as complex cooling circuit structures, achieving multiple benefits at once.

[0033] The refrigerating evaporator used to supply cooling to the refrigerating compartment can be installed in either the first cooling zone 210 or the second cooling zone 220, while the other cooling zone can be used to install other evaporators and use that evaporator to supply cooling to spaces outside the refrigerating compartment. Of course, in the refrigerator 10, the inner liner 200 that can simultaneously accommodate two evaporators is not limited to the refrigerating compartment liner.

[0034] In some optional embodiments, the first cooling zone 210 forms a refrigerating cooling zone for installing the refrigerating evaporator. The second cooling zone 220 forms an ice-making cooling zone for installing an ice-making evaporator, or forms a variable temperature cooling zone for installing a variable temperature evaporator.

[0035] In existing refrigerators 10 with door-mounted ice-making modules, there is no separate cooling system on the door 120, and it is necessary to use the freezing compartment's cooling system to supply cooling to the door-mounted ice-making module. Due to the long distance between the freezing compartment's cooling system and the door-mounted ice-making module, a complex cooling supply structure needs to be arranged between them, resulting in high manufacturing costs, low cooling efficiency, and easy odor mixing.

[0036] When the first cooling zone 210 forms a refrigerating cooling zone for installing the refrigerating evaporator, and the second cooling zone 220 forms an ice-making cooling zone for installing the ice-making evaporator, the distance between the second cooling zone 220 and the door-mounted ice-making module is shorter. There is no need to arrange excessively long cooling supply pipes between them, which is conducive to simplifying the cold supply structure of the door-mounted ice-making module, improving cooling efficiency, reducing or avoiding odor mixing, and achieving "clean ice".

[0037] When the first cooling zone 210 forms a refrigerating cooling zone for installing the refrigerating evaporator, and the second cooling zone 220 forms a variable temperature cooling zone for installing the variable temperature evaporator, the refrigerator 10 can be equipped with a separate variable temperature evaporator for the variable temperature compartment, which is beneficial for improving the temperature control effect of the variable temperature compartment.

[0038] Of course, in some embodiments, the second cooling zone 220 can also form a freezing cooling zone for installing a freezing evaporator. In this case, no freezing evaporator needs to be installed inside the freezing compartment liner, thereby fully releasing the storage space of the freezing compartment.

[0039] In some optional embodiments, the first cooling zone 210 and the second cooling zone 220 are thermally isolated from each other and arranged side by side horizontally on the rear wall of the inner liner 200. For example, thermal insulation materials can be used between the first cooling zone 210 and the second cooling zone 220 to prevent heat exchange and avoid confusion in the cooling process.

[0040] Arranging the first cooling zone 210 and the second cooling zone 220 side by side horizontally allows the upper space of the two cooling zones to be left vacant, so that respective air delivery mechanisms or other components can be arranged in the vacant space, further improving space utilization.

[0041] The terms indicating positions such as "horizontal", "vertical", "front", "rear", "inner", "outer", "upper", and "lower" are all relative to the actual use state of the inner liner 200. The actual use state of the inner liner 200 refers to the state when the inner liner 200 is assembled into the cabinet to form the body 110.

[0042] Of course, the first cooling zone 210 and the

second cooling zone 220 can also be arranged side by side vertically, but are not limited to this.

[0043] In some optional embodiments, the inner side of the rear wall of the inner liner 200 comprises a protruding annular protrusion 240, thereby forming the second cooling zone 220 within it. The protruding annular protrusion 240 extends (or protrudes) from a specific annular area of the rear wall of the inner liner 200 towards the inside of the inner liner 200, so that the second cooling zone 220 is defined within the protruding annular protrusion 240 and isolated from the second cooling zone 220 located outside the protruding annular protrusion 240.

[0044] The protruding annular protrusion 240 is made of thermal insulation material, and the first cooling zone 210 is arranged on one side of the protruding annular protrusion 240. This allows the protruding annular protrusion 240 to achieve thermal isolation between the second cooling zone 220 and the first cooling zone 210 on the basis of physical isolation of the second cooling zone 220. For example, the protruding annular protrusion 240 can be set on one horizontal side (e.g., the left side) of the rear wall of the inner liner 200, and the first cooling zone 210 can be set on the other horizontal side (e.g., the right side) of the rear wall of the inner liner 200, so that the first cooling zone 210 and the second cooling zone 220 are arranged side by side horizontally.

[0045] The protruding annular protrusion 240 is integrally formed with the rear wall of the inner liner 200, making the connection between the protruding annular protrusion 240 and the rear wall of the inner liner 200 seamless, which is beneficial for improving the thermal insulation effect of the second cooling zone 220.

[0046] In some optional embodiments, the upper sections of the first cooling zone 210 and the second cooling zone 220 each form an air circulation zone 201 for installing fans. That is, each cooling zone also provides space for installing fans. The upper section can refer to the upper space of each cooling zone.

[0047] The first cooling zone 210 is configured so that the installed evaporator is positioned below its upper section, and the second cooling zone 220 is configured so that the installed evaporator is positioned below its upper section. In other words, the lower section of the cooling zone, located below the upper section, is used for installing the evaporator, and each air circulation zone 201 is located above the evaporator installation area of its respective cooling zone.

[0048] When fans are installed in the upper sections of the cooling zones, under the driving action of the fans, each cooling zone can circulate air with its corresponding cold storage area, allowing the cold storage area to receive cooling from the corresponding cooling zone, thus achieving temperature control.

[0049] In some embodiments, the first cooling zone 210 can be offset to one side of the rear wall of the inner liner 200, while the second cooling zone 220 can be offset to the other side of the rear wall of the inner liner 200. Here, "offset" means that the first cooling zone 210 is set off-center from the rear wall of the inner liner 200, which can be offset horizontally or vertically relative to the inner liner 200.

