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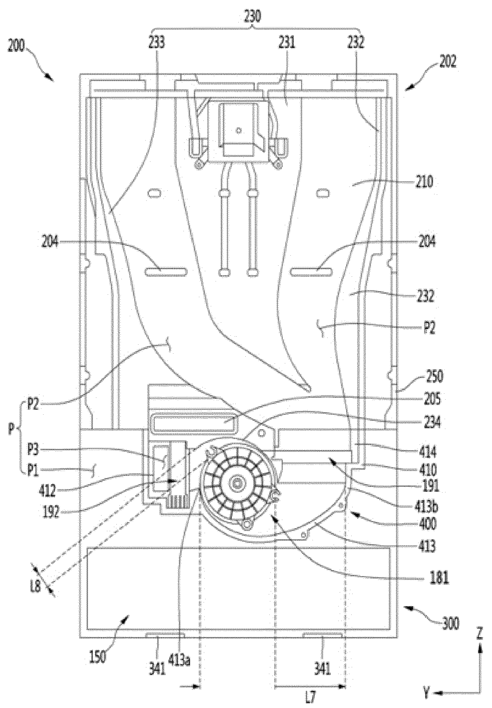
(54) **REFRIGERATOR**

(57) A refrigerator includes a discharge body configured to be formed with a discharge port and a suction port, a flow path body configured to be disposed in the discharge body and forms a discharge flow path for guiding air to the discharge port, an air guide configured to be formed with a scroll and an opening that guides air to the discharge flow path and an outlet spaced apart from the opening, and a fan provided inside the air guide.

FIG. 17



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Description

BACKGROUND

1. Field

[0001] The present disclosure relates to a refrigerator.

2. Background

[0002] In general, a refrigerator is a home appliance that allows food or other items to be stored at a relative low temperature in an internal storage space that is accessed by a door.

Summary

[0003] An object of the present disclosure is to provide a refrigerator having an improved efficiency.

[0004] The object is solved by the features of the independent claims. Preferred embodiments are given in the dependent claims.

[0005] According to one aspect a refrigerator comprising a cabinet; a wall that is provided in the cabinet and is formed with a discharge port and a suction port; flow path layer that is provided in the wall and forms a discharge flow path that guides air to the discharge port; a fan housing that includes a conduit that guides air to the discharge flow path, the fan housing being formed with an opening coupled to the conduit and an outlet spaced apart from the opening; and a fan that is received inside the fan housing.

[0006] Preferably, the conduit may have a leading end and a trailing end associated with the opening.

[0007] Preferably, the leading end may be provided closer to an outer circumference of the fan than the trailing end.

[0008] Preferably, the fan may be positioned closer to the outlet than to the trailing end of the conduit.

[0009] Preferably, the refrigerator may comprise a guide that directs air from the fan to the outlet.

[0010] Preferably, the fan may be positioned between the conduit and the guide.

[0011] Preferably, a length of the conduit in a horizontal direction may be greater than a length of the guide in the horizontal direction.

[0012] Preferably, a first distance between the trailing end of the conduit and the fan may be greater than a second distance between the guide and the fan.

[0013] Preferably, the refrigerator may further comprise an inner cover that includes an additional discharge port and an additional suction port.

[0014] Preferably, the refrigerator may further comprise a discharge duct that guides air flow between the outlet of the fan housing and the additional discharge port of the inner cover.

[0015] Preferably, the refrigerator may further comprise a heat exchange device provided adjacent to the fan housing.

[0016] Preferably, the inner cover may cover the fan housing and the temperature adjusting device.

[0017] Preferably, the additional discharge port may be positioned lower than the discharge port and the suction port.

[0018] Preferably, the refrigerator may further comprise a partition that divides an interior of the cabinet into two storage spaces and/or may be positioned between the suction port and the additional discharge port.

[0019] Preferably, the refrigerator may further comprise a first damper configured to adjust amount of air flowing into the discharge flow path.

[0020] Preferably, the refrigerator may further comprise a second damper configured to adjust amount of the air flowing to the outlet.

[0021] Preferably, the discharge flow path may include an inlet communicating with the first damper and a plurality of branch flow paths connected to the inlet.

[0022] Preferably, the refrigerator may further comprise an outer plate configured to cover a front surface of the wall and including openings corresponding, respectively, to the discharge port and the suction port.

[0023] Preferably, the discharge flow path may include a plurality of branch flow paths connected to the fan housing and spaced apart from each other.

[0024] Preferably, the refrigerator may further comprise a diverter body provided at the wall.

[0025] Preferably, the diverter body may be configured to be received in the fan housing to block air flow to the outlet.

[0026] Preferably, the refrigerator may further comprise an outer plate provided at a front surface of the partition to cover the suction port and including an opening corresponding to the discharge port.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] Embodiments will be described in detail with reference to the following drawings in which like reference numerals refer to like elements, and wherein:

Fig. 1 is a sectional view illustrating an example of a refrigerator according to an embodiment of the present disclosure;

Fig. 2 is a sectional view illustrating another example of a refrigerator according to an embodiment of the present disclosure;

Fig. 3 is a front view when a refrigerator according to an embodiment of the present disclosure is disposed adjacent to another refrigerator;

Fig. 4 is a view illustrating on and off of cooling device and on and off of heating device according to the temperature change of the storage chamber acc. to an embodiment of the present disclosure;

Figs. 5 to 8 are views illustrating examples of a refrigeration cycle of a refrigerator according to an embodiment of the present disclosure;

Fig. 9 is a control block diagram of a refrigerator acc. to an embodiment of the present disclosure;

Fig. 10 is a perspective view illustrating a see-through door of a refrigerator according to an embodiment of the present disclosure;

Fig. 11 is a plan view when an example of a door according to an embodiment of the present disclosure is opened in a door opening module;

Fig. 12 is a cross-sectional view when another example of a door according to an embodiment of the present disclosure is opened by the door opening module;

Fig. 13 is a sectional view when a holder illustrated in Fig. 12 is lifted;

Fig. 14 is a front view illustrating a storage chamber of an example of a refrigerator according to an embodiment of the present disclosure;

Fig. 15 is a perspective view illustrating when the partition member, the shelf, and the storage member acc. to the embodiment of the present disclosure are separated in front of the storage space;

Fig. 16 is an exploded perspective view illustrating an inner guide and an evaporator according to an embodiment of the present disclosure;

Fig. 17 is a rear view illustrating an inner portion of the inner guide according to an embodiment of the present disclosure;

Fig. 18 is a sectional view illustrating when the air is discharged to the second space and the storage space, as an example of a refrigerator according to an embodiment of the present disclosure;

Fig. 19 is an exploded perspective view illustrating a discharge guide and an air guide according to an embodiment of the present disclosure;

Fig. 20 is a rear view illustrating a return duct acc. to an embodiment of the present disclosure;

Fig. 21 is a perspective view when the return duct of Fig. 20 is separated from the inner guide;

Fig. 22 is a front view illustrating a storage chamber of another example of the refrigerator according to the embodiment of the present disclosure; and

Fig. 23 is an enlarged rear view illustrating an inner guide of the refrigerator of Fig. 22 according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0028] Hereinafter, specific embodiments of the present disclosure will be described in detail with reference to the accompanying drawings. Fig. 1 is a sectional view illustrating an example of a refrigerator according to an embodiment of the present disclosure. The refrigerator may have a storage chamber W in which goods and the like may be stored. The refrigerator may include a cabinet 1 in which a storage chamber W is formed. The refrigerator may further include a door 50 that opens and closes the storage chamber W. The door 50 may include at least one of a rotatable door 5 (e.g., a swinging door) or an advancing and retracting type door 6 (e.g., a drawer). The cabinet 1 may include an outer case 7 forming an outer appearance and an inner case 8 forming at least one surface for forming the storage chamber W therein.

[0029] The storage chamber W may be a storage chamber to receive mainly certain kinds of goods which are preferably stored at a specific temperature range. For example, the storage chamber W may be a dedicated storage chamber for storing certain goods that need to be kept warm or cold, for example, alcoholic liquors such as wine and beer, fermented foods, cosmetics, or medical supplies. As one example, the storage chamber for receiving wine may be maintained at a temperature range of 3°C to 20°C, and this temperature range is relatively higher than temperatures for the refrigerating chamber of a conventional refrigerator to receive food items, and is preferable not to exceed 20°C. More specifically, the temperature of the storage chamber for red wine can be adjusted to 12°C to 18°C, and the temperature of the storage chamber for white wine can be adjusted to 6°C to 11°C. In another example, the temperature of the storage chamber for champagne can be adjusted to about 5°C.

[0030] The temperature of the storage chamber W can be adjusted such that the storage chamber temperature fluctuates between a target temperature upper limit value and a target temperature lower limit value of the storage chamber W. The quality or freshness of the goods stored in the storage chamber W may be reduced by the difference between the target temperature upper limit value and the target temperature lower limit value (hereinafter, referred to as storage chamber temperature difference). The refrigerator may be manufactured with a small storage chamber temperature difference according to the type of the goods and may minimize the reduction of the quality of the goods. The storage chamber W of the refrigerator of the present embodiment may be a storage chamber having a smaller storage chamber temperature difference than that of a general refrigerator. For example, the storage chamber temperature difference of the storage chamber W may be less than 3°C and may be 2°C, as an example. Of course, in a case of considering certain types of goods that are very sensitive to temperature changes, the storage chamber temperature difference may be less than 1°C.

[0031] The refrigerator may include a device capable of adjusting the temperature of the storage chamber W (hereinafter, referred to as a "temperature adjusting device" or "temperature adjusting module"). The temperature adjusting device may include at least one of a cooling device or a heating device. The temperature adjusting device may cool or heat the storage chamber W by at least one of conduction, convection, and radiation. For example, a cooling device (or heat exchanger), such as an evaporator 150 or a heat absorbing body of a thermoelectric element, may be attached to the inner case 8 to cool the storage chamber W by conduction. By adding an airflow forming mechanism such as a fan, the air may be heat-exchanged with the cooling device by convection and supplied to the storage chamber W. In another example, a heating device, such as a heater or a heat generating body of the thermoelectric element, may be attached to the inner case 8 to heat the storage chamber W by conduction. An airflow forming mechanism, such as a fan, can supply a flow of air that is heated by convection and provided to the storage chamber W by convection.

[0032] In the present specification, the cooling device may be defined as a device capable of cooling the storage chamber W, including at least one of the evaporator 150, the heat absorbing body of the thermoelectric element, or the fan. In addition, the heating device may be defined as a device capable of heating the storage chamber W, including at least one of a heater, a heat generating body of the thermoelectric element, or a fan.

[0033] The refrigerator may further include an inner guide or wall (or flow path housing) 200. The inner guide 200 may partition an inner portion of the inner case 8 into a first space in which goods are stored and a second space in which a temperature adjusting device is located (the second space hereinafter being referred to as a "temperature adjusting device chamber"). The temperature adjusting device chamber may include a cooling device chamber and a heating device chamber. For example, the temperature adjusting device chamber can be located between the inner guide 200 and the inner case 8, between the inner guide 200 and the outer case 7, or inside the inner guide 200, such as in the storage chamber W.

[0034] The inner guide 200 may be disposed to partition a cold air flow path P for supplying cold air to the space where goods are stored and the storage chamber W, and at least one cooling device may be disposed in the cold air flow path P. The inner guide 200 may be further disposed to partition a space in which goods are stored and a hot air flow path P for supplying heat to the storage chamber W, and at least one heating device may be disposed in the hot air flow path P. The inner guide for the cooling device and the inner guide for the heating device may be designed in common or may be manufactured separately. The inner guide 200 may form a storage space together with the inner case 8. The inner guide 200 may be disposed in front of the rear body of the inner case.

[0035] The refrigerator may have one space having the same storage chamber temperature range of the storage chamber W or may have two or more spaces having different storage temperature ranges from each other (such as freezer/refrigerator combination. The refrigerator may further include a partition member 3 disposed vertically or horizontally in order to divide the storage chambers W into two or more spaces (for example, a first space W1 and a second space W2) which have different storage chamber temperatures range from each other.

[0036] The refrigerator may further include the partition member 10 disposed vertically or horizontally in order to divide the storage chambers W into two or more spaces (for example, a second space W2, a third space W3) which have different storage chamber temperatures range from each other. The partition member 10 may be separately manufactured and then mounted in the inner case 8. The partition member 10 may be manufactured as a heat insulating material disposed between the outer case 7 and the inner cases 8 and 9.

[0037] The two or more spaces may be different in size and locations. For example, the first space W1 may be located at the upper side, the second space W2 may be located at the lower side, and the partition member 3 may be disposed so that the size of the first space W1 is larger than the size of the second space W2. In one example, the first storage chamber temperature for the first space W may be higher than the second storage chamber temperature for the second space W2.

[0038] In the present specification, it can be defined that a meaning of the first storage chamber temperature being higher than the second storage chamber temperature corresponds to at least one case of a case where the maximum value of the first storage chamber temperature is greater than the maximum value of the second storage chamber temperature, a case where the average value of the first storage chamber temperature is greater than the average value of the second storage chamber temperature, a case where the minimum value of the first storage chamber temperature is greater than the minimum value of the second storage chamber temperature, or a case where a current detected value of the first storage chamber temperature is greater than a current detected value of the second storage chamber temperature..

[0039] The refrigerator may further include a door (hereinafter, a see-through door) through which the user can see the storage chamber through a see-through window without opening the door 50 from the outside of the refrigerator, and the see-through door will be described later. In addition, the refrigerator may further include a transparent gasket 24 disposed on at least one of the see-through door or the partition members 3 and 10. When the see-through door closes the storage chamber W, the transparent gasket 24 may combine with the partition members 3 and 10 to partition the storage chamber W into two or more spaces having different storage temperature ranges from each other together.

[0040] The refrigerator may further include door opening modules (or door motors) 11 and 11' for guiding an opening motion of the door 50. The door opening modules 11 and 11' may be a rotatable door opening module 11 which can allow the door 5 to be rotated more than a predetermined angle without the user holding the door 5, or an advancing and retracting type door opening module 11' which can allow the door (e.g., a drawer) 6 to be advanced and retracted in a front and rear direction. The door opening modules 11 and 11' will be described later.

[0041] The refrigerator may further include a lifting module (or lifting mechanism) 13 capable of lifting or lowering the holder (or bin) 12, and although not illustrated in Fig. 1, the lifting module may be located in at least one of the storage chamber or the door.

[0042] As previously described, the refrigerator may include a plurality of doors for opening and closing two or more spaces having different storage temperature ranges from each other. At least one of the plurality of doors may be a see-through door having a region that is formed of a transparent or translucent material, such as glass. At least one of the cabinet 1 or the plurality of doors may include door opening modules 11 and 11'. The lifting module 13 for lifting and lowering the holder located in the storage chamber to open and close may be disposed on at least one of the plurality of doors. For example, the door for the storage chamber located at the top may be a see-through door, and a lifting module 13 for lifting and lowering a holder 12 of a storage chamber located at the lower portion may be disposed.

[0043] Fig. 2 is a sectional view illustrating an example of another type of refrigerator according to an embodiment of the present disclosure. Hereinafter, the storage chamber W illustrated in Fig. 1 will be described as a first storage chamber W. The refrigerator may further include at least one of the first storage chamber W (e.g., first chambers W1 and W2) and at least one second storage chamber C that may be temperature-controlled independently of the first storage chamber W. Hereinafter, a detailed description of the same configuration and operation as those of the storage chamber W illustrated in Fig. 1 will be omitted for the first storage chamber W, and a different configuration and operation from the storage chamber W illustrated in Fig. 1 will be described.

[0044] The second storage chamber C may be a storage chamber having a temperature range lower than the temperature range of the first storage chamber W and, for example, may be a storage chamber having a temperature range of -24°C to 7°C. The second storage chamber C may be a storage chamber which is temperature-controlled based on a target temperature, which is a temperature selected by a user in this lower temperature range (e.g., between -24°C to 7°C). The second storage chamber C may be composed of a switching chamber (or a temperature changing chamber) in which any one of a plurality of temperature ranges may be selected, or may be configured as a non-switching chamber having one temperature range.

[0045] The switching chamber is a storage chamber which can be temperature-controlled to a selected temperature range among a plurality of temperature ranges, and the plurality of temperature ranges may include, for example, a first temperature range above zero, a second temperature range below zero, and a third temperature range between the first temperature range and the second temperature range. For example, the user may provide an input to control the second storage chamber C to operate in a mode (for example, a refrigerating chamber mode) associated with a temperature range above zero, and accordingly, the temperature range of the second storage chamber C may be selected a temperature range above zero (for example, 1°C to 7°C). For example, the user may further input a desired temperature in the temperature range above zero, and the target temperature of the second storage chamber C may be a specific temperature (for example, 4°C) entered by a user in the temperature range (for example, 1°C to 7°C) above zero.

[0046] In another example, the user can provide an input to select an operating mode in which the second storage chamber C is maintained in the temperature range below zero (for example, freezing chamber mode) or a special mode (for example, a mode for maintaining an optimal temperature range for storing certain kind of goods, such as a kimchi storage mode). For example, the user may further input a desired temperature in the temperature range below zero or a desired temperature for the certain type of goods, and the second storage chamber C may be maintained within a temperature range that is centered at or otherwise includes the specific inputted temperature.

[0047] As previously described, the first storage chamber W may be a specific goods storage chamber in a specific temperature range or other environmental conditions (e.g., humidity, light levels, etc.) are maintained to optimally store a particular kind of goods or to mainly store a certain kind of goods, or the second storage chamber C may be a non-specific goods storage chamber in which a various kinds of goods may be stored in addition to a specific kind of goods. Examples of specific goods may include alcoholic beverages such as wine, fermented foods, cosmetics, and medical supplies. For example, the first storage chamber W may be a storage chamber in which wine is stored or a wine chamber in which wine is mainly stored, and the second storage chamber C may be a non-wine chamber in which goods other than wine are stored or goods other than wine are mainly stored.

[0048] A storage chamber having a relatively small storage chamber temperature difference among the first storage chamber W and the second storage chamber C may be defined as a constant temperature chamber, and a storage chamber having a relatively large storage chamber temperature difference among the first storage chamber W and the second storage chamber C may be defined as a non-constant temperature chamber.

[0049] Any one of the first storage chamber W and the second storage chamber C may be a priority storage chamber which is controlled in priority, and the other may be a subordinate storage chamber which is controlled in relatively subordinate. A first goods having a large or expensive quality change according to the temperature change may be stored in the priority storage chamber, and A second goods having a small or low quality change according to the temperature change may be stored in the subordinate storage chamber.

[0050] The refrigerator may perform a specific operation for the priority storage chamber and a specific operation for the subordinate storage chamber. The specific operation includes a general operation and a special operation for the storage chamber. A general operation may include, for example, a conventional cooling operation for the storage chamber cooling. The special operation may include, for example, a defrost operation for defrosting the cooling device, a door load response operation that can be performed when one or more predetermined conditions are satisfied after the door is opened, or an initial power supply operation, which is an operation when the power is first supplied to the refrigerator.

[0051] The refrigerator may be controlled such that a specific operation for the priority storage chamber is performed first when two operations collide with each other. Here, the collision of the two operations may be occur, for example, as a case where the start condition of the first operation and the start condition of the second operation are satisfied at the same time; as a case where the start condition of the first operation is satisfied and thus the start condition of the second operation is satisfied while the first operation is in progress; or as a case where the start condition of the second operation is satisfied and thus the start condition of the first operation is satisfied while the second operation is in progress.

[0052] For example, in the refrigerator, the priority storage chamber may be cooled or heated prior to the subordinate storage chamber when the temperature of the priority storage chamber is not satisfied, and the temperature of the subordinate storage chamber is not satisfied. In another example, while the cooling device for cooling the subordinate storage chamber is being defrosted, if the temperature of the priority storage chamber is not satisfied, the priority storage chamber may be cooled or heated while the cooling device of the subordinate storage chamber is being defrosted (even if this cooling or heating of the priority chamber may interfere with defrosting the cooling device of the subordinate storage chamber).

