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(71) Applicant: **BSH HAUSGERÄTE GMBH** [DE/DE]; Carl-Wery-Str. 34, 81739 München (DE).

(72) Inventors: **CHEN, Jia**; Room 503, building 15#,Yu Garden of Jinling,Guanyun country, Lian Yun Gang, Jiangsu 222200 (CN). **CHEN, Xiupeng**; Yaoxin Road No. 208, Nanjing, Jiangsu 210046 (CN). **TIAN, Yong2**; No.1 Ximenzi road,Chuzhou, Nanjing, Jiangsu 239016 (CN). **YIN, Hao**; Zhongshan Road No.129, Nanjing, Jiangsu 210000 (CN). **ZHU, Qiwu**; West district,Tian'andushi garden, Chuzhou City, Anhui 239000 (CN). **ZHU, Weizhong**; No. 402, Entrance 3 building 2, Run Fang Yuan, Feng Le Shan Zhuang, Chuzhou City, Anhui 239000 (CN).

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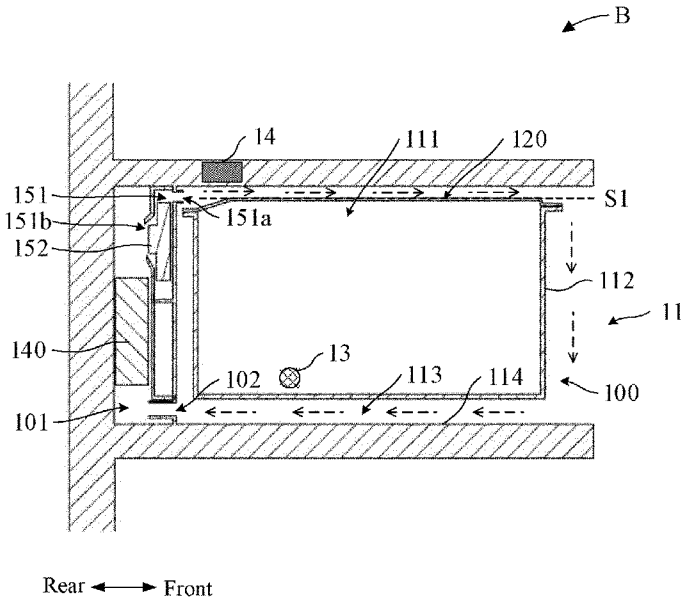


FIG. 3

(57) Abstract: Embodiments of the present invention provide an improved refrigerator. The refrigerator includes a variable-temperature compartment, a drawer located inside the variable-temperature compartment, a lid adapted to open or close the drawer, a temperature sensor used for detecting a temperature of the variable-temperature compartment, and a controller, where the controller is used for controlling a position of the lid relative to the drawer based on a set temperature of the variable-temperature compartment and/or a detected temperature of the variable-temperature compartment detected by the temperature sensor. The refrigerator can determine the position of the lid of the drawer relative to the drawer in the variable-temperature compartment based on the set temperature of the variable-temperature compartment that is set by the user and/or the detected temperature of the variable-temperature compartment detected by the temperature sensor. In this way, when the variable-temperature compartment is adjusted to a freezing state, the drawer

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is opened to improve refrigeration efficiency of the drawer in the variable-temperature compartment and prevent the lid and the drawer from being frozen together. In addition, when the variable-temperature compartment is adjusted to a non-freezing state, the drawer is closed to improve a preservation effect of items in the drawer, in particular, a preservation effect of fruits and vegetables.

REFRIGERATOR

TECHNICAL FIELD

The present invention relates to the field of household appliance technologies, and in particular, to a refrigerator.

BACKGROUND

With continuous improvement of living standards and diversified development of item storage requirements, functional requirements of a user for a refrigerator also gradually increase. Currently, storage requirements for refrigerators are no longer satisfied with simple refrigerating and freezing modes, and therefore more and more refrigerators begin to have variable-temperature compartments that can flexibly change between the non-freezing mode and the freezing mode.

SUMMARY

An objective of the present invention is to provide an improved refrigerator.

The improved refrigerator provided by embodiments of the present invention includes a variable-temperature compartment, a drawer located inside the variable-temperature compartment, a lid adapted to open or close the drawer, a driving unit used for driving the lid to move, a temperature sensor used for detecting a temperature of the variable-temperature compartment, and a controller, where the controller is used for controlling the driving unit to adjust a position of the lid relative to the drawer based on a set temperature of the variable-temperature compartment and/or a detected temperature of the variable-temperature compartment detected by the temperature sensor.

Optionally, the variable-temperature compartment includes at least two settable temperature zones, and the controller is adapted to control the driving unit to adjust the position of the lid relative to the drawer in a case that the set temperature or the detected temperature is changed across temperature zones.

Optionally, the controller is adapted to control the driving unit to drive the lid to move to open the drawer in a case that the set temperature is switched from a non-freezing temperature to a freezing temperature and/or the detected temperature is switched from the

non-freezing temperature to the freezing temperature.

Optionally, the controller is adapted to control, in a case that the set temperature is switched from the non-freezing temperature to the freezing temperature, the driving unit to drive the lid to open the drawer and input cooled air into the variable-temperature compartment to cause cold air to enter the drawer.

Optionally, the controller is adapted to control the driving unit to drive the lid to move to close the drawer in a case that the set temperature is switched from the freezing temperature to the non-freezing temperature and/or the detected temperature is switched from the freezing temperature to the non-freezing temperature.

Optionally, the controller is adapted to control the driving unit to drive the lid to close the drawer in a case that the set temperature is switched from the non-freezing temperature to the freezing temperature, and the detected temperature reaches the set temperature or reaches a temperature threshold determined according to the set temperature.

Optionally, the refrigerator includes an input unit, the input unit includes a mode setting portion for a user to set a storage mode associated with the set temperature of the variable-temperature compartment, and the controller is adapted to control the driving unit to adjust the lid to be located at a corresponding position according to the selected storage mode.

Optionally, the refrigerator includes an input unit, used for receiving the set temperature inputted by a user and outputting the set temperature into the controller, and the controller is adapted to control the driving unit to cause the lid to move to be located at a corresponding position in a case that the set temperature is switched across temperature zones.

Optionally, the controller is adapted to cause the driving unit to adjust the position of the lid relative to the drawer in a case that the detected temperature reaches the set temperature or reaches a temperature threshold determined according to the set temperature.

Optionally, when the set temperature is in a non-freezing temperature range, the lid is located at a first position to close the drawer, and when the set temperature is in a freezing temperature range, the lid leaves the first position to open the drawer.

Optionally, the lid is retained at a second position to open the drawer when the set temperature is in a first freezing temperature range; and the lid is retained at a third position when the set temperature is in a second freezing temperature range, where the third position is between the second position and the first position, both the first freezing temperature range and the second freezing temperature range are in the freezing temperature range, and any

temperature value within the second freezing temperature range is greater than any temperature value within the first freezing temperature range.

Optionally, the non-freezing temperature range includes a temperature interval from greater than or equal to 0 degrees Celsius to less than or equal to 12 degrees Celsius.

Optionally, the freezing temperature range includes a temperature interval from greater than or equal to -20 degrees Celsius to less than 0 degrees Celsius.

Optionally, the first freezing temperature range includes a temperature interval from greater than or equal to -20 degrees Celsius to less than or equal to -18 degrees Celsius; and/or the second freezing temperature range includes a temperature interval from greater than or equal to -12 degrees Celsius to less than or equal to -6 degrees Celsius.

Optionally, the refrigerator includes a first air inlet used for inputting cold air into the variable-temperature compartment, where when the lid is located at the first position, the cold air inputted from the first air inlet into the variable-temperature compartment is adapted to flow forward from above the lid; and when the lid leaves the first position, the cold air inputted from the first air inlet into the variable-temperature compartment at least partially flows to a space under the lid to flow through the interior of the drawer.

Optionally, when the lid leaves the first position, both a front end and a rear end of the lid are located above the drawer to cause the cold air to be adapted to flow from a gap between the rear end of the lid and the drawer to a gap between the front end of the lid and the drawer.

Optionally, a plane on which the lid is located when being located at the first position is a first plane, and a plane on which the lid is located when leaving and being farthest away from the first position is a second plane, and the first air inlet is at least partially located between the first plane and the second plane.

Optionally, a gap between the first air inlet and the drawer in a front-rear direction is less than or equal to a threshold, to cause the cold air inputted into the variable-temperature compartment to be adapted to flow to the drawer in a rear-to-front direction, where the threshold includes 10 millimeters.

Compared with the prior art, the technical solutions of embodiments of the present invention have the following beneficial effects.

For example, the refrigerator can determine the position of the lid of the drawer relative to the drawer in the variable-temperature compartment based on the set temperature of the

variable-temperature compartment that is set by the user and/or the detected temperature of the variable-temperature compartment detected by the temperature sensor, to significantly improve user experience of the variable-temperature compartment. For example, in some embodiments, when the variable-temperature compartment is set to a freezing temperature zone, the drawer can be opened to improve cooling efficiency of food in the drawer, and the lid and the drawer are further prevented from being frozen together. In another example, when the variable-temperature compartment is set to a non-freezing temperature zone, the lid can close the drawer to improve a preservation effect of items in the drawer, in particular, a preservation effect of fruits and vegetables.

In another example, when the variable-temperature compartment is adjusted to a refrigerating compartment, a freezing compartment, and a soft freezing compartment respectively, the lid can close, open, and fully open the drawer based on different refrigeration requirements of the refrigerating compartment, the freezing compartment, and the soft freezing compartment, making use flexible and convenient.

In another example, when the variable-temperature compartment is adjusted to a freezing state and the lid opens the drawer, cold air entering the variable-temperature compartment can at least partially flow to a space under the lid to flow through the interior of the drawer, to improve refrigeration efficiency of the drawer.

In another example, when the variable-temperature compartment is adjusted to the freezing state and the lid opens the drawer, both a front end and a rear end of the lid are located above the drawer, to cause the cold air to be adapted to flow from a gap between the rear end of the lid and the drawer to a gap between the front end of the lid and the drawer, to make it convenient to refrigerate the drawer by using the cold air.

In another example, when the variable-temperature compartment is adjusted to a first freezing temperature range (a conventional freezing temperature range) and the lid opens the drawer, a position of the lid can be a highest position within a range in which the lid can move up and down, so that the cold air entering the variable-temperature compartment flows to a space under the lid as much as possible to flow through the interior of the drawer, to improve the refrigeration efficiency of the drawer as much as possible.

In another example, a first air inlet used for inputting the cold air into the variable-temperature compartment can be at least partially located between a highest position and a lowest position of the lid, so that the cold air inputted from the first air inlet into the varia-

ble-temperature compartment can effectively flow to the drawer, to facilitate refrigerating the drawer.

In another example, a drawer gap is provided between the drawer and the variable-temperature compartment, which can guide the cold air in the variable-temperature compartment from the drawer to a first air return vent, to facilitate forming a cold air circulation loop between an evaporator and the variable-temperature compartment.

Other features of the present invention are shown in the claims, accompanying drawings, and description of the accompanying drawings. The features and feature combinations described in the foregoing description and the features and feature combinations described in the description of the following accompanying drawings and/or simply shown in the accompanying drawings can not only be presented by the described combination manners, but also be presented by other combinations or separately without departing from the scope of the present invention. The embodiments of the present invention that are not described and not specifically shown in the accompanying drawings but can be thought of from the detailed description of the embodiments and that can be obtained from combinations of various features shall be considered to be included and disclosed.