[0050] It should be emphasized that in existing technology, the evaporator is usually set in the center of the rear wall of the inner liner 200, which leads to insufficient utilization of the rear wall space of the inner liner 200 and limits the number of evaporators that can be installed in the refrigerator 10. The inventor of present application creatively sets up an offset first cooling zone 210 on the inner liner 200 of the refrigerator 10, which can serve as an avoidance, providing sufficient installation space around the first cooling zone 210 for arranging the second cooling zone 220 or installing other components. This breaks through the constraints of existing technology, providing a new approach for the rational use of space within the limited volume of the refrigerator 10.

[0051] In some optional embodiments, the first cooling zone 210 is horizontally offset to one side of the vertical centerline of the rear wall of the inner liner 200. This arrangement allows the space on one horizontal side of the first cooling zone 210 to be left vacant. When the second cooling zone 220 is assembled in this vacant space, it allows the upper space of the first cooling zone 210 to be left empty, so that air delivery mechanisms or other components can be arranged in the vacant space, further improving space utilization.

[0052] FIG. 2 is a schematic structural diagram of a refrigerator 10 according to an embodiment of the present invention.

[0053] The refrigerator 10 can generally include an inner liner 200 as described in any of the above embodiments. The inner liner 200 comprises a first cooling zone 210 and a second cooling zone 220, with the first cooling zone 210 and the second cooling zone 220 each used for installing an evaporator.

[0054] In some optional embodiments, the refrigerator 10 comprises a first cold storage area 230 formed inside the inner liner 200 and a second cold storage area 310 located outside the inner liner 200. For example, when the first cooling zone 210 and the second cooling zone 220 are formed on the rear wall of the inner liner 200, the first cold storage area 230 can refer to the storage compartment located in front of the first cooling zone 210 and the second cooling zone 220. The second cold storage area 310 can refer to storage space defined by other inner liners, or it can refer to other low-temperature spaces formed within the refrigerator 10, such as an ice-making area.

[0055] When the inner liner 200 is a refrigerating compartment liner, correspondingly, the first cold storage area 230 can be the refrigerating compartment. Preferably, the second cold storage area 310 can be a low-temperature space set adjacent to the second cooling zone 220, which can simplify the cold supply structure between the second cooling zone 220 and the second cold storage area 310.

[0056] Adopting the above structure, the refrigerating

compartment liner of the refrigerator 10 can allow for the arrangement of additional dedicated evaporators, improving the refrigeration performance of the refrigerator 10 and increasing the space utilization of the refrigerating compartment liner.

[0057] FIG. 3 is a schematic front view of a partial structure of the refrigerator 10 according to an embodiment of the present invention. The FIG. omits the cabinet 110 and door 120 of the refrigerator 10, and shows the assembly structure of the first cooling zone 210 and the second cooling zone 220 of the inner liner 200.

[0058] The refrigerator 10 also includes a first evaporator 410 and a second evaporator 420. The first evaporator 410 is set in the first cooling zone 210 and configured to supply cooling to the first cold storage area 230. The second evaporator 420 is set in the second cooling zone 220 and configured to supply cooling to the second cold storage area 310.

[0059] For example, the first evaporator 410 can be a refrigerating evaporator, and the second evaporator 420 can be an ice-making evaporator. The refrigerator 10 also includes a door 120. The second cold storage area 310 can be the ice-making area of the door-mounted ice-making module set on the door 120, configured to receive cooling provided by the second evaporator 420 and make ice.

[0060] Alternatively, in some embodiments, the first evaporator 410 can be a refrigerating evaporator, while the second evaporator 420 can be changed to a variable temperature evaporator. The refrigerator 10 can also include another inner liner, and the second cold storage area 310 can be a variable temperature compartment set in that other inner liner.

[0061] In some optional embodiments, the refrigerator 10 also includes a first air duct 510 and a second air duct 520, used for guiding cooling air flow and return air flow respectively.

[0062] FIG. 4 is a schematic front view of a partial structure of the refrigerator 10 according to another embodiment of the present invention, and FIG. 5 is a schematic structural view of a partial structure of the refrigerator 10 according to an embodiment of the present invention. These figures omit the cabinet 110 and door 120 of the refrigerator 10, and illustrate the first air duct 510 and the second air duct 520 respectively. FIG. 5 shows a rear view schematic diagram of the inner liner 200 assembled with the second air duct 520.

[0063] The first air duct 510 connects between the first cooling zone 210 and the first cold storage area 230, configured to guide the cooling air flow passing through the first evaporator 410 to the first cold storage area 230, and guide the return air flow passing through the first cold storage area 230 to the first cooling zone 210.

[0064] The second air duct 520 connects between the second cooling zone 220 and the second cold storage area 310, configured to guide the cooling air flow passing through the second evaporator 420 to the second cold storage area 310, and guide the return air flow passing through the second cold storage area 310 to the second cooling zone 220.

[0065] The first air duct 510 and the second air duct 520 can each include a supply air duct and a return air duct, where the supply air duct is used for guiding cooling air flow, and the return air duct is used for guiding return air flow. By using separate air ducts to connect cooling zones with corresponding cold storage areas, each cold storage area can receive specific cooling air flow according to its own temperature settings, achieving temperature control.

[0066] In some optional embodiments, the refrigerator 10 also includes a first fan 610 and a second fan 620.

[0067] The first fan 610 is set in the first cooling zone 210 and positioned above the first evaporator 410, configured to promote air circulation flowing through the first evaporator 410, the first air duct 510, and the first cold storage area 230.

[0068] The second fan 620 is set in the second cooling zone 220 and positioned above the second evaporator 420, configured to promote air circulation flowing through the second evaporator 420, the second air duct 520, and the second cold storage area 310.