[0053] In another example, if the temperature of the priority storage chamber is not satisfied (e.g., outside of a desired temperature range) while the subordinate storage chamber is in progress of the door load response operation, the priority storage chamber may be cooled or heated during the door load response operation of the subordinate storage chamber such that the temperature of the priority storage chamber may be adjusted to be within the desired temperature range.

[0054] In certain configurations, any one of the first storage chamber W or the second storage chamber C may be a storage chamber in which the temperature is adjusted by the first cooling device and the heating device, and the other is a storage chamber in which the temperature is adjusted by a second cooling mechanism or device.

[0055] In the refrigerator, a separate receiving member (or storage drawer) 4 may be additionally disposed in at least one of the first space W1 or the second space W2. In the receiving member 4, a separate space S (hereinafter, referred to as a receiving space) may be formed separately from the first space W1 and the second space W2 to accommodate goods. The refrigerator may adjust the receiving space S of the receiving member 4 to a temperature range different from that of the first space W1 and the second space W2.

[0056] The receiving member 4 may be disposed to be located in the second space W2 provided below the first space W1. The receiving space S of the receiving member 4 may be smaller than the second space W2. In one example, the storage chamber temperature of the receiving space S may be equal to or less than the storage chamber temperature of the second space W2.

[0057] In the refrigerator, in order to dispose as many shelves 2 as possible in the first storage chamber W, the length of the refrigerator itself in the vertical direction may be longer than the width in the horizontal direction, and in this case, the length of the refrigerator in the vertical direction may be more than twice the width in the horizontal direction. Meanwhile, since the refrigerator may be unstable and tip over if the length in the vertical direction is too long relative to the width in the horizontal direction, it may be preferable that the length in the vertical direction is less than three times the width in the horizontal direction. Certain examples of the length in the vertical direction that can store a plurality of the specific goods may be 2.3 to 3 times the width in a left and right direction, and a particular example may be 2.4 to 3 times the width in the left and right direction.

[0058] Meanwhile, even if the length of the refrigerator in the vertical direction is longer than the width in the left and right direction, when the length of the storage chamber in which the specific goods are substantially stored (for example, the first storage chamber W) is relatively short in a vertical direction, the number of specific goods that may be received in the storage chamber may not be high. In the refrigerator, preferably, the length of the first storage chamber W in the vertical direction is longer than the length of the second storage chamber C in the vertical direction so that the specific goods can be stored as much as possible. For example, the length of the first storage chamber W in the vertical direction may be 1.1 times to 1.5 times the length of the second storage chamber C in the vertical direction.

[0059] At least one of the first door 5 and the second door 6 may be a see-through door, and aspects of the see-through door will be described later. The refrigerator may further include door opening modules 11 and 11' for providing a force for automatically opening at least one of the first door 5 or the second door 6 coupled to the door opening modules 11 and 11', and the door opening modules 11 and 11' will be described later. In at least one of the first storage chamber W, the second storage chamber C, and the first door 5, or the second door 6, a lifting module 13 capable of lifting the holder 12 may be disposed. The lifting module 13 will be described later.

[0060] Fig. 3 is a front view when a refrigerator according to an embodiment of the present disclosure is positioned adjacent to another refrigerator. The refrigerator described in the present disclosure may be disposed adjacent to one or more other refrigerators, and a pair of adjacent refrigerators may be disposed, for example, in the left and right direction. Hereinafter, for convenience of description, the first refrigerator Q1 and the second refrigerator Q2 will be referred for description thereof, and the same configuration of the first refrigerator Q1 and the second refrigerator Q2 as each other will be described using the same reference numerals for convenience of description. In one example, a refrigerator may include a plurality of storage chambers that may be located in the left and right direction and the vertical direction in one outer case, such as a side by side type refrigerator or a French door type refrigerator.

[0061] At least one of the first refrigerator Q1 or the second refrigerator Q2 may be a refrigerator to which an embodiment of the present disclosure is applied. Although the first refrigerator Q1 and the second refrigerator Q2 may have some functions that different from each other, the lengths (or heights) of the first and second refrigerators Q1 and Q2 in the vertical direction be the same or almost similar so that the overall appearance may give the same or similar feeling when disposed adjacent to each other in the left and right direction.

[0062] Each of the first refrigerator Q1 and the second refrigerator Q2 may include each of a first storage chamber and a second storage chamber, and the first storage chamber and the second storage chamber may include a partition member 10 partitioning in the vertical direction, respectively, and the partition member 10 of the first refrigerator Q1 and the partition member 10 of the second refrigerator Q2 may overlap in the horizontal direction.

[0063] The upper end 6A of the second door 6 opening and closing the second storage chamber of the first refrigerator Q1 and the upper end 6A of the second door 6 opening and closing the second storage chamber of the second refrigerator Q2 can coincide with each other in the horizontal direction. Similarly, the lower end 6B of the second door 6 opening and closing the second storage chamber of the first refrigerator Q1 and the lower end 6B of the second door 6 opening and closing the second storage chamber of the second refrigerator Q2 can coincide with each other in the horizontal direction.

[0064] Fig. 4 is a view illustrating on and off of a cooling device and on and off of heating device according to the temperature change of the storage chamber according to an embodiment of the present disclosure. As previously described, the refrigerator may be provided with cooling device and heating device that can be independently controlled to control the temperature of the storage chamber W. For example, the refrigerator may include the cooling device and the heating device for controlling the temperature of at least one storage chamber among a specific goods storage chamber, a constant temperature chamber, and a priority storage chamber.

[0065] The refrigerator may be controlled in a plurality of modes for temperature adjusting of the storage chamber W, and the plurality of modes may include a cooling mode E in which the storage chamber W is cooled by the cooling device, a heating mode H in which the storage chamber W is heated by the heating device, and a standby mode D which maintains the current state without cooling or heating the storage chamber W. The refrigerator may include a temperature sensor for sensing a temperature of the storage chamber W and may perform the cooling mode E, the heating mode H, and the standby mode D according to the storage chamber temperature sensed by the temperature sensor.

[0066] The cooling mode E is not limited to the storage chamber W being continuously cooled by the cooling device and may include a case where the storage chamber is cooled by the cooling device as a whole, but the storage chamber W is temporarily not cooled by the cooling device and a case where the storage chamber W is cooled by the cooling device as a whole, but the storage chamber is temporarily heated by the heating device. The cooling operation E may include a case where the time when the storage chamber is cooled by the cooling device is longer than the time when the storage chamber W is not cooled by the cooling device.

[0067] The heating mode H is not limited to the storage chamber W being continuously heated by the heating device and include a case where the storage chamber W is heated by the heating device as a whole, but the storage chamber W is temporarily not heated by the heating device and a case where the storage chamber W is heated by the heating device as a whole, the storage chamber W is temporarily cooled by the cooling device. The heating operation H may include a case where the time when the storage chamber W is heated by the heating device is longer than the time when the storage chamber W is not heated by the heating device.

[0068] There is a case where the temperature of the storage chamber W, which has been temperature-controlled by the cooling mode E, may be kept below a target temperature lower limit value without lifting above the target temperature lower limit value for a long time in a state of being lowered below the target temperature lower limit value. In this case, the refrigerator may start the heating mode H so that the storage chamber W is not overcooled when the storage chamber temperature falls below the lower limit temperature, and the heating device can be turned on. The lower limit temperature may be a temperature set to be lower than the target temperature lower limit value by the predetermined temperature.

[0069] Meanwhile, the refrigerator may start the heating mode H so that the storage chamber temperature is not maintained in a low state for a long time when the storage chamber temperature is maintained between the target temperature lower limit value and the lower limit temperature during the setting time. The heating mode H may be started when the storage temperature is the lower limit temperature, and the lower limit temperature may be the heating mode start temperature.

[0070] One example of the standby mode D may be a mode in which the storage chamber temperature is maintained between the target lower limit value and the lower limit temperature, the refrigerator may be controlled in the order of the cooling mode E, the standby mode D, and the heating mode H without immediately switching to the heating mode H during the cooling mode E.

[0071] Meanwhile, the temperature of the storage chamber W, which has been temperature-controlled by the heating mode H, may be kept above the target temperature upper limit value without being lowered below the target temperature upper limit value for a long time in a state of lifting above the target temperature upper limit value. In this case, when the storage chamber temperature exceeds the upper limit temperature, the refrigerator can start the cooling mode E so that the storage chamber W is not overheated, and the cooling device can be turned on. The upper limit temperature may be a temperature set to be higher than a target temperature upper limit value.

[0072] Meanwhile, the refrigerator may start the cooling mode E so that the storage chamber temperature does not remain high for a long time when the storage chamber temperature is maintained between the target temperature upper limit value and the upper limit temperature during the setting time. The cooling mode E may be started if the storage temperature is the upper limit temperature, and the upper limit temperature may be the cooling mode start temperature.

[0073] Another example of the standby mode D may be a mode in which the storage chamber temperature is maintained between the target temperature upper limit value and the upper limit temperature, and without switching to the cooling mode E immediately during the heating mode H, the refrigerator may be controlled in the order of the heating mode H, the standby mode D, and the cooling mode E.

[0074] For example, the cooling mode E may be a mode in which the refrigerant passes through the evaporator, the air in the storage chamber W is cooled by the evaporator, and then flows into the storage chamber W. In the cooling mode E, the compressor may be turned on or off according to the temperature of the storage chamber W. In the cooling mode E, the compressor may be turned on or off such that the storage chamber temperature is maintained between the target temperature upper limit value and the target temperature lower limit value. Specifically, the compressor may be turned on because the cooling is not satisfied when the storage chamber temperature reaches the target temperature upper limit value and may be turned off when cooling is satisfied when the storage chamber temperature reaches the target temperature lower limit value.

[0075] For example, in the heating mode H, the heater may be turned on or off so that the storage chamber temperature is maintained between the target temperature upper limit value and the target temperature lower limit value. Specifically, the heater may be turned off because heating is satisfied when the storage chamber temperature reaches the target temperature upper limit value and may be turned on because heating is not satisfied when the storage chamber temperature reaches the target temperature lower limit value.

[0076] For example, the standby mode D may be a mode in which the refrigerant does not pass through the evaporator and the heater maintains the off state. The standby mode D may be a mode in which air in the storage chamber W is not forced to flow by the storage chamber fan. The standby mode D may be a mode in which the heater also maintains the off state while the compressor maintains the off state.

[0077] The plurality of modes may further include a humidification mode for increasing the humidity of the storage chamber. The humidification mode may be a mode in which air in the storage chamber W may be humidified by flowing into the cooling device chamber by a fan, and the humidified air may flow into the storage chamber W to humidify the storage chamber, in a state where at least a portion of the cooling device is in an off state (for example, the supply of refrigerant to the evaporator is interrupted, the thermoelectric element is turned off), and at least some of the heating device is maintained in an off state (for example, the heater is turned off and the thermoelectric element is turned off).

[0078] For example, the humidification mode may be a mode in which the air in the storage chamber flows to the evaporator by a fan to humidify, and the humidified air flows into the storage chamber to humidify the storage chamber, in a state where the heater maintains in an off state while the refrigerant does not pass through the evaporator. In the humidification mode, a fan that circulates air in the storage chamber to the evaporator and the storage chamber may be driven.

[0079] Fig. 5 is a view illustrating a first example of a refrigeration cycle of a refrigerator according to an embodiment of the present disclosure, Fig. 6 is a view illustrating a second example of a refrigeration cycle of a refrigerator according to an embodiment of the present disclosure, Fig. 7 is a view illustrating a third example of a refrigeration cycle of a refrigerator according to an embodiment of the present disclosure, and Fig. 8 is a diagram illustrating a fourth example of a refrigeration cycle of a refrigerator according to an embodiment of the present disclosure.

[0080] The refrigeration cycles illustrated in Figs. 5 to 8 may be applied to a refrigerator having three spaces (hereinafter, referred to as first, second, and third spaces) that may have different storage temperature ranges from each other. For example, the refrigeration cycles may be applied to at least one of i) a refrigerator having a first space W1, a separate second space W2, and a separate third space W3, ii) a refrigerator having a first storage chamber W having the first space W1 and the second space W2, and a second storage chamber C partitioned from the first storage chamber W, or iii) a refrigerator having a first storage chamber W and second and third storage chambers partitioned from the first storage chamber W.

[0081] The refrigeration cycle illustrated in Figs. 5 to 7 may include a compressor 100, a condenser 110, a plurality of expansion mechanisms (or valves) 130', 130, 140, and a plurality of evaporators (or heat exchange devices) 150', 150, 160 and may further include a flow path switching mechanism (or refrigerant valves) 120'. A case where the first region is the first space W1, the second region is the second space W2, and the third region is the second storage chamber C will be described below. The first, second, and third regions are also applicable to cases ii) and iii) described above.

[0082] The plurality of evaporators 150', 150, 160 may include a pair of first evaporators 150', 150 capable of independently cooling the first space W1 and the second space W2, respectively, and a second evaporator 160 that can cool a second storage chamber C. One of the pair of first evaporators 150' and 150 may be an evaporator 150' cooling the first space W1, and the other of the pair of first evaporators 150' and 150 may be an evaporator 150 cooling the second space W2.

[0083] The plurality of expansion mechanisms 130', 130, and 140 may include a pair of first expansion mechanisms 130' and 130 connected to a pair of first evaporators 150' and 150, and a second expansion mechanism 140 connected to a second evaporator 160. Any one of the pair of first expansion mechanisms 130' and 130 may be an expansion mechanism 130' connected to any one 150' of the pair of first evaporators 150' and 150, and the other of the pair of first expansion mechanisms 130' and 130 may be an expansion mechanism 130 connected to the other one 150 of the pair of first evaporators 150' and 150.

[0084] The flow path switching mechanism 120' may include a first valve 121 capable of controlling a refrigerant flowing into the pair of first expansion mechanisms 130' and 130, and a second valve 122 capable of controlling a refrigerant flowing into the first valve 121 and the second expansion mechanism 140.

[0085] The refrigerator having the refrigeration cycle illustrated in Figs. 5 to 7 may include a pair of first fans 181' and 181, and a second fan 182 for circulating cold air in the space of the second storage chamber C to the space of the second evaporator 160 and the second storage chamber C and may further include a condensation fan 114 for blowing outside air to the condenser 110. Any one 181' of the pair of first fans 181' and 181 may be a fan for the first space in which cold air in the first space W1 can be circulated into any one 150' of the pair of first evaporators 150' and 150 and the first space W1. In addition, the other one 181 of the pair of fans 181' and 181 may be a fan the second space in which cold air in the second space W2 can be circulated into any one 150 of the pair of first evaporators 150' and 150 and the second space W2.

[0086] The refrigeration cycle illustrated in Fig. 5 may include a first parallel flow path in which a pair of first evaporators 150' and 150 are connected in parallel and a second parallel flow path in which a pair of first evaporators 150' and 150 are connected to the second evaporator 160 in parallel. In this case, a one-way valve 168 may be installed at an outlet side of the second evaporator 160 to prevent the refrigerant at the outlet side of the second evaporator 160 from flowing back to the second evaporator 160.

[0087] The refrigeration cycle illustrated in Fig. 6 may include a parallel flow path in which a pair of first evaporators 150' and 150 are connected in parallel and a serial flow path 123 in which the pair of first evaporators 150' and 150 are connected to a second evaporator 160 in series. One end of the serial flow path 123 may be connected to a parallel flow path in which a pair of first evaporators 150' and 150 are connected in parallel. The other end of the serial flow path 123 may be connected between the second expansion mechanism 140 and the inlet of the second evaporator 160. In this case, a one-way valve 168 may be installed at the outlet side of the second evaporator 150 to prevent the refrigerant at the outlet side of the second evaporator 160 from flowing back to the second evaporator 160.

[0088] The refrigeration cycle illustrated in Fig. 7 may include a serial flow path 125 in which a pair of first evaporators 150' and 150 are connected in series, and, a parallel flow path in which the pair of first evaporators 150' and 150 are connected to the second evaporator 160 in parallel. One end of the serial flow path 125 may be connected to the outlet side of any one 150 of the pair of first evaporators 150' and 150. The other end of the serial flow path 125 may be connected to an inlet side of the other 150' of the pair of first evaporators 150' and 150'. In this case, a one-way valve 168 may be installed at the outlet side of the second evaporator 160 to prevent the refrigerant at the outlet side of the second evaporator 160 from flowing back to the second evaporator 160.

[0089] The refrigeration cycle illustrated in Fig. 8 may include one first evaporator 150 instead of the pair of first evaporators 150' and 150 illustrated in Figs. 5 to 7, and one first expansion mechanism 130 instead of the pair of expansion mechanism 130' and 130. In addition, the refrigeration cycle illustrated in Fig. 8 may include a flow path switching mechanism (or valve) 120 for controlling the refrigerant flowing into the first expansion mechanism 130 and the second expansion mechanism 140, and the flow path switching mechanism 120 may include a refrigerant valve that can be switched so that the refrigerant flowing from the condenser 110 flows to the first expansion mechanism 130 or the second expansion mechanism 140. In addition, a one-way valve 168 may be installed at the outlet side of the second evaporator 160 to prevent the refrigerant at the outlet side of the second evaporator 160 from flowing back to the second evaporator 160.

[0090] Since other configurations and actions other than one first evaporator 150, one first expansion mechanism 130, a flow path switching mechanism 120, and a one-way valve 168 of the refrigeration cycle illustrated in Fig. 8 are the same as or similar to those of the refrigeration cycle illustrated in Figs. 5 to 7, a detailed description with respect to those will be omitted.

[0091] In addition, the refrigerator having a refrigeration cycle illustrated in Fig. 8 may include a first fan 181 circulating cold air of the first storage chamber W into the first evaporator 150 and the first storage chamber W instead of the pair of first fans 181' and 181 illustrated in Figs. 5 to 7. In addition, the refrigerator having the refrigeration cycle illustrated in Fig. 8 may include a first damper 191 for controlling cold air flowing into the first space W1 after being cooled by the first evaporator 150 and a second damper 192 for controlling the cold air flowing into the second space W2 after being cooled by the first evaporator 150. Only one of the first damper 191 and the second damper 192 may be provided. Meanwhile, in the refrigerator, one damper may selectively supply air cooled by the evaporator 150 to at least one of the first space W1 and the second space W2.

[0092] Modification of the examples of the refrigeration cycle illustrated in Figs. 5 to 8 may be applied to a refrigerator having two spaces having different storage temperature ranges from each other. In other words, the modification examples of the refrigeration cycle may be applied to a refrigerator having a first space W1 and a second space W2 or a refrigerator having a first storage chamber W and a second storage chamber C. In certain examples, the refrigeration cycle can be configured with a cycle which does not include the flow path switching mechanisms 120 and 122, the second expansion mechanism 140, the second evaporator 160, the second fan 182, and the one-way valve 168.

[0093] Fig. 9 is a control block diagram illustrating a refrigerator according to an embodiment of the present disclosure. The refrigerator may include a controller 30 that controls various electronic devices such as a motor provided in the refrigerator. The controller 30 may control the refrigerator according to the input value of the input device.

[0094] The input device may include at least one of a communication device 31 which receives a signal from an external device such as a remote controller such as a remote controller or a mobile terminal such as a mobile phone, a microphone 32 that changes a user's voice to a sound signal, a sensing unit 33 which can sense a user's motion, a proximity sensor 34 (or a distance sensor) which can sense the user's proximity, a touch sensor 35 which can sense the user's touch, a door switch 36 which can detect the opening and closing of the door, or a timer 37 which can measure the lapse of time.