BRIEF DESCRIPTION OF THE DRAWINGS

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

FIG. 2 is a first partial cross-sectional view of the refrigerator shown in FIG. 1 along an A-A line, where a lid is located at a first position and closes a drawer, and door bodies of a variable-temperature compartment, a refrigerating compartment and a freezing compartment are not shown;

FIG. 3 is an enlarged schematic diagram of the variable-temperature compartment of the refrigerator shown in FIG. 2, where dashed arrows indicate a flow direction of cold air, the lid is located at the first position and closes the drawer, and the door body of the variable-temperature compartment is not shown;

FIG. 4 is a second partial cross-sectional view of the refrigerator shown in FIG. 1 along an A-A line, where a lid is located at a second position and opens a drawer, and door bodies of a variable-temperature compartment, a refrigerating compartment and a freezing com-

partment are not shown;

FIG. 5 is an enlarged schematic diagram of the variable-temperature compartment of the refrigerator shown in FIG. 4, where dashed arrows indicate a flow direction of cold air, the lid is located at the second position and opens the drawer, and the door body of the variable-temperature compartment is not shown;

FIG. 6 is a third partial cross-sectional view of the refrigerator shown in FIG. 1 along an A-A line, where a lid is located at a third position and opens a drawer, and door bodies of a variable-temperature compartment, a refrigerating compartment and a freezing compartment are not shown;

FIG. 7 is an enlarged schematic diagram of the variable-temperature compartment of the refrigerator shown in FIG. 6, where dashed arrows indicate a flow direction of cold air, the lid is located at the third position and opens the drawer, and the door body of the variable-temperature compartment is not shown;

FIG. 8 is a fourth partial cross-sectional view of the refrigerator shown in FIG. 1 along an A-A line;

FIG. 9 is a schematic diagram of a variable-temperature compartment according to an embodiment of the present invention;

FIG. 10 is a schematic exploded view of a driving unit according to an embodiment of the present invention;

FIG. 11 is a front view of a cam rear lid according to an embodiment of the present invention;

FIG. 12 is a rear view of a cam rear lid according to an embodiment of the present invention;

FIG. 13 is a rear view of a cam according to an embodiment of the present invention;

FIG. 14 is a schematic diagram of a lid opening a drawer according to an embodiment of the present invention; and

FIG. 15 is a schematic diagram of a lid closing a drawer according to an embodiment of the present invention.

DETAILED DESCRIPTION

Embodiments of the present invention provide an improved refrigerator. The refrigerator

includes a variable-temperature compartment, a drawer located inside the variable-temperature compartment, a lid adapted to open or close the drawer, a temperature sensor used for detecting a temperature of the variable-temperature compartment, and a controller, where the controller is used for determining a position of the lid relative to the drawer based on a set temperature of the variable-temperature compartment and/or a detected temperature of the variable-temperature compartment detected by the temperature sensor.

The refrigerator can determine the position of the lid of the drawer relative to the drawer in the variable-temperature compartment based on the set temperature of the variable-temperature compartment that is set by the user and/or the detected temperature of the variable-temperature compartment detected by the temperature sensor, to significantly improve user experience of the variable-temperature compartment. For example, in some embodiments, when the variable-temperature compartment is set to a freezing temperature zone, the drawer can be opened to improve cooling efficiency of food in the drawer, and the lid and the drawer are further prevented from being frozen together. In another example, when the variable-temperature compartment is set to a non-freezing temperature zone, the lid can close the drawer to improve a preservation effect of items in the drawer, in particular, a preservation effect of fruits and vegetables.

To make the objectives, features, and beneficial effects of the embodiments of the present invention more comprehensible, the specific embodiments of the present invention are described in detail with reference to the accompanying drawings. It may be understood that specific embodiments described below are only used to explain the present invention, but not to limit the present invention. In addition, for ease of description, the accompanying drawings only show parts relevant to the present invention rather than the entire structure.

To facilitate description of the refrigerator provided in the embodiments of the present invention, some accompanying drawings provided in the embodiments of the present invention show four directions that are front, rear, left, and right. The "front" indicates a direction of the refrigerator facing a user, the "rear" indicates a direction opposite to the "front", the "right" indicates a direction of a right side of the user when facing the refrigerator, and the "left" indicates a direction opposite to the "right". It should be understood that, from another perspective of the refrigerator, there are also directions of front, rear, left, and right corresponding to the corresponding perspective. The directions of front, rear, left, and right shown in some accompanying drawings provided in the embodiments of the present invention are

merely used for ease of description of the technical solutions provided in the embodiments of the present invention, but do not limit description of the solutions.

Referring to FIG. 1 to FIG. 15, a refrigerator 10 provided by an embodiment of the present invention includes a variable-temperature compartment 100.

Specifically, the variable-temperature compartment 100 is adapted to change a temperature across temperature zones according to an input from a user. For example, the variable-temperature compartment 100 may be set to a freezing temperature zone or a non-freezing temperature zone. Generally, the freezing temperature zone is below 0 degrees Celsius, and the non-freezing temperature zone is above 0 degrees Celsius.

The user may select a set temperature of the variable-temperature compartment 100 from at least one freezing temperature zone (for example, two) and at least one non-freezing temperature zone (for example, two).

During specific implementation, the refrigerator 10 further includes a drawer 110 located inside the variable-temperature compartment 100, a lid 120 adapted to open or close the drawer 110, a temperature sensor 13 used for detecting a temperature of the variable-temperature compartment 100, and a controller 14.

The refrigerator 10 may include a driving unit 400 used for driving the lid 120 to move, and the driving unit 400 drives the lid 120 to move and causes the lid to be retained at a corresponding position according to a signal of the controller 14.

In this embodiment of the present invention, the controller 14 is used for controlling the driving unit 400 to adjust a position of the lid 120 relative to the drawer 110 based on the set temperature of the variable-temperature compartment 100 and/or a detected temperature of the variable-temperature compartment 100 detected by the temperature sensor 13.

Referring to FIG. 1, the refrigerator 10 may further include an input unit 130. The refrigerator 10 may determine the set temperature of the variable-temperature compartment 100 according to information inputted from the input unit 130.

Specifically, the input unit 130 is used for receiving the set temperature inputted by the user and outputting the set temperature into the controller 14.

The input unit 130 may include a temperature setting portion. The user may select the set temperature of the variable-temperature compartment 100 through the temperature setting portion. The set temperature of the variable-temperature compartment 100 may be a specific temperature or a temperature range.

The input unit 130 may include a mode setting portion for the user to set a storage mode associated with the set temperature of the variable-temperature compartment 100. For example, the mode setting portion may include any two of a normal freezing mode, a soft freezing mode, a zero-degree refrigerating mode, a normal refrigerating mode, or a wine cooler mode, so that the user sets the set temperature of the variable-temperature compartment 100 according to uses. In this case, the controller 14 is adapted to determine the position of the lid 120 relative to the drawer according to the set temperature corresponding to the set storage mode.

The input unit 130 may include either of the temperature setting portion and the mode setting portion to set the set temperature of the variable-temperature compartment 100. In other embodiments, the input unit 130 may include the temperature setting portion and the mode setting portion. For example, the user may first determine the storage mode of the variable-temperature compartment 100 through the mode setting portion, and then finely adjust the set temperature of the variable-temperature compartment 100 through the temperature setting portion.

During specific implementation, the input unit 130 may include a touch panel. The touch panel is adapted to sense an input operation of the user to obtain a corresponding set temperature. For example, when the user enters "-18 degrees Celsius" through the touch panel, the touch panel may sense the input operation of the user and obtain "-18 degrees Celsius" as the set temperature of the variable-temperature compartment 100.

In this embodiment of the present invention, the input unit 130 may alternatively adopt any other input form known in the prior art and applicable to temperature setting of the variable-temperature compartment 100 of the refrigerator 10.

In this embodiment of the present invention, the set temperature may be a specific temperature value, or a temperature range.

In some embodiments, the controller 14 is adapted to control the driving unit 400 to adjust the position of the lid 120 relative to the drawer 110 in a case that the set temperature or the detected temperature is changed across temperature zones.

Change across temperature zones may include change of the storage mode of the variable-temperature compartment 100.

In some embodiments, the controller 14 is adapted to control the driving unit 400 to drive the lid 120 to move to open the drawer 110 in a case that the set temperature is switched from a non-freezing temperature to a freezing temperature and/or the detected temperature is

switched from the non-freezing temperature to the freezing temperature.

In some embodiments, the controller 14 is further adapted to control, in a case that the set temperature is switched from the non-freezing temperature to the freezing temperature, the driving unit 400 to drive the lid 120 to open the drawer 110 and input cooled air into the variable-temperature compartment 100 to cause cold air to enter the drawer 110.

In some embodiments, the controller 14 is adapted to control the driving unit 400 to drive the lid 120 to move to close the drawer 110 in a case that the set temperature is switched from the freezing temperature to the non-freezing temperature and/or the detected temperature is switched from the freezing temperature to the non-freezing temperature.

In some embodiments, the controller 14 is adapted to control the driving unit 400 to drive the lid 120 to close the drawer 110 in a case that the set temperature is switched from the non-freezing temperature to the freezing temperature, and the detected temperature reaches the set temperature or reaches a temperature threshold determined according to the set temperature.

In some other embodiments, the controller is further adapted to control the driving unit 400 to adjust the position of the lid 120 relative to the drawer 110 in a case that the detected temperature of the variable-temperature compartment 100 detected by the temperature sensor reaches the set temperature.

In still some other embodiments, the controller is further adapted to control the driving unit 400 to adjust the position of the lid 120 relative to the drawer 110 in a case that the detected temperature of the variable-temperature compartment 100 detected by the temperature sensor reaches the temperature threshold determined according to the set temperature. For example, when the set temperature is in a temperature interval from greater than or equal to -20 degrees Celsius to less than or equal to -18 degrees Celsius, the temperature threshold may be set to -18 degrees Celsius; and when the detected temperature of the variable-temperature compartment 100 decreases from more than -18 degrees Celsius to -18 degrees Celsius, the controller controls the driving unit 400 to adjust the position of the lid 120 relative to the drawer 110.

In this embodiment of the present invention, the set temperature of the variable-temperature compartment 100 may change with change of storage requirements of the user.

Specifically, the set temperature may change from high to low or from low to high.

When the set temperature changes from high to low, and changes from the non-freezing temperature to the freezing temperature, the controller 14 is adapted to control the driving unit 400 to adjust the lid 120 to move to open the drawer 110. In this case, the variable-temperature compartment 100 may be regarded as being adjusted from a refrigeration state to a frozen state. When the variable-temperature compartment 100 is adjusted to the frozen state, the drawer 110 is opened, which can not only improve refrigeration efficiency of the drawer 110 in the variable-temperature compartment 100, but also prevent the lid 120 and the drawer 110 from being frozen together.

When the set temperature changes from low to high, and changes from the freezing temperature to the non-freezing temperature, the controller 14 is adapted to control the driving unit 400 to adjust the lid 120 to move to close the drawer 110. In this case, the variable-temperature compartment 100 may be regarded as being adjusted from the frozen state to the refrigeration state. When the variable-temperature compartment 100 is adjusted to the refrigeration state, the drawer 110 is closed, which can improve a preservation effect of items in the drawer 110, especially a preservation effect of fruits and vegetables.

In this embodiment of the present invention, the lid 120 may automatically open or close the drawer 110 under the action of the controller 14. Specifically, any conventional technical means known in the art may be used for realizing that the lid 120 automatically closes or opens the drawer 110.