[0069] For example, the first fan 610 can be set in the air circulation zone 201 of the first cooling zone 210, and the second fan 620 can be set in the air circulation zone 201 of the second cooling zone 220. Under the action of each fan, the cooling air flow can flow out from the top of the evaporator in its cooling zone, and the return air flow can pass through the bottom section of the evaporator and undergo heat exchange when passing through the evaporator again to form cooling air flow, thus achieving circulation.

[0070] In some embodiments, the first cooling zone 210 and the second cooling zone 220 are arranged side by side horizontally on the rear wall of the inner liner 200. The refrigerator 10 can further include a first front panel 710 and a second front panel 720. The first front panel 710 and the second front panel 720 each have a thermal insulation layer.

[0071] FIG. 6 is a schematic front view of a partial structure of the refrigerator 10 according to yet another embodiment of the present invention, with the first front panel 710 omitted in the figure.

[0072] Using the thermal insulation layer to separate the cooling zones and the first cold storage area 230 can prevent heat transfer between the cooling zones and the first cold storage area 230, ensuring that the first cold storage area 230 can only receive cooling from the corresponding air ducts, avoiding ineffective temperature control.

[0073] The first front panel 710 is set at the front of the first cooling zone 210 and the second cooling zone 220, to separate the first cold storage area 230 from the first cooling zone 210 and the second cooling zone 220.

[0074] In other words, the first front panel 710 divides the internal space of the inner liner 200 into the front-arranged first cold storage area 230 and the rear-ar-

ranged cooling zones. The first cold storage area 230 forms the refrigerating compartment, while the cooling zones consist of the horizontally arranged first cooling zone 210 and second cooling zone 220.

[0075] The second front panel 720 is set at the front of the second cooling zone, positioned behind the first front panel 710, and closes the forward opening of the first cooling zone.

[0076] That is, the front side of the second cooling zone 220 comprises the second front panel 720 and the first front panel 710 layered, forming a double-layer thermal insulation, which enhances the insulation effect, reducing or avoiding adverse effects on temperature control of the first cold storage area 230 caused by the additionally installed second evaporator 420.

[0077] The first air duct 510 forms a first air supply outlet 511 and a first air return inlet 512. The second air duct 520 forms a second air supply outlet 521 and a second air return inlet 522. In some optional embodiments, the first front panel 710 comprises openings for the first air supply outlet 511 and the first air return inlet 512 connecting to the first cooling zone 210, forming the first air duct 510. The surrounding wall of the second cooling zone 220 can have openings for the second air supply outlet 521 and the second air return inlet 522 connecting to the second cooling zone 220, forming the second air duct 520.

[0078] The first air supply outlet 511 can be located in the upper section of the first front panel 710, and the first air return inlet 512 can be located in the lower section of the first front panel 710. This allows the cooling air flow passing through the first evaporator 410 to flow upward under the driving action of the fan, and enter the first cold storage area 230 through the first air supply outlet 511. The return air flow passing through the first cold storage area 230 can enter the bottom of the first evaporator 410 through the first air return inlet 512, and pass through the first evaporator 410 again for heat exchange.

[0079] In some optional embodiments, there can be multiple first air supply outlets 511, distributed at intervals along the upper section of the first front panel 710, so that the first air supply outlets 511 are arranged along the width direction of the first cold storage area 230, which is beneficial for improving the uniformity of air supply in the first cold storage area 230.

[0080] FIG. 7 is a schematic structural diagram of a partial structure of the refrigerator 10 according to an embodiment of the present invention. Compared with FIG. 6, FIG. 7 omits part of the second air duct 520 and exposes the second air supply outlet 521 and the second air return inlet 522.

[0081] The second air supply outlet 521 can be located in the upper section of the side wall of the second cooling zone 220 that is away from the first cooling zone 210, and the second air return inlet 522 can be located in the lower section of the side wall of the second cooling zone 220 that is away from the first cooling zone 210. When the second evaporator 420 supplies cooling to the door-mounted ice-making module, the side wall of the inner liner 200 can have a third air supply outlet and a third air return inlet opened to connect with the air inlet and outlet of the ice-making area of the door-mounted ice-making module respectively. The air supply section of the second air duct 520 can extend from the second air supply outlet 521 along the outer surface of the inner liner 200 wall to the third air supply outlet, and the air return section of the second air duct 520 can extend from the second air return inlet 522 along the outer surface of the inner liner 200 wall to the third air return inlet. This allows the cooling air flow passing through the second evaporator 420 to flow upward under the driving action of the fan, and enter the ice-making area of the door-mounted ice-making module through the air supply section of the second air duct 520. The return air flow passing through the ice-making area of the door-mounted ice-making module can enter the bottom of the second evaporator 420 through the air return section of the second air duct 520, and pass through the second evaporator 420 again for heat exchange.

[0082] In some optional embodiments, defrosting heating components for defrosting can be installed on the first evaporator 410 and the second evaporator 420 respectively, allowing them to defrost independently.

[0083] The inner liner 200 for the refrigerator 10 and the refrigerator 10 having the same, according to the present invention, provide a dual-evaporator inner liner 200 through rational zoning of the inner liner 200. As the inner liner 200 simultaneously defines a first cooling zone 210 and a second cooling zone 220, with each cooling zone used for installing an evaporator, the space utilization of the inner liner 200 is improved. Different evaporators can be simultaneously installed in the same inner liner 200, which is conducive to enhancing the integration of the refrigerator 10.

[0084] At this point, those skilled in the art should recognize that although multiple exemplary embodiments of the present invention have been shown and described in detail, many other variations or modifications that conform to the principles of the present invention can be directly determined or derived from the content disclosed in this invention without departing from the spirit and scope of the invention. Therefore, the scope of the present invention should be understood and recognized as covering all these other variations or modifications.

Claims

1. An inner liner for a refrigerator, wherein,
the inner liner comprises a first cooling zone and a second cooling zone, the first cooling zone and the second cooling zone are each configured to install an evaporator.

