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(73) Proprietor: **LG Electronics Inc.**
Seoul 150-721 (KR)

(72) Inventors:
- **KANG, Byeong-Gyu**
  Gyeongsangnam-do 641-711 (KR)
- **LEE, Jae-Youl**
  Gyeongsangnam-do 641-711 (KR)
- **PARK, Sang-Ho**
  Gyeongsangnam-do 641-711 (KR)

(74) Representative: **Cabinet Plasseraud**
66, rue de la Chaussée d'Antin
75440 Paris Cedex 09 (FR)

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Description

[0001] The present invention relates to a refrigerator, and more particularly, to an ice bank for a refrigerator capable of storing ice pieces therein.

[0002] Generally, a refrigerator serves to freshly store food items for a long time in a frozen state or in a cooled state.

[0003] The refrigerator is provided with a refrigerator body divided into a freezing chamber and a refrigerating chamber. The refrigerator body is provided with a freezing chamber door and a refrigerating chamber door through which the freezing chamber and the refrigerating chamber are opened or closed. The freezing chamber door and the refrigerating chamber door are respectively installed at one side of the refrigerator body, such that one ends thereof are rotatable in back and forth directions of the refrigerator body centering around another ends thereof.

[0004] At each one side of the freezing chamber door and the refrigerating chamber door, provided are supplementary storage chambers (hereinafter, will be referred to as home bars) for storing and drawing out food items without opening the freezing chamber door or the refrigerating chamber door.

[0005] The home bar is composed of a home bar housing disposed on a rear surface of the freezing chamber door or the refrigerating chamber door with a storage space, and a home bar door for opening and closing the storage space.

[0006] The home bar door serves to open or close an opening formed as a part of the freezing chamber door or the refrigerating chamber door corresponding to the home bar housing is cut out. The home bar door is installed such that an upper end thereof is rotatable in up and down directions centering around a lower end thereof.

[0007] The freezing chamber is provided with an ice-making device for making ice pieces. And, the freezing chamber may also be provided with an ice bank for storing ice pieces made by the ice-making device. A refrigerator according to the preamble of claim 1 is disclosed in WO02007/094554. However, the conventional ice bank has the following problems.

[0008] Firstly, in order to draw out the ice bank for storing ice pieces made by the ice-making device, the freezing chamber has to be opened by rotating the freezing chamber door. This may cause a difficulty in drawing out the ice bank.

[0009] Secondly, once the freezing chamber is opened in order to draw out the ice bank, cool air inside the freezing chamber is leaked out. As cool air inside the freezing chamber is unnecessarily leaked out, power consumption of the refrigerator is increased.

[0010] Thirdly, since the ice bank is accommodated in the freezing chamber, ice pieces in the ice bank may be soaked with odor of other food items stored in the freezing chamber.

[0011] Fourthly, since the ice bank is provided in the refrigerating chamber with a limited volume, the ice-making device has to make ice pieces a plurality of times when a large amount of ice pieces are required in summer, for example.

[0012] Therefore, it is an object of the present invention to provide a refrigerator capable of easily drawing out ice pieces, and controlling an amount of ice pieces to be stored according to a user's necessity.

[0013] To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, there is provided a refrigerator according to claim 1.

[0014] The ice bank comprises a body portion formed in a box shape having opened upper and lower surfaces; and a volume expansion container inserted into the body portion so as to be vertically moveable along an inner surface of the body portion, and forming an ice storage space having an opened upper surface.

[0015] The volume control unit comprises volume control grooves formed, in a volume control direction of the ice bank, at one of inner side surfaces of the body portion and outer side surfaces of the volume expansion container; volume control protrusions formed at another of the inner side surfaces of the body portion and the outer side surfaces of the volume expansion container; and a locking unit for restricting a relative motion of the volume control grooves with respect to the volume control protrusions step by step.

[0016] The locking unit comprises locking grooves formed at one of the volume control grooves and the volume control protrusions in a volume control direction of the ice bank; and locking protrusions locked by the locking grooves step by step.

[0017] The guide unit comprises a first guide portion fixed in the opening, for guiding the ice bank to downward slantly move toward the opening; and a second guide portion configured to be introduced into or drawn out of the opening under guide of the first guide portion, for mounting the ice bank in a drawing manner.

[0018] The refrigerator according to the present invention has the following advantages.

[0019] A volume of the ice bank is varied according to a user's necessity. This may solve a user's inconvenience to make ice pieces a plurality of times, for example, in summer when a large amount of ice pieces are required.

[0020] Also, ice pieces stored in the ice bank are taken out through the home bar. This may enable the ice bank to be drawn out of the refrigerator in a state that the door is not opened. Accordingly, a user can easily take ice pieces out of the refrigerator.

[0021] Furthermore, the ice bank is drawn out of the refrigerator through the home bar by downward slantly moving. This may prevent food items stored in the home bar from being drawn out with interfering with the ice bank, or prevent the ice bank from being drawn out with interfering with ice pieces stored therein.

[0022] Furthermore, the ice bank is installed at a predetermined space on a rear surface of the freezing chamber door. This may prevent the ice pieces stored in the ice bank from being soaked with odor of food items stored in the ice storage space of the refrigerator. Accordingly, a user may use the ice pieces in a sanitary and comfortable manner.

FIG. 1 is a view showing appearance of a refrigerator according to a first embodiment of the present invention;

FIG. 2 is a view showing inside of the refrigerator according to a first embodiment of the present invention;

FIG. 3 is a sectional view taken along line I-I in FIG. 1;

FIG. 4 is a perspective view showing a mounted state of an ice bank of FIG. 3;

FIG. 5 is a perspective view showing the ice bank of FIG. 4 and a second guide portion;

FIG. 6 is an exploded perspective view showing the ice bank and the second guide portion of FIG. 5;

FIGS. 7 to 9 are views showing processes for drawing the ice bank out, and controlling a volume of the ice bank according to the first embodiment of the present invention

FIG. 10 is an exploded perspective view showing an ice bank and a second guide portion according to a second embodiment of the present invention;

FIG. 11 is an exploded perspective view showing an ice bank and a second guide portion according to a third embodiment of the present invention; and

FIG. 12 is an exploded perspective view showing an ice bank and a second guide portion according to a fourth embodiment of the present invention.

[0023] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

[0024] Hereinafter, a refrigerator according to a first embodiment of the present invention will be explained in more detail.

[0025] FIG. 1 is a view showing appearance of a refrigerator according to a first embodiment of the present invention, and FIG. 2 is a view showing inside of the refrigerator according to a first embodiment of the present invention.

[0026] Referring to FIGS. 1 and 2, the refrigerator body 10 is provided with a freezing chamber 11 and a refrigerating chamber 13 therein. The freezing chamber 11 and the refrigerating chamber 13 are disposed at left and right sides of the refrigerator body 10, respectively. A freezing chamber door 11 a and a refrigerating chamber door 13a are installed at the refrigerator body 10, such that one ends thereof are rotatable in back and forth directions centering around anther ends thereof. The freezing chamber door 11a and the refrigerating chamber door 13a serve to open or close the freezing chamber 11 and the refrigerating chamber 13, respectively.