Referring to FIG. 2 and FIG. 3, when the set temperature is in a non-freezing temperature range, the lid 120 is located at a first position S1 to close the drawer 110.

In some embodiments, the non-freezing temperature range may include a temperature interval from greater than or equal to 0 degrees Celsius to less than or equal to 12 degrees Celsius. At the non-freezing temperature, the variable-temperature compartment 100 may, for example, include the normal refrigerating mode (2 to 8 degrees Celsius), the zero-degree refrigerating mode (close to and slightly greater than zero degrees Celsius), or the wine cooler mode (10 to 12 degrees Celsius). When the variable-temperature compartment 100 is at the non-freezing temperature, especially in the normal refrigerating mode or the zero-degree refrigerating mode, the drawer 110 in the variable-temperature compartment 100 is closed by the lid 120. In this way, the preservation effect of items in the drawer 110 can be improved.

In examples shown in FIG. 2 to FIG. 7, the drawer 110 may move in a front-rear direction to be taken out from or put away in the variable-temperature compartment 100, and have

an opening 111 that opens upward to make it convenient for items to be taken out or put away. In this case, the lid 120 may move in an up-down direction to open or close the opening 111 of the drawer 110.

When the lid 120 closes the drawer 110, the first position S1 at which the lid is located is a lowest position within a range in which the lid may move up and down.

Referring to FIG. 4 to FIG. 7, when the set temperature is in a freezing temperature range, the lid 120 leaves the first position S1 to open the drawer 110.

In some embodiments, the freezing temperature range may include a temperature interval from greater than or equal to -20 degrees Celsius to less than 0 degrees Celsius. In this case, the variable-temperature compartment 100 is adapted to serve as a conventional freezing compartment or soft freezing compartment.

Referring to FIG. 4 and FIG. 5, the lid 120 is retained at a second position S2 to open the drawer 110 when the set temperature is in a first freezing temperature range.

In this embodiment of the present invention, the first freezing temperature range is in the freezing temperature range.

In some embodiments, the first freezing temperature range may include a temperature interval from greater than or equal to -20 degrees Celsius to less than or equal to -18 degrees Celsius. In this case, the variable-temperature compartment 100 is adapted to serve as the conventional freezing compartment.

When the variable-temperature compartment 100 is used as the conventional freezing compartment, the drawer 110 in the variable-temperature compartment 100 is opened by the lid, in particular, is fully opened, which can improve the refrigeration efficiency of the drawer 110 in the variable-temperature compartment 100, and prevent the lid 120 and the drawer 110 from being frozen together.

In some embodiments, when the lid 120 opens the drawer 110, the second position S2 at which the lid is located is a highest position within the range in which the lid may move up and down (in this case, it can be understood that the drawer 110 is fully opened), which can improve the refrigeration efficiency of the drawer 110 in the variable-temperature compartment 100.

Referring to FIG. 6 and FIG. 7, the lid 120 is further retained at a third position S3 to open the drawer 110 when the set temperature is in a second freezing temperature range, and the third position S3 is between the second position S2 and the first position S1.

In this embodiment of the present invention, the second freezing temperature range is in the freezing temperature range, and any temperature value within the second freezing temperature range is greater than any temperature value within the first freezing temperature range.

In some embodiments, the second freezing temperature range includes a temperature interval from greater than or equal to -12 degrees Celsius to less than or equal to -6 degrees Celsius. In this case, the variable-temperature compartment 100 is adapted to serve as the conventional soft freezing compartment.

When the variable-temperature compartment 100 is used as the conventional soft freezing compartment, the drawer 110 in the variable-temperature compartment 100 is opened by the lid, which can improve the refrigeration efficiency of the drawer 110 in the variable-temperature compartment 100, and prevent the lid 120 and the drawer 110 from being frozen together.

In some embodiments, when the lid 120 opens the drawer 110, the second position S3 at which the lid is located is between the highest position and the lowest position within the range of which the lid may move up and down, which can also improve the refrigeration efficiency of the drawer 110 in the variable-temperature compartment 100, and prevent the lid 120 and the drawer 110 from being frozen together.

In this embodiment of the present invention, the refrigerator 10 further includes a refrigeration system (not shown) adapted to generate cold air to cool the variable-temperature compartment 100.

Specifically, the refrigeration system includes a compressor, a condenser, an evaporator, and a dryer. The compressor, the condenser, the dryer, the evaporator, and the compressor are connected in sequence to form a refrigeration loop adapted to circulate a refrigerant.

In the refrigeration loop, the compressor is adapted to compress a low-temperature and low-pressure gas refrigerant from the evaporator into a high-temperature and high-pressure gas refrigerant, the condenser is adapted to condense the high-temperature and high-pressure gas refrigerant from the compressor into a low-temperature and high-pressure liquid refrigerant, the dryer is adapted to remove moisture and impurities from the low-temperature and high-pressure liquid refrigerant from the condenser and throttle and depressurize the low-temperature and high-pressure liquid refrigerant into a low-temperature and low-pressure liquid refrigerant, and the evaporator is adapted to evaporate the low-temperature and

low-pressure liquid refrigerant from the dryer into the low-temperature and low-pressure gas refrigerant. In the process of evaporating the low-temperature and low-pressure liquid refrigerant into the low-temperature and low-pressure gas refrigerant, heat inside the variable-temperature compartment 100 may be constantly absorbed to generate the cold air, thereby achieving refrigeration inside the variable-temperature compartment 100.

In some embodiments, the refrigeration system may include an evaporator disposed independently corresponding to the variable-temperature compartment 100, that is, include an evaporator only for cooling the variable-temperature compartment 100. Moreover, when the refrigerator 10 includes a plurality of variable-temperature compartments 100, each of the variable-temperature compartments 100 has one corresponding evaporator.

In some other embodiments, the refrigerator 10 may further include a refrigerating compartment 200 and/or a freezing compartment 300 that are also adapted to store items at lower temperatures. In this case, the variable-temperature compartment 100 may have an evaporator disposed independently, or may share an evaporator with the refrigerating compartment 200 and/or the freezing compartment 300.

During specific implementation, the variable-temperature compartment 100, the refrigerating compartment 200, and the freezing compartment 300 are further provided with corresponding door bodies respectively, to open or close the variable-temperature compartment 100, the refrigerating compartment 200, and the freezing compartment 300 respectively.

In each of the examples shown in FIG. 2 to FIG. 7, an evaporator 140 disposed independently is used for the variable-temperature compartment 100. It should be understood that, the present invention is not limited thereto. The variable-temperature compartment 100 may alternatively share an evaporator with at least one other storage compartment.

Referring to FIG. 2 to FIG. 7, the refrigerator 10 further includes the evaporator 140 and an air pressure system 150 adapted to guide cold air from the evaporator 140 into the variable-temperature compartment 100.

During specific implementation, the refrigerator 10 further includes a first accommodating space 11 adapted to accommodate the variable-temperature compartment 100. The first accommodating space 11 is divided into the variable-temperature compartment 100 and a first evaporator compartment 101 in the front-rear direction. The evaporator 140 is disposed in the first evaporator compartment 101.

In some embodiments, the air pressure system 150 may be disposed in the first evapora-

tor compartment 101.

Specifically, the air pressure system 150 includes an air duct 151 and a fan 152 disposed in the air duct 151. The fan 152 is adapted to guide the cold air from the evaporator 140 into the variable-temperature compartment 100 through the air duct 151.

During specific implementation, the air duct 151 has a first air inlet 151a and a second air inlet 151b. Under the action of the fan 152, the cold air from the evaporator 140 enters the air duct 151 through the second air inlet 151b, and then the cold air entering the air duct 151 enters the variable-temperature compartment 100 through the first air inlet 151a.

Referring to FIG. 3, when the lid 120 is located at the first position S1, the cold air inputted from the first air inlet 151a into the variable-temperature compartment 100 is adapted to flow forward from above the lid 120.

Referring to FIG. 5 and FIG. 7, when the lid 120 leaves the first position S1, the cold air inputted from the first air inlet 151a into the variable-temperature compartment 100 at least partially flows to a space under the lid 120 to flow through the interior of the drawer 110.

When the lid 120 leaves the first position S1, both a front end 121a and a rear end 121b of the lid 120 are located above the drawer 110 to cause the cold air to be adapted to flow from a gap between the rear end 121b of the lid 120 and the drawer 110 to a gap between the front end 121a of the lid 120 and the drawer 110, to facilitate refrigerating the drawer 110 by using the cold air.

When the lid 120 opens the drawer 110, and the third position S3 at which the lid is located is between the highest position and the lowest position within the range in which the lid may move up and down, the cold air inputted from the first air inlet 151a into the variable-temperature compartment 100 may partially flow to a space under the lid 120 to flow through the interior of the drawer 110, and partially flow to a space above the lid 120.

When the lid 120 opens the drawer 110, and the second position S2 at which the lid is located is the highest position within the range in which the lid may move up and down, the cold air inputted from the first air inlet 151a into the variable-temperature compartment 100 may flow to a space under the lid 120 as much as possible to flow through the interior of the drawer 110, thereby improving the refrigeration efficiency of the drawer 110 as much as possible.

In some embodiments, a plane on which the lid 120 is located when being located at the first position S1 is a first plane, and a plane on which the lid 120 is located when leaving and

being farthest away from the first position S1 is a second plane, and the first air inlet 151a may be at least partially located between the first plane and the second plane. In this way, the cold air inputted from the first air inlet 151a into the variable-temperature compartment 100 can effectively flow to the drawer 110, to facilitate refrigerating the drawer 110.

In some embodiments, a gap between the first air inlet 151a and the drawer 110 in a front-rear direction may be less than or equal to a threshold, for example, less than or equal to 10 millimeters, to cause the cold air inputted into the variable-temperature compartment 100 to be adapted to flow to the drawer 110 in a rear-to-front direction, thereby improving the refrigeration efficiency of the drawer 110.

In some other embodiments, projections of the first air inlet 151a and the drawer 110 on a horizontal plane may partially overlap. In this way, the cold air inputted into the variable-temperature compartment 100 can also be adapted to flow to the drawer 110 in the rear-to-front direction, thereby improving the refrigeration efficiency of the drawer 110.

Referring to FIG. 3, FIG. 5, and FIG. 7, the variable-temperature compartment 100 further includes a first air return vent 102 used for guiding the cold air in the variable-temperature compartment 100 out of the variable-temperature compartment 100.

Specifically, the first air return vent 102 may be in communication with the variable-temperature compartment 100 and the first evaporator compartment 102, to be adapted to guide the cold air in the variable-temperature compartment 100 out to the evaporator 140.

In this embodiment of the present invention, the drawer 110 includes a drawer body 112 adapted to form a storage space.

In some embodiments, a drawer gap 113 is provided between the drawer body 112 and the variable-temperature compartment 100, to be adapted to guide the cold air in the variable-temperature compartment 100 from the drawer 110 to the first air return vent 102, so as to facilitate forming a cold air circulation loop between the evaporator 140 and the variable-temperature compartment 100.

In some embodiments, the variable-temperature compartment 100 may further include an inner bottom wall 114 adapted to support the drawer body 112, and the inner bottom wall 114 has grooves and/or protrusions adapted to form the drawer gap 113 between the inner bottom wall and the drawer body 112.

During specific implementation, the grooves (which are recessed downward relative to the inner bottom wall 114) and/or the protrusions (which are protruded upward relative to the

inner bottom wall 114) of the inner bottom wall 114 may be realized by using any conventional technical means known in the art, and details are not described herein again.