[0095] As previously described, the refrigerator may include a see-through door. The see-through door may be a door that can selectively switched between a first state in which the door is at least partially transparent and a user can see through the door (a see-through activation state), and a second state in which the door is at least partially opaque and a user cannot see through the door (a see-through deactivation state). The see-through door may be a door that is changed from a see-through deactivation state to a see-through activation state or is changed from a see-through activation state to a see-through deactivation state according to an input value provided to the controller 30 through the input device. In another example, the see-through door may be a door in which the see-through door is changed from see-through deactivation state to see-through activation state when the see-through door is closed and according to an input value provided to the controller 30 through the input device.

[0096] An example of an operation method according to the input device is now described. The sensing unit 33 may include a vibration sensor. For example, the vibration sensor may be disposed on the rear surface of the front panel, and the vibration sensor may be formed in black such that visible exposure of the vibration sensor may be minimized. For example, the sensing unit 33 may include a microphone or other audio sensor disposed, for example, on the rear surface of the front panel, and the microphone may sense sound waves of vibration applied to the front panel. When a user provides a particular input, such as tapping the panel assembly 23 a plurality of times at a predetermined time interval, the specific input may be detected through the sensing unit 33, and the controller 30 may change the see-through door to be activated or deactivated based on the detected input.

[0097] Additionally or alternatively, the sensing unit 33 may be a device for imaging a user's motion, such as a camera. It may be determined whether the image photographed by the sensing unit 33 is similar or identical to a specific motion input in advance, and the controller 30 may determine whether to activate or deactivate the see-through door according to the determination result.

[0098] Similarly, if it is determined that the user or a part of the user (e.g., the user's hand) is positioned within a predetermined distance or less (e.g., 30 cm or less) of a portion of the refrigerator according to the value detected by the proximity sensor 34, the see-through door may be changed between the activated or deactivated states. In another example, the see-through door may be changed between the activated or deactivated states when it is determined that the user positioned with a predetermined distance or less and is moving toward the refrigerator according to the value detected by the proximity sensor 34.

[0099] In another example, when the controller 30 determines that the door is closed according to the value detected by the door switch 36, the see-through door may be activated, and when it is determined that the door is open, the see-through door may be changed to be inactivated. For example, the see-through door may be in the deactivated state when opened and may remain in the deactivated state when closed, until a particular input is received that prompts the see-through door to be switched to the activated state.

[0100] The see-through door may be controlled to be deactivated after a certain time elapses after being activated according to the value input through the timer 37.

For example, the see-through door may be controlled to be deactivated after a certain time elapses after an input to activate the see-through door is received. In another example, according to the value input through the timer 37, the see-through door may be controlled to be activated when a predetermined time elapses after being deactivated.

[0101] If the device for activating or deactivating the see-through door is defined as a transparency control module, for example, the panel assembly 23 and the light source 38 may be used. As an example in which the see-through door is activated or deactivated, there may be a case where the transparency of the see-through door itself may vary. For example, the see-through door may maintain in an opaque state when no current is applied to the panel assembly 23 and may be changed to be transparent when current is applied to the panel assembly 23. In another example, it can be a case that, when the light source 38 installed inside the see-through door is turned on, the user may see the storage chamber through the see-through door by the light emitted from the light source 38.

[0102] The light source 38 may make the panel assembly 23 appear transparent or translucent so that an inside of the refrigerator (a side of the storage chamber relative to the panel assembly) looks brighter than outside of the refrigerator (outside relative to the panel assembly). The light source 38 may be mounted on the light source mounting portion formed on the cabinet 1 or the light source mounting portion formed on the door and may be disposed to emit light toward the panel assembly 23.

[0103] In other examples, the controller 30 may control the door opening module 11 according to the input value of the input device. The controller 30 may control the lifting module 13 according to the input value of the input device.

[0104] Fig. 10 is a perspective view illustrating a see-through door of a refrigerator according to an embodiment of the present disclosure. The refrigerator may include a door (hereinafter, a see-through door) through which a user may view the storage chamber through a see-through window without opening the door 50 from the outside of the refrigerator. The see-through door may include an outer door 22 and a panel assembly 23.

[0105] The outer door 22 may be opaque, and an opening portion 21 may be formed in (e.g., in a central region) of the outer door 22. The outer door 22 may form an outer appearance of the see-through door. The outer door 22 may be rotatably connected to or connected to the cabinet 1 to be capable of being advanced and retracted to open storage chamber W. The panel assembly 23 may be disposed in the opening portion 21. The panel assembly 23 may be disposed to shield the opening portion 21. The panel assembly 23 can form the same outer appearance as the front surface of the outer door 22.

[0106] The see-through door may be provided to open and close the storage chamber which mainly stores goods (for example, wine) having a large quality change according to the temperature change (e.g., the goods are preferable stored in a narrow temperature range to preserve a quality of the goods). In a case where goods having a large quality change due to temperature change are mainly stored in the storage chamber W, the storage chamber W is preferably opened and closed as short as possible, the number of opening and closing is preferably minimized, and the see-through door is preferably installed to open and close the storage chamber W. For example, the see-through door is may be provided in a door for opening and closing at least one of the specific goods storage chamber, the constant temperature chamber, and the priority storage chamber.

[0107] Fig. 11 is a plan view when an example of a swinging-type door according to an embodiment of the present disclosure is opened in a door opening module. In the refrigerator, a door opening and closing the storage chamber may be an automatic door, and the door for opening and closing the specific goods storage chamber, the constant temperature chamber, and a priority storage chamber may be an automatic door. The refrigerator may include a door opening module 11 that provides a force for automatically opening the door 5. The automatic door may be controlled to be opened or closed according to an input value provided to the controller 30 through the input device. For this purpose, the controller 30 may control the door opening module 11.

[0108] The cabinet 1 may be installed with a hinge mechanism 40 in which the hinge shaft 42 is connected to the door 5. The refrigerator may further include a module cover 70 that may cover the hinge mechanism 40 and the door opening module 11 together. In addition, the door opening module 11 may include a drive motor 72, a power transmission unit 74, and a push member 76.

[0109] When the power of the refrigerator is turned on, the controller 30 may wait to receive an open command of the door 5. When the door opening command is input through the input device, the controller 30 may transmit an opening signal to the drive motor 72 included in the door opening module 11.

[0110] When the controller 30 transmits an opening signal to the drive motor 72, the drive motor 72 may be rotated in a first direction to move the push member 76 from the initial position to the door opening position. When the drive motor 72 rotates in the first direction, the power transmission unit 74 may transmit a first direction rotational force of the drive motor 72 to the push member 76, and the push member 76 may push the door while protruding forward, and the door 5 may be rotated in the forward direction with respect to the cabinet 1.

[0111] The controller 30 may determine whether the push member 76 has reached the door opening position in a process of rotating in the first direction of the drive motor 72. For example, the controller may determine that the push member 76 has reached the door opening position when the cumulative rotational speed of the drive motor 72 reaches the reference rotational speed. The controller 30 may stop the rotation of the drive motor 72 when it is determined that the push member 76 has moved to the door opening position.

[0112] In a state where the door 5 is rotated by a predetermined angle, the user can manually increase the opening angle of the door 5. When the user increases the opening angle of the door in a state where the push member 76 moves the door 5 to the door opening position, the door sensor including a magnet 46 and a reed switch 48 can sense the manual opening of the door 5, and if the manual opening of the door 5 is sensed by the door sensor, the controller 30 can output a return signal to the drive motor 72.

[0113] The controller 30 may transmit the return signal to the drive motor 72 so that the push member 76 returns to the initial position and the drive motor 72 may be reversely rotated in a second direction opposite to the first direction. If it is determined that the push member 76 has returned to the initial position, the controller 30 may stop the drive motor 72.

[0114] Fig. 12 is a sectional view when another example of a door according to an embodiment of the present disclosure is opened by a door opening module 11'. In the example shown in Fig. 12, the door is drawer that may be automatically opened by the door opening module 11' that applies an outward force.

[0115] The door opening module 11' illustrated in Fig. 12 may automatically open the door (or drawer) 6 disposed in the cabinet 1 to be capable of being advanced and retracted. The refrigerator may include a first door provided at a relatively higher at a greater height and a second door that is relatively lower and having a smaller height, and the door opening module 11' may be installed to automatically open a door having a lower height than other doors. Such a door may be a retractable automatic door which is automatically opened by the door opening module 11'. The door 6 advanced and retracted by the door opening module 11' may include a drawer body 6A and a door body 6B disposed at the drawer body 6A to open and close the storage chamber.

[0116] The door opening module 11' may include a drive motor 80, a pinion 82, and a rack 84. The pinion 82 may be connected to the rotation shaft of the drive motor 80. The rack 84 may extend from the door 6, such as the drawer body 6A. The refrigerator may further include a door sensor that senses a position of the door 6, and the door sensor may sense a pair of magnets 46' spaced apart from the door 6 and a reed switch (or Hall sensor) 48' sensing the magnet 46'.

[0117] When the power of the refrigerator is turned on, the controller 30 may wait to receive an opening command of the door 6. When the door opening command is input through the input device, the controller 30 may transmit an opening signal to the drive motor 80.

[0118] The drive motor 80 may be activated to rotate in the first direction by the controller 30 when an opening signal is input, and the pinion 82 and the rack 84 may transmit the rotational force of the drive motor 80 to the drawer body 82. The drawer body 6A may advance the door body 6B while advancing forward in the storage chamber, and the door body 6B can be advanced to be spaced apart from the cabinet 1 toward the front of the cabinet 1. The controller 30 may sense that the door 6 has reached the opening position by the door sensor, and when the door 6 has reached the opening position, the controller 30 may stop the rotation of the drive motor 80.

[0119] When the drawer body 6A is advanced as described above, the upper surface of the drawer body 6A may be exposed. In a state where the drawer body 6A is advanced to the opening position, the user can enter a door closing command such that the drawer body 6A retracts to the closing position via the input device. For example, if the motion sensed by the sensing unit 33 coincides with a specific motion, the controller 30 may transmit a close signal to the drive motor 80. In another example, the controller 30 may sense the proximity of the user by the proximity sensor 34 and transmit a closing signal to the drive motor 80 when the proximity sensor 34 detects that the user has moved more than a predetermined distance (e.g., toward the proximity sensor 34).

[0120] When the close signal is input, the drive motor 80 may be reversely rotated in a second direction opposite to the first direction. In reverse rotation of the drive motor 80, the pinion 82 and the rack 84 can transmit the rotational force of the drive motor 80 to the drawer body 6A, and while the drawer body 6A retracts into the storage chamber, the door body 6B can be retracted and the door body 6B can be retracted in close contact with the cabinet 1 toward the front of the cabinet 1. The controller 30 may sense that the door 6 has reached the closing position by the door sensor, and if the door 6 has reached the closing position, the controller 30 may stop the reverse rotation of the drive motor 80.

[0121] Fig. 13 is a sectional view illustrating when the holder 12 lifts while the door is opened according to the embodiment of the present disclosure. As previously described, the refrigerator may further include a lifting module (also referred to as a lift or elevator) 13 which allows the holder 12 to be automatically lifted and lowered after the holder 12 is moved forward in a state where the door 50 is opened. The holder 12 may be a shelf, a drawer, a basket, or the like on which goods can be placed. The lifting module 13 may be disposed in the storage chamber or at least one of the rotatable door 5 and the advancing and retracting type door 6 for opening and closing the storage chamber. The refrigerator may have both a first holder provided higher at a greater height and a second holder provided lower at a smaller lower height.

[0122] The lifting module 13 may be disposed in a low storage chamber associated with a holder 12 having a lower height than other holders 12. In another example, the lifting module 13 may function for lowering a holder and may be arranged in a storage chamber in which a holder having a relatively greater height than other holders is located.

[0123] An example of the lifting module 13 will be described. An example of the lifting module 13 may include a lower frame 93, an upper frame 94, a lifting and lowering mechanism 92 having at least one link 95, and a drive mechanism 90 capable of lifting and lowering the upper frame 94. The drive mechanism 90 may include a lifting and lowering motor 91 and a power transmission member connected to the lifting and lowering motor 91 to transfer the drive force of the lifting and lowering motor 91 to the upper frame 94.

[0124] When the refrigerator is turned on, the controller 30 may wait for a lifting command of the holder 12 to be input. When the lifting command is input through the input device, the controller 30 may transmit a lifting signal to the lifting and lowering motor 91 included in the lifting module 13. When the controller 30 transmits an opening signal to the lifting and lowering motor 91, the upper frame 94 may lift, and the holder 12 may be lifted to the upper side of the drawer body 6B.

[0125] The user may input a lowering command through the input device, and the controller 30 may transmit a lowering signal to the lifting and lowering motor 91 when the lowering command is input through the input device. In another example, the controller 30 may automatically generate the lowering command when a lifted drawer is being closed or other, higher drawers start to be closed. For example, the lifting and lowering motor 91 may be reversely rotated in a second direction opposite to the first direction. Upon reverse rotation of the lifting and elevating motor 91, the upper frame 94 may be lowered to the inner lower portion of the drawer body 82, and the holder 12 may be inserted into the drawer body 6B together with the upper frame 94.

[0126] Fig. 14 is a front view illustrating a storage chamber of an example of a refrigerator according to an embodiment of the present disclosure, Fig. 15 is a perspective view illustrating when the partition member, the shelf, and the storage member according to the embodiment of the present disclosure are separated in front of the storage space, Fig. 16 is an exploded perspective view illustrating an inner guide and an evaporator according to an embodiment of the present disclosure, Fig. 17 is a rear view illustrating an inner portion of the inner guide according to an embodiment of the present disclosure, Fig. 18 is a sectional view illustrating when the air is discharged to the second space and the storage space, as an example of a refrigerator according to an embodiment of the present disclosure, Fig. 19 is an exploded perspective view illustrating a discharge guide and an air guide according to an embodiment of the present disclosure, Fig. 20 is a rear view illustrating a return duct according to an embodiment of the present disclosure, and Fig. 21 is a perspective view when the return duct illustrated in Fig. 20 is separated from the inner guide.

[0127] Hereinafter, although the temperature adjusting device disposed in the air flow path P will be described as an example of a cooling device, the temperature adjusting device disposed in the air flow path P is not limited to being a cooling device, but may be a heating device, such as a heater, or may include a device that selectively heats or cools. For convenience, the temperature control device disposed in the air flow path P will be described with the same reference numeral 150 as the evaporator, which is provided as an example of the temperature control device. Hereinafter, the airflow forming mechanism disposed in the air flow path P will be described as the fan 181.

[0128] When the storage chamber W is opened, the front surface of the inner guide 200 may face the front of the storage chamber W. The inner guide 200 may be formed so that its front surface has a substantially planar shape. The inner guide 200 may further include a portion (that is, a bent portion or region) that is bent at another portion of the periphery or a portion (that is, a protrusion portion) that protrudes more than the other portion of the periphery.

[0129] When the inner guide 200 is a combination of a plurality of members, the boundary L of the plurality of members or the coupling portion of the plurality of members may be positioned the rear or the side of another structure (for example, the shelf 2, the partition member 3, receiving member 4, or the like) disposed inside the storage chamber W, and thus may be concealed by the other configuration or located close to the other configuration. When the boundary L or the coupling portion is minimized, the outer appearance of the inner guide 200 may be simplified, and the refrigerator may be advanced.

[0130] Hereinafter, the detailed structure of the inner guide 200 is described. The inner guide 200 may function to define a discharge duct for discharging air into the storage chamber W and may function to define a suction duct for returning the air in the storage chamber W to the temperature adjusting device 150. For example, the inner guide 200 may have a discharge port 204 and a suction port 205, and the discharge hole 204 and the suction port 205 may be formed to be spaced apart from the inner guide 200. When the suction port is not visible as much as possible in front of the storage chamber W as described above, the outer appearance of the inner guide 200 may be more concise, and the refrigerator may be advanced.

[0131] The refrigerator may further include a partition member 3 disposed in the storage space to partition the storage space into a first space W1 and a second space W2. The partition member 3 may be closer to the lower end of the upper and lower ends of the storage chamber.

[0132] In the refrigerator, a discharge port 204 (hereinafter, referred to as a first discharge port) for discharging air into the first space W1 and a suction port 205 (hereinafter, referred to as a first suction port) for suctioning air in the first space W1 may be formed at a position facing the first space W1. In the refrigerator, an additional discharge port 321 (hereinafter, referred to as a second discharge port) for discharging air into the second space W2 and an additional suction port 341 (hereinafter, referred to as a second suction port) formed in a guide 340 for suctioning air in the second space W2 may be formed at a position facing the second space W2. The first discharge port may be provided at a position higher than the first suction port. The second discharge port may be provided at a position higher than the second suction port.

[0133] One surface of the partition member 3 may be a suction guide surface for guiding air flowing toward the suction port 205, and the other surface of the partition member 3 may be a discharge guide surface for guiding air discharged to the additional discharge port 321. The partition member 3 may be spaced apart from the suction port 205 in the horizontal direction and may be disposed to cover a portion of the suction port 205. At least a portion of the suction port 205 may face the partition member 3 in the horizontal direction.

[0134] The gap between the partition member 3 and the suction port 205 may function as an inlet passage through which air in the first space W1 passes to be suctioned into the suction port 205, and the air in the first space W1 may be suctioned to the suction port 205 after passing through the gap between the partition member 3 and the suction port 205. As described above, when a portion of the suction port 205 is covered by the partition member 3, the outer appearance of the suction port 205 may be more advanced than when the entire suction port 205 is visible through the periphery of the partition member 3.

[0135] Meanwhile, the inner guide 200 may have a heat exchange flow path P1 in which the temperature adjusting device 150 and the fan 181 are received. The inner guide 200 may have a discharge flow path P2 through which air blown by the fan 181 is guided to the discharge port 204. The inner guide 200 may be provided with an additional discharge flow path P3 for guiding the air blown by the fan 181 to be discharged to the additional discharge port 321. The heat exchange flow path P1, the discharge flow path P2, and the additional discharge flow path P3 may constitute an air flow path P for guiding air to circulate between the temperature adjusting device 150 and the storage space, and the temperature adjusting device 150 and the fan 181 may adjust the temperature of the first space W1 and the second space W2 in a state received in the air flow path P.

[0136] The first damper 191 may be disposed in the air flow path P and may adjust the air supplied to the first space W1. The first damper 191 may be mounted to the inner guide 200 and may be mounted to be positioned between the fan 181 and the discharge port 204 in the air flow direction.

[0137] The second damper 192 may be disposed in the air flow path P and may adjust the air supplied to the second space W2. The second damper 192 may be mounted to the inner guide 200 and may be mounted to be positioned between the fan 181 and the additional discharge port 321 in the air flow direction.

[0138] The inner guide 200 may include a discharge port 204 for discharging air into the first space W1, a discharge guide 202 disposed to face the first space W1, an additional discharge port 321 for discharging air to the second space W2, and an inner cover (or cover) 300 disposed to shield the temperature adjusting device 150, facing the second space W2. The cover 300 may define a cavity (also referred to as a machine room) to receive the temperature adjusting device 150, an air guide (also referred to as a fan housing) 400, and the fan 181. One of the discharge guide 202 or the inner cover 300 may be disposed higher than the other one of the discharge guide 202 or the inner cover 300.

[0139] For example, the width L1 of the inner cover 300 in the front and rear direction may be larger than the width L2 of the temperature adjusting device 150 in the front and rear direction, and the width L3 of the discharge guide 202 in the front and rear direction may be smaller than the width L2 of the temperature adjusting device 150 in the front and rear direction. For example, the width L1 of the inner cover 300 in the front and rear direction may be larger than the width L3 of the discharge guide 202 in the front and rear direction.

[0140] In this case, the temperature adjusting device 150 may be closer to the lower end of the upper and lower ends of the storage chamber (W). The fan 181 and the temperature adjusting device 150 may be positioned lower than the upper end of the inner cover 300 and may be received and covered by the inner cover 300. A portion of the inner guide 200 in which the lower end of the discharge guide 202 and the upper end of the inner cover 300 contact each other may be a boundary L between the discharge guide 202 and the inner cover 300.