2. The inner liner for a refrigerator according to claim 1,

wherein,
the inner liner is a refrigerating compartment liner.

3. The inner liner for a refrigerator according to claim 1, wherein,

the first cooling zone is formed as a refrigerating cooling zone for installing a refrigerating evaporator; and
the second cooling zone is formed as an ice-making cooling zone for installing an ice-making evaporator, or formed as a variable temperature cooling zone for installing a variable temperature evaporator.

4. The inner liner for a refrigerator according to claim 1, wherein,
the first cooling zone and the second cooling zone are thermally isolated from each other, and are arranged side by side horizontally on the rear wall of the inner liner.

5. The inner liner for a refrigerator according to claim 1, wherein,

the rear wall of the inner liner comprises a protruding annular protrusion on its inner side, thereby forming the second cooling zone within it; the protruding annular protrusion is integrally formed with the rear wall of the inner liner; and the protruding annular protrusion is made of thermal insulation material; the first cooling zone is arranged on one side of the protruding annular protrusion.

6. The inner liner for a refrigerator according to claim 1, wherein,

the upper sections of the first cooling zone and the second cooling zone each form an air circulation zone for installing a fan; and
the first cooling zone is configured so that the installed evaporator is positioned below its upper section, and the second cooling zone is configured so that the installed evaporator is positioned below its upper section.

7. A refrigerator, wherein, comprising:
an inner liner, the inner liner comprises a first cooling zone and a second cooling zone, the first cooling zone and the second cooling zone are each configured to install an evaporator.

8. The refrigerator according to claim 7, wherein,

the refrigerator comprises a first cold storage compartment formed inside the inner liner and a second cold storage compartment located outside the inner liner; and
the refrigerator further comprises:

a first evaporator, installed in the first cooling zone, configured to supply cold to the first cold storage compartment; and
a second evaporator, installed in the second cooling zone, configured to supply cold to the second cold storage compartment.

9. The refrigerator according to claim 8, wherein,

the first evaporator is a refrigerating evaporator;
the second evaporator is an ice-making evaporator;
the refrigerator further comprises a door; and
the second cold storage compartment is an ice-making area set in the door, configured to receive cold supplied by the second evaporator and make ice.

10. The refrigerator according to claim 8, wherein, further comprising:

a first air duct, connecting between the first cooling zone and the first cold storage compartment, configured to guide the cooling air flow passing through the first evaporator to the first cold storage compartment, and guide the return air flow passing through the first cold storage compartment to the first cooling zone; and
a second air duct, connecting between the second cooling zone and the second cold storage compartment, configured to guide the cooling air flow passing through the second evaporator to the second cold storage compartment, and guide the return air flow passing through the second cold storage compartment to the second cooling zone.

11. The refrigerator according to claim 8, wherein, further comprising:

a first fan, installed in the first cooling zone and positioned above the first evaporator, configured to promote air circulation flowing through the first evaporator, the first air duct, and the first cold storage compartment; and
a second fan, installed in the second cooling zone and positioned above the second evaporator, configured to promote air circulation flowing through the second evaporator, the second air duct, and the second cold storage compartment.

12. The refrigerator according to claim 8, wherein, further comprising:

a first front panel, arranged at the front of the first

cooling zone and the second cooling zone, to separate the first cold storage compartment from the first cooling zone and the second cooling zone; and

a second front panel, arranged at the front of the second cooling zone, positioned behind the first front panel, and closing the forward opening of the first cooling zone; and

the first front paneland the second front panel each have a thermal insulation layer.

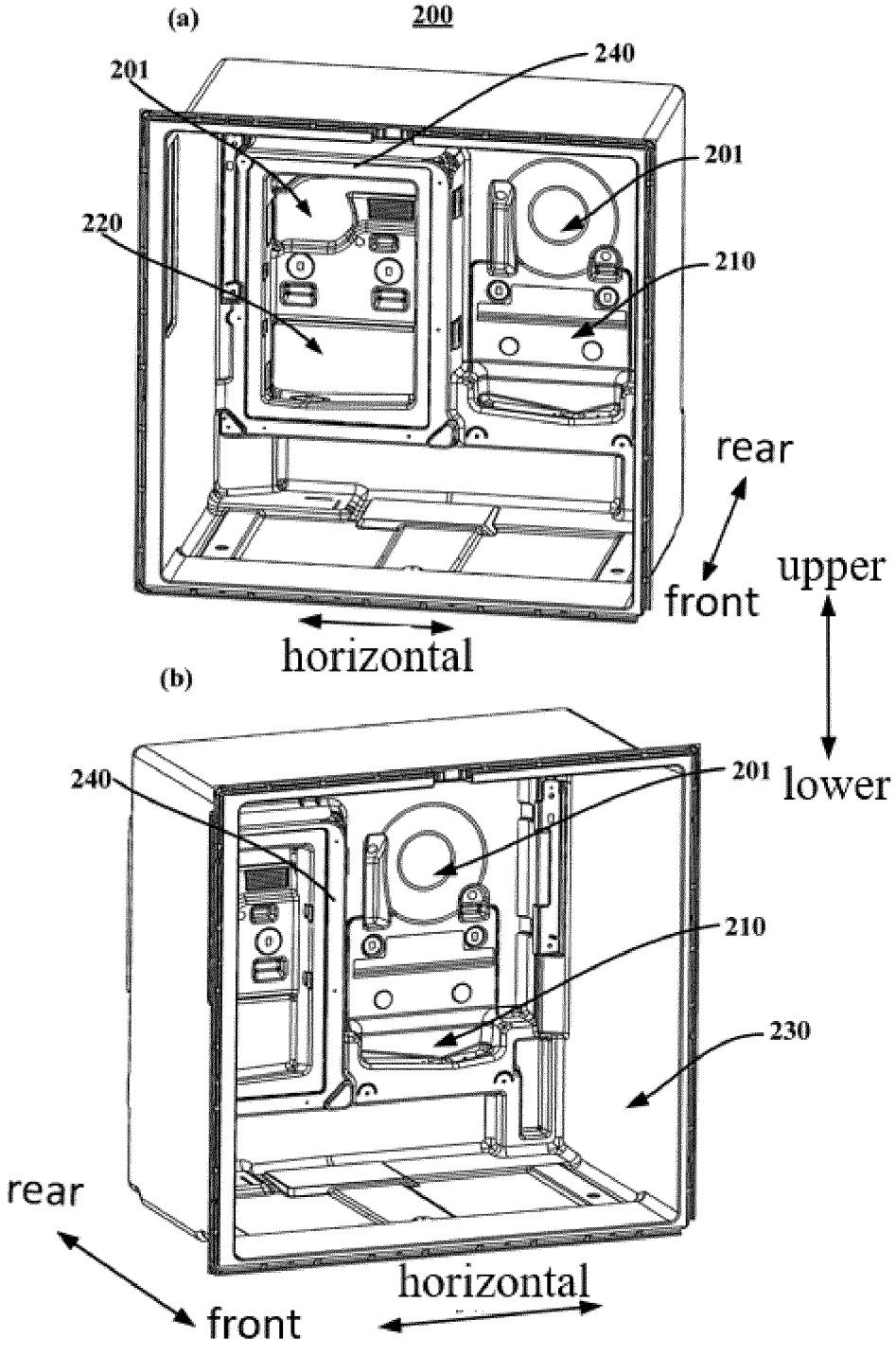
(a)
200
201
240
201
220
210
rear
front
upper
lower
horizontal
(b)
240
201
210
230
rear
front
horizontal