In some other embodiments, the variable-temperature compartment 100 further includes a pair of side walls engaged with the inner bottom wall 114 of the variable-temperature compartment respectively, and there is a drawer gap 113 between each of the side walls and the drawer body 112, so as to be adapted to guide the cold air in the variable-temperature compartment 100 from the drawer 110 to the first air return vent 102.

In this embodiment of the present invention, the variable-temperature compartment 100 may alternatively share the evaporator 140 with the refrigerating compartment 200 and/or the freezing compartment 300.

Referring to FIG. 8, different from the examples shown in FIG. 2 to FIG. 7, the variable-temperature compartment 100 shares the evaporator 140 with the freezing compartment 300, and the evaporator 140 and the air pressure system 150 are both located in a same accommodating space as that in which the freezing compartment 300 is located, that is, a second accommodating space 12.

Specifically, the refrigerator 10 includes the second accommodating space 12 adapted to accommodate the freezing compartment 300, and the second accommodating space 12 is divided into the freezing compartment 300 and a second evaporator compartment 301 in the front-rear direction.

The evaporator 140 and the air pressure system 150 are disposed in the second evaporator compartment 301, and a manner of arranging the evaporator 140 and the air pressure system 150 in the second evaporator compartment 301 may be the same as that in the examples shown in FIG. 2 to FIG. 7.

Different from the examples shown in FIG. 2 to FIG. 7, the refrigerator 10 further includes an air supply duct 160 that is in communication with the air duct 151 of the air pressure system 150 and the variable-temperature compartment 100 and that is adapted to guide cold air in the air duct 151 into the variable-temperature compartment 100.

Further, the refrigerator 10 may further include an air return duct 170 in communication with the variable-temperature compartment 100 and the second evaporator compartment 301, and a second air return vent 180 in communication with the air return duct 170 and the second evaporator compartment 301. In this way, a cold air circulation loop may be formed among the second evaporator compartment 301, the air duct 151, the air supply duct 160, the

variable-temperature compartment 100, and the air return duct 170, to facilitate heat exchange between the variable-temperature compartment 100 and the evaporator 140.

Referring to FIG. 9 and FIG. 10, the driving unit 400 provided by the embodiments of the present invention may include support components 410 and 420 and a motor component 430.

Specifically, the support components 410 and 420 are mounted on an inner side wall of the variable-temperature compartment 100, and include elastic members 413, 414, 423, and 424. The motor component 430 includes a motor 431, a cam 432, and a connection portion 433 connecting the lid 120 and the cam 432.

During specific implementation, the motor 431 is adapted to drive the cam 432 to generate first rotation to push the connection portion 433 to move upward, to cause the lid 120 to compress the elastic members 413, 414, 423, and 424 upward, so that the lid 120 ascends; and is adapted to drive the cam 432 to generate second rotation to push the connection portion 433 to move downward, to cause the connection portion 433 and the elastic members 413, 414, 423, and 424 to push the lid 120 downward, so that the lid 120 descends.

In some embodiments, the lid 120 is adapted to ascend from the first position to the second position or the third position under driving of the driving unit 400.

In some other embodiments, the lid 120 is adapted to descend from the second position to the first position or the third position under driving of the driving unit 400.

In still some other embodiments, the lid 120 is adapted to ascend from the third position to the second position or descend from the third position to the first position under driving of the driving unit 400.

Referring to FIG. 10, the support components 410 and 420 include supports 412 and 422 provided with grooves 411 and 421, and the elastic members 413, 414, 423, and 424. The grooves 411 and 421 have openings 411a and 421a that open toward the lid 120, and the elastic members 413, 414, 423, and 424 are accommodated in the grooves 411 and 421.

In some embodiments, the support components 410 and 420 include a first support component 410 mounted on a left inner side wall of the variable-temperature compartment 100 and a second support component 420 mounted on a right inner side wall of the variable-temperature compartment 100.

The supports 412 and 422 include a first support 412 and a second support 422, the grooves 411 and 421 include a first groove 411 and a second groove 421, and the elastic

members 413, 414, 423, and 424 include first elastic members 413 and 414 and second elastic members 423 and 424.

The first support component 410 includes the first support 412 provided with the first groove 411 and the first elastic members 413 and 414 accommodated in the first groove 411. The second support component 420 includes the second support 422 provided with the second groove 421 and the second elastic members 423 and 424 accommodated in the second groove 421.

In some embodiments, the first support 412 may be mounted on a left inner side wall of the variable-temperature compartment 100 by using screws, and the second support 422 may be mounted on a right inner side wall of the variable-temperature compartment 100 by using screws.

During specific implementation, the first support 412 is provided with a first mounting hole 415, so that the first support 412 is mounted on the left inner side wall of the variable-temperature compartment 100 by using the screws to pass through the first mounting hole 415 and fixing the screws to the left inner side wall of the variable-temperature compartment 100.

The second support 422 is provided with a second mounting hole 425, so that the second support 422 is mounted on the right inner side wall of the variable-temperature compartment 100 by using the screws to pass through the second mounting hole 425 and fixing the screws to the right inner side wall of the variable-temperature compartment 100.

During specific implementation, the first groove 411 is provided with a first opening 411a that opens toward the lid 120. The second groove 421 is provided with a second opening 421a that opens toward the lid 120.

In some embodiments, the first elastic members 413 and 414 are adapted to extend out of the first opening 411a from the first groove 411, and the second elastic members 423 and 424 are adapted to extend out of the second opening 421a from the second groove 421.

In some embodiments, the lid 120 includes a first contact portion 124 disposed on a left side edge 122 of the lid and a second contact portion 125 disposed on a right side edge 123 of the lid. The first contact portion 124 is adapted to come into elastic contact with the first elastic members 413 and 414, and the second contact portion 125 is adapted to come into elastic contact with the second elastic members 423 and 424.

In some embodiments, the first contact portion 124 extends leftward from the left side

edge 122 of the lid 120, and the second contact portion 125 extends rightward from the right side edge 123 of the lid 120.

In some embodiments, the first groove 411 is adapted to completely accommodate the first elastic members 413 and 414 and at least partially accommodate the first contact portion 124, and the second groove 421 is adapted to completely accommodate the second elastic members 423 and 424 and at least partially accommodate the second contact portion 125.

In some embodiments, the first support component 410 includes two first elastic members 413 and 414, and two first grooves 411 disposed in the front-rear direction, and the two first grooves 411 are used for respectively accommodating the two first elastic members 413 and 414.

Correspondingly, the first contact portion 124 includes two first contact portions 124 disposed in the front-rear direction, and the two first contact portions 124 are adapted to come into elastic contact with the two first elastic members 413 and 414 respectively.

The second support component 420 includes two second elastic members 423 and 424, and two second grooves 421 disposed in the front-rear direction, and the two second grooves 421 are used for respectively accommodating the two second elastic members 423 and 424.

Correspondingly, the second contact portion 125 includes two second contact portions 125 disposed in the front-rear direction, and the two second contact portions 125 are adapted to come into elastic contact with the two second elastic members 423 and 424 respectively.

In some embodiments, the elastic members 413, 414, 423, and 424 include springs 413 and 423 and sliders 414 and 424, and the lid 120 is adapted to come into elastic contact with the springs 413 and 423 through the sliders 414 and 424.

During specific implementation, the first elastic members 413 and 414 include a first spring 413 and a first slider 414, and the first contact portion 124 of the lid 120 is in elastic contact with the first spring 413 through the first slider 414.

The second elastic members 423 and 424 include a second spring 423 and a second slider 424, and the second contact portion 125 of the lid 120 is in elastic contact with the second spring 423 through the second slider 424.

During specific implementation, both the first spring 413 and the second spring 423 are in a compressed state when being in a working state.

During specific implementation, the motor component 430 may be mounted on a top inner side wall of the variable-temperature compartment 100.

Still referring to FIG. 10, the motor component 430 may include the motor 431, the cam 432, the connection portion 433, a cam front lid 440, and a cam rear lid 450.

During specific implementation, the cam front lid 440 is provided with a first depressed portion (not shown) extending forward along a rear end of the cam front lid, the cam rear lid 450 is provided with a second depressed portion 450a extending rearward along a front end of the cam rear lid, and the cam front lid 440 and the cam rear lid 450 are engaged with each other and cause the first depressed portion and the second depressed portion 450a to be opposed to form a space adapted to accommodate the cam 432 and a part of the connection portion 433.

Referring to FIG. 10 to FIG. 13, the cam rear lid 450 is located on a rear side of the cam 432 and provided with a first hole 453, and the cam 432 is provided with a second hole 439.

During specific implementation, the motor 431 is located on a rear side of the cam rear lid 450. The motor 431 includes a motor shaft (not shown) extending forward and being adapted to pass through the first hole 453 to reach the second hole 439.

During specific implementation, the motor shaft passes through the first hole 453 to be connected to the second hole 439 of the cam 432, so that the motor 431 may drive the cam 432 to generate the first rotation or the second rotation through the motor shaft. Rotation directions of the first rotation and the second rotation are opposite.

In some embodiments, the motor 431 may be mounted on the cam rear lid 450 by using screws.

Specifically, the motor 431 may be provided with a motor screw (not shown), and a rear end of the cam rear lid 450 may be provided with a third mounting hole 456 (referring to FIG. 12) adapted to mount the motor screw, so that the motor 431 is connected to the cam rear lid 450 through the motor screw and the third mounting hole 456.

During specific implementation, at least two groups of motor screws and third mounting holes 456 may be set, so that the motor 431 is stably connected to the cam rear lid 450.

The motor 431 may be further provided with a fourth mounting hole (not shown), and the rear end of the cam rear lid 450 may be further provided with a rear lid screw 457 (referring to FIG. 12) adapted to fit into the fourth mounting hole, so that the motor 431 is connected to the cam rear lid 450 through the rear lid screw 457 and the fourth mounting hole.

During specific implementation, at least two groups of rear lid screws 457 and fourth mounting holes may alternatively be set, so that the motor 431 is stably connected to the cam

rear lid 450.

In some embodiments, the cam rear lid 450 may be fixedly connected to the cam front lid 440 by using screws.

Specifically, the cam rear lid 450 may be provided with a fifth mounting hole 455 (referring to FIG. 11 and FIG. 12). Correspondingly, the cam front lid 440 may be provided with a sixth mounting hole (not shown) matching the fifth mounting hole 455. The cam rear lid 450 may be fixedly connected to the cam front lid 440 by using the screws to sequentially pass through the fifth mounting hole 455 and the sixth mounting hole that match each other from rear to front.

In some embodiments, four fifth mounting holes 455 may be located on edges of the cam rear lid 450, and may be arranged uniformly. Correspondingly, four sixth mounting holes may alternatively be located on edges of the cam front lid 440, and may be arranged uniformly. Moreover, the fifth mounting holes 455 correspond to the sixth mounting holes one by one. In this way, the cam rear lid 450 may be more stably connected to the cam front lid 440.

Still referring to FIG. 10, FIG. 14, and FIG. 15, the cam front lid 440 is located on a front side of the cam 432 and provided with a third hole 441, and a front surface 435 of the cam 432 is provided with a protrusion 434 extending forward and matching the third hole 441. The protrusion 434 is inserted into the third hole 441, and rotate synchronously in the third hole 441 when the cam 432 generates the first rotation or the second rotation.

Specifically, when the cam 432 generates the first rotation, the protrusion 434 is adapted to perform rotation whose rotation speed and direction are the same as those of the first rotation in the third hole 441; and when the cam 432 generates the second rotation, the protrusion 434 is adapted to perform rotation whose rotation speed and direction are the same as those of the second rotation in the third hole 441.