[0141] The inner cover 300 may be connected to the lower end of the discharge guide 202, and the inner cover 300 may be disposed to have a step with the discharge guide 202. For example, the inner cover 300 may be a portion that protrudes relatively further in the forward direction than the discharge guide 202.

[0142] The length of the inner cover 300 in the vertical direction Z may be a factor for determining the total volume occupied by the storage space in the storage chamber W. The inner cover 300 has a length in the vertical direction Z which can receive the fan 181, the temperature adjusting device 150, and the air guide 400, wherein the length in the vertical direction Z is preferably formed as short as possible. In another example, when the inner cover 300 is connected to the lower portion of the discharge guide 202, and the temperature adjusting device 150 is close to the lower surface of the inner case 8, the length of the inner cover 300 in the vertical direction Z may be short, and the volume occupied by the storage space in the storage chamber W may be large.

[0143] When the upper end height H1 of the temperature adjusting device 150 is lower than the lower end height H2 of the partition member 3, the portion of the inner cover 300 facing the first space W1 is minimized or absent, and the volume of the first space W1 can be maximized. A portion of the discharge guide 202 facing the first space W1 may be provided with a heating air generation module (HG) module 184 and a temperature sensor T2. The HG module 184 may further include an air purification filter.

[0144] The inner guide 200 may further include an air guide (or fan housing) 400. The fan 181 may be disposed inside the air guide 400 and may be received in the air guide 400. The air guide 400 may be connected to the lower end of the discharge guide 202. The air guide 400 and the temperature adjusting device 150 may be covered by the inner cover 300.

[0145] The air guide 400 may be formed with a shroud 411 opened toward the temperature adjusting device 150, and when the fan 181 is driven, the air heat exchanged with the temperature adjusting device 150 may pass through the shroud 411 to flow into the air guide 400. The air guide 400 may overlap the temperature regulating device 150 in the front and rear direction X or in the vertical direction Z.

[0146] When the air guide 400 and the temperature adjusting device 150 overlap in the front and rear direction X, the length of a space in which the air guide 400 and the temperature adjusting device 150 occupies in the vertical direction is short while the width of the space in the front and rear direction may be large. In this case, the width L1 of the inner cover 400 in the front and rear direction X is also large, and the width of the second space W2 in the front and rear direction X is small.

[0147] Meanwhile, the inner cover 300 may be further formed with a receiving member discharge port 331 through which the air blown from the receiving member fan 183 passes to be blown toward the receiving member. The inner cover 300 may include a receiving member fan mounting portion (or fan mount) 330 on which the receiving member fan 183 is mounted. The receiving member fan 183 may be disposed in the inner cover 300.

[0148] Meanwhile, the refrigerator may further include a receiving member cover 2' facing the upper surface of the receiving member 4. The receiving member cover 2' may be disposed on the shelf 2 disposed in the second space W2. The receiving member cover 2' may be disposed to be spaced apart from the upper end of the receiving member 4, and the air discharged through the receiving member discharge port 331 can flow to the receiving space P of the receiving member (4) through the gap between the receiving member cover 2' and the receiving member 4.

[0149] The discharge guide 202 may be formed of a combination of a plurality of members. The discharge guide 202 may further include a discharge body (or discharge plate) 210 and a flow path body (or flow path layer) 230 disposed on the rear surface of the discharge body 210. The discharge guide 202 may further include a cover body (or rear cover plate) 220 spaced apart from the discharge body 210 in the front and rear direction.

[0150] Discharge ports 204 and suction ports 205 may be formed in the discharge body 210.The flow path body 230 may be disposed in the discharge body 210 to form a discharge flow path P2 for guiding air to the discharge port 204. The flow path body 230 may form a discharge flow path P2 for guiding the air exchanged with the temperature adjusting device 150 to the discharge port 204. The flow path body 230 may be provided between the discharge body 210 and the cover body 220.

[0151] The discharge guide 202 may further include an outer plate (or front cover plate) 250 disposed on the front surface of the discharge body 210. The outer plate 250 may form an outer appearance of the rear wall surface of the first space W1 and may be formed of a metal material such as stainless steel. The outer plate 250 may have openings 251, 252, 253, and 255 having sizes corresponding to positions corresponding to the discharge ports 204, the purification module mounting portion 212, the temperature sensor mounting portion (or sensor opening) 213, and the suction port 205, respectively.

[0152] The cover body 220 may have a plate shape and may be spaced apart from the discharge body 210 by the flow path body 230. The discharge flow path P2 may be defined as an area in which the flow path body 230 is not located among the areas between the discharge body 210 and the cover body 220.

[0153] The lower end of the discharge flow path P2 may communicate with the air guide 400, and may be branched to both left and right sides by the first member 231 and may extend upward. The first member 231 may be formed such that the left and right widths become wider from the lower end to the upper side, and both left and right side surfaces may be formed to have a predetermined curvature to provide a smooth flow of air. A purification module recessed portion 231a may be further formed on the upper portion of the first member 231 so that the purification module 184 may be recessed thereon, and if necessary, the first member 231 may further include a flow path for allowing air in the first space W1 to enter and exit the purification module 184.

[0154] The second member 232 and the third member 233 may be spaced apart from the left and right sides of the first member 231 to form the discharge flow path P2, and the side facing the first member 231 may be formed round in a shape corresponding to each other. The discharge ports 204 formed in the discharge body 210 may be formed toward the discharge flow path P2 branched into a pair. Meanwhile, a through-hole 233a corresponding to the suction port 205 may be formed at one lower side of the third member 233, and the through-hole 233a communicates with the return duct 500, which will be described later and thus the air recovered at the storage chamber W may flow into the return duct 500.

[0155] Meanwhile, the heat insulating sheet 290 may be provided on the rear surface of the discharge flow path P2 formed by the flow path body 230. The heat insulating sheet 290 may be formed in a shape corresponding to the shape of the discharge flow path P2 and may be attached to the front surface of the cover body 220.

[0156] The refrigerator may include a guide 234 for guiding air forcedly flowing by the fan 181 inside the air guide 400. Guide 234 may be formed to guide the air blown from the fan 181 to the outlet (or first opening) 412 which will be described later. To this end, the guide 234 may be formed to have a predetermined curvature. The guide 234 may be formed farther from the outer circumference of the fan 181 as the guide 234 approaches the outlet 412 in the air flow direction. The guide 234 may be formed in the discharge guide 202 and may be inserted into the air guide 400 to be positioned around the fan 181.

[0157] The guide 234 can be formed integrally with any one of the discharge body 210, the flow path body 230, and the cover body 220, and can be coupled to one of the discharge body 210, the flow path body 230, and the cover body 220. The guide 234 may be formed to protrude from the lower portion of the flow path body 230, and, for example, the guide 234 may be formed to protrude from the third member 233.

[0158] The air guide 400 may be a fan housing surrounding the fan 181. An inner air flow path may be formed in the air guide 400 in which air heat-exchanged with the temperature adjusting device 150 is distributed to the first damper 191 and the second damper 192.

[0159] The first damper 191 and the second damper 192 may be installed in the air guide 400. The air guide 400 may be a damper built-in fan housing. In this case, the air guide 400 may be a fan housing capable of guiding the air flowing by the fan 181 to the first damper 191 and the second damper 192.

[0160] The air guide 400 may be coupled to the lower end of the discharge body 210, and the fan 181, the first damper 191, and the second damper 192 may be provided inside the air guide 400. When the first damper 191 and the second damper 192 are operated when the fan 181 is driven, the refrigerator allows air that is heat-exchanged with the temperature adjusting device 150 to be selectively supplied to the first space W1 and the second space W2.

[0161] The air guide 400 may include a front housing 410 and a rear housing 420, and the fan 181, the first damper 191, and the second damper 192 may be received in the space formed by the combination of the front housing 410 and the rear housing 420. The fan 181 may be a centrifugal fan or a turbofan that suctions in the axial direction and discharges in the circumferential direction.

[0162] The air guide 400 may have a scroll (or conduit) 413 and an opening portion or opening (also referred to as a second opening) 414 for guiding air to the discharge flow path P2. The scroll 413 may guide the air blown from the fan 181 to the opening portion 414. The scroll 413 may be formed to have a predetermined curvature. The scroll 413 may be formed far from the outer circumference of the fan 181 as it approaches the opening portion 414 in the air flow direction. A cross-section area of the scroll 413 may increase between the fan 181 and toward the opening portion 414. The opening portion 414 may communicate with the lower end of the discharge flow path P2.

[0163] The size of the first space W1 may be larger than that of the second space W2, and the air guide 400 may be formed in a shape such that a large amount of air may rapidly flow into the discharge flow path P2. The fan 181 may be disposed between the scroll 413 and the guide 234. In the refrigerator, the flow path sectional area between the outer circumference of the fan 181 and the scroll 413 in the air flow direction may be larger than the flow path sectional area between the outer circumference of the fan 181 and the guide 234. The scroll 413 may have a leading end 413a closest to the outer circumference of the fan 181 and a trailing end 413b farthest from the outer circumference of the fan 181.

[0164] The fan 181 may be disposed closer to the outlet 412 than to the trailing end 413b of the scroll 413. In addition, the length of the scroll 413 may be longer than the length of the guide 234. The length of the scroll 413 may be an air flow direction length of a surface of the scroll 413 facing the outer circumferential surface of the fan 181, and the length of the guide 234 may be defined as the length of the air flow direction of the surface facing the outer circumferential surface of the fan 181 of the guide 234.

[0165] If the fan 181 is disposed closer to the outlet 412 than the trailing end 413b of the scroll 413 and the length of the scroll 413 is longer than the length of the guide 234, then the first distance L7 between the trailing end 413b of the scroll 413 and the fans 181 may be longer than the second distance L8 between the trailing end of the guide 234 and the fan 181. In this case, the fan 181 may be eccentrically positioned to one side of the left and right in the inner guide. In this case, the fan 181 and the scroll 413 can quickly supply a large amount of air to the discharge flow path P2.

[0166] The first damper 191 may interrupt the flow of air through the opening portion 414. The first damper 191 may interrupt the flow of the air flowing in the fan 181 to the discharge flow path P2. The air supply of the discharge flow path P2 may be determined when the first damper 191 is opened and closed.

[0167] The first damper 191 may be disposed in the opening portion 414 and may be disposed before the opening portion 414 or after the opening portion 414 in the air flow direction. When the first damper 191 is disposed in the opening portion 414 in the air flow direction, the first damper 191 may be disposed in the air guide 400.

[0168] The discharge guide 202 is preferably configured to be as slim as possible so that the volume of the first space W1 is maximized. In addition, the width of the first damper 191 in the front and rear direction may be greater than the width of the discharge guide 202 in the front and rear direction. When the width of the first damper 191 in the front and rear direction are larger than the width of the discharge guide 202 in the front and rear direction, the first damper 191 may be preferably positioned before the opening portion or in the opening portion in the air flow direction. The first damper 191 is preferably disposed in the air guide 400.

[0169] The air guide 400 may have a shroud 411 through which air may be suctioned into the fan 181. The shroud 411 may be formed in the front housing 410. When the fan 181 is driven, air in front of the front housing 410 may be suctioned into the air guide 400 through the shroud 411 and may be discharged in the circumferential direction of the fan 181.

[0170] The first damper 191, the second damper 192, the fan 181, the air guide 400, and the temperature adjusting device 150 is configured to be received in the inner cover 300, and it is preferable to be located as close as possible. For example, the positions of each of the first damper 191, the second damper 192, and the fan 181 may be determined by the air guide 400, and if the air guide 400 overlaps the evaporator 140 in the vertical direction Z, at least a portion of each of the first damper 191, the fan 181, and the second damper 192 may be disposed to be overlapped with the temperature adjusting device 150 in the vertical direction Z.

[0171] The first damper 191 and the second damper 192 may be spaced apart in the horizontal direction, particularly in the left and right directions Y, and a portion of the fan 181 can be located between the first damper 191 and the second damper 192. At least a portion of the first damper 191 may be disposed to overlap the fan 191 in the horizontal direction, for example, the left and right directions Y. The first damper 191 may be eccentrically disposed on one side of the left and right sides of the air flow path P. The first damper 191 may be disposed at a height H3 overlapping the partition member 3 in the horizontal direction, particularly in the front and rear direction X.

[0172] The first damper 191 may overlap the partition member 3 in the horizontal direction in a state where a portion of the air guide 200 is interposed between the first damper and the partition member 3. The first damper 191 may overlap the rear end of the partition member 3 in the front and rear direction X in a state where the air guide 400 is disposed between the first damper and the inner cover 300.

[0173] At least a portion of the second damper 192 may be disposed to overlap the fan 191 in a horizontal direction, for example, in a left and right direction Y. The second damper 192 may be disposed eccentrically to the other side of the air flow path P in the left and right direction. At least a portion of the second damper 192 may be disposed to overlap the partition member 3 in the horizontal direction, for example, in the front and rear direction X.

[0174] The second damper 192 may overlap the partition member 3 in the horizontal direction, for example, the front and rear direction X, in a state where a portion of the air guide 200 is interposed between the second damper and the partition member 3. A portion of the inner cover 300 and a portion of the air guide 400 of the air guide 200 may be located between the partition member 3 and the second damper 192. The second damper 192 may overlap the rear end of the partition member 3 in the front and rear direction X in a state where the air guide 400 is disposed between the inner cover 300 and the second damper 192.

[0175] When the first damper 191, the second damper 192, and the fan 181 are disposed at the above positions, the size of the air guide 400 may be minimized, and the first damper 191, the second damper 192, the fan 181, the air guide 400, and the temperature adjusting device 150 may be disposed as compactly as possible in the inner case 8.

[0176] Meanwhile, an outlet 412 communicating with the additional discharge port 321 may be formed in the air guide 400, for example, the front housing 410. The outlet 412 may be formed to face the additional discharge port 321 to discharge air to the additional discharge port 321, and may also communicate with the additional discharge port 321 through the discharge duct 360. The outlet 412 may be formed to be spaced apart from the opening portion 414 through which the discharge flow path P2 communicates.

[0177] The inner guide 200 may further include a discharge duct 360 that guides the air passing through the outlet 412 to the additional discharge port 321 after being flowed by the fan 181. The discharge duct 360 may connect the air guide 400 and the inner cover 300, and guide the air blown from the air guide 400 to the additional discharge port 321. The discharge duct 360 may form an air flow path P3 (for example, an additional discharge flow path P3) so that the air blown by the fan 181 may be directed to the additional discharge port 321.

[0178] The discharge duct 360 may include an inlet portion 361 connected to the second damper 192 and an outlet portion 362 connected to the additional discharge port 321. The inlet portion 361 and the outlet portion 362 may extend in a direction crossing each other.

[0179] The outlet portion 362 may extend in the horizontal direction from the inlet portion 361 to be lengthened and may be formed to open forward. The outlet portion 362 may face the additional outlet port 321. An edge 363 which is in close contact with the inner cover 300may be formed on the front surface of the outlet portion 362. The additional discharge holes 321 may face the inner region of the outlet portion 362 in the front and rear direction X, and all of the air guided through the discharge duct 360 may be discharged to the second space W2 through the additional discharge holes 321.

[0180] The outlet 412 may be formed to be spaced apart from the shroud 411 and the opening portion 414 in the air guide 400, and the outlet 412 may be an air guide discharge port for supplying air to the second space W2. The second damper 192 may be disposed to be located before the outlet 412 in the air flow direction, and the second damper 192 may adjust the air flow through the outlet 412.

[0181] When the fan 181 is driven and the second damper 192 is opened, the air heat exchanged with the temperature adjusting device 150 may be supplied to the second space W2 through the discharge duct 360. When the second damper 192 is embedded in the air guide 400, a second separate damper receiver does not need to be formed in the inner cover 300, and a portion of the inner cover 300 which protrudes toward the second space W2 can be minimized and the volume of the second space W2 can be maximized.

[0182] Meanwhile, a fan motor mounting portion (or fan mount) 421 in which the fan 181 is mounted may be formed in the air guide 400, for example, the rear housing 420. The first damper mounting portion 422 may be formed on one side of the left and right sides of the fan motor mounting portion 421, and the second damper mounting portion 423 may be formed on the other side of the fan motor mounting portion 421. The first damper mounting portion 422 and the second damper mounting portion 423 may be positioned opposite to each other in a state where the fan motor mounting portion 421 is interposed between the first damper mounting portion 422 and the second damper mounting portion 423.

[0183] Meanwhile, the refrigerator may be configured to discharge air into the first space W1 from the storage chamber W, particularly from the upper portion of the first space W1. The flow path body 230 may extend to the upper end of the discharge body 210, and the upper end of the flow path body 230 may be coupled to the duct connecting member 270. In addition, the inner case 8 may be an upper duct 280 for guiding air to be discharged into the first space W1.

[0184] The upper duct 280 may be disposed on the upper surface of the inner case 8. The upper duct 280 may be formed with an inner flow path for guiding the air passing through the discharge flow path P2 to be discharged into the first space W1, and a top discharge port through which the air guided in the inner flow path is discharged to the first space W1. The top discharge port may be formed under the upper duct 280 and may be formed to be open toward the first space W1.

[0185] The duct connecting member 270 allows the interior of the discharge flow path P2 and the upper duct 280 to communicate with each other and may be mounted on the upper end of the passage body 230. The duct connecting member 270 may include a connecting portion 272 connecting between the pair of flow passage portions 271 and the pair of flow passage portions 271 respectively connected to the discharge flow path P2 and the upper duct 280.

[0186] The duct connecting member 270 may be disposed to penetrate the inner case 8 and may connect the upper end of the discharge guide 202 inside the inner case 102 and the rear end of the upper duct 280 outside the inner case 102. A pair of upper ducts 280 may be provided in the refrigerator. The upper duct 280 may be disposed to penetrate the inner case 8, and the top discharge port may face the first space W1.

[0187] The inner guide 200 may be connected to a return duct 500 for recovering air in the first space W1 to the temperature adjusting device 150. The return duct 500 may be connected to the inner guide 200 in communication with the suction port 205. The return duct 500 may guide the air suctioned into the suction port 205 to the temperature adjusting device 150 disposed in the air flow path P.

[0188] The return duct 500 may include an inlet portion 510 through which air is suctioned. The inlet portion 510 may be formed on the upper portion of the return duct 500. The return duct 500 may further include a discharge unit 520 for discharging air to a temperature adjusting device, for example, the temperature adjusting device 150 disposed in the air flow path P. The discharge portion 520 may be formed under the return flow path 500.

[0189] The inner case 8 may have a through-hole 8A through which a portion of the return duct 500 may pass. The through-hole 8A may be formed at the position facing the air guide 400, particularly the rear housing 420, of the inner case 8. In addition, an inlet 424 corresponding to the inlet portion 510 may be formed in the air guide 400. The inlet 424 may be formed in the rear housing 420 of the air guide 400.

[0190] The inlet 424 may be formed at a position corresponding to the suction portion 205 and the inlet portion 510 and may be in communication with each of the suction port 205 and the inlet portion 510. For example, the suction port 205 and the return duct 500 may be communicated by the inlet 424 formed in the air guide 400.

[0191] The inner case 8 may have an outlet 8B corresponding to the outlet portion 520. The outlet 8A may face the lower end of the temperature adjusting device 150 or downward of the temperature adjusting device 150. The outlet 8B may be in communication with the outlet portion 520. The heat exchange flow path P1 and the return duct 500 in which the temperature adjusting device 150 is received may be communicated by the outlet 8B formed in the inner case 8. The outlet 8A may be formed at a lower height than the additional discharge port 321 and the receiving member discharge port 331.