[0027] Supporting side walls 11b and 13b are provided at two ends on rear surfaces of the freezing chamber door 11 a and the refrigerating chamber door 13a.

[0028] The supporting side walls 11b and 13b are formed as parts of door liners that form appearance of the rear surfaces of the freezing chamber door 11 a and the refrigerating chamber door 13a are backward protruding by a predetermined height.

[0029] A plurality of fixing protrusions (not shown) are provided on surfaces of the supporting side walls 11b and 13b facing each other.

[0030] A plurality of door baskets 14 are provided on rear surfaces of the freezing chamber door 11 a and the refrigerating chamber door 13a between the supporting side walls 11b and 13b.

[0031] Accommodation spaces for accommodating food items are formed in the door baskets 14.

[0032] The door baskets 14 are detachably mounted to the rear surfaces of the freezing chamber door 11 a and the refrigerating chamber door 13a.

[0033] Home bars 15 and 17 are provided at the freezing chamber door 11 a and the refrigerating chamber door 13a, respectively. The home bars 15 and 17 serve to draw out food items such as beverage, from the refrigerator, without opening the refrigerating chamber door 13a and the freezing chamber door 11a. The home bars 15 and 17 are composed of home bar housings 15a and 17a, and home bar doors 15b and 17b, respectively.

[0034] The home bar housings 15a and 17a are formed to have polygonal shapes that upper surfaces thereof, and rear surfaces adhered to the rear surface of the freezing chamber door 11 a or the refrigerating chamber door 13a are opened. The home bar housings 15a and 17a are provided on the rear surface of the freezing chamber door 11 a and the refrigerating chamber door 13a between the supporting side walls 11b and 13b. The home bar housings 15a and 17a are provided with storage spaces 15s and 17s for storing beverage, etc. therein.

[0035] As parts of the freezing chamber door 11 a and the refrigerating chamber door 13a are cut out, openings 15c and 17c are formed. Here, the opening 15c of the freezing chamber door 11 a is communicated with the storage space 15s of the home bar housing 15a. Through the opening 15c, food items are received into or drawn out of the storage space 15s of the home bar housing 15a, or an ice bank 100 (refer to FIG. 3) installed at the storage space 15s of the home bar housing 15a is drawn out.

[0036] The opening 17c of the refrigerating chamber door 13a is communicated with the storage space 17s of the home bar housing 17a. Through the opening 17c, food items are received into or drawn out of the storage space 17s of the home bar housing 17a.

[0037] The home bar doors 15b and 17b are installed at front surfaces of the freezing chamber door 11 a and the refrigerating chamber door 13a, such that upper ends thereof are rotatable in up and down directions centering around lower ends thereof. The home bar doors 15b and

17b serve to open or close the openings 15c and 17c, respectively.

[0038] The storage space 15s of the home bar housing 15a is opened or closed by the home bar door 15b of the freezing chamber door 11a.

[0039] An ice-making device 22 for making ice pieces may be provided above the home bar housing 15a on the rear surface of the freezing chamber door 11 a.

[0040] A water box 21 for storing water to be supplied to the ice-making device 22 may be mounted above the ice-making device 22.

[0041] Here, ice pieces made by the ice-making device 22 are transferred to the home bar housing 15a, and stored in the ice bank 100 (refer to FIG. 3) installed at the storage space 15s of the home bar housing 15a.

[0042] When the ice pieces made by the ice-making device 22 are to be transferred to the ice bank 100, the positions of the ice-making device 22 and the water box 21 may be changed.

[0043] Hereinafter, the ice bank 100 will be explained in more detail.

[0044] FIG. 3 is a sectional view taken along line I-I in FIG. 1, FIG. 4 is a perspective view showing a mounted state of an ice bank of FIG. 3, and FIG. 5 is a perspective view showing the ice bank of FIG. 4 and a second guide portion.

[0045] Referring to FIGS. 3 to 5, the ice bank 100 is installed at the storage space 15s of the home bar housing 15a, so as to be drawn out of the storage space 15s of the home bar housing 15a through the opening 15c. The ice bank 100 comprises a body portion 110 formed in a hexahedron shape having opened upper and lower surfaces; and a volume expansion container 120 inserted into the body portion 110 so as to be vertically moveable along an inner surface of the body portion 110, and forming an ice storage space 100s having an opened upper surface.

[0046] Preferably, one surface of the ice bank 100 is formed of a transparent or a semi-transparent material such that ice pieces stored in the ice storage space 100s can be recognized from outside.

[0047] A handgrip 101 may be provided at the ice bank 100 between a front surface of the body portion 110 and a front surface of the volume expansion container 120. The handgrip 101 may be formed to be concaved from a lower end of the front surface of the volume expansion container 120 toward a rear surface of the volume expansion container 120 by a predetermined height. Hereinafter, it is assumed that the front surface of the ice bank 100 indicates one surface of the ice bank 100 viewed from a front surface of the freezing chamber door 11a, i.e., one surface of the ice bank 100 viewed when the storage space 15s of the home bar housing 15a is opened by the home bar door 15b.

[0048] The ice bank 100 is installed at the storage space 15s of the home bar housing 15a by a guide unit.

[0049] The guide unit includes a first guide portion 140 fixed in the opening 15c for guiding the ice bank 100 to downward slantly move toward the opening 15c; and a second guide portion 150 drawn out of the opening 15c under guide of the first guide portion 140 for mounting the ice bank 100 in a drawing manner.

[0050] A process for coupling the first guide portion 140 and the second guide portion 150 with each other will be explained in more detail.

[0051] The first guide portion 140 guides the second guide portion 150 having the ice bank 100 mounted thereto to downward slantly move toward the opening 15c, the opened front surface of the first guide portion 140.

[0052] The first guide portion 140 prevents ice pieces stored in the ice storage space 100s of the ice bank 100 from being locked by the rear surface of the freezing chamber door 11 a adjacent to the opening 15c, in the process that the ice bank 100 and the second guide portion 150 are drawn out of the storage space 15s of the home bar housing 15a.

[0053] In order to guide the ice bank 100 and the second guide portion 150 to downward slantly move toward the opening 15c, one pair of guide slots 141 are provided at both side surfaces of the first guide portion 140.

[0054] One pair of guide protrusions 151 are protruding from both side surfaces of the second guide portion 150.

[0055] The guide protrusions 151 serve to guide the second guide portion 150 to be drawn out of the storage space 15s of the home bar housing 15a through the opening 15c in a state that the ice bank 100 is mounted to the second guide portion 150.

[0056] The guide protrusions 151 perform a sliding motion along the guide slots 141 in an inserted state into the guide slots 141 of the first guide portion 140.

[0057] The guide protrusions 151 are composed of a first guide protrusion 152 and a second guide protrusion 153. The first guide protrusion 152 is protruding from upper middle portions of both sides of the second guide portion 150, respectively.

[0058] The second guide protrusion 153 is protruding from rear middle portions of both sides of the second guide portion 150, respectively, with a lower height than the first guide protrusion 152. More concretely, the first guide protrusion 152 and the second guide protrusion 153 are spacing from each other by a predetermined distance in a direction that the ice bank 100 and the second guide portion 150 are drawn out of the storage space 15s of the home bar housing 15a through the opening 15c.