In this way, the cam 432 may be supported on the cam front lid 440 when generating the first rotation or the second rotation, so that the cam 432 may keep stable when generating the first rotation or the second rotation.

Referring to FIG. 10, FIG. 14, and FIG. 15, the cam 432 includes a cam body 432a and a support portion 432b located on a front end of the cam body 432a.

The support portion 432b is adapted to generate eccentric rotation in the same direction as a rotation direction of the cam 432 when the cam 432 performs the first rotation and the

second rotation.

In some embodiments, the cam body 432a may be made of a uniform material and provided with a regular shape, for example, a circle, and a rotation center of the cam body 432a during the first rotation and the second rotation coincides with a geometric center of the cam body.

The support portion 432b may also be made of a uniform material and provided with a regular shape, for example, a circle, and a geometric center of the support portion 432b does not coincide with the geometric center of the cam body 432a.

In this way, when the cam body 432a performs the first rotation and the second rotation, the support portion 432b may generate the eccentric rotation because a rotation center of the support portion does not coincide with the geometric center of the support portion.

In some embodiments, when the lid 120 is located at the second position, the geometric center of the support portion 432b is located above the geometric center of the cam body 432a; and when the lid 120 is located at the first position, the geometric center of the support portion 432b is located under the geometric center of the cam body 432a.

Referring to FIG. 10, FIG. 14, and FIG. 15, the connection portion 433 includes a sleeve portion 438 whose inner surface is partially engaged with an outer periphery of the support portion 432b.

In some embodiments, the sleeve portion 438 is adapted to abut against the outer periphery of the support portion 432b only in a vertical direction during a process that the support portion 432b generates the first rotation and the second rotation.

During specific implementation, the support portion 432b is adapted to move upward when the cam 432 generates the first rotation, to drive the sleeve portion 438 sleeved on the outer periphery of the support portion to move upward, so as to drive the connection portion 433 to move upward.

The support portion 432b is further adapted to move downward when the cam 432 generates the second rotation, to drive the sleeve portion 438 sleeved on the outer periphery of the support portion to move downward, so as to drive the connection portion 433 to move downward.

Referring to FIG. 10, FIG. 14, and FIG. 15, the lid 120 includes a mounting portion 126 adapted to fix the connection portion 433.

In some embodiments, the mounting portion 126 is fixed to a top part of the lid 120, and

is connected to the connection portion 433 in a mutually nested manner, so that the connection portion 433 is mounted on the top part of the lid 120.

During specific implementation, the connection portion 433 may drive the lid 120 to move upward or downward synchronously. In some embodiments, the mounting portion 126 may be disposed in a position equidistant from the left side edge 122 and the right side edge 123 of the lid 120.

In some embodiments, the mounting portion 126 may be further disposed in a position equidistant from a front side edge and a rear side edge of the lid 120.

In this way, not only the lid 120 can move upward or downward smoothly, but also various parts of the lid 120 have a same ascending height during upward movement, and the various parts of the lid 120 have a same descending height during downward movement.

During specific implementation, when the cam 432 generates the first rotation, the connection portion 433 moves upward, so as to drive the lid 120 to move upward, so that cold air in the variable-temperature compartment 100 enters the drawer 110 rapidly, thereby improving refrigeration efficiency of the drawer 110.

During a process that the lid 120 moves upward, the first contact portion 124 of the lid 120 may compress upward the first elastic members 413 and 414, and the second contact portion 125 of the lid 120 may compress upward the second elastic members 423 and 424.

During specific implementation, materials and structures of the first elastic members 413 and 414 and the second elastic members 423 and 424 are identical.

In this way, not only the lid 120 can move upward smoothly, but also the various parts of the lid 120 have the same ascending height during upward movement, so that gaps between various positions of edges of the lid 120 and the drawer 110 are the same, and then cold air in the variable-temperature compartment 100 can enter the drawer 110 uniformly along a periphery of the lid 120, to cause refrigeration to be performed rapidly and uniformly in the drawer 110.

During specific implementation, when the cam 432 generates the second rotation, the connection portion 433 moves downward, to drive the lid 120 to move downward, thereby better facilitating moisturizing and preservation of an interior of the drawer 110.

During a process that the lid 120 moves downward, the first elastic members 413 and 414 may push downward the first contact portion 124 of the lid 120 due to an elastic function, and the second elastic members 423 and 424 may push downward the second contact portion

125 of the lid 120 due to the elastic function.

During specific implementation, materials and structures of the first elastic members 413 and 414 and the second elastic members 423 and 424 are identical.

In this way, not only the lid 120 can move downward smoothly, but also the various parts of the lid 120 have the same descending height during downward movement, and when the lid 120 moves downward, a force applied to various positions of which an upper edge of the drawer 110 is in contact with the lid 120 can be uniform.

In some embodiments, a sealing ring may be further disposed between the drawer 110 and the lid 120, so that the drawer 110 may be sealed when the lid 120 closes the drawer 110. In this case, a force applied to various positions of which the upper edge of the drawer 110 is in contact with the sealing ring is uniform, and a force applied to various positions of which the sealing ring is in contact with the lid 120 is also uniform.

In this way, the upper edge of the drawer 110 can be sealed uniformly, so as to avoid a situation that a certain position of the upper edge of the drawer 110 is not tightly sealed due to a nonuniform force.

Still referring to FIG. 11 and FIG. 13, a front surface 451 of the cam rear lid 450 is provided with a blocking portion 452, and a rear surface 436 of the cam 432 is provided with a motion portion 437 matching the blocking portion 452.

In some embodiments, the blocking portion 452 may be located on an upper part of the front surface 451 of the cam rear lid 450, and the motion portion 437 may be located on a left side part of the rear surface 436 of the cam 432 (if it is viewed from a rear view of the cam 432, the motion portion 437 is located on a right side part of the rear surface 436 of the cam 432, as shown in FIG. 13). In this case, for a direction of the first rotation and a direction of the second rotation of the cam 432, reference may be made to FIG. 13.

During specific implementation, when the cam 432 performs the first rotation, the blocking portion 452 is adapted to prevent the motion portion 437 from continuing to move by using one end of the blocking portion to abut against one end of the motion portion 437, so that the lid 120 moves upward to the second position (that is, the highest position).

Specifically, the blocking portion 452 includes a first blocking end 452a, and the motion portion 437 includes a first motion end 437a. When the cam 432 performs the first rotation, the first blocking end 452a is adapted to abut against the first motion end 437a to prevent the motion portion 437 from continuing to move, so that the lid 120 moves upward to the second

position.

When the cam 432 performs the second rotation, the blocking portion 452 is further adapted to prevent the motion portion 437 from continuing to move by using an other end of the blocking portion to abut against an other end of the motion portion 437, so that the lid 120 moves downward to the first position (that is, the lowest position).

Specifically, the blocking portion 452 includes a second blocking end 452b, and the motion portion 437 includes a second motion end 437b. When the cam 432 performs the second rotation, the second blocking end 452b is adapted to abut against the second motion end 437b to prevent the motion portion 437 from continuing to move, so that the lid 120 moves downward to the first position.

In some embodiments, a position to which the lid 120 ascends or descends may alternatively be controlled through a working rotational speed and a working time of the motor 431.

During specific implementation, the working rotational speed of the motor 431 may be fixed, and the working time of the motor 431 may be calculated based on a distance by which the lid 120 is intended to ascend or descend, to control the position to which the lid 120 ascends or descends through the working time of the motor 431.

The calculating the working time of the motor 431 by using the working rotational speed of the motor 431 and the distance by which the lid 120 is intended to ascend or descend is common knowledge in the art, and details are not repeated herein.

Although specific implementations are described above, the implementations are not intended to limit the scope disclosed in the present invention, even if only a single implementation is described relative to a specific feature. The feature examples provided in the present invention are intended to be illustrative rather than limiting, unless different expressions are made. During specific implementation, according to an actual requirement, in a technically feasible case, the technical features of one or more dependent claims may be combined with the technical features of the independent claims, and the technical features from the corresponding independent claims may be combined in any appropriate way instead of using just specific combinations listed in the claims.

Although the present invention is disclosed above, the present invention is not limited thereto. Any person skilled in the art can make various changes and modifications without departing from the spirit and the scope of the present invention. Therefore, the protection scope of the present invention should be subject to the scope defined by the claims.

CLAIMS

What is claimed is:

1. A refrigerator (10), comprising a variable-temperature compartment (100), a drawer (110) located inside the variable-temperature compartment (100), a lid (120) adapted to open or close the drawer (110), a temperature sensor (13) used for detecting a temperature of the variable-temperature compartment (100), and a controller (14), characterized in that the controller (14) is used for controlling a position of the lid (120) relative to the drawer (110) based on a set temperature of the variable-temperature compartment (100) and/or a detected temperature of the variable-temperature compartment (100) detected by the temperature sensor (13).

2. The refrigerator according to claim 1, characterized in that the variable-temperature compartment (100) comprises at least two settable temperature zones, and the controller (14) is adapted to control the position of the lid (120) relative to the drawer (110) in a case that the set temperature or the detected temperature is changed across temperature zones.

3. The refrigerator (10) according to claim 1 or 2, characterized in that the controller (14) is adapted to control the lid (120) to move to open the drawer (110) in a case that the set temperature is switched from a non-freezing temperature to a freezing temperature and/or the detected temperature is switched from the non-freezing temperature to the freezing temperature.

4. The refrigerator according to claim 3, characterized in that the controller (14) is adapted to control, in a case that the set temperature is switched from the non-freezing temperature to the freezing temperature, the lid (120) to open the drawer (110) and input cooled air into the variable-temperature compartment (100) to cause cold air to enter the drawer (110).

5. The refrigerator (10) according to any one of claims 1 to 4, characterized in that the controller (14) is adapted to control the lid (120) to move to close the drawer (110) in a case that the set temperature is switched from the freezing temperature to the non-freezing temperature and/or the detected temperature is switched from the freezing temperature to the non-freezing temperature.

6. The refrigerator (10) according to claim 5, characterized in that the controller (14) is adapted to control the lid (120) to close the drawer (110) in a case that the set temperature is

switched from the non-freezing temperature to the freezing temperature, and the detected temperature reaches the set temperature or reaches a temperature threshold determined according to the set temperature.

7. The refrigerator (10) according to claim 1, 2 or 3, characterized by comprising an input unit (130), wherein the input unit (130) comprises a mode setting portion for a user to set a storage mode associated with the set temperature of the variable-temperature compartment, and the controller (14) is adapted to control the lid (120) to be located at a corresponding position according to the selected storage mode.

8. The refrigerator (10) according to claim 1, 2 or 3, characterized by comprising an input unit (130), used for receiving the set temperature inputted by a user and outputting the set temperature into the controller (14), wherein the controller (14) is adapted to control the lid (120) to move to be located at a corresponding position in a case that the set temperature is switched across temperature zones.

9. The refrigerator (10) according to claim 1, 2 or 3, characterized in that the controller (14) is adapted to adjust the position of the lid (120) relative to the drawer (110) in a case that the detected temperature reaches the set temperature or reaches a temperature threshold determined according to the set temperature.

10. The refrigerator (10) according to claim 1, characterized in that when the set temperature is in a non-freezing temperature range, the lid (120) is located at a first position (S1) to close the drawer (110), and when the set temperature is in a freezing temperature range, the lid (120) leaves the first position (S1) to open the drawer (110).