[0192] The inlet portion 510 may be disposed in communication with the suction port 205. The outlet portion 520 may be disposed to face the temperature adjusting device 150 or the lower side of the temperature adjusting device 150. The outlet portion 520 may be disposed to face the lower portion of the temperature adjusting device 150.

[0193] The return duct 500 connects between the inlet portion 510 and the outlet portion 520 and may include a body portion 530. The body portion 530 may be provided with a return flow path P4 for guiding the air suctioned in the first space W1 to the temperature adjusting device 150.

[0194] The size of the outlet portion 520 may be larger than that of the inlet portion 510, and the body portion 530 may be formed to be wider toward the outlet portion 520. The air flowing into the temperature adjusting device 150 through the outlet portion 520 may be supplied to the widest area of the temperature adjusting device 150.

[0195] The return duct 500 may include an overlap portion 532 overlapping the fan 191 in the front and rear direction X. The overlap portion 532 may be positioned behind the fan 191 in a state where the air guide 200 for example, a portion of the rear housing 420 is interposed between the overlap portion and fan. The fan motor mounting portion 421 formed in the rear housing 420 may be positioned between the fan 191 and the overlap portion 532, and the front surface of the fan motor mounting portion 421 may face the fan 191. The rear surface of the fan motor mounting portion 421 may face the overlap portion 532. For example, the overlap portion 532 may overlap the fan 191 in the front and rear direction X in a state where the fan motor mounting portion 421 is interposed between the overlap portion 532 and the fan 191.

[0196] In the return duct 500, an expansion portion 534 may be formed at a lower side of the overlap portion 532 to extend in a horizontal direction, for example, in a left and right direction Y, toward the outlet portion 520. The expansion portion 534 may be formed to gradually expand as the return flow path P4 goes downward, and after the air passing through the return duct 500 spreads wide in the left and right directions Y while passing through the expansion portion 534, the air may flow to the temperature adjusting device 150.

[0197] Fig. 22 is a front view illustrating a storage chamber of another example of the refrigerator according to the embodiment of the present disclosure, and Fig. 23 is an enlarged rear view illustrating an inner guide of another example of a refrigerator according to an embodiment of the present disclosure. While the refrigerator illustrated in Figs. 14 to 21 (hereinafter, referred to as a first refrigerator Q1) may include a storage chamber W in which the first space W1 and the second space W2 can be independently temperature-adjusted, the refrigerator illustrated in Figs. 22 and 23 may be a refrigerator (hereinafter referred to as a second refrigerator Q2) in which one entire storage chamber (W', see Fig. 22) can be temperature-adjusted based on the same target temperature.

[0198] As illustrated in Fig. 3, the first refrigerator Q1 and the second refrigerator Q2 may be disposed adjacently to be used together, and if as many components as possible are shared, the overall cost for manufacturing all of the plurality of first refrigerators Q1 and the plurality of second refrigerators Q2 can be minimized. In the first and second refrigerators Q1 and Q2, the fan 181 and the temperature adjusting device 150 may be shared with each other, and some components of the inner guides 200 and 200' may be shared. In the first and second refrigerators Q1 and Q2, as many components as possible among the components constituting the inner guide 200 and 200' (see Figs. 22 and 23) may be formed in the same structure, and the components of the inner guide 200 and 200' are preferably formed to allow rapid air flow while minimizing flow path resistance of each of the first refrigerator Q1 and the second refrigerator Q2.

[0199] For example, the inner guides 200, 200' of each of the first refrigerator Q1 and the second refrigerator Q2 may include a discharge body 210 in which a discharge port 204 and a suction port 205 are formed, flow path bodies 230 and 230' which are disposed in the discharge body 210 and form discharge flow paths for guiding air to the discharge ports 204; and an air guide 400 in which a scroll 413 and an opening portion 414 for guiding air to the discharge flow path are formed and in which an outlet 412 spaced apart from the opening portion 414 is formed. In addition, the second refrigerator Q2 may have a structure capable of blocking the inlet 205 of the discharge body 205 and the outlet 412 of the air guide 400.

[0200] Each of the first refrigerator Q1 and the second refrigerator Q2 may include a fan 181 received in the air guide 400. Each of the first refrigerator Q1 and the second refrigerator Q2 may further include a temperature adjusting device 150 adjacent to the air guide 400. The components of the discharge body 210, the air guide 400, the fan 181, and the temperature adjusting device 150 may be shared in the manufacture of the first refrigerator Q1 and the second refrigerator Q2, and the flow path body 230, 230' and/or inner cover 300, 300' may be configured differently for each of the first refrigerator Q1 and the second refrigerator Q2.

[0201] Hereinafter, the same reference numerals are used for the common configuration (that is, a configuration that the components can be shared) of the first refrigerator Q1 and the second refrigerator Q2, and a detailed description thereof will be omitted. As previously described, the first refrigerator Q1 may include a discharge port 204, a suction port 205, an additional discharge port 321, and an additional suction port 341 in the inner guide 200 to independently adjust the temperature of the first space W1 and the second space W2, and a partition member 3 disposed toward between the suction port 205 and the additional discharge port 321 may be disposed in the storage space. The first refrigerator Q1 may include a first damper 191 for adjusting air flowing into the discharge flow path P and a second damper 192 for adjusting air flowing to the outlet 412. have.

[0202] On the other hand, the second refrigerator (Q2) may be formed with the discharge port 204 and the additional suction port 341 in the inner guide 200' so as to adjust the temperature of the storage chamber W', as illustrated in Fig. 22, the discharge port 204 and the additional suction port 341, but the additional discharge port 321 of the first refrigerator Q1 does not need to be formed in the inner guide 200'.

[0203] While an additional discharge port 321 and an additional suction port 341 are formed in the inner cover 300 of the first refrigerator Q1, as illustrated in Fig. 22, the additional discharge port 321 of the first refrigerator need not be formed in the inner cover 300' of the second refrigerator Q2. While, the components of the first refrigerator Q1 and the second refrigerator Q2 share the inner cover 300 having the additional discharge port 321 and the additional suction port 341, it is also possible to block the additional discharge port 321 formed in the inner cover 300 of the second refrigerator Q2 with a separate shield member (or cover) that can shield the additional discharge port 321 formed on the inner cover 300 of the second refrigerator Q2.

[0204] Hereinafter, the inner guide 200’ of the second refrigerator Q2 will be described in detail. The second refrigerator Q2 includes a discharge guide 202’ in which a discharge port 204 is formed and in which a discharge flow path P2’ for guiding air to the discharge port 204 is formed, wherein the discharge guide 202’ may include a discharge body 210 and a separate flow path body 230’. Since the discharge body 210 of the second refrigerator Q2 has the same configuration as that of the discharge body 210 of the first refrigerator Q1 so as to share the components, a detailed description thereof will be omitted.

[0205] At least one of a shape and a size of the flow path body 230’ of the second refrigerator Q2 may different from at least one of a shape and a size of the flow path body 230 of the first refrigerator Q1. The flow path body 230’ of the second refrigerator Q2 may have the same number as the flow path body 230 of the first refrigerator Q1, and may include the first, second, and third members 231’, 232, and 233’.

[0206] As illustrated in Fig. 17, the discharge flow path P2 of the first refrigerator Q1, as previously described, may include an inlet communicating with the first damper 191 and a plurality of branch flow paths connected to the inlet. The discharge flow path P2 of the first refrigerator Q1 may allow the air passing through the first damper 191 to be dispersed in the discharge flow path P2.

[0207] On the other hand, the discharge flow path P2’ of the second refrigerator Q2 may include a plurality of branch flow paths P21 and P22 connected to the air guide 400 and spaced apart from each other, as illustrated in Fig. 23. The plurality of branch flow paths P21 and P22 may include a first branch flow path P21 connected to the air guide 400 so that the air blown from the fan 181 is not guided to the scroll 413 but flows into the scroll 413 and a second branch flow path P22 connected to the air guide 400 to be guided to the scroll 413 and the opening portion 414 after being blown from the air guide 400.

[0208] The flow path body 230 of the first refrigerator Q1 and the flow path body 230’ of the second refrigerator Q2 may be an expanded polystyrene (EPS) material, the air guide 400 may be an acrylonitrile butadiene styrene (ABS) material, and the discharge body 210 of the outer plate may be made of steel. In a case where the components of the air guide 400 or the discharge body 210 being a component which are more expensive than the flow path body 230 and 230’ and are difficult to process, are shared and the flow path bodies 230, 230’ which are made of EPS material, which is easier to process than ABS or steel, and is manufactured at a lower cost are separately manufactured for each of the first and second refrigerators Q1 and Q2, the overall manufacturing cost of the first and second refrigerators Q1 and Q2 may be reduced.

[0209] The inner guide 200’ of the second refrigerator Q2 configured as described above includes a discharge body 210 and an air guide 400, which are common components with the first refrigerator Q1, wherein a separate flow path body 230’ may be included instead of the flow path body 230 of the first refrigerator Q1, and a separate inner cover 300’ may be included instead of the inner cover 300 of the first refrigerator Q1.

[0210] Meanwhile, the second refrigerator Q2 may not discharge air through the outlet 412 of the air guide 400, and the shielding body (or diverter body) 236 shielding the outlet 412 needs to be provided in the second refrigerator Q2. The shielding body 236 may be integrally formed with the flow path body 230’. The shielding body 236 may include a guide surface 227 for guiding the air blown from the fan 181 to one of the plurality of branch flow paths P21 and P22.

[0211] Some of the air blown in the radial direction from the fan 181 of the second refrigerator Q2 is not guided to the scroll 413 but can be guided to any one of the plurality of branch flow paths P21 and P22 by the guide surface 227 of the shielding body 236. On the other hand, the remaining of the air blown in the radial direction in the fan 181 of the second refrigerator Q2 can be guided to the scroll 413 and then can be supplied to the other one P22 of the plurality of branch flow paths P21, P22.

[0212] The second refrigerator Q2 may be configured to block the suction port 205 of the discharge body 210 without being opened, and the outlet plate 250’ covering the front surface of the discharge body 210 is formed with an opening 252 corresponding to the discharge port 204 like a first refrigerator, wherein, unlike the first refrigerator, the opening 255 corresponding to the suction port 205 may not be formed. The outer plate 250’ may be provided with a shield portion 255’ (see Fig. 22) as a portion that blocks the suction port 205 formed in the discharge body 210.

[0213] An aspect of the present disclosure provides a refrigerator that can be shared components and can reduce the manufacturing cost. A refrigerator according to an embodiment of the present disclosure includes a discharge body configured to be formed with a discharge port and a suction port, a flow path body configured to be disposed in the discharge body and forms a discharge flow path for guiding air to the discharge port, an air guide configured to be formed with a scroll and an opening portion for guiding air to the discharge flow path and an outlet spaced apart from the opening portion, and a fan configured to be disposed inside the air guide.

[0214] The fan may be disposed closer to the outlet than to the trailing end of the scroll. The flow path body may be formed with a guide for guiding air to the outlet. The fan may be disposed between the scroll and the guide. A length of the scroll may be longer than a length of the guide. A first distance between the trailing end of the scroll and the fan may be longer than a second distance between the trailing end of the guide and the fan.

[0215] The refrigerator may further include an inner cover configured to form an additional discharge port and an additional suction port, and a discharge duct configured to communicate the outlet with the additional discharge port. The refrigerator may further include a temperature adjusting device configured to be adjacent to the air guide. The inner cover may cover the air guide and the temperature adjusting device. The additional discharge port may be formed at a lower height than the discharge port and the suction port. The refrigerator may further include a partition member configured to face between the suction port and the additional discharge port. The refrigerator may further include a first damper configured to adjust air flowing into the discharge flow path, and a second damper configured to adjust air flowing to the outlet. The discharge flow path may include an inlet communicating with the first damper and a plurality of branch flow paths connected to the inlet.

[0216] The refrigerator may further include an outer plate configured to cover a front surface of the discharge body and to be formed with an opening corresponding to each of the discharge port and the suction port. The discharge flow path may include a plurality of branch flow paths connected to the air guides, respectively, and spaced apart from each other. The flow path body may be provided with a shielding body for shielding the outlet. The refrigerator may further include an outer plate configured to cover a front surface of the discharge body and to be formed with an opening corresponding to the discharge hole. The flow path body may be made of EPS material.

[0217] A refrigerator according to an embodiment of the present disclosure includes a first refrigerator and a second refrigerator configured to be disposed so as to be adjacent to each other, in which each of the first refrigerator and the second refrigerator includes a discharge body configured to be formed with a discharge port and a suction port, a flow path body configured to be disposed in the discharge body and forms a discharge flow path for guiding air to the discharge port, an air guide configured to be formed with a scroll and an opening portion for guiding air to the discharge flow path, and an outlet spaced apart from the opening portion, and a fan configured to be disposed inside the air guide. The first refrigerator further includes a first damper for adjusting air flowing into the discharge flow path and a second damper for adjusting air flowing to the outlet. The second refrigerator is provided with a shielding body for shielding the outlet.

[0218] The first refrigerator may include a guide for guiding air to the outlet. The fan may be disposed closer to the outlet than to the trailing end of the scroll. The length of the scroll may be longer than the length of the guide. A first distance between the trailing end of the scroll and the fan may be longer than a second distance between the trailing end of the guide and the fan.

[0219] According to an aspect of the present disclosure, the components of the discharge body, the air guide, and the fan can be shared. In addition, the fan can allow a relatively large amount of air to be blown into the discharge flow path having a large flow path resistance, so that a large amount of air can be rapidly discharged through the discharge port, and the temperature of the storage space can be quickly adjusted. In addition, the refrigerators are easy to manufacture, and the flow path bodies of the low-cost EPS material may be configured differently.

[0220] According to an aspect of the present disclosure, A refrigerator comprises: a heat exchanger; a fan housing having a cavity and first opening and a second opening to the cavity; a fan positioned in the cavity of the fan housing to generate air flow from the heat exchanger to one or more of the first opening or the second opening; a cover provided over the heat exchanger, the fan, and the fan housing, the cover including a first discharge port; a duct that couples the first opening of the fan housing and the first discharge port of the cover; and a guide that defines a flow path between the second opening and a second discharge port that is spaced from the first discharge port.

[0221] The refrigerator further comprises: a diverter that is coupled to the guide and includes a surface that is positioned to block the first opening.

[0222] wherein the cover further includes a first suction port through which air flows to the heat exchanger, and the flow path housing further includes a second suction port that is spaced from the from the first suction port, and wherein the refrigerator further comprises a return duct positioned to connect the second suction port and the heat exchanger.

[0223] The above description is merely illustrative of the technical idea of the present disclosure, and a person skilled in the art to which the present disclosure pertains may make various modifications and changes without departing from the essential characteristics of the present disclosure. Therefore, the embodiments disclosed in the present disclosure are not intended to limit the technical idea of the present disclosure but to describe the present disclosure, and the scope of the technical idea of the present disclosure is not limited by these embodiments. The protection scope of the present disclosure should be interpreted by the following claims, and all technical ideas within the scope equivalent thereto should be construed as being included in the scope of the present disclosure.

[0224] It will be understood that when an element or layer is referred to as being "on" another element or layer, the element or layer can be directly on another element or layer or intervening elements or layers. In contrast, when an element is referred to as being "directly on" another element or layer, there are no intervening elements or layers present. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items.

[0225] It will be understood that, although the terms first, second, third, etc., may be used herein to describe various elements, components, regions, layers and/or sections, these elements, components, regions, layers and/or sections should not be limited by these terms. These terms are only used to distinguish one element, component, region, layer or section from another region, layer or section. Thus, a first element, component, region, layer or section could be termed a second element, component, region, layer or section without departing from the teachings of the present invention.

[0226] Spatially relative terms, such as "lower", "upper" and the like, may be used herein for ease of description to describe the relationship of one element or feature to another element(s) or feature(s) as illustrated in the figures. It will be understood that the spatially relative terms are intended to encompass different orientations of the device in use or operation, in addition to the orientation depicted in the figures. For example, if the device in the figures is turned over, elements described as "lower" relative to other elements or features would then be oriented "upper" relative to the other elements or features. Thus, the exemplary term "lower" can encompass both an orientation of above and below. The device may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein interpreted accordingly.

[0227] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

[0228] Embodiments of the disclosure are described herein with reference to cross-section illustrations that are schematic illustrations of idealized embodiments (and intermediate structures) of the disclosure. As such, variations from the shapes of the illustrations as a result, for example, of manufacturing techniques and/or tolerances, are to be expected. Thus, embodiments of the disclosure should not be construed as limited to the particular shapes of regions illustrated herein but are to include deviations in shapes that result, for example, from manufacturing.

[0229] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0230] Any reference in this specification to "one embodiment," "an embodiment," "example embodiment," etc., means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. The appearances of such phrases in various places in the specification are not necessarily all referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with any embodiment, it is submitted that it is within the purview of one skilled in the art to effect such feature, structure, or characteristic in connection with other ones of the embodiments.

[0231] Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

Claims

1. A refrigerator comprising:

a cabinet (1);
an inner guide (200) provided in the cabinet (1) and having at least one discharge port (204) and a suction port (205);
flow path layer (230) provided in the inner guide (200), the flow path layer (230) forms a discharge flow path (P2) for guiding air to the at least one discharge port (204);
a fan housing (400) including a conduit (413) for guiding air to the discharge flow path (P2), the fan housing (400) comprises an opening (414) coupled to the conduit (413), the fan housing (400) comprises an outlet (412) spaced apart from the opening (413); and
a fan (181) inside the fan housing (400).

2. The refrigerator of claim 1, wherein the conduit (413) has a leading end (413a) and a trailing end (413b) associated with the opening (414), the leading end (413a) being provided closer to an outer circumference of the fan (181) than the trailing end (413b), wherein the fan (181) is positioned closer to the outlet (412) than to the trailing end (413b) of the conduit (413).

3. The refrigerator of claim 1 or 2, further comprising a guide (234) for directing air from the fan (181) to the outlet (412).

4. The refrigerator of claim 3, wherein the fan (181) is positioned between the conduit (413) and the guide (234).

5. The refrigerator of claim 3 or 4, wherein a length of the conduit (413) in a horizontal direction is greater than a length of the guide (234) in the horizontal direction.

6. The refrigerator of any one of claims 3 to 5, wherein a first distance between the trailing end (413b) of the conduit (413) and the fan (181) is greater than a second distance between the guide (234) and the fan (181).

7. The refrigerator of any one of claims 1 to 6, further comprising:

an inner cover (300) including an additional discharge port (321) and an additional suction port (341); and
a discharge duct (360) for guiding air flow between the outlet (412) of the fan housing (400) and the additional discharge port (321) of the inner cover (300).

8. The refrigerator of claim 7, further comprising a temperature adjusting device (150) provided adjacent to the fan housing (400), wherein the inner cover (300) covers the fan housing (400) and the temperature adjusting device (150).

9. The refrigerator of claim 7 or 8, wherein the additional discharge port (321) is positioned lower than the discharge port (204) and the suction port (205).

10. The refrigerator of any one of claims 1 to 9, further comprising a partition member (3) dividing an interior of the cabinet (1) into two storage spaces (W1, W2), and/or the partition member (3) is positioned between the suction port (205) and the additional discharge port (321).

11. The refrigerator of any one of claims 1 to 10, further comprising at least one of: a first damper (191) configured to adjust amount of air flowing into the discharge flow path (P2), and a second damper (192) configured to adjust amount of the air flowing to the outlet (412).

12. The refrigerator of claim 11, wherein the discharge flow path (P2) includes an inlet (424) communicating with the first damper (191) and a plurality of branch flow paths (P21, P22) connected to the inlet (424).

13. The refrigerator of any one of claims 1 to 12, further comprising an outer plate (250) configured to cover a front surface of the inner guide (200) and including openings (251, 252, 253, 255) corresponding, respectively, to the discharge port (204) and the suction port (205).