FIG. 1

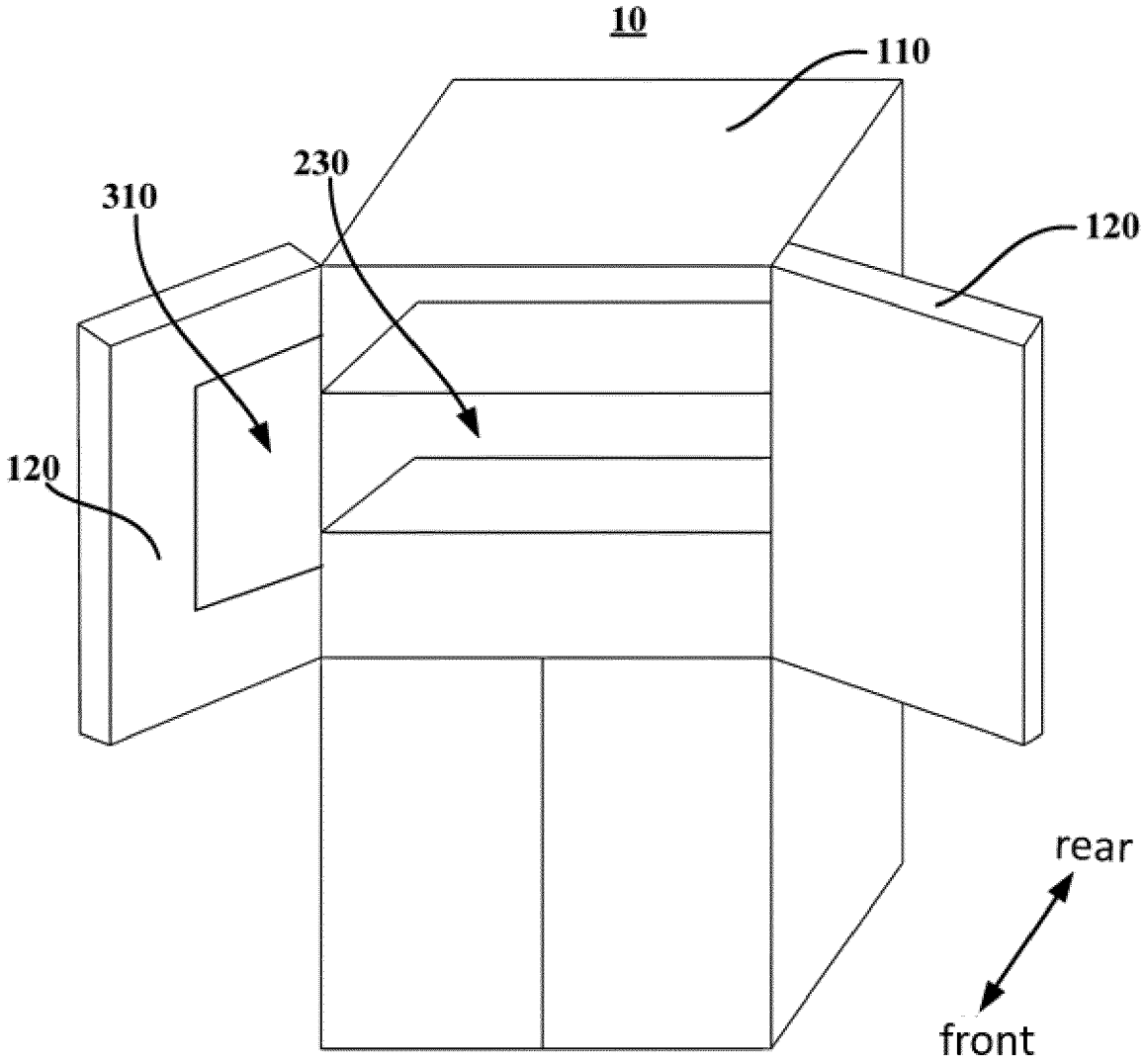

FIG. 2

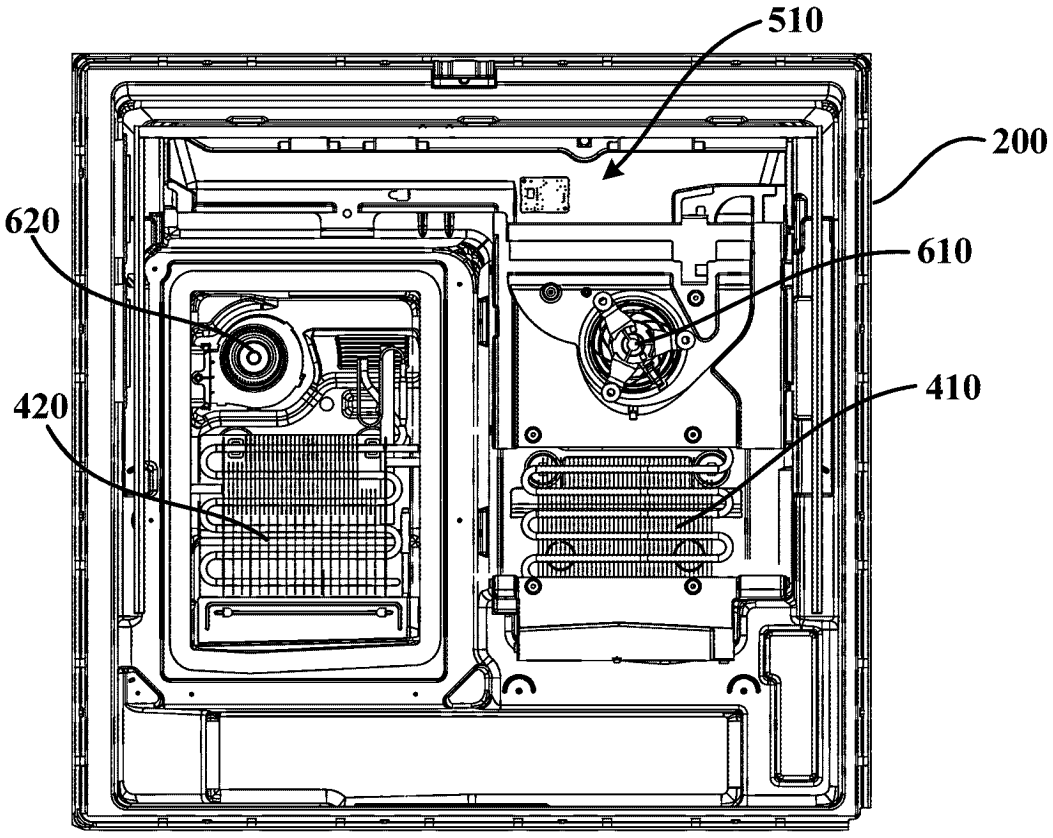

FIG. 3

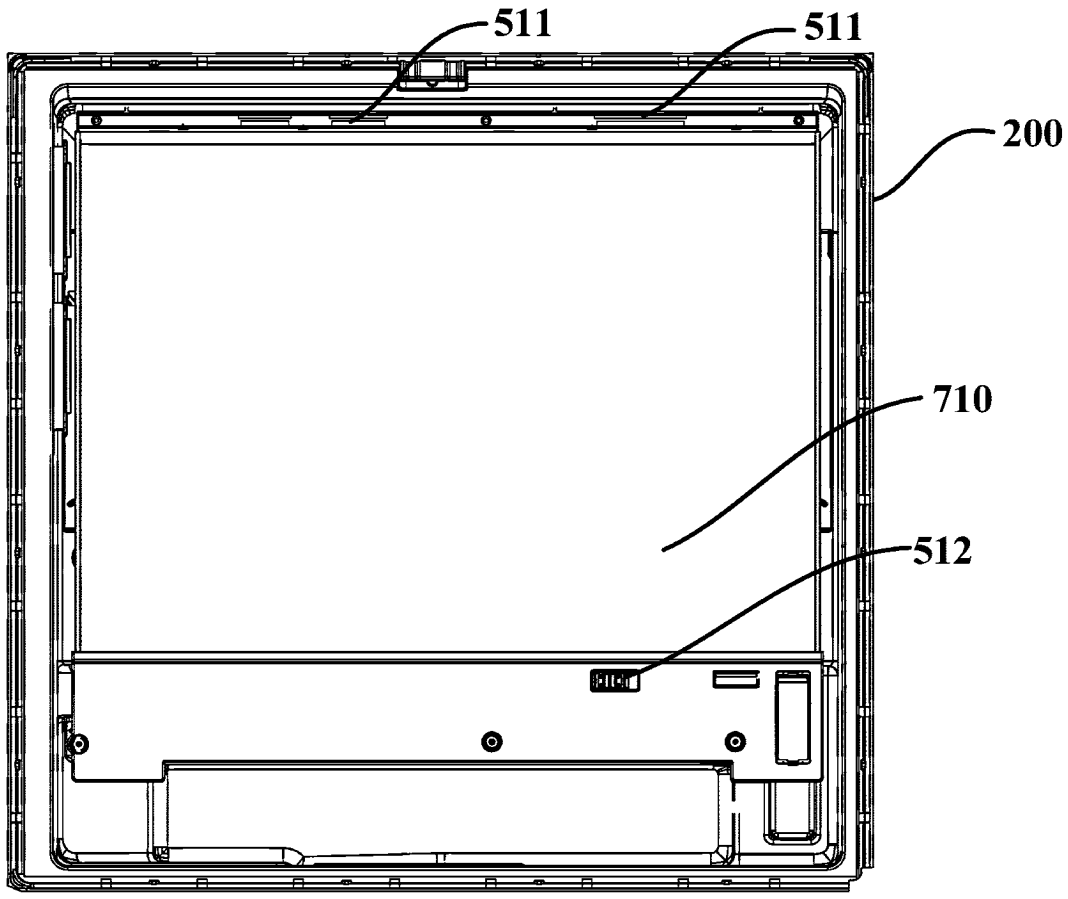

FIG. 4

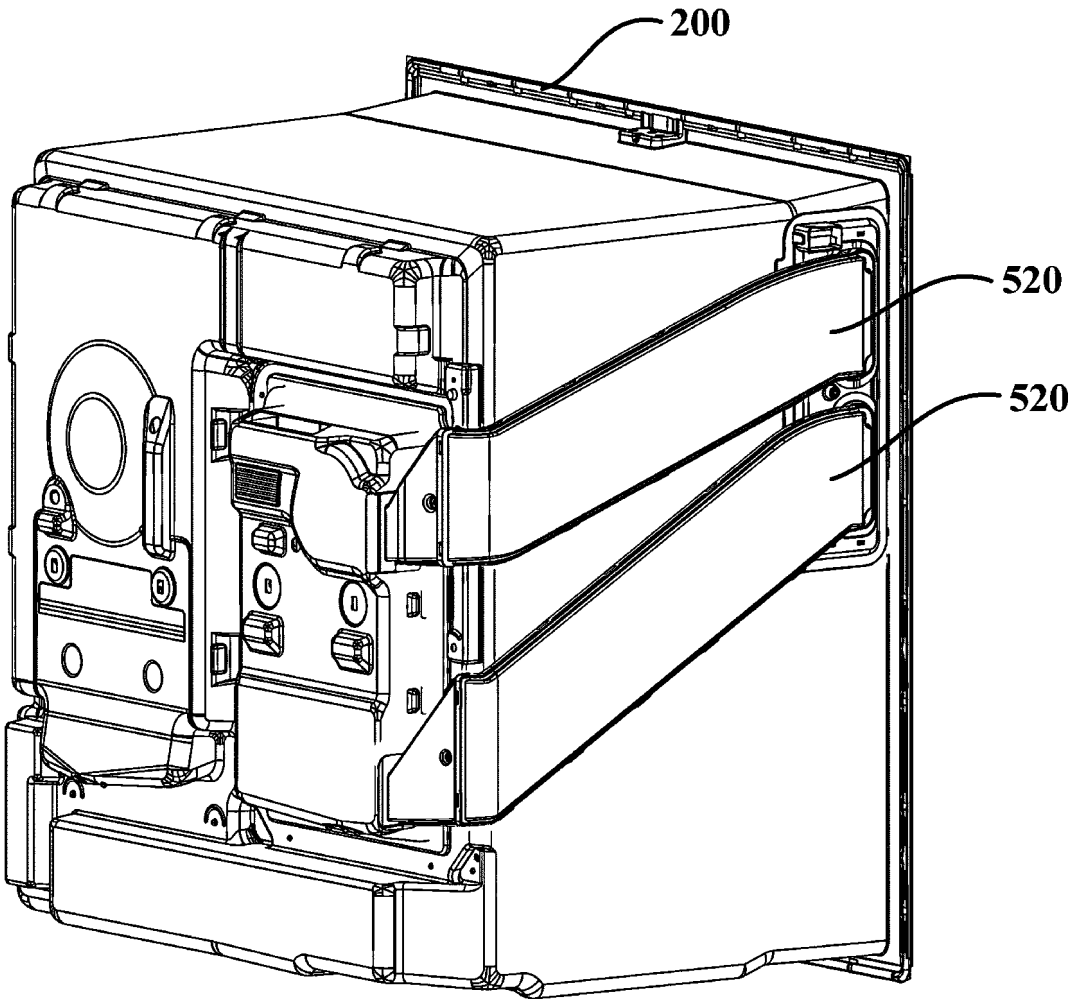

FIG. 5

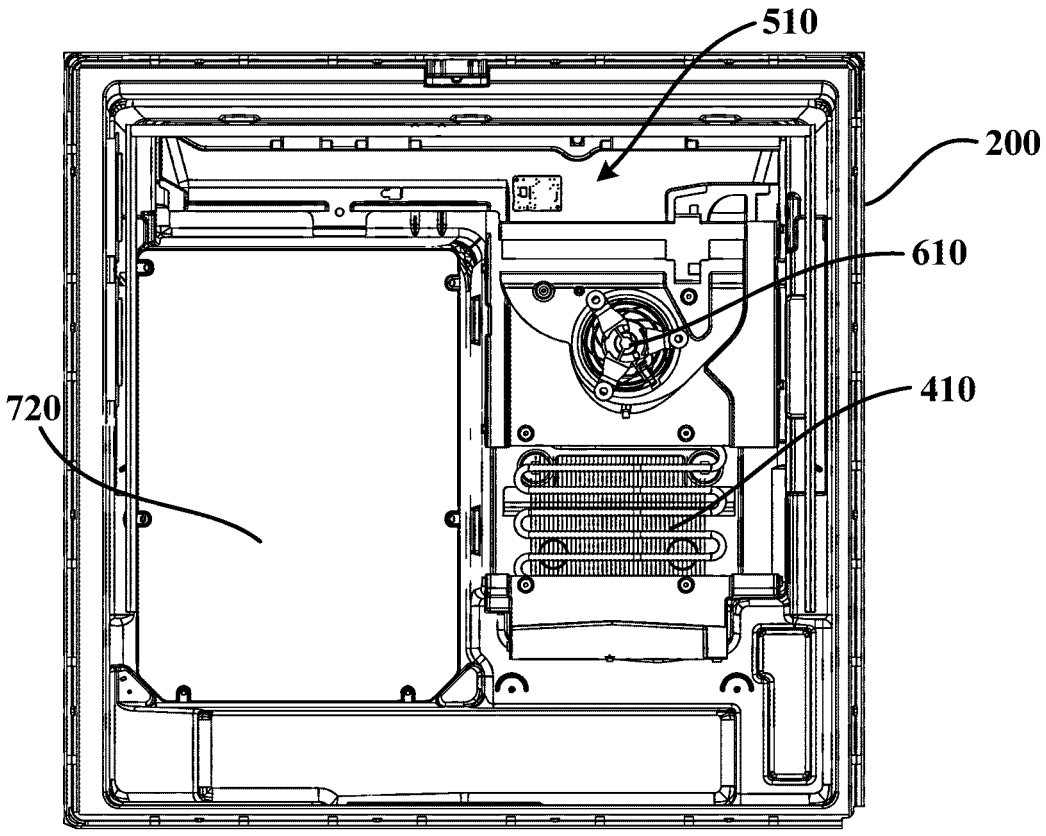

FIG. 6

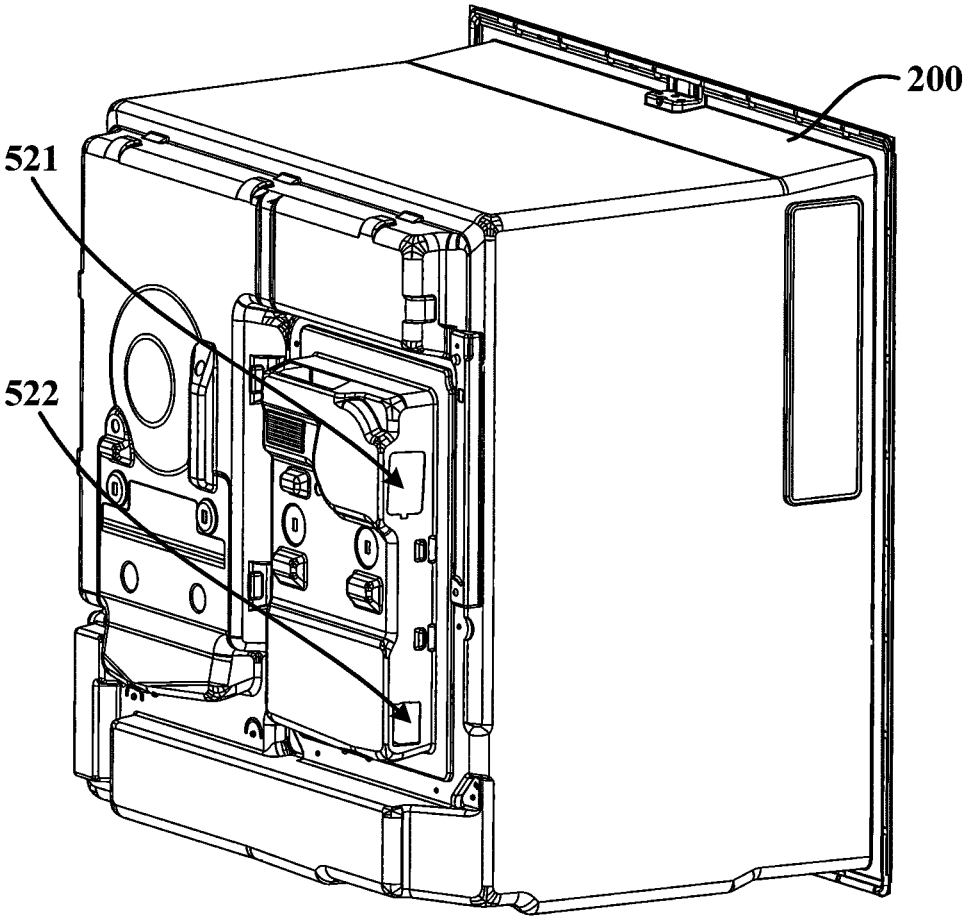

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/084117

A. CLASSIFICATION OF SUBJECT MATTER

F25D23/00(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)

IPC: F25D23/12, F25D23/06, F25D23/00,F25B39/02, F25B39/00,F25D11/00

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, ENTXTC, CNKI: 冰箱, 内胆, 蒸发器, 第二, 隔离, 前凸, 