11. The refrigerator (10) according to claim 10, characterized in that the lid (120) is retained at a second position (S2) to open the drawer (110) when the set temperature is in a first freezing temperature range; and the lid (120) is retained at a third position (S3) when the set temperature is in a second freezing temperature range, wherein the third position (S3) is between the second position (S2) and the first position (S1), both the first freezing temperature range and the second freezing temperature range are in the freezing temperature range, and any temperature value within the second freezing temperature range is greater than any temperature value within the first freezing temperature range.

12. The refrigerator (10) according to claim 10, characterized in that the non-freezing temperature range comprises a temperature interval from greater than or equal to 0 degrees Celsius to less than or equal to 12 degrees Celsius.

13. The refrigerator (10) according to claim 10, characterized in that the freezing temperature range comprises a temperature interval from greater than or equal to -20 degrees Celsius to less than 0 degrees Celsius.

14. The refrigerator (10) according to claim 11, characterized in that the first freezing temperature range comprises a temperature interval from greater than or equal to -20 degrees Celsius to less than or equal to -18 degrees Celsius; and/or the second freezing temperature range comprises a temperature interval from greater than or equal to -12 degrees Celsius to less than or equal to -6 degrees Celsius.

15. The refrigerator (10) according to claim 10, characterized by comprising a first air inlet (151a) used for inputting cold air into the variable-temperature compartment (100), wherein when the lid (120) is located at the first position (S1), the cold air inputted from the first air inlet (151a) into the variable-temperature compartment (100) is adapted to flow forward from above the lid (120); and when the lid (120) leaves the first position (S1), the cold air inputted from the first air inlet (151a) into the variable-temperature compartment (100) at least partially flows to a space under the lid (120) to flow through the interior of the drawer (110).

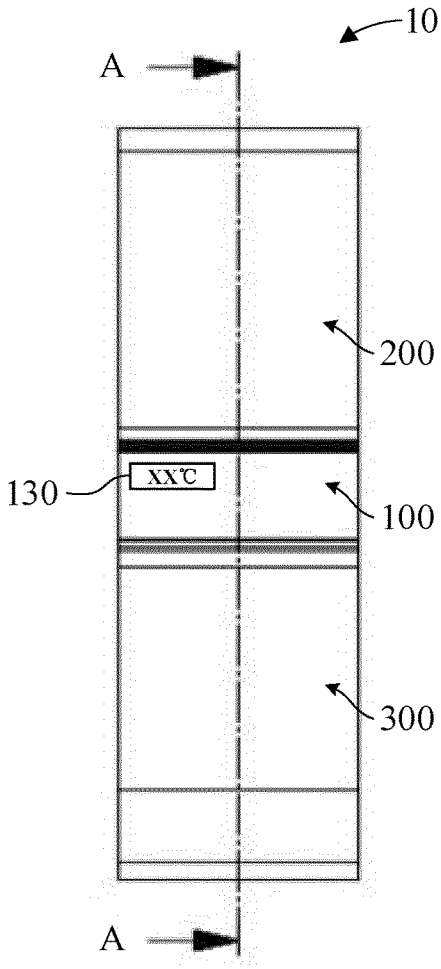


FIG. 1

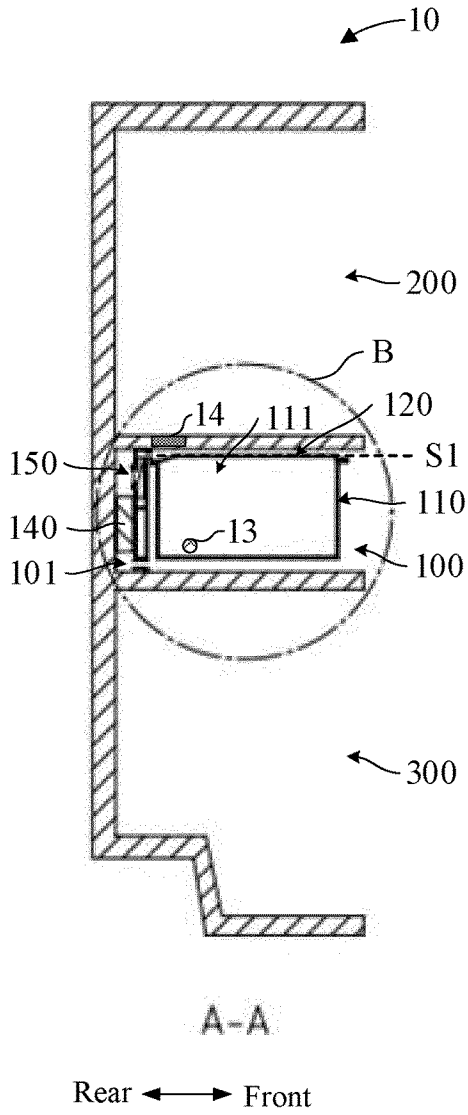


FIG. 2

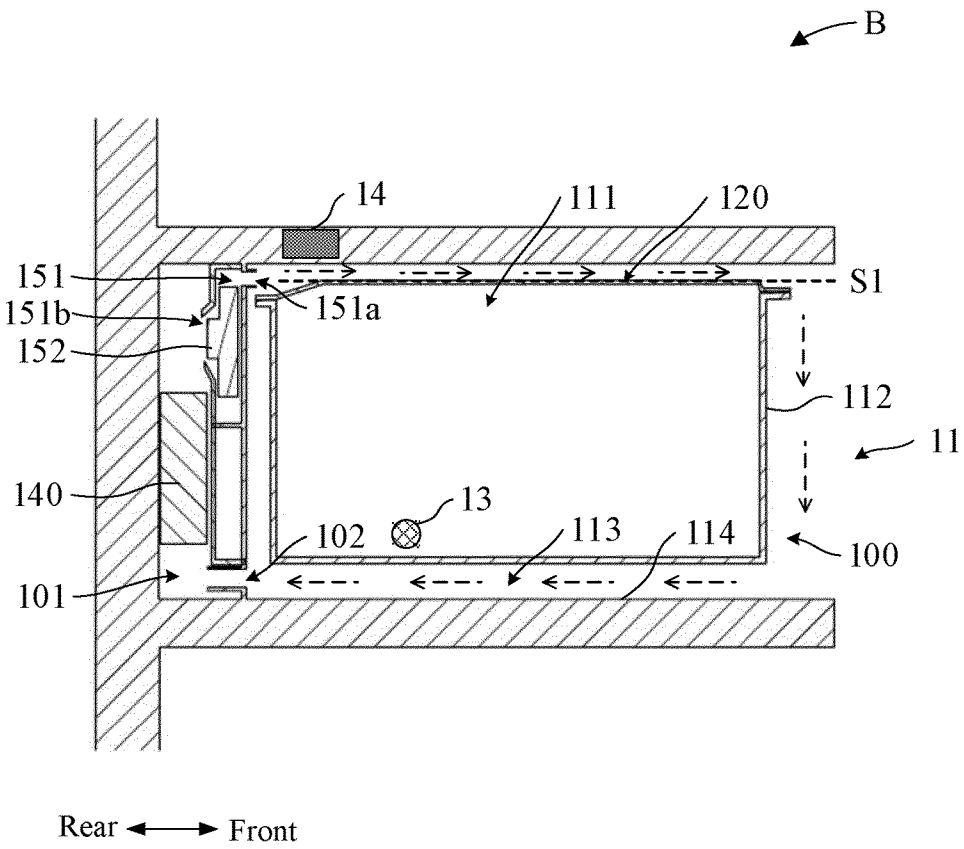

B
14
111
120
151
151b
151a
S1
152
112
11
140
13
102
113
114
100
101
Rear
Front

FIG. 3

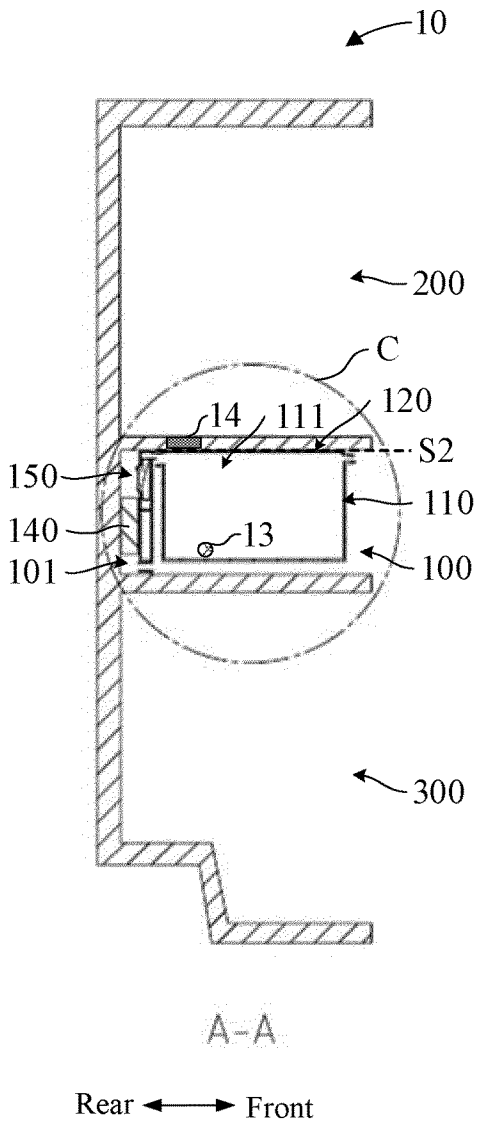


FIG. 4

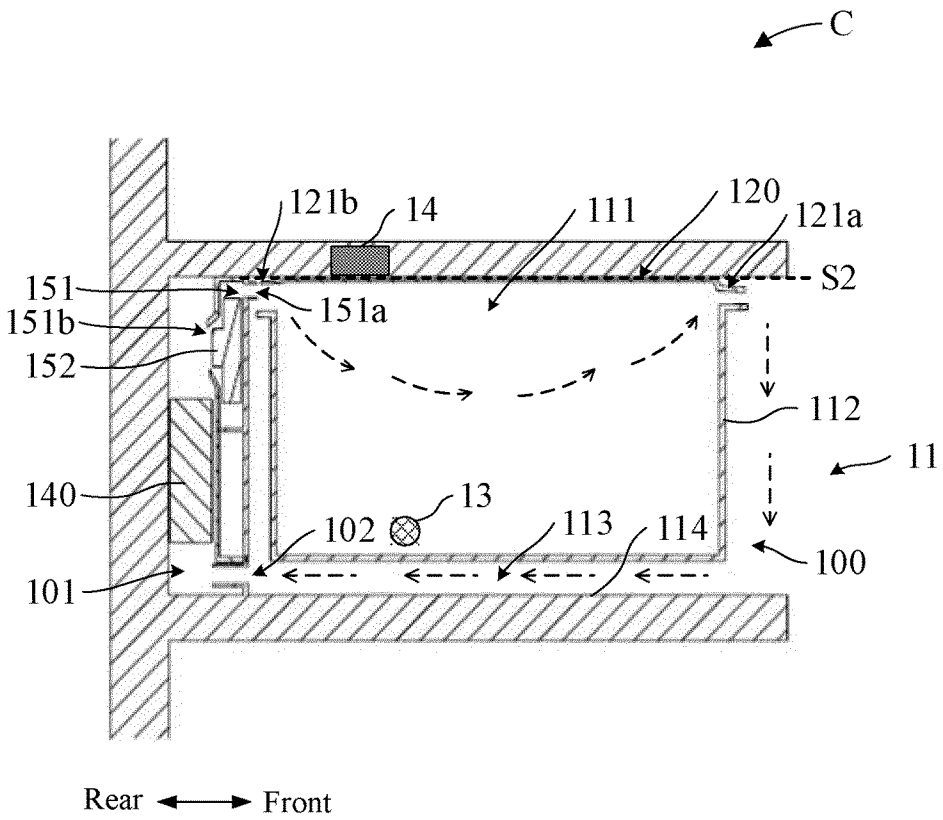

C
121b
14
111
120
121a
S2
151
151a
151b
152
112
11
140
13
102
113
114
100
101
Rear
Front