14. The refrigerator of any one of claims 1 to 13, wherein the discharge flow path (P2) includes a plurality of branch flow paths (P21, P22) connected to the fan housing (400) and spaced apart from each other.

15. The refrigerator of any one of claims 1 to 14, further comprising:

a diverter body (236) provided at the inner guide (200), the diverter body (236) being configured to be received in the fan housing (400) to block air flow to the outlet (412); and
an outer plate (250') provided at a front surface of the discharge body (210) to cover the suction port (205) and including an opening (252) corresponding to the discharge port (204).

FIG. 1

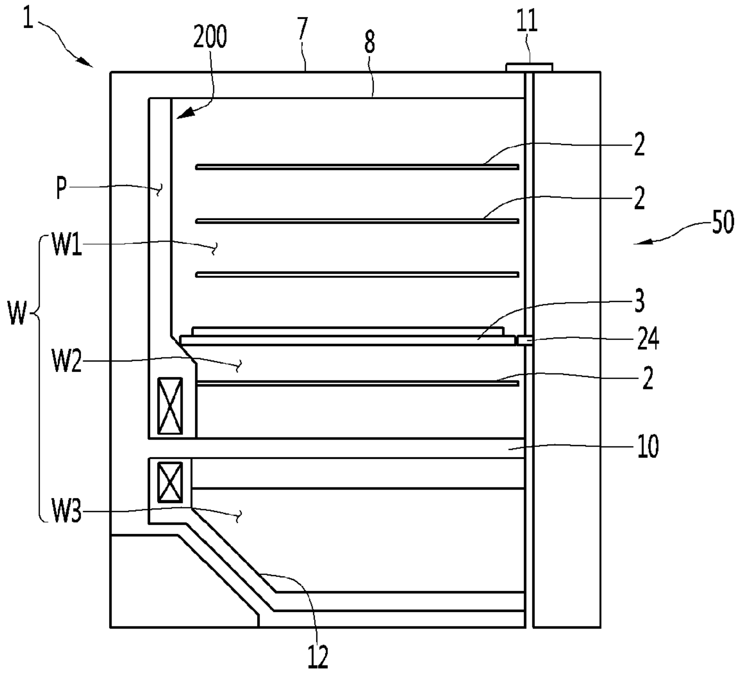

1
200
7
8
11
2
2
P
50
W1
W
3
24
W2
2
10
W3
12

FIG. 2

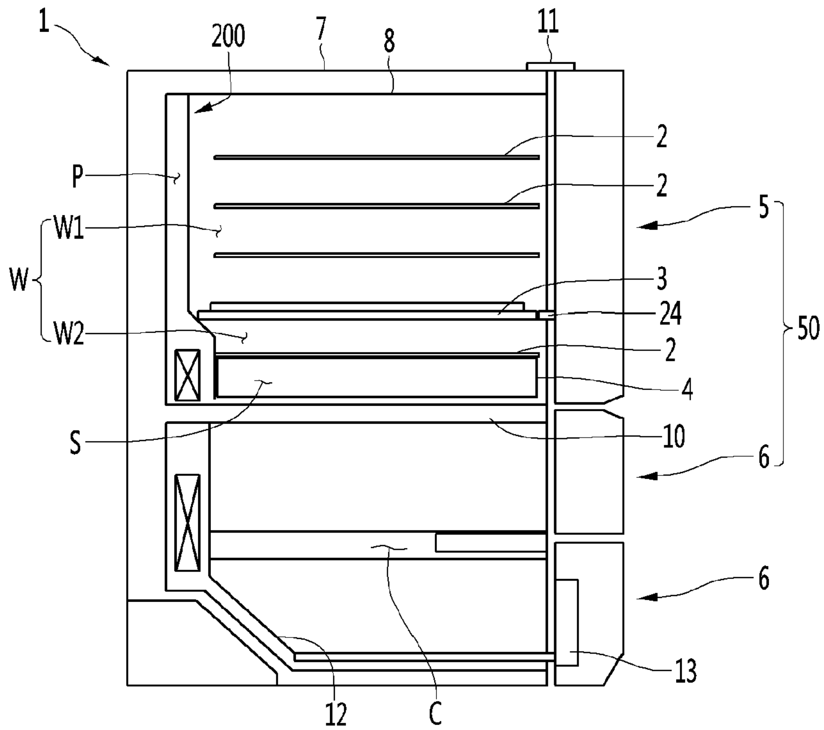

1
200
7
8
11
2
P
2
5
W1
W
3
24
50
W2
2
4
S
10
6
6
13
12
C

FIG. 3

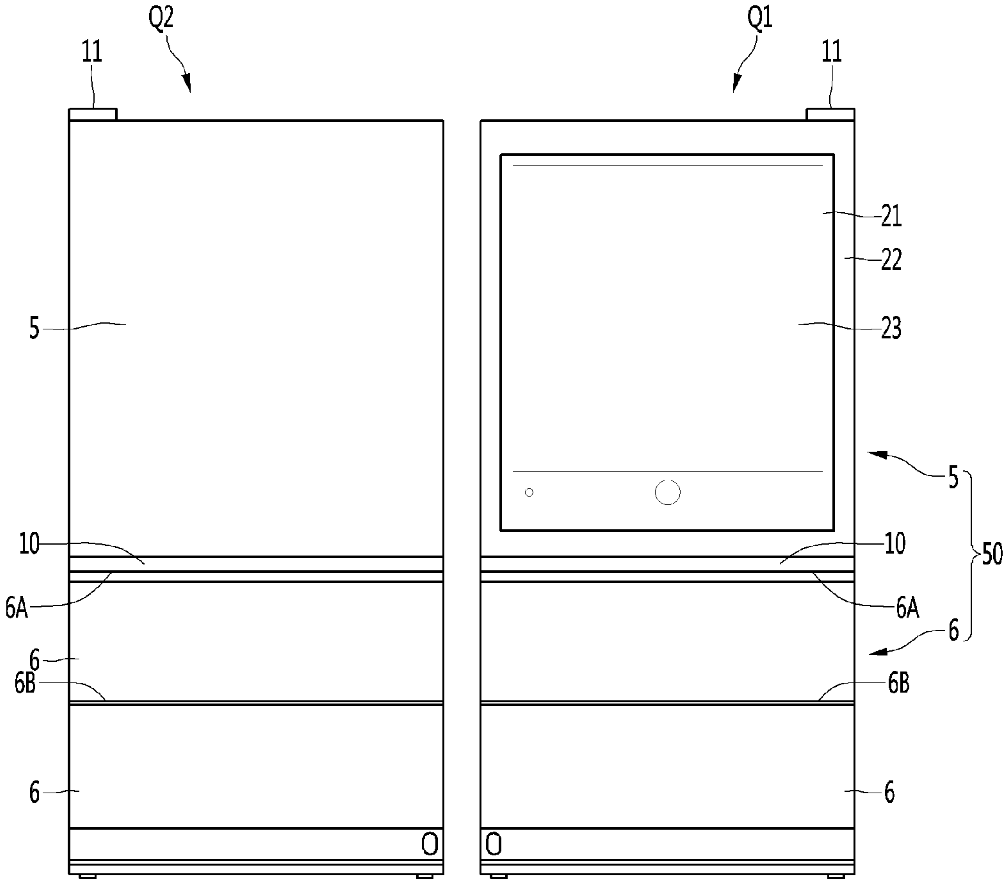

Q2
Q1
11
11
21
22
5
23
5
50
10
10
6A
6A
6
6
6B
6B
6
6

FIG. 4

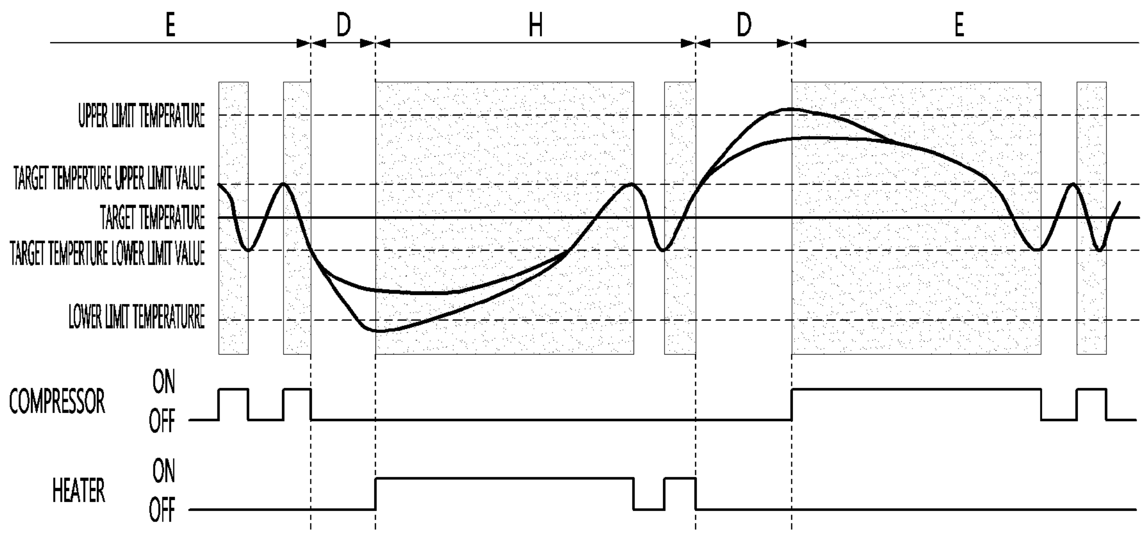

E
D
H
D
E
UPPER LIMIT TEMPERATURE
TARGET TEMPERTURE UPPER LIMIT VALUE
TARGET TEMPERATURE
TARGET TEMPERTURE LOWER LIMIT VALUE
LOWER LIMIT TEMPERATURRE
COMPRESSOR
ON
OFF
HEATER
ON
OFF

FIG. 5

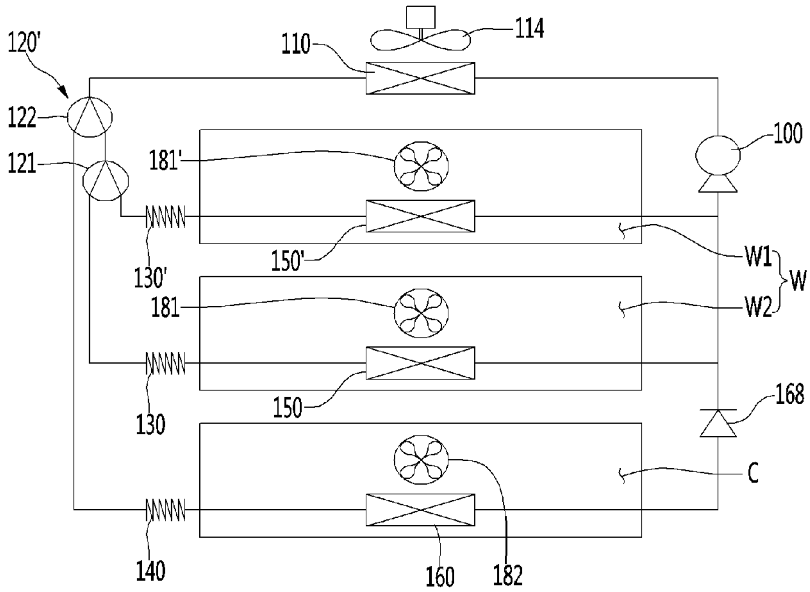

120'
110
114
122
121
181'
100
130'
150'
W1
W
W2
181
130
150
168
C
140
160
182

FIG. 6

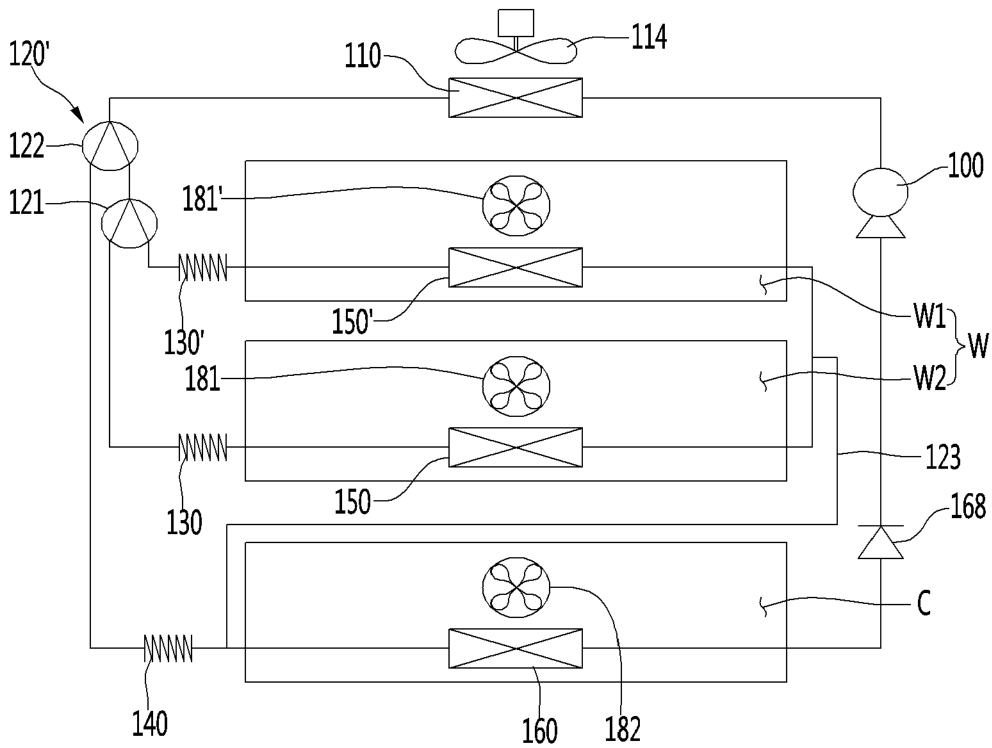

120'
110
114
122
121
181'
100
130'
150'
W1
W
W2
181
130
150
123
168
C
140
160
182

FIG. 7

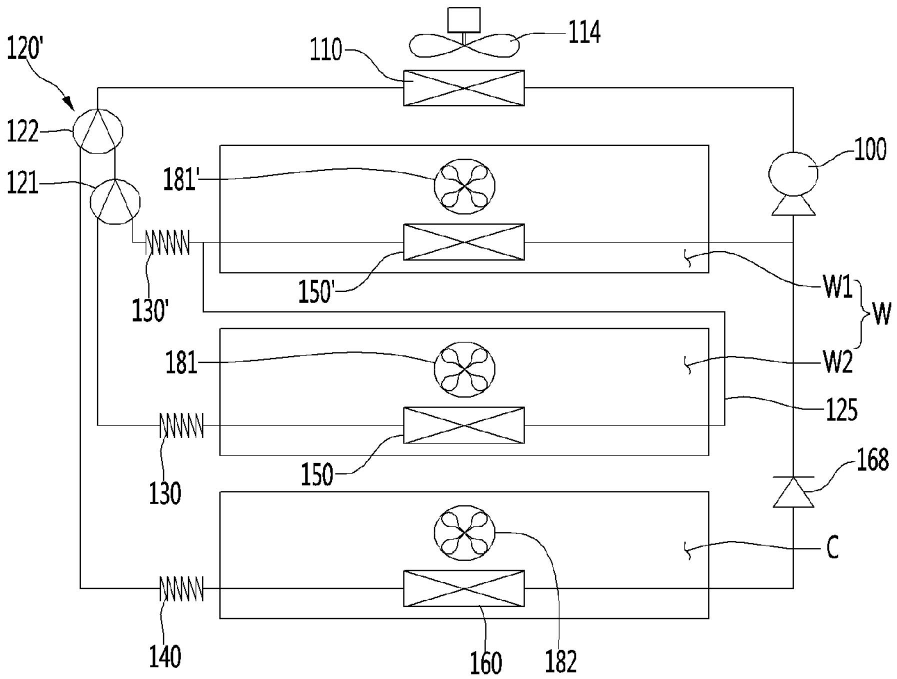

120'
122
121
110
114
181'
100
130'
150'
W1
W
W2
181
125
130
150
168
C
140
160
182

FIG. 8

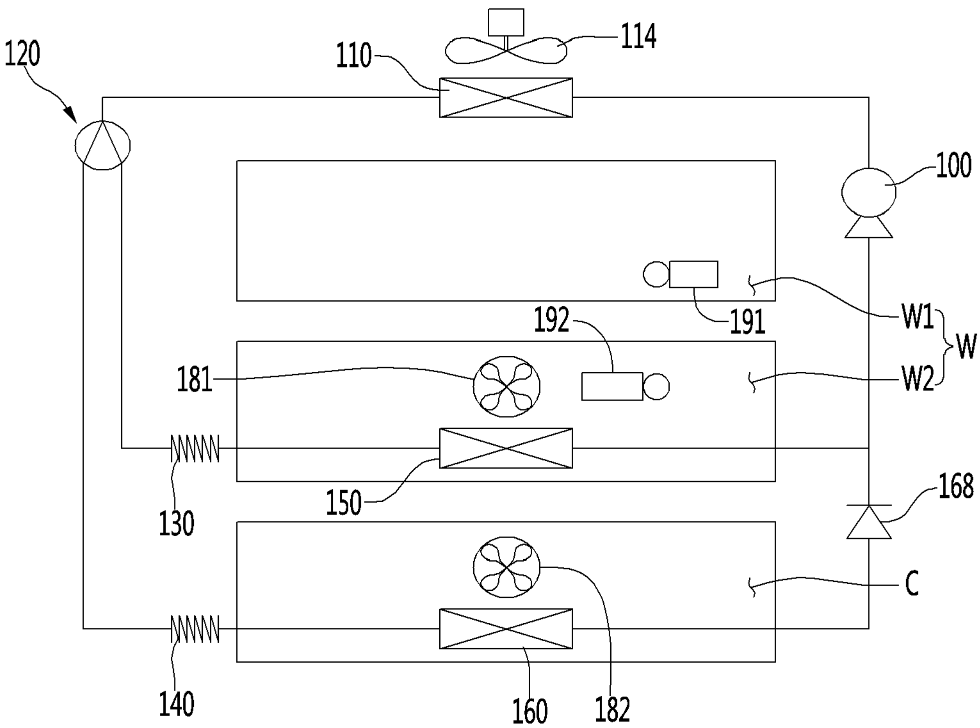

120
110
114
100
191
W1
W
192
181
W2
130
150
168
C
140
160
182

FIG. 9

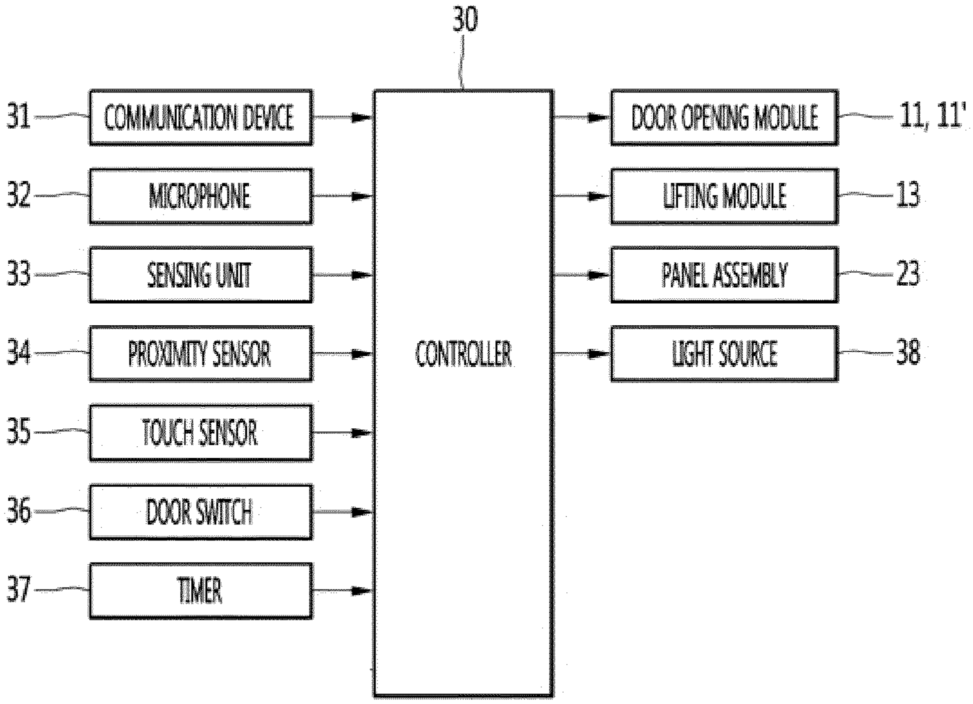

30
31
COMMUNICATION DEVICE
32
MICROPHONE
33
SENSING UNIT
34
PROXIMITY SENSOR
35
TOUCH SENSOR
36
DOOR SWITCH
37
TIMER
CONTROLLER
DOOR OPENING MODULE
11, 11'
LIFTING MODULE
13
PANEL ASSEMBLY
23
LIGHT SOURCE
38