[0059] The reason is in order to allow the ice bank 100 and the second guide portion 150 to maintain a horizontal state when accommodated in the storage space 15s of the home bar housing 15a.

[0060] The first guide portion 140 serves to guide the second guide portion 150 drawn out of the storage space 15s of the home bar housing 15a in a state that the ice bank 100 is mounted to the second guide portion 150.

[0061] The first guide portion 140 is formed in a hexahedron shape having opened front, rear, and lower surfaces. The second guide portion 150 is installed in the first guide portion 40 so as to be drawn out in a front

direction.

[0062] An ice transfer opening 144 is provided on an upper surface of the first guide portion 140. The ice transfer opening 144 serves as a passage through which ice pieces made by the ice-making device 22 are supplied to the ice storage space 100s of the ice bank 100. The ice transfer opening 144 is formed as an upper surface of the first guide portion 140 is opened. The ice transfer opening 144 is formed in a rectangular shape having a size equal to or less than an opened upper portion of the ice bank 100, i.e., an inlet of the ice storage space 100s.

[0063] An ice transfer guide portion 145 is provided on an upper surface of the first guide portion 140 corresponding to the edge of the ice transfer opening 144. The ice transfer guide portion 145 is formed in a hopper shape that two side surfaces thereof are downward slanted toward the ice transfer opening 144. The ice transfer guide portion 145 serves to guide ice pieces made by the ice-making device 22 so as to be supplied to the ice storage space 100s of the ice bank 100 through the ice transfer opening 144.

[0064] Fixing grooves 147 are formed on both side surfaces of the first guide portion 140. The fixing grooves 147 serve to fix the first guide portion 140. To the fixing groove, inserted is a fixing protrusion (not shown) disposed at the supporting side wall 11 b of the freezing chamber door 11 a, and protruding to the storage space 15s of the home bar housing 15a.

[0065] The guide slots 141 are composed of a first guide slot 142 along which the first guide protrusion 152 inserted therein perform a sliding motion, and a second guide slot 143 along which the second guide protrusion 153 inserted therein perform a sliding motion.

[0066] The first guide slot 142 is composed of a first horizontal section 142a, an inclined section 142b, and a second horizontal section 142c.

[0067] The first horizontal section 142a is horizontally extending by a predetermined length, from upper middle portions of both side surfaces of the first guide portion 140, respectively, toward a direction that the second guide portion 150 having the ice bank 100 mounted thereto is drawn out, i.e., toward front ends of both side surfaces of the first guide portion 140.

[0068] The inclined section 142b is downward slantly extending by a predetermined length, from a front end of the first horizontal section 142a, to a direction that the second guide portion 150 having the ice bank 100 mounted thereto is drawn out.

[0069] The second horizontal section 142c is horizontally extending by a predetermined length, from a front end of the inclined section 142b, to a direction that the second guide portion 150 having the ice bank 100 mounted thereto is drawn out. A front end of the second horizontal section 142c is respectively located at middle portions of front ends of both side surfaces of the first guide portion 140.

[0070] The second guide slot 143 is composed of a first horizontal section 143a, an inclined section 143b, and a second horizontal section 143c.

[0071] The first horizontal section 143a is horizontally extending by a predetermined length, from rear middle portions of both side surfaces of the first guide portion 140, respectively, toward a direction that the second guide portion 150 having the ice bank 100 mounted thereto is drawn out, i.e., toward front ends of both side surfaces of the first guide portion 140.

[0072] The inclined section 143b is downward slantly extending by a predetermined length, from a front end of the first horizontal section 143a, to a direction that the second guide portion 150 having the ice bank 100 mounted thereto is drawn out.

[0073] The second horizontal section 143c is horizontally extending by a predetermined length, from a front end of the inclined section 143b, to a direction that the second guide portion 150 having the ice bank 100 mounted thereto is drawn out. A front end of the second horizontal section 143c is located at lower front ends of both side surfaces of the first guide portion 140, respectively.

[0074] Accordingly, when the second guide portion 150 having the ice bank 100 mounted thereto is located in the first guide portion 140, i.e., when the second guide portion 150 is accommodated in the storage space 15s of the home bar housing 15a, the first guide protrusion 152 and the second guide protrusion 153 are located at a rear end of the first horizontal section 142a of the first guide slot 142, and a rear end of the first horizontal section 143a of the second guide slot 143, respectively.

[0075] Here, the ice bank 100 and the second guide portion 150 in a horizontal state with respect to each other are disposed to be adjacent to the ice transfer opening 144 of the first guide portion 140 therebelow, and to an upper end of the opening 15c.

[0076] Then, once the second guide portion 150 having the ice bank 100 mounted thereto is moved towards the opening 15c, the first guide protrusion 152 and the second guide protrusion 153 slide along the inclined section 142b of the first guide slot 142 and the inclined section 143b of the second guide slot 143, respectively.

[0077] Accordingly, the second guide portion 150 is downward slantly moved toward the opening 15c. Here, upper surfaces of the ice bank 100 and the second guide portion 150 are downward spacing, by a predetermined distance, from the upper end of the ice transfer opening 144 of the first guide portion 140 and the opening 15c.

[0078] When the second guide portion 150 having the ice bank 100 mounted thereto continues to move toward the opening 15c, the first guide protrusion 152 and the second guide protrusion 153 slide along the second horizontal section 142c of the first guide slot 142, and the second horizontal section 143c of the second guide slot 143.

[0079] Once the first guide protrusion 152 and the second guide protrusion 153 are positioned on a front end of the second horizontal section 142c of the first guide slot 142, and on a front end of the second horizontal section 143c of the second guide slot 143, respectively,

front ends of the second guide portion 150 and the ice bank 100 mounted to the second guide portion 150 are partially drawn out of the storage space 15s of the home bar housing 15a through the opening 15c.

[0080] In the present invention, the ice bank 100 mounted to the second guide portion 150 is guided by the first guide portion 140.

[0081] However, it may be configured that the ice bank 100 is directly guided by the first guide portion 140 without being mounted to the second guide portion 150.

[0082] In this case, in order to draw the ice bank 100 out of the storage space 15s of the home bar housing 15a, front ends of the guide slots 141 of the first guide portion 140, i.e., the second horizontal sections 142c and 143c are formed to be outwardly opened through front ends of both side surfaces of the first guide portion 140.

[0083] A process for coupling the second guide portion 150 and the ice bank 100 will be explained in more detail with reference to FIG. 5.

[0084] Referring to FIG. 5, the ice bank 100 comprises a body portion 110 formed in a box shape having opened upper and lower surfaces; and a volume expansion container 120 inserted into the body portion 110 so as to be vertically moveable along an inner surface of the body portion 110, and forming an ice storage space 100s having an opened upper surface.

[0085] The second guide portion 150 is formed in a hexahedron shape of which upper, lower, and front surfaces are opened in correspondence to the body portion 110.

[0086] The second guide portion 150 having the ice bank 100 mounted thereto is drawn out of the storage space 15s of the home bar housing 15a, through the opening 15c under guide of the first guide portion 140. And, the ice bank 100 is drawn out of the storage space 15s of the home bar housing 15a, through the opening 15c under guide of the second guide portion 150.