FIG. 5

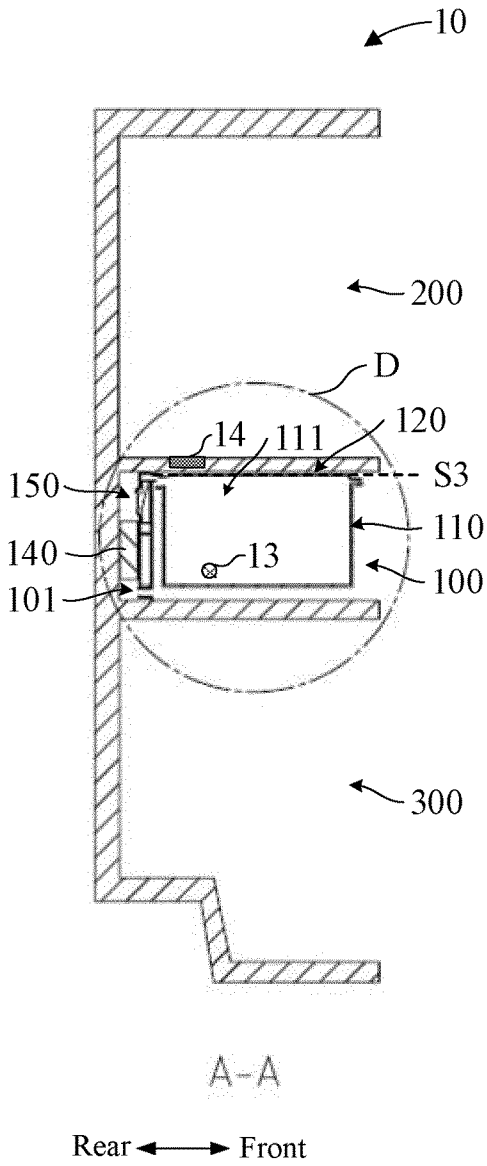


FIG. 6

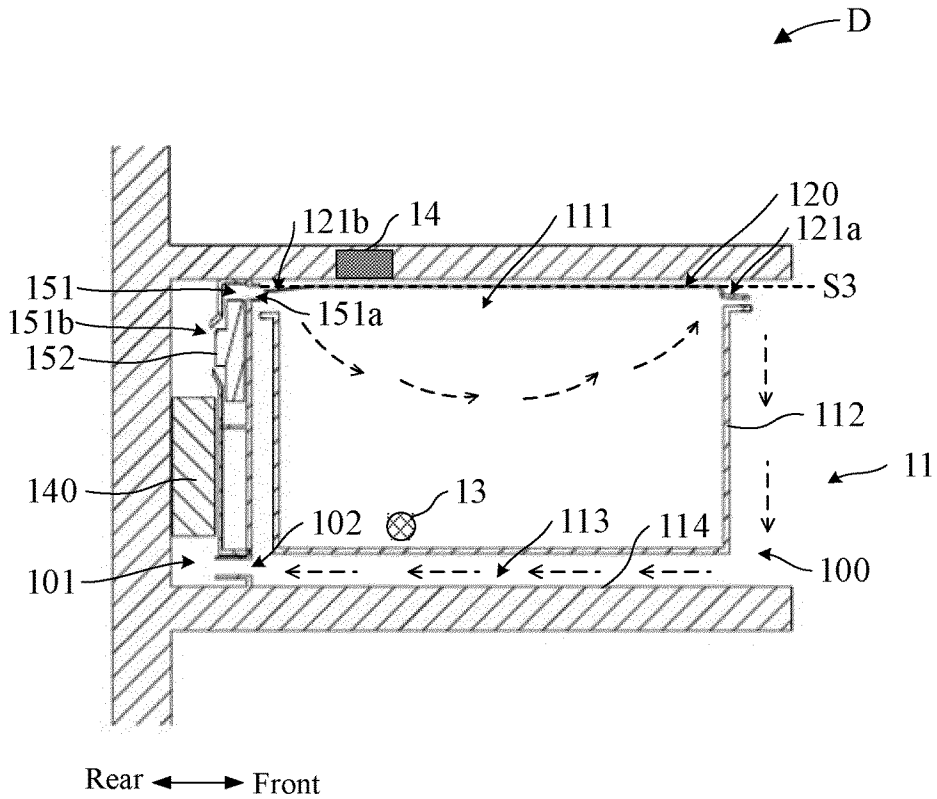

D
121b
14
111
120
121a
151
S3
151b
151a
152
112
11
140
13
102
113
114
101
100
Rear
Front

FIG. 7

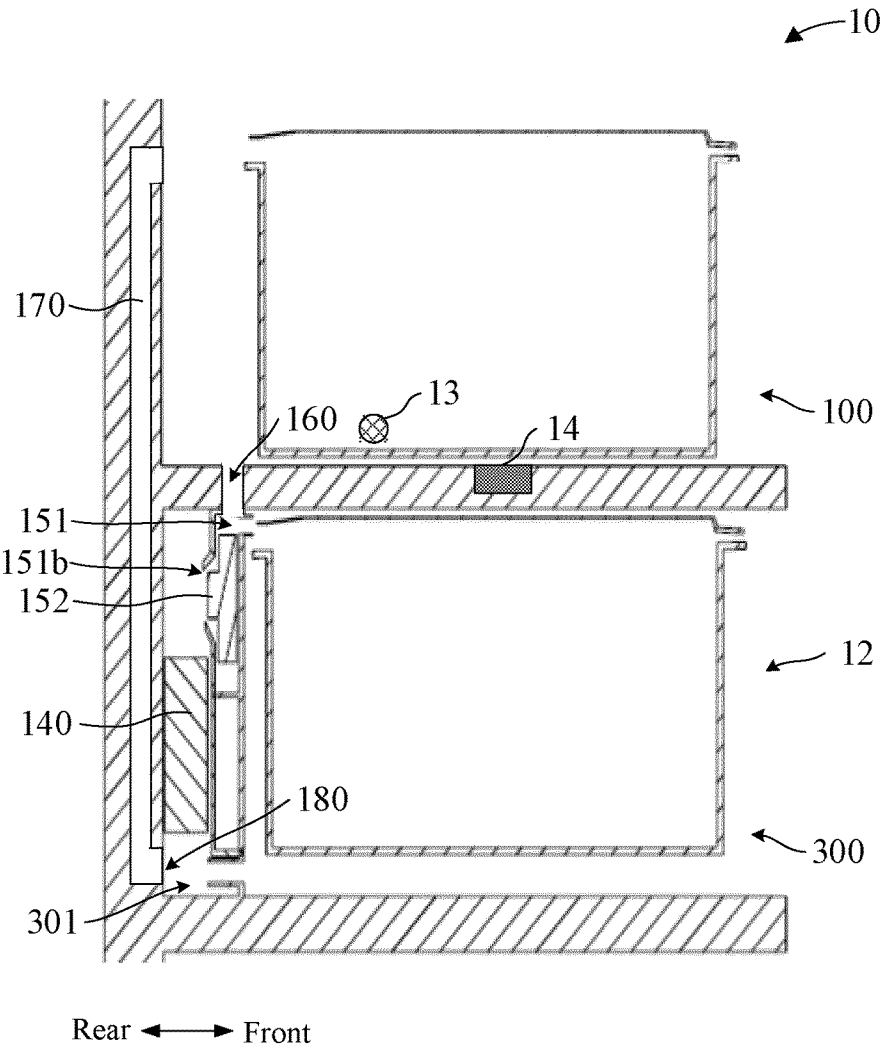


FIG. 8

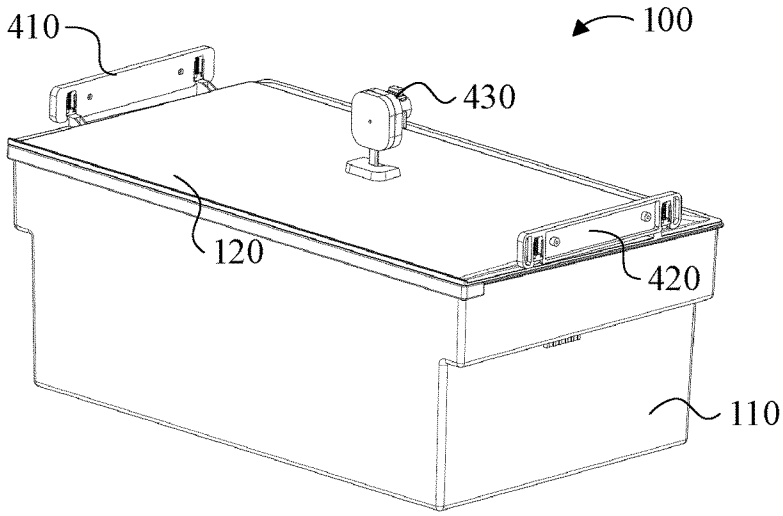

410
100
430
120
420
110

FIG. 9

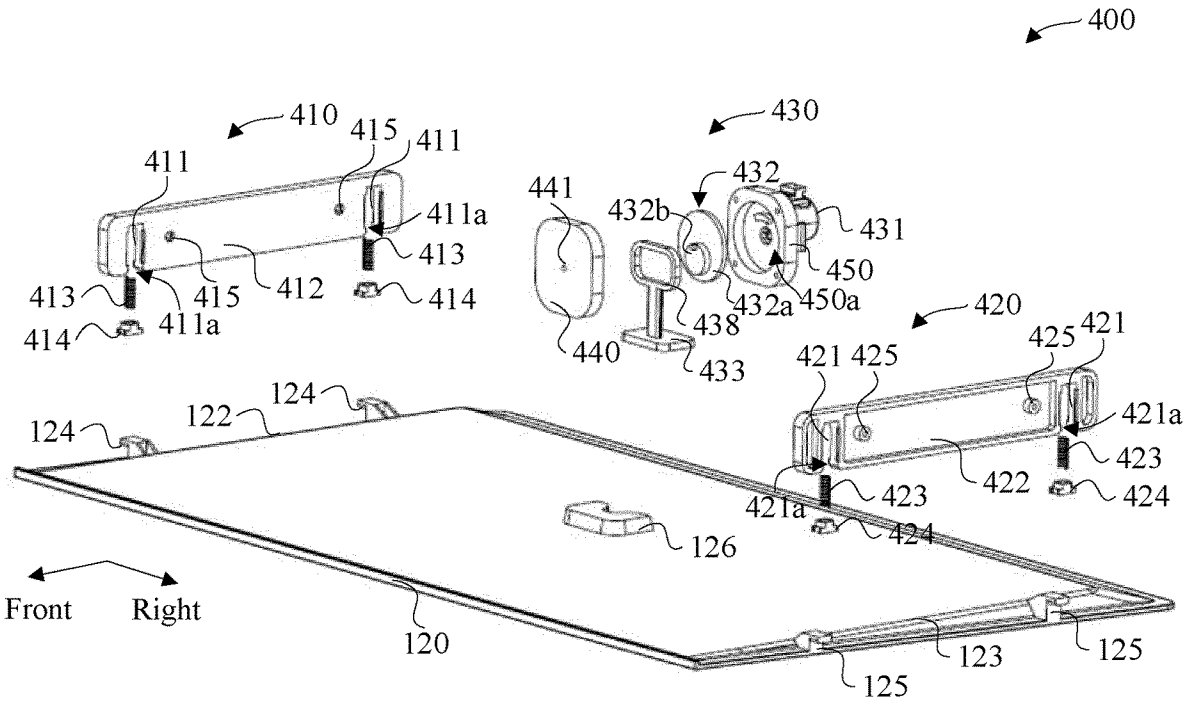

400
410
415
411
411
411a
413
412
414
413
415
414
411a
430
432
441
432b
431
450
450a
432a
438
440
433
420
425
421
421 425
421a
423
422
424
421a
423
424
126
124
122
124
124
Front
Right
120
123
125
125