风机; REFRIGERATOR, INNER, CONTAINER, DOUBLE, SECOND, EVAPORATOR, PARTITION, FAN, BLOWER, PROTRUDE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 218096802 U (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 20 December 2022 (2022-12-20) claims, and description, pages 2 and 6	1-12
PX	CN 218065526 U (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 16 December 2022 (2022-12-16) description, pages 3-8, and figures 1-7	1-12
X	CN 212778133 U (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 23 March 2021 (2021-03-23) description, pages 3-6, and figures 1-9	1-4, 6, 7
A	CN 109990528 A (PANASONIC RANDD CENTER SUZHOU CO., LTD. et al.) 09 July 2019 (2019-07-09) description, pages 4-6, and figures 1-11	1-12
A	CN 209893747 U (QINDAO HAIER REFRIGERATOR CO., LTD. et al.) 03 January 2020 (2020-01-03) description, pages 4-6, and figures 1-6	1-12

☑ 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
"D" document cited by the applicant in the international application
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"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	Date of mailing of the international search report
03 June 2023	**11 August 2023**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **China No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2023/084117

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 205002490 U (QINGDAO HAIER CO., LTD.) 27 January 2016 (2016-01-27) entire document	1-12
A	CN 205593257 U (AUCMA CO., LTD.) 21 September 2016 (2016-09-21) entire document	1-12

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2023/084117

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 218096802 U	20 December 2022	None	
CN 218065526 U	16 December 2022	None	
CN 212778133 U	23 March 2021	None	
CN 109990528 A	09 July 2019	None	
CN 209893747 U	03 January 2020	None	
CN 205002490 U	27 January 2016	None	
CN 205593257 U	21 September 2016	None	

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