[0087] Locking ribs 115 are provided on a front surface of the ice bank 100. And, interworking protrusions 113 are provided at upper rear portions of both side surfaces of the ice bank 100.

[0088] Supporting portions 155 for supporting the ice bank 100 are extending from lower ends of both side surfaces of the second guide portion 150 in a thickness direction of the body portion 110. Interworking ribs 154 are extending from upper front ends of both side surfaces of the second guide portion 150, by a predetermined length, so as to face each other in a thickness direction of the body portion 110.

[0089] The locking ribs 115 are downward extending from lower front ends of the ice bank 100 by a predetermined length, and are extending in right and left directions of the front surface of the ice bank 100.

[0090] The interworking protrusions 113 are upward protruding, by a predetermined height, from upper rear ends of both side surfaces of the ice bank 100.

[0091] The locking ribs 115 and the interworking protrusions 113 serve to move the second guide portion 150 by interworking with the ice bank 100 that moves in a direction to be drawn out of the storage space 15s of the home bar housing 15a through the opening 15c.

[0092] For this, the locking ribs 115 and the interworking protrusions 113 are adhered to front ends of both side surfaces of the second guide portion 150, and rear ends of the interworking ribs 154 of the second guide portion 150, respectively.

[0093] Inclined portions 111 are provided at lower rear ends of both side surfaces of the body portion 110.

[0094] The inclined portions 111 are downward slanted toward a direction that the ice bank 100 is drawn out of the storage space 15s of the home bar housing 15a through the opening 15c. The inclined portions 111 serve to detach the ice bank 100 having been drawn out of the storage space 15s of the home bar housing 15a through the opening 15c, from the second guide portion 150, by upward slantly moving the ice bank 100 with a mounted state to the second guide portion 150.

[0095] Once the ice bank 100 is moved in a direction to be accommodated in the storage space 15s of the home bar housing 15a, the locking ribs 115 push a front end of a bottom surface of the second guide portion 150. This allows the second guide portion 150 to be accommodated in the ice bank 100 by interworking with the ice bank 100.

[0096] Then, when the ice bank 100 is moved in a direction to be drawn out of the storage space 15s of the home bar housing 15a through the opening 15c, the interworking protrusions 113 are adhered to rear ends of the interworking ribs 154 to push the interworking ribs 154. This allows the second guide portion 150 to be drawn out of the ice bank 100 by interworking with the ice bank 100.

[0097] In the present invention, when the ice bank 100 is moved in a direction to be accommodated in the storage space 15s of the home bar housing 15a, the second guide portion 150 interworks with the ice bank 100 by the locking ribs 115, and is accommodated in the ice bank 100 under guide of the first guide portion 140.

[0098] It may be also configured that when the ice bank 100 is moved in a direction to be accommodated in the storage space 15s of the home bar housing 15a, the second guide portion 150 interworks with the ice bank 100 as a rear surface thereof is pushed by a rear surface of the ice bank 100.

[0099] Hereinafter, will be explained a volume control unit 130 for changing a volume of the ice bank 100 step by step.

[0100] FIG. 6 is an exploded perspective view showing the ice bank and the second guide portion of FIG. 5.

[0101] Referring to FIG. 6, the volume control unit 130 controls a volume of the ice bank 100 by restricting a relative motion of the volume expansion container 120 with respect to the body portion 110 step by step.

[0102] The volume control unit 130 includes volume control grooves 131 formed at one of inner side surfaces of the body portion 110 and outer side surfaces of the

volume expansion container 120; volume control protrusions 132 formed at another of the inner side surfaces of the body portion 110 and the outer side surfaces of the volume expansion container 120; and a locking unit 133 and 134 for restricting a relative motion of the volume control grooves 131 and the volume control protrusions 132 step by step.

[0103] Referring to FIG. 6, the volume control grooves 131 are formed at the volume expansion container 120, whereas the volume control protrusions 132 are formed at the body portion 110. However, the positions of the volume control grooves 131 and the volume control protrusions 132 may be interchanged to each other.

[0104] The volume control grooves 131 are formed at outer side surfaces of the volume expansion container 120 in a consecutive manner from an upper end to a lower end of the volume expansion container 120. That is, the volume control grooves 131 are formed in a volume control direction of the ice bank 100.

[0105] The volume control grooves 131 may be formed by partially reducing a thickness of both side surfaces of the volume expansion container 120. However, in order to prevent lowering of a strength of the ice bank 100 stored in a lower temperature, it is preferable to inwardly curve parts of both side surfaces of the volume expansion container 120.

[0106] Preferably, the volume control grooves 131 are formed such that upper ends thereof are closed. The reason is in order to prevent separation of the body portion 110 from the volume expansion container 120, occurring as the volume control protrusions 132 moving along the volume control grooves 131 are detached from an upper end of the volume expansion container 120 when a volume of the ice bank 100 is to be maximized.

[0107] The volume control protrusions 132 are formed at the inner side surfaces of the body portion 110 in correspondence to the volume control grooves 131.

[0108] In order to maximize a volume of the ice bank 100, the volume control protrusions 132 are preferably formed at lower ends of the inner side surfaces of the body portion 110.

[0109] The locking unit includes locking grooves 133 formed at one of the volume control grooves 131 and the volume control protrusions 132 in a volume control direction of the ice bank 100, and locking protrusions 134 formed at another of the volume control grooves 131 and the volume control protrusions 132 and locked by the locking grooves 133 step by step.

[0110] Referring to FIG. 6, the locking grooves 133 are provided at the volume control grooves 131 with a predetermined gap therebetween in plurality in a volume control direction of the ice bank 100. And, the locking protrusions 134 are formed at the volume control protrusions 132.

[0111] However, the positions of the locking grooves 133 and the locking protrusions 134 may be interchanged to each other.

[0112] The locking grooves 133 are formed on either inner surfaces of the volume control grooves 131, or both side surfaces of the volume control grooves 131. And, the locking grooves 133 are formed so as to be opened in a direction that the ice bank 100 is drawn out.

[0113] The locking protrusions 134 are formed on side surfaces of the volume control protrusions 132 in correspondence to the locking grooves 133.

[0114] The locking protrusions 134 are formed so as to be elastically supported in a direction perpendicular to a volume control direction of the ice bank 100.

[0115] In the present invention, the locking protrusions 134 are implemented as plate springs supported by inner side walls of the volume control protrusions 132. However, the locking protrusions 134 may be configured so as to be supported by compression springs, etc.

[0116] The locking groove 133 is formed such that inner side surfaces thereof are inclined in a volume control direction of the ice bank 100. The reason is in order to guide motion of the locking protrusions 134.

[0117] Accordingly, an upper side of the locking grooves 133 is upward slantly formed toward an upper surface of the volume expansion container 120, whereas a lower side of the locking grooves 133 is downward slantly formed toward a lower surface of the volume expansion container 120.

[0118] Hereinafter, will be explained processed for drawing the ice bank 100 out of the storage space 15s in the refrigerator according to the first embodiment of the present invention.

[0119] FIGS. 7 to 9 are views showing processes for drawing the ice bank out, and for controlling a volume of the ice bank in the refrigerator according to the first embodiment of the present invention.