FIG. 10

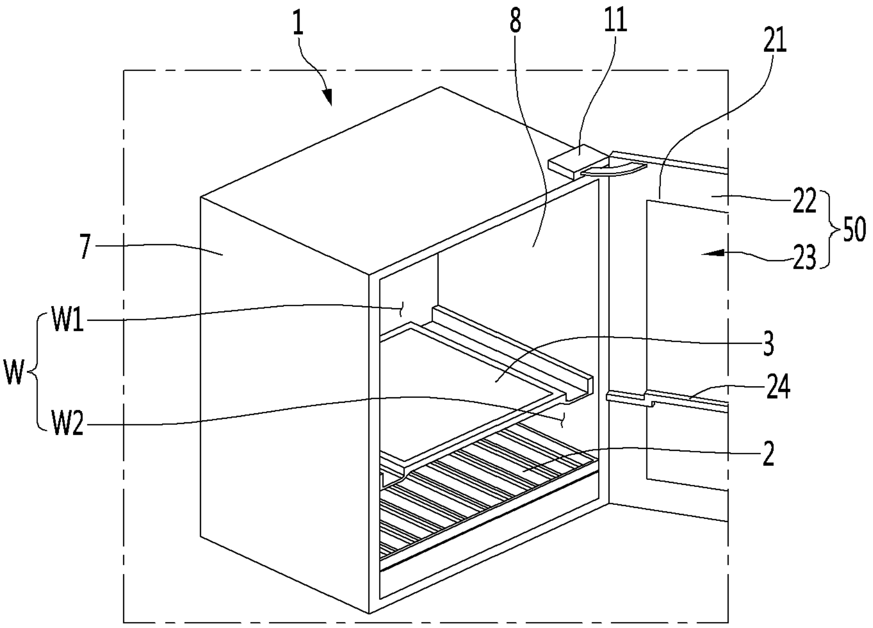

1
8
11
21
22
50
23
7
W1
W
W2
3
24
2

FIG. 11

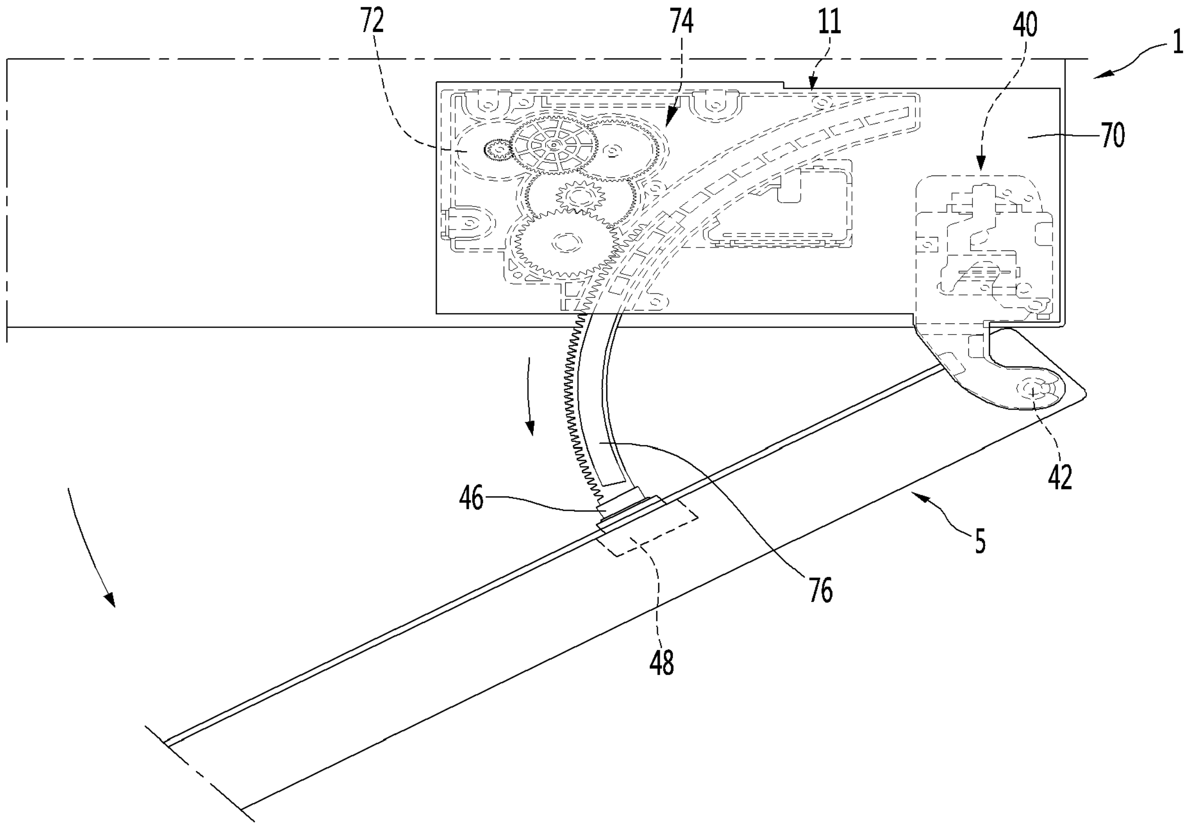


FIG. 12

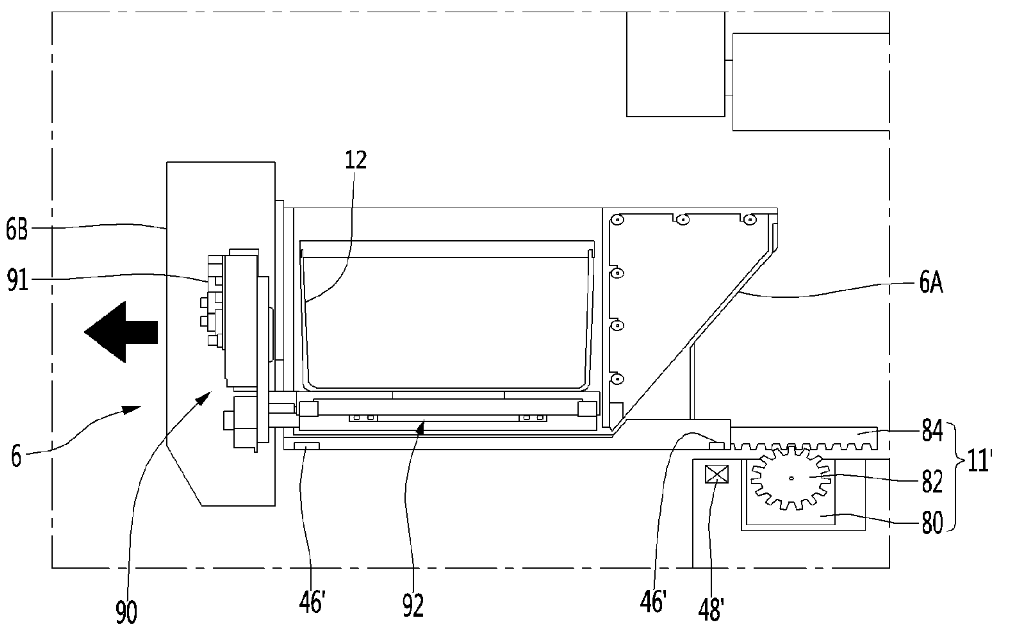


FIG. 13

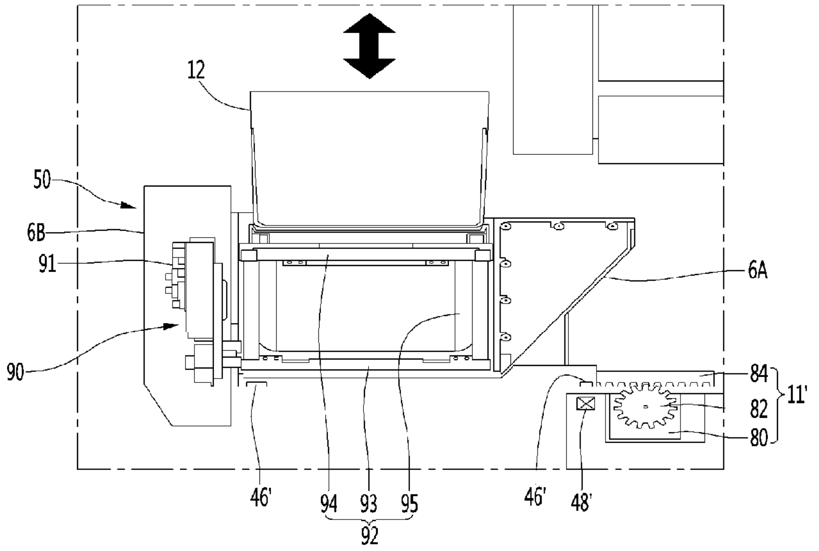

12
50
6B
91
90
6A
84
82
80
11'
46'
94
93
95
92
46'
48'

FIG. 14

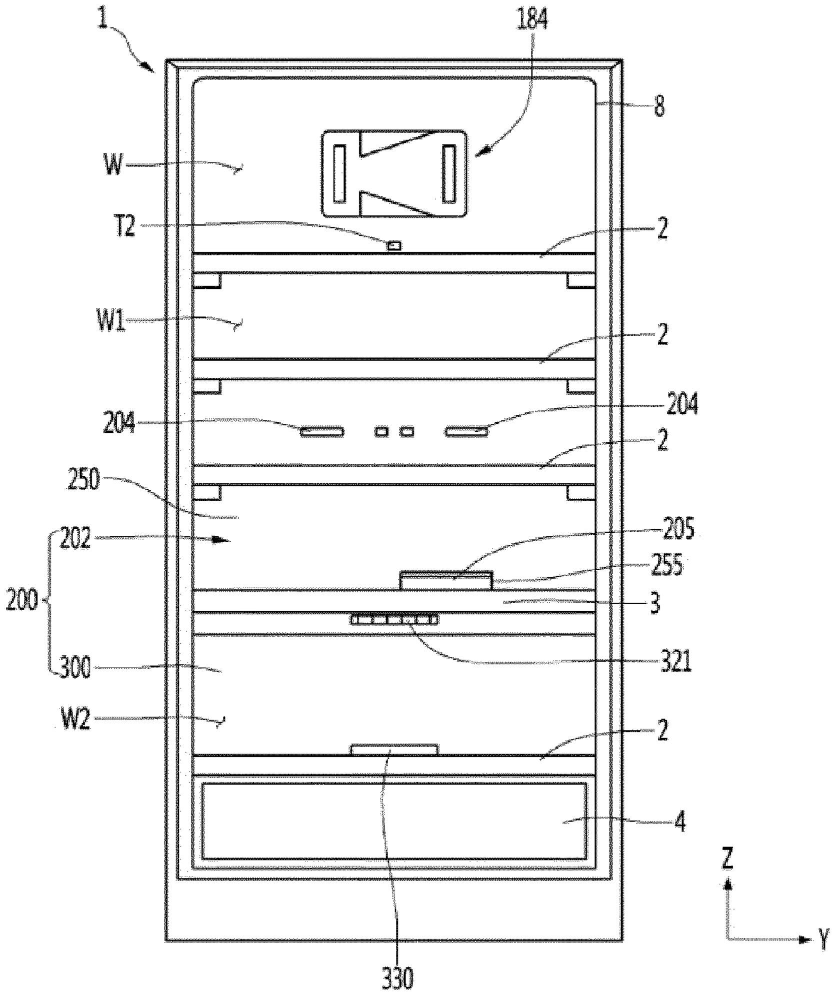

1
184
8
W
T2
2
W1
2
204
204
2
250
202
205
255
200
3
321
300
W2
2
4
330
Z
Y

FIG. 15

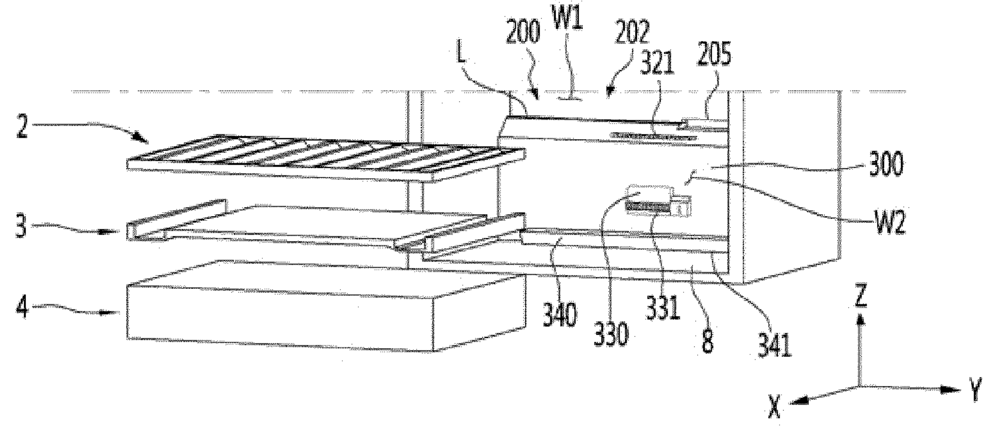

200
W1
202
L
321
205
2
300
3
W2
4
340
330
331
8
341
Z
Y
X

FIG. 16

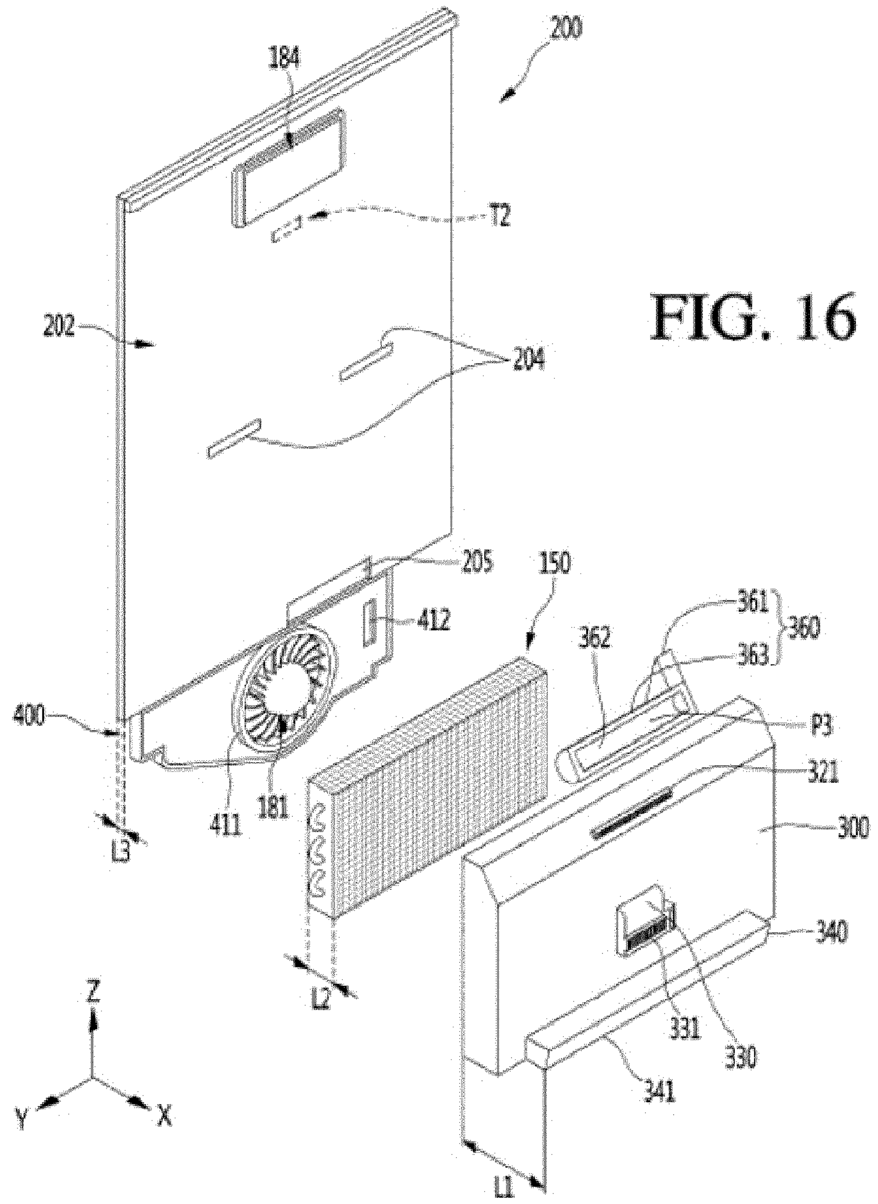

200
184
T2
202
204
205
150
412
361
360
362
363
400
P3
321
411
181
L3
300
340
L2
Z
331
330
Y
X
341
L1

FIG. 17

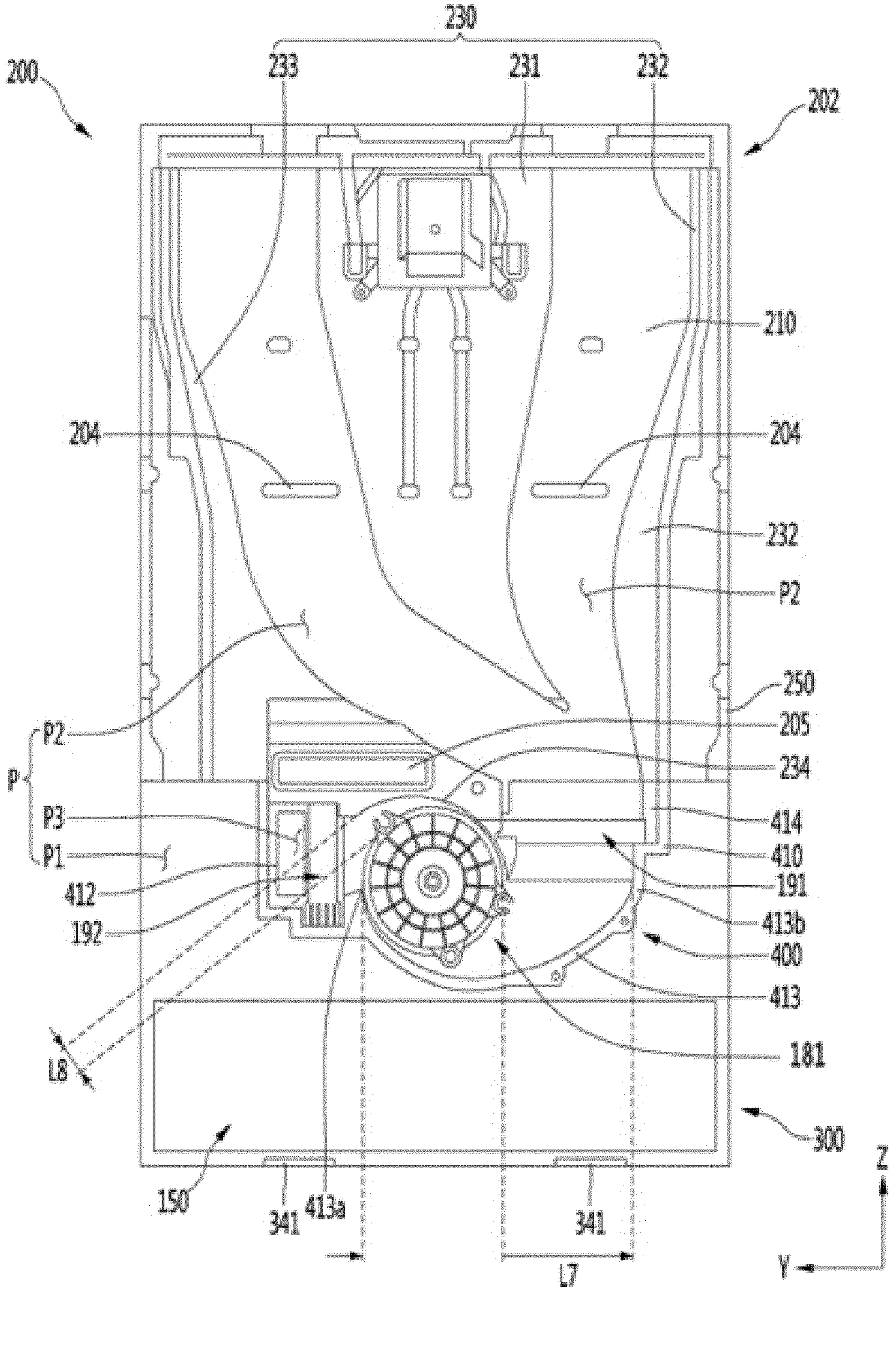

230
233
231
232
200
202
210
204
204
232
P2
250
205
P2
P
234
P3
414
P1
410
412
191
192
413b
400
413
L8
181
300
150
341
413a
341
L7
Z
Y