FIG. 10

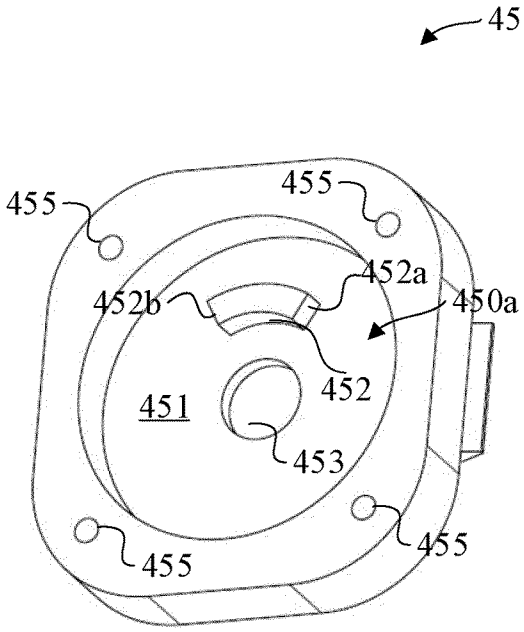

450
455
455
452a
452b
450a
452
451
453
455
455

FIG. 11

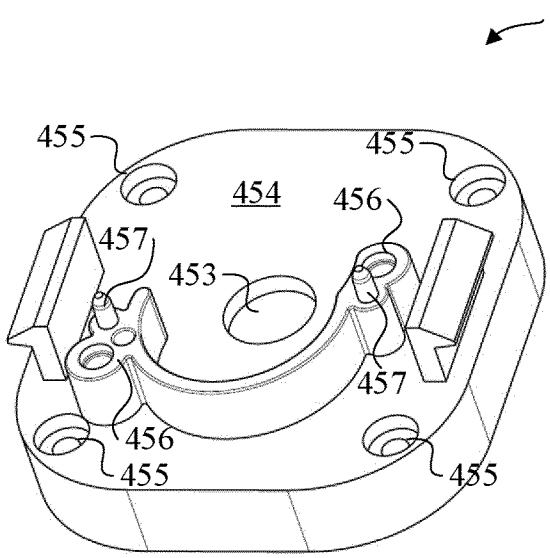

450
455
455
454
456
457
453
457
456
455
455

FIG. 12

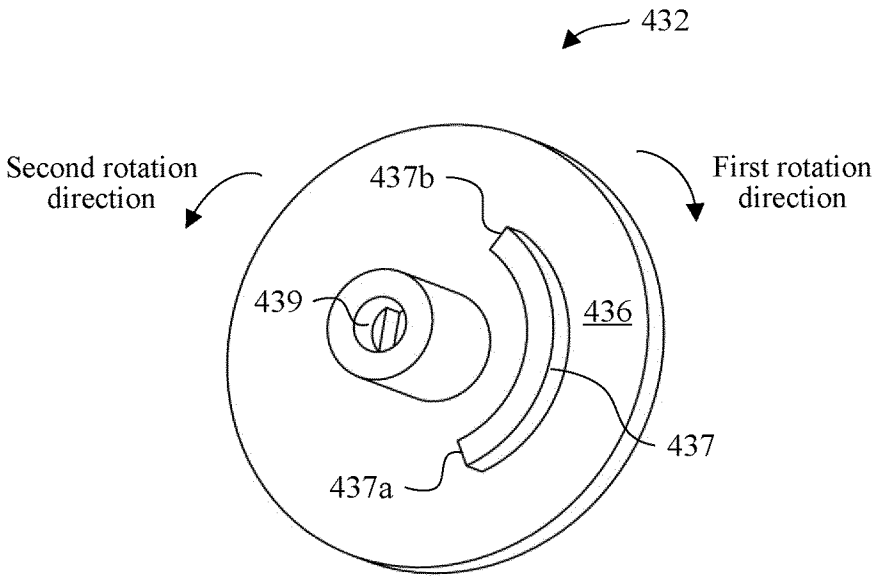

432
Second rotation direction
First rotation direction
437b
439
436
437
437a

FIG. 13

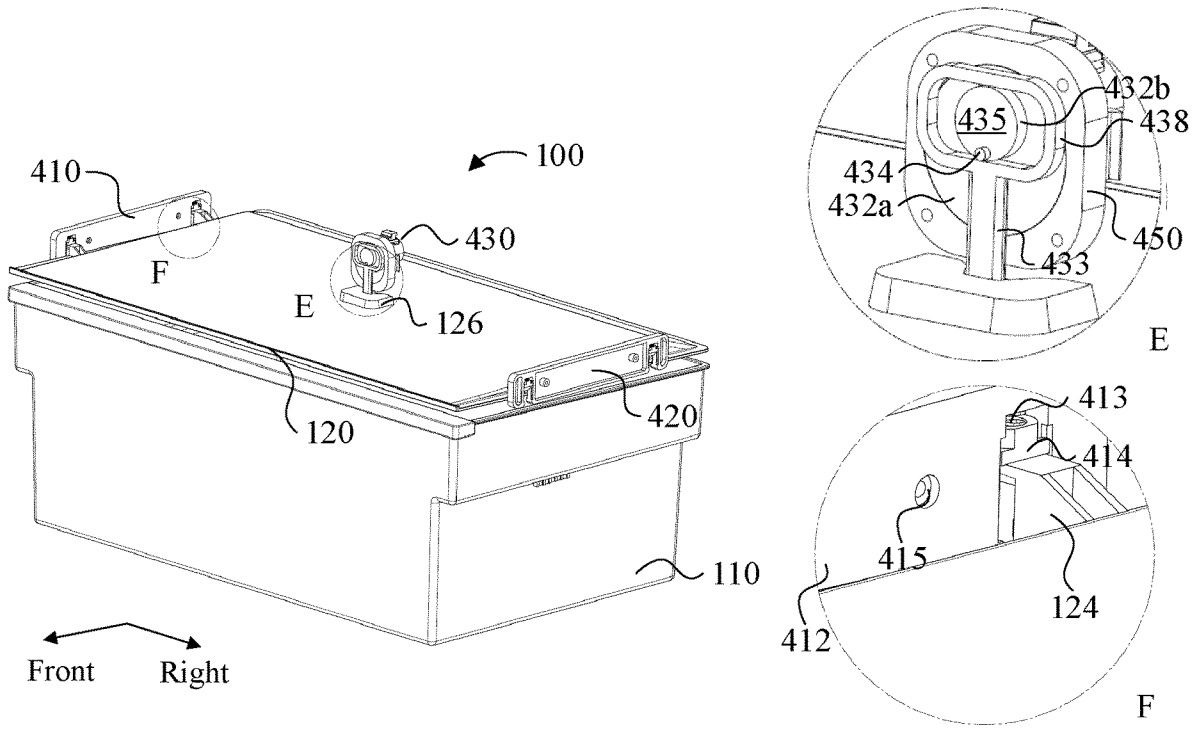

100
410
F
E
430
126
120
420
110
Front
Right
432b
435
438
434
432a
450
433
E
413
414
415
124
412
F

FIG. 14

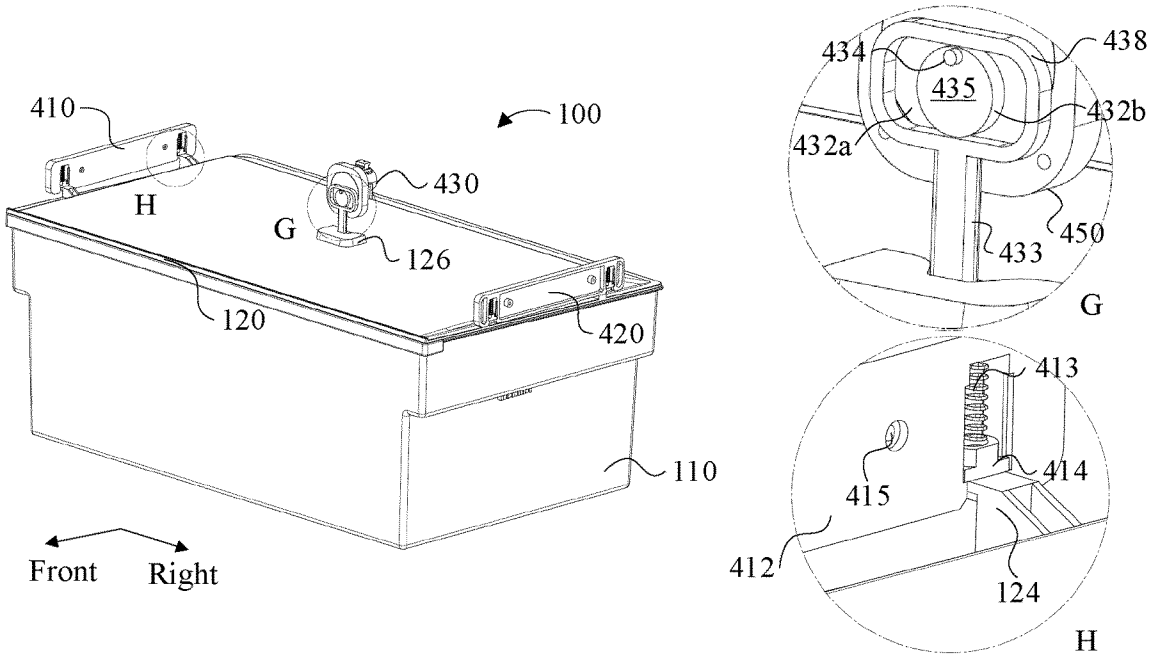

410
100
H
G
430
126
120
420
110
Front
Right
434
438
435
432b
432a
450
433
G
413
415
414
412
124
H

FIG. 15

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2022/060028

A. CLASSIFICATION OF SUBJECT MATTER
INV. F25D25/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F25D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2018/121786 A1 (QINGDAO HAIER JOINT STOCK CO LTD [CN]) 5 July 2018 (2018-07-05) abstract; figures 1-6 paragraphs [0048] - [0061]	1-15
X	WO 2018/121785 A1 (QINGDAO HAIER JOINT STOCK CO LTD [CN]) 5 July 2018 (2018-07-05) abstract; figures 1-5	1-15
X	JP 2006 090686 A (TOSHIBA CORP; TOSHIBA CONSUMER MARKETING; TOSHIBA KADEN SEIZO KK) 6 April 2006 (2006-04-06) abstract; figures 1, 5-7	1

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
3 August 2022	17/08/2022

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Bejaoui, Amin

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2022/060028

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2018121786 A1	05-07-2018	CN 107062735 A	18-08-2017
		WO 2018121786 A1	05-07-2018
WO 2018121785 A1	05-07-2018	CN 106766638 A	31-05-2017
		WO 2018121785 A1	05-07-2018
JP 2006090686 A	06-04-2006	NONE	