[0120] Referring to FIG. 7, in order to use ice pieces stored in the ice storage space 100s of the ice bank 100, the home bar door 15b of the home bar 15 is opened to open the opening 15c. Then, the ice bank 100 is pulled out of the storage space 15s of the home bar housing 15a, i.e., in a drawing direction.

[0121] Here, the second guide portion 150 having the ice bank 100 mounted thereto is also moved in the drawing direction by friction to the ice bank 100. The ice bank 100 and the second guide portion 150 are moved under guide of the guide protrusion 151 of the second guide portion 150, and the guide slot 141 of the first guide portion 140.

[0122] More concretely, the second guide portion 150 is horizontally moved in a drawing direction, then is downward slantly moved, and then is horizontally moved, again. Accordingly, even if ice pieces excessively stored in the ice storage space 100s of the ice bank 100 are partially protruding toward an upper side, the ice bank 100 can be drawn out without interfering with the freezing chamber door 11 a.

[0123] When the guide protrusions 151 are located at front ends of the guide slots 141, the second guide portion 150 is not moved any longer in the drawing direction.

[0124] As shown in FIG. 9, when the ice bank 100 is

continuously pulled in the drawing direction, only the ice bank 100 is moved in the drawing direction to be drawn out of the storage space 15s of the home bar housing 15a through the opening 15c.

[0125] Here, the ice bank 100 is moved in the drawing direction until the interworking protrusions 113 are adhered to rear ends of the interworking ribs 154 of the second guide portion 150. In a state that the interworking protrusions 113 are adhered to the rear ends of the interworking ribs 154, only a part of a front end of the ice bank 100 is drawn out of the storage space 15s of the home bar housing 15a through the opening 15c.

[0126] Under this state, the ice bank 100 is moved so that its front end is upward slanted in the drawing direction. This causes the ice bank 100 to be detached from the second guide portion 150, and to be completely drawn out of the storage space 15s of the home bar housing 15a. Here, the inclined portions 111 serve to prevent the ice bank 100 from interfering with the second guide portion 150 when being separated from the second guide portion 150.

[0127] Hereinafter, a refrigerator according to a second embodiment of the present invention will be explained in more detail with reference to the attached drawings. Detailed explanations for the same structures as those of the first embodiment will be omitted.

[0128] FIG. 10 is an exploded perspective view showing an ice bank and a second guide portion according to a second embodiment of the present invention.

[0129] The refrigerator according to the second embodiment is the same as that according to the first embodiment, except for locking unit 233 and 234 of a volume control unit 230.

[0130] The volume control unit 230 includes volume control grooves 231 formed at one of inner side surfaces of a body portion 210 and outer side surfaces of a volume expansion container 220; volume control protrusions 232 formed at another of the inner side surfaces of the body portion 210 and the outer side surfaces of the volume expansion container 220; and a locking unit 233 and 234 for restricting a relative motion of the volume control grooves 231 and the volume control protrusions 232 step by step.

[0131] The volume control grooves 231 are formed at outer side surfaces of the volume expansion container 220 in a consecutive manner from an upper end to a lower end of the volume expansion container 220. That is, the volume control grooves 231 are formed in a volume control direction of the ice bank 200.

[0132] The volume control grooves 231 are formed as parts of both side surfaces of the volume expansion container 220 are inwardly curved.

[0133] The volume control protrusions 232 are formed at the inner side surfaces of the body portion 210 in correspondence to the volume control grooves 231.

[0134] In order to maximize a volume of the ice bank 200, the volume control protrusions 232 are preferably formed at lower ends of the inner side surfaces of the body portion 210.

[0135] The locking unit includes locking grooves 233 formed at one of the volume control grooves 231 and the volume control protrusions 232 with a sectional surface of a sine wave in a volume control direction of the ice bank 200, and locking protrusions 234 formed at another of the volume control grooves 231 and the volume control protrusions 232 with a sectional surface of a sine wave.

[0136] In the present invention, the locking grooves 233 are consecutively formed in upper and lower directions of the volume expansion container 220. This allows a volume of the ice bank 200 to be variably controlled.

[0137] The locking protrusions 234 are provided in plurality in number in correspondence to the locking grooves 233 formed in consecutive sine waves. This allows a coupling force between the body portion 210 and the volume expansion container 220 to be increased.

[0138] Like in the first embodiment, the locking protrusions 234 are preferably formed so as to be elastically supported in a direction perpendicular to a volume control direction of the ice bank 200.

[0139] Hereinafter, a refrigerator according to a third embodiment of the present invention will be explained in more detail with reference to the attached drawings. Detailed explanations for the same structures as those of the first embodiment will be omitted.

[0140] FIG. 11 is an exploded perspective view showing an ice bank and a second guide portion according to a third embodiment of the present invention.

[0141] Referring to FIG. 11, the volume control unit 330 includes a first controller 331 formed at one of inner side surfaces of a body portion 310 and outer side surfaces of a volume expansion container 320, and having a sectional surface of a sine wave in a volume control direction of the ice bank 300; and a second controller 332 formed at another of the inner side surfaces of the body portion 310 and the outer side surfaces of the volume expansion container 320 so as to be engaged with the first controller 331, and having a sectional surface of a sine wave in the volume control direction of the ice bank 300.

[0142] The volume control unit 330 is formed at the inner side surface of the body portion 310, and the outer side surface of the volume expansion container 320 corresponding to each other. The volume control unit 330 is formed to have a sectional surface of a sine wave in a volume control direction of the ice bank 300.

[0143] As the first controller 331 and the second controller 332 are engaged with each other, the body portion 310 and the volume expansion container 320 are coupled to each other, and the body portion 310 and the volume expansion container 320 perform a relative motion with respect to each other along the sectional surfaces of a sine wave.

[0144] For the relative motion of the body portion 310 and the volume expansion container 320 with respect to each other, a predetermined air gap is preferably formed between the inner side surfaces of the body portion 310 and the outer side surfaces of the volume expansion con-

tainer 320.

[0145] Hereinafter, a refrigerator according to a fourth embodiment of the present invention will be explained in more detail with reference to the attached drawings. Detailed explanations for the same structures as those of the first embodiment will be omitted.

[0146] FIG. 12 is an exploded perspective view showing an ice bank and the second guide portion according to a fourth embodiment of the present invention.

[0147] Referring to FIG. 12, a volume control unit 430 may be implemented as the volume control unit according to the first embodiment or the second embodiment.

[0148] The volume control unit 430 includes volume control grooves 431 formed at one of inner side surfaces of a body portion 410 and outer side surfaces of a volume expansion container 420, volume control protrusions 432 formed at another of the inner side surfaces of the body portion 410 and the outer side surfaces of the volume expansion container 420, and a locking unit 433 and 434 for restricting a relative motion of the volume control grooves 431 and the volume control protrusions 432 step by step.

[0149] Referring to FIG. 12, guide ribs 435 are formed at the inner side surfaces of the body portion 410 in a volume control direction of the ice bank 400. And, guide grooves 436 for guiding the guide ribs 435 are formed at the outer side surfaces of the volume expansion container 420.

[0150] The reason is, in order to prevent a phenomenon that the volume control protrusions 432 are fitted into the volume control grooves 431 not to be moved due to a motion between the body portion 410 and the volume expansion container 420, in the case that an inner surface of the body portion 410 is spacing from an outer surface of the volume expansion container 420 due to a tolerance, etc. when a volume of the ice bank 400 is to be changed.

[0151] It will also be apparent to those skilled in the art that various modifications and variations can be made in the present invention provided they come within the scope of the appended claims.

Claims

1. A refrigerator, comprising:

an opening (15c) disposed at one side of a door;
an ice bank (100) disposed on a rear surface of the door, and configured to be drawn out through the opening, for storing ice pieces;
a guide unit for guiding the ice bank (100) to be drawn out; **characterized by**
a volume control unit (130) for changing a volume of the ice bank (100) step by step,

wherein the ice bank (100) comprises:

a body portion (110, 210, 310, 410) formed in a box shape having opened upper and lower surfaces; and
a volume expansion container (120, 220, 320, 420) inserted into the body portion (110, 210, 310, 410) so as to be vertically moveable along an inner surface of the body portion, and forming an ice storage space having an opened upper surface, and wherein the volume control unit (130, 230, 330, 430) comprises:

volume control grooves (131, 231, 331, 431) formed in a volume control direction of the ice bank (100), at one of inner side surfaces of the body portion and outer side surfaces of the volume expansion container;
volume control protrusions (132, 232, 332, 432) formed at another of the inner side surfaces of the body portion and the outer side surfaces of the volume expansion container in correspondence to the volume control grooves (131, 231, 331, 431), the volume control protrusions (132, 232, 332, 432) being inserted into the volume control grooves (131, 231, 331, 431) to be movable in the volume control direction of the ice bank (100); and
a locking unit (133, 134) (233, 234) (331, 332) (433, 434) for restricting a relative motion of the volume control grooves (131, 231, 331, 431) with respect to the volume control protrusions (132, 232, 332, 432) step by step.

2. The refrigerator of claim 1, wherein the ice bank is provided with a handgrip (101) concaved at a lower front end of the volume expansion container by predetermined height toward a rear surface of the volume expansion container, and formed between a front surface of the body portion and a front surface of the volume expansion container.

3. The refrigerator of claim 1 or 2, wherein the locking unit comprises:

locking grooves (133, 233, 433) formed at one of the volume control grooves and the volume control protrusions in a volume control direction of the ice bank (100); and
locking protrusions (134, 234, 434) formed at another of the volume control grooves and the volume control protrusions, and locked by the locking grooves step by step, and

wherein the locking protrusion is formed of a material with elasticity, the locking protrusion is inserted into the volume control protrusion so as to be elastically supported in a direction perpendicular to the volume

control direction of the ice bank (100).

4. The refrigerator of claim 3, wherein the locking groove (133, 233, 433) is formed at one surface of both side surfaces of the volume control groove so as to be opened in a direction that the ice bank is drawn out, and
wherein the locking protrusion (134, 234, 434) is provided at a side surface of the volume control protrusion in correspondence to the locking groove.

5. The refrigerator of claim 3 or 4, wherein
the locking groove (133, 233, 433) is formed such that its inner side surfaces are inclined in the volume control direction of the ice bank (100).

6. The refrigerator of any one of claim 1 to 5, wherein the locking unit comprises:

locking grooves (133, 233, 433) formed at one of the volume control grooves and the volume control protrusions, and having a sectional surface of a sine wave in a volume control direction of the ice bank; and
locking protrusions (134, 234, 434) formed at another of the volume control grooves and the volume control protrusions in correspondence to the locking grooves.

7. The refrigerator of claim 6, wherein the locking groove (133, 233, 433) is formed at one surface of both side surfaces of the volume control groove so as to be opened in a direction that the ice bank is drawn out, and
wherein the locking protrusion (134, 234, 434) is provided at a side surface of the volume control protrusion in correspondence to the locking groove.

8. The refrigerator of any one of claims 1 to 7,
wherein a guide ribs (435) are formed at the inner side surfaces of the body portion (410) in a volume control direction of the ice bank (400), and
guide grooves (436) for guiding the guide ribs (435) are formed at the outer side surfaces of the volume expansion container (420).

9. The refrigerator of claim 1 or 2, wherein the volume control unit (130) comprises:

a first controller (331) formed at one of inner side surfaces of the body portion and outer side surfaces of the volume expansion container, and having a sectional surface of a sine wave in a volume control direction of the ice bank; and
a second controller (332) formed at another of the inner side surfaces of the body portion and the outer side surfaces of the volume expansion container so as to be engaged with the first controller, and having a sectional surface of a sine wave in the volume control direction of the ice bank.

10. The refrigerator of claim 1 or 2, wherein the guide unit comprises:

a first guide portion (140) fixed in the opening, for guiding the ice bank to downward slantly move toward the opening; and
a second guide portion (150) configured to be drawn out of the opening under guide of the first guide portion, for mounting the ice bank in a drawing manner.

11. The refrigerator of claim 10, wherein one pair of guide protrusions (151) formed at one of outer side surfaces of the second guide portion and inner side surfaces of the first guide portion perform a sliding motion in an inserted state into one pair of guide slots (142) formed at another of the outer side surfaces of the second guide portion and the inner side surfaces of the first guide portion.

12. The refrigerator of claim 10 or 11, wherein the second guide portion is formed in a hexahedron shape of which upper, lower, and front surfaces are opened in correspondence to the body portion, and
wherein the second guide portion guides the ice bank to be introduced into or drawn out of the opening.

13. The refrigerator of claim 10 or 11, wherein the second guide portion comprises:

supporting portions (155) extending from lower ends of both side surfaces of the second guide portion in a thickness direction of both side surfaces of the body portion, for supporting the ice bank; and
one pair of interworking ribs (154) formed at upper front ends of both side surfaces of the second guide portion, and extending from both side surfaces of the body portion in a thickness direction,

wherein one pair of interworking protrusions (113) are formed at upper rear ends of both side surfaces of the body portion, such that the second guide portion is drawn out by interworking therewith when the ice bank is drawn out.

Patentansprüche

1. Kühlschrank umfassend:

eine Öffnung (15c) angeordnet an einer Seite einer Tür;

ein Eislager (100) zum Lagern von Eisstücken angeordnet an einer hinteren Fläche der Tür und ausgelegt, um durch die Öffnung herausgezogen zu werden;
eine Führungseinheit zum Führen des Eislagers (100), das hinaus zu ziehen ist; **gekennzeichnet durch**
eine Volumenregel-/-Steuereinheit (130) zum schrittweisen Ändern eines Volumens des Eislagers (100),

wobei das Eislager (100) umfasst:

einen Körperbereich (110, 210, 310, 410) ausgebildet in einer Kastenform aufweisend offene obere und untere Flächen; und
einen Volumenexpansionsbehälter (120, 220, 320, 420) eingeführt in den Körperbereich (110, 210, 310, 410) um vertikal entlang einer inneren Fläche des Körperbereichs bewegbar zu sein und ausbildend einen Eislagerungsraum aufweisend eine offene obere Fläche, und wobei die Volumenregel-/-steuereinheit (130, 230, 330, 430) umfasst:

Volumenregel-/-steuernuten (131, 231, 331, 431) ausgebildet in einer Volumenregel-/-steuerrichtung des Eislagers (100) an einem von inneren seitlichen Flächen des Körperbereichs und äußeren seitlichen Flächen des Volumenexpansionsbehälters;
Volumenregel-/-steuervorsprünge (132 , 232, 332, 432) ausgebildet am anderen der inneren seitlichen Flächen des Körperbereichs und der äußeren seitlichen Flächen des Volumenexpansionsbehälters entsprechend zu den Volumenregel-/-steuernuten (131, 231, 331, 431), wobei die Volumenregel-/- steuervorsprünge (132, 232, 332, 432) in die Volumenregel-/-steuernuten (131, 231, 331, 431) eingeführt sind, um in der Volumenregel-/- steuerrichtung des Eislagers (100) bewegbar zu sein; und
eine Verschlusseinheit (133, 134) (233, 234) (331, 332) (433, 434) zum Begrenzen einer relativen schrittweisen Bewegung der Volumenregel-/- steuernuten (131, 231, 331, 431) in Bezug auf die Volumenregel-/-steuervorsprünge (132, 232, 332, 432).

2. Kühlschrank nach Anspruch 1, wobei das Eislager mit einem Handgriff (101) bereitgestellt ist, der an einem unteren vorderen Ende des Volumenexpansionsbehälters um eine vorbestimmte Höhe hin zu einer hinteren Fläche des Volumenexpansionsbehälters ausgehöhlt ist und der zwischen einer vorderen Fläche des Körperbereichs und einer vorderen Fläche des Volumenexpansionsbehälters ausgebildet ist.

3. Kühlschrank nach Anspruch 1 oder 2, wobei die Verschlusseinheit umfasst:

Verschlussnuten (133, 233, 433) ausgebildet an einem von den Volumenregel-/-steuernnuten und den Volumenregel-/-steuervorsprüngen in einer Volumenregel-/-steuerrichtung des Eislagers (100); und
Verschlussvorsprünge (134, 234, 434) schrittweise ausgebildet an dem anderen der Volumenregel-/-steuernuten und der Volumenregel-/- steuervorsprünge und verschlossen durch die Verschlussnuten, und wobei der Verschlussvorsprung aus einem Material ausgebildet ist mit Elastizität, wobei der Verschlussvorsprung in den Volumenregel-/- steuervorsprung eingeführt ist, um elastisch in einer Richtung rechtwinklig zu der Volumenregel-/-steuerrichtung des Eislagers (100) gehaltert zu sein.

4. Kühlschrank nach Anspruch 3, wobei die Verschlussnut (133, 233, 433) an einer Fläche von beiden seitlichen Flächen der Volumenregel-/- steuernut ausgebildet ist, um in einer Richtung offen zu sein, in die das Eislager hinaus gezogen wird, und wobei der Verschlussvorsprung (134, 234, 434) an einer seitlichen Fläche des Volumenregel-/-steuervorsprungs bereitgestellt ist entsprechend zu der Verschlussnut.

5. Kühlschrank nach Anspruch 3 oder 4, wobei die Verschlussnut (133, 233, 433) so ausgebildet ist, dass ihre inneren seitlichen Flächen in die Volumenregel-/-steuerrichtung des Eislagers (100) geneigt sind.

6. Kühlschrank nach irgend einem der Ansprüche 1 bis 5, wobei die Verschlusseinheit umfasst:

Verschlussnuten (133, 233, 433) ausgebildet an einem von den Volumenregel-/- steuernuten und den Volumenregel-/-steuervorsprüngen und aufweisend eine eingeteilte Fläche in einer Sinuswelle in einer Volumenregel-/-steuerrichtung des Eislagers; und
Verschlussvorsprünge (134, 234, 434) ausgebildet am anderen der Volumenregel-/-steuernuten und der Volumenregel-/-steuervorsprünge entsprechend den Verschlussnuten.

7. Kühlschrank nach Anspruch 6, wobei die Verschlussnut (133, 233, 433) an einer Fläche von beiden seitlichen Flächen der Volumenregel-/- steuernut ausgebildet ist, um in eine Richtung offen zu sein, in die das Eislager hinaus gezogen wird, und wobei der Verschlussvorsprung (134, 234, 434) an

einer seitlichen Fläche des Volumenregel-/-steuervorsprungs bereitgestellt ist entsprechend der Verschlussnut.

8. Kühlschrank nach irgend einem der Ansprüche 1 bis 7,
wobei Führungsrippen (435) an den inneren seitlichen Flächen des Körperbereichs (410) in einer Volumenregel-/-steuerrichtung des Eislagers (400) ausgebildet sind, und
Führungsnuten (436) zum Führen der Führungsrippen (435) an der äußeren seitlichen Fläche des Volumenexpansionsbehälters (420) ausgebildet sind.

9. Kühlschrank nach Anspruch 1 oder 2, wobei die Volumenregel-/- steuereinheit (130) umfasst:

einen ersten Regler/Steuerer (331) ausgebildet an einem von inneren seitlichen Flächen des Körperbereichs und äußeren seitlichen Flächen des Volumenexpansionsbehälters und aufweisend eine eingeteilte Fläche in einer Sinuswelle in einer Volumenregel-/-steuerrichtung des Eislagers; und
einen zweiten Regler/Steuerer (332) ausgebildet am anderen von den inneren seitlichen Flächen des Körperbereichs und den äußeren seitlichen Flächen des Volumenexpansionsbehälters, um mit dem ersten Regler/Steuerer in Eingriff zu stehen, und aufweisend eine eingeteilte Fläche in einer Sinuslinie in einer Volumenregel/-steuerrichtung des Eislagers.

10. Kühlschrank nach Anspruch 1 oder 2, wobei die Führungseinheit umfasst:

einen ersten Führungsbereich (140) fixiert in der Öffnung zum Führen des Eislagers in einer nach unten geneigten Bewegung hin zu der Öffnung; und
einen zweiten Führungsbereich (150) ausgelegt, um unter Führung des ersten Führungsbereichs aus der Öffnung herausgezogen zu werden zum ziehbaren Anbringen des Eislagers.

11. Kühlschrank nach Anspruch 10, wobei ein Paar von Führungsvorsprüngen (151), die an einem von äußeren seitlichen Flächen des zweiten Führungsbereichs und inneren seitlichen Flächen des ersten Führungsbereichs ausgebildet sind, eine Verlagerungsbewegung in einem eingesetzten Zustand in ein Paar von Führungsschlitzen (142) hinein ausführen, die am anderen von den äußeren seitlichen Flächen des zweiten Führungsbereichs und den inneren seitlichen Flächen des ersten Führungsbereichs ausgebildet sind.

12. Kühlschrank nach Anspruch 10 oder 11, wobei der zweite Führungsbereich in Form eines Hexaeders ausgebildet ist, dessen obere, untere und vordere Flächen offen sind entsprechend dem Körperbereich, und
wobei der zweite Führungsbereich das Eislager so führt, dass es in die Öffnung hinein geführt oder aus der Öffnung hinaus gezogen wird.

13. Kühlschrank nach Anspruch 10 oder 11, wobei der zweite Führungsbereich umfasst:

Halterungsbereiche (155), die sich von unteren Enden von beiden seitlichen Flächen des zweiten Führungsbereichs in einer Dickenrichtung von beiden seitlichen Flächen des Körperbereichs erstrecken zum Haltern des Eislagers; und
ein Paar von zusammenwirkenden Rippen (154), die an oberen vorderen Enden von beiden seitlichen Flächen des zweiten Führungsbereichs ausgebildet sind und die sich von beiden seitlichen Flächen des Körperbereichs in einer Dickenrichtung erstrecken,

wobei ein Paar von zusammenwirkenden Vorsprüngen (113) an oberen hinteren Enden von beiden seitlichen Flächen des Körperbereichs ausgebildet sind, sodass der zweite Führungsbereich herausgezogen wird durch Zusammenwirken mit diesen, wenn das Eislager hinaus gezogen wird.

Revendications

1. Réfrigérateur comprenant :

une ouverture (15c) agencée sur un côté d'une porte ;
un bac à accumulation de glace (100) agencé sur une surface arrière de la porte, et configuré pour être extrait à travers l'ouverture, pour stocker des pièces de glace ;
une unité de guidage pour le guidage du bac à accumulation de glace (100) à extraire ;

caractérisé par
une unité de commande de volume (130) pour changer un volume du bac à accumulation de glace (100) étape par étape,
dans lequel le bac à accumulation de glace (100) comprend :

une partie de corps (110, 210, 310, 410) formée en une forme de boîte présentant des surfaces supérieure et inférieure ouvertes ; et
un contenant d'expansion de volume (120, 220, 320, 420) inséré dans la partie de corps (110, 210, 310, 410) de sorte à être mobile verticale-

ment le long d'une surface intérieure de la partie de corps, et formant un espace de stockage de glace présentant une surface supérieure ouverte, et dans lequel

l'unité de commande de volume (130, 230, 330, 430) comprend :

des rainures de commande de volume (131, 231, 331, 431) formées dans une direction de commande de volume du bac à accumulation de glace (100) sur une des surfaces latérales intérieures de la partie de corps et des surfaces latérales extérieures du contenant d'expansion de volume ;
des saillies de commande de volume (132, 232, 332, 432) formées sur une autre des surfaces latérales intérieures de la partie de corps et des surfaces latérales extérieures du contenant d'expansion de volume en correspondance avec les rainures de commande de volume (131, 231, 331, 431), les saillies de commande de volume (132, 232, 332, 432) étant insérées dans les rainures de commande de volume (131, 231, 331, 431) pour être mobiles dans la direction de commande de volume du bac à accumulation de glace (100) ; et
une unité de verrouillage (133, 134) (233, 234) (331, 332) (433, 434) pour restreindre un mouvement relatif des rainures de commande de volume (131, 231, 331, 431) par rapport aux saillies de commande de volume (132, 232, 332, 432) étape par étape.

2. Réfrigérateur selon la revendication 1, dans lequel le bac à accumulation de glace est doté d'une poignée (101) concave sur une extrémité avant inférieure du contenant d'expansion de volume d'une hauteur prédéterminée vers une surface arrière du contenant d'expansion de volume, et formée entre une surface avant de la partie de corps et une surface avant du contenant d'expansion de volume.

3. Réfrigérateur selon la revendication 1 ou 2, dans lequel l'unité de verrouillage comprend :

des rainures de verrouillage (133, 233, 433) formées sur une des rainures de commande de volume et des saillies de commande de volume dans une direction de commande de volume du bac à accumulation de glace (100) ; et
des saillies de verrouillage (134, 234, 434) formées sur une autre des rainures de commande de volume et des saillies de commande de volume, et verrouillées par les rainures de verrouillage étape par étape, et

dans lequel la saillie de verrouillage est formée d'un matériau avec élasticité, la saillie de verrouillage est insérée dans la saillie de commande de volume de sorte à être supportée élastiquement dans une direction perpendiculaire à la direction de commande de volume du bac à accumulation de glace (100).

4. Réfrigérateur selon la revendication 3, dans lequel la rainure de verrouillage (133, 233, 433) est formée sur une surface des deux surfaces latérales de la rainure de commande de volume de sorte à être ouverte dans une direction, dans laquelle le bac à accumulation de glace est extrait, et
dans lequel la saillie de verrouillage (134, 234, 434) est fournie sur une surface latérale de la saillie de commande de volume en correspondance avec la rainure de verrouillage.

5. Réfrigérateur selon la revendication 3 ou 4, dans lequel
la rainure de verrouillage (133, 233, 433) est formée de sorte que ses surfaces latérales intérieures soient inclinées dans la direction de commande de volume du bac à accumulation de glace (100).

6. Réfrigérateur selon l'une quelconque des revendications 1 à 5, dans lequel l'unité de verrouillage comprend :

des rainures de verrouillage (133, 233, 433) formées sur une des rainures de commande de volume et des saillies de commande de volume, et présentant une surface de section d'une onde sinusoïdale dans une direction de commande de volume du bac à accumulation de glace ; et
des saillies de verrouillage (134, 234, 434) formées sur une autre des rainures de commande de volume et des saillies de commande de volume en correspondance avec les rainures de verrouillage.

7. Réfrigérateur selon la revendication 6, dans lequel la rainure de verrouillage (133, 233, 433) est formée sur une surface des deux surfaces latérales de la rainure de commande de volume de sorte à être ouverte dans une direction, dans laquelle le bac à accumulation de glace est extrait, et
dans lequel la saillie de verrouillage (134, 234, 434) est fournie sur une surface latérale de la saillie de commande de volume en correspondance avec la rainure de verrouillage.

8. Réfrigérateur selon l'une quelconque des revendications 1 à 7,
dans lequel des nervures de guidage (435) sont formées sur les surfaces latérales intérieures de la partie de corps (410) dans une direction de commande de volume du bac à accumulation de glace (400), et des rainures de guidage (436) pour guider les ner-

vures de guidage (435) sont formées sur les surfaces latérales extérieures du contenant d'expansion de volume (420).

9. Réfrigérateur selon la revendication 1 ou 2, dans lequel l'unité de commande de volume (130) comprend :

un premier contrôleur (331) formé sur une des surfaces latérales intérieures de la partie de corps et des surfaces latérales extérieures du contenant d'expansion de volume, et présentant une surface de section d'une onde sinusoïdale dans une direction de commande de volume du bac à accumulation de glace ; et
un second contrôleur (332) formé sur une autre des surfaces latérales intérieures de la partie de corps et des surfaces latérales extérieures du contenant d'expansion de volume de sorte à être engagées avec le premier contrôleur, et présentant une surface de section d'une onde sinusoïdale dans une direction de commande de volume du bac à accumulation de glace.

10. Réfrigérateur selon la revendication 1 ou 2, dans lequel l'unité de guidage comprend :

une première partie de guidage (140) fixée dans l'ouverture, pour guider le bac à accumulation de glace pour qu'il se déplace incliné vers le bas vers l'ouverture ; et
une seconde partie de guidage (150) configurée pour être extraite de l'ouverture par le guidage de la première partie de guidage pour le montage du bac à accumulation de glace par tirage.