FIG. 18

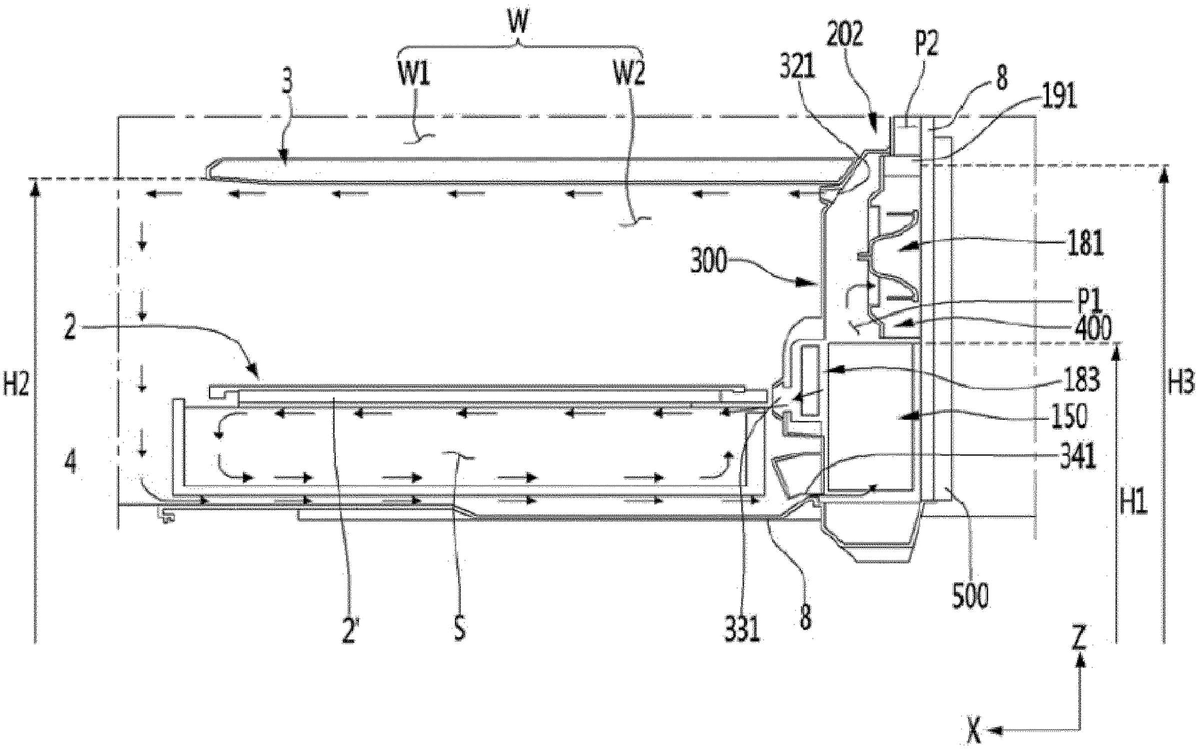

W
W1
W2
3
202
321
P2
8
191
181
300
P1
400
2
H2
183
H3
150
4
341
H1
500
2'
S
331
8
Z
X

FIG. 19

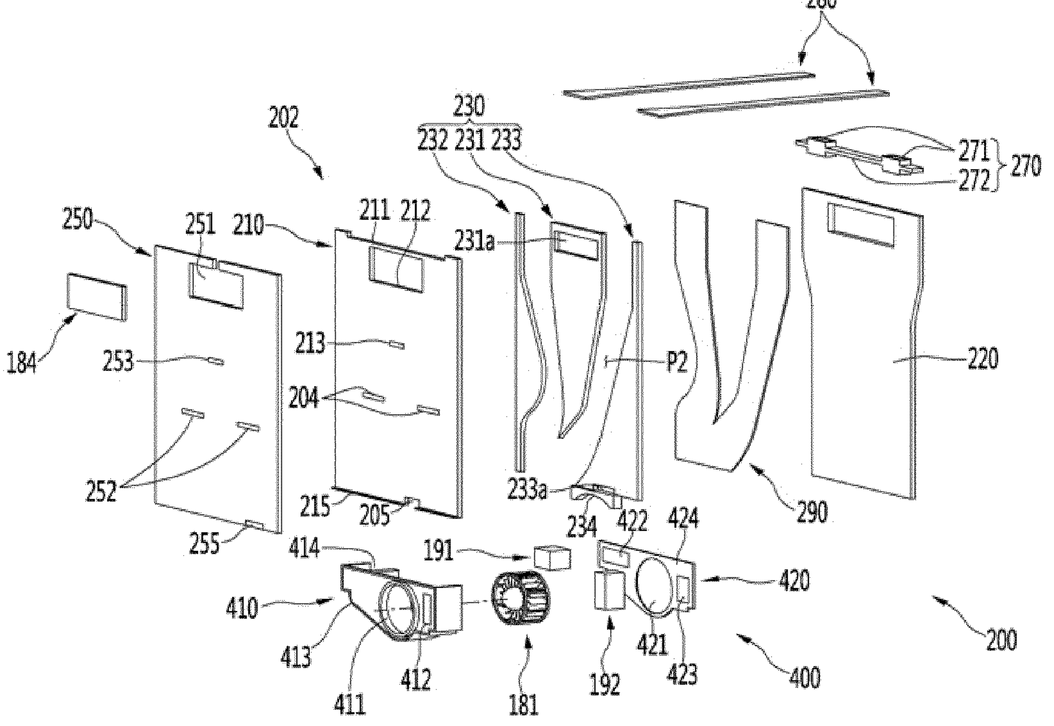

280
230
232 231 233
271
272
270
202
250
251
210
211 212
231a
184
253
213
P2
220
204
252
215
205
233a
234
422
424
290
255
414
191
420
410
413
411
412
181
192
421
423
400
200

FIG. 20

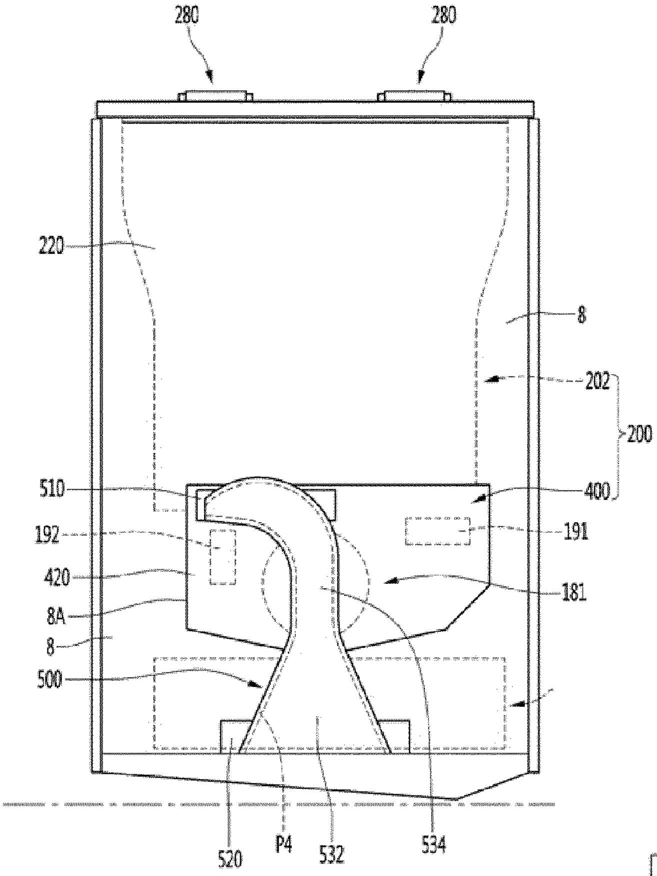

280
280
220
8
202
200
400
510
192
191
420
181
8A
8
500
520
P4
532
534

FIG. 21

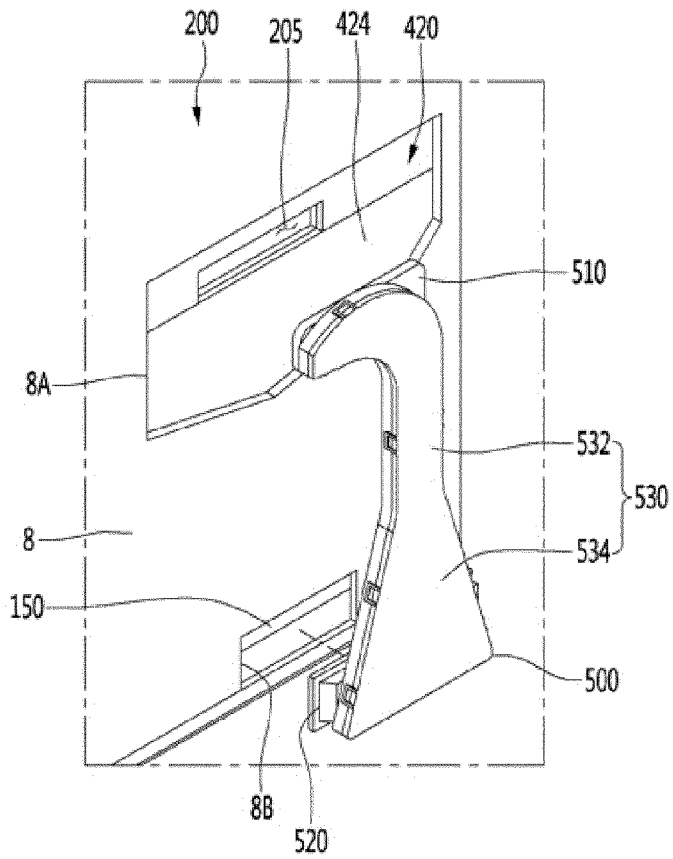

200
205
424
420
510
8A
532
530
8
534
150
500
8B
520

FIG. 22

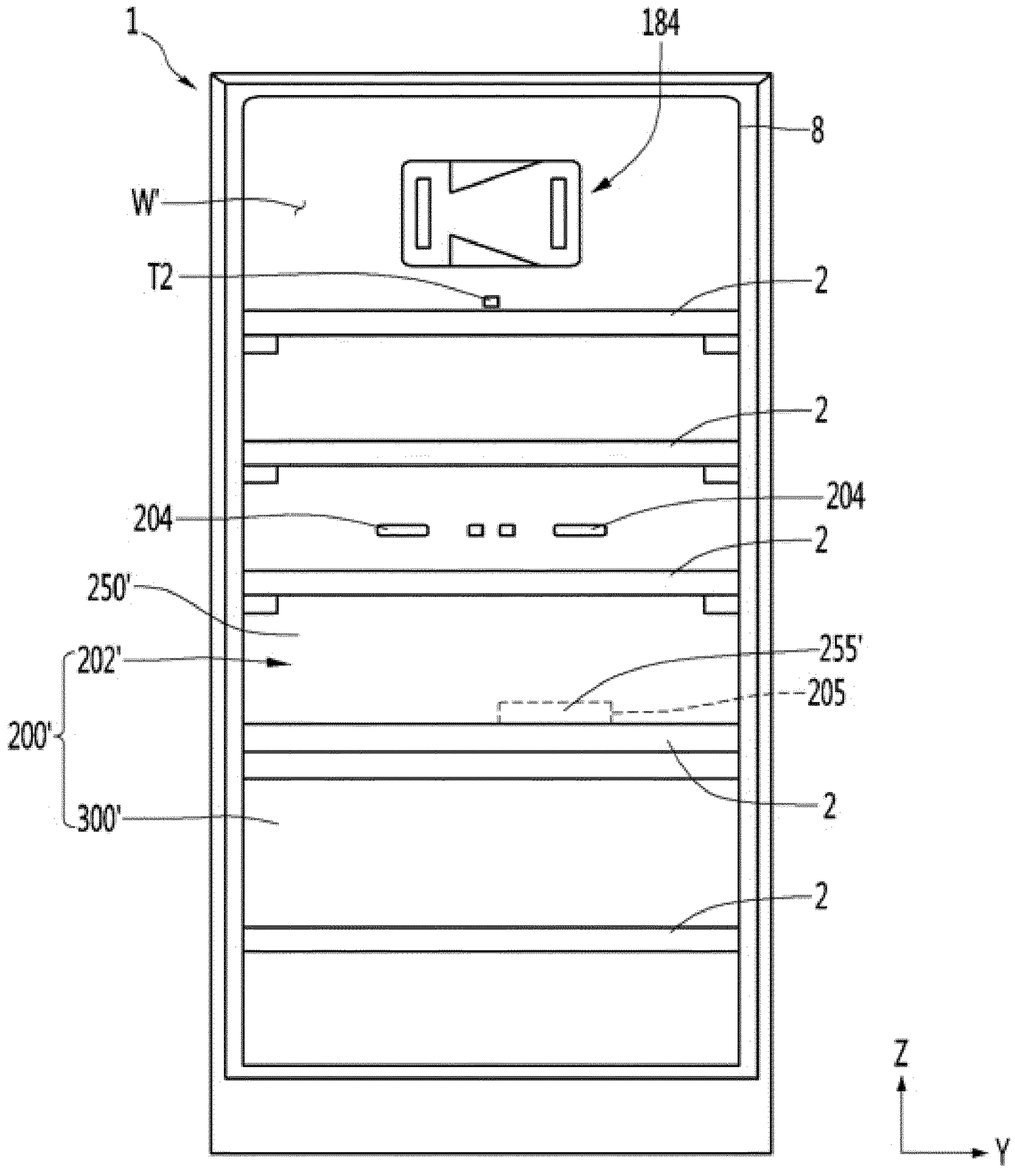
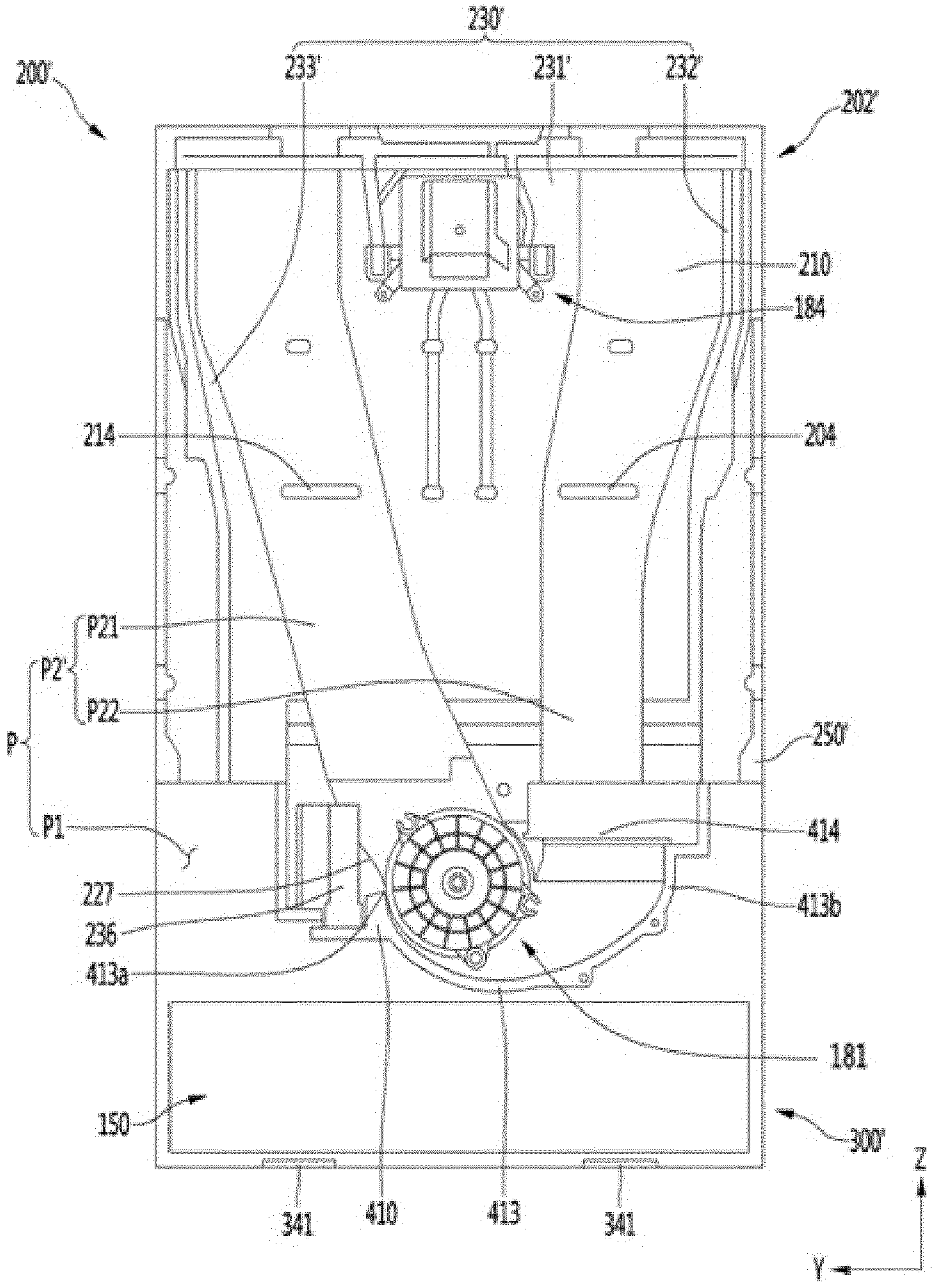


FIG. 23



230'
200'
233'
231'
232'
202'
210
184
214
204
P21
P2'
P22
P
250'
P1
414
227
413b
236
413a
181
150
300'
341
410
413
341
Z
Y

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 15 0252

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	KR 2011 0020482 A (LG ELECTRONICS INC [KR]) 3 March 2011 (2011-03-03) * paragraph [0048]; figure 2 * -----	1-15	INV. F25D17/06
X	KR 2018 0084516 A (LG ELECTRONICS INC [KR]) 25 July 2018 (2018-07-25) * figures 3,16 * -----	1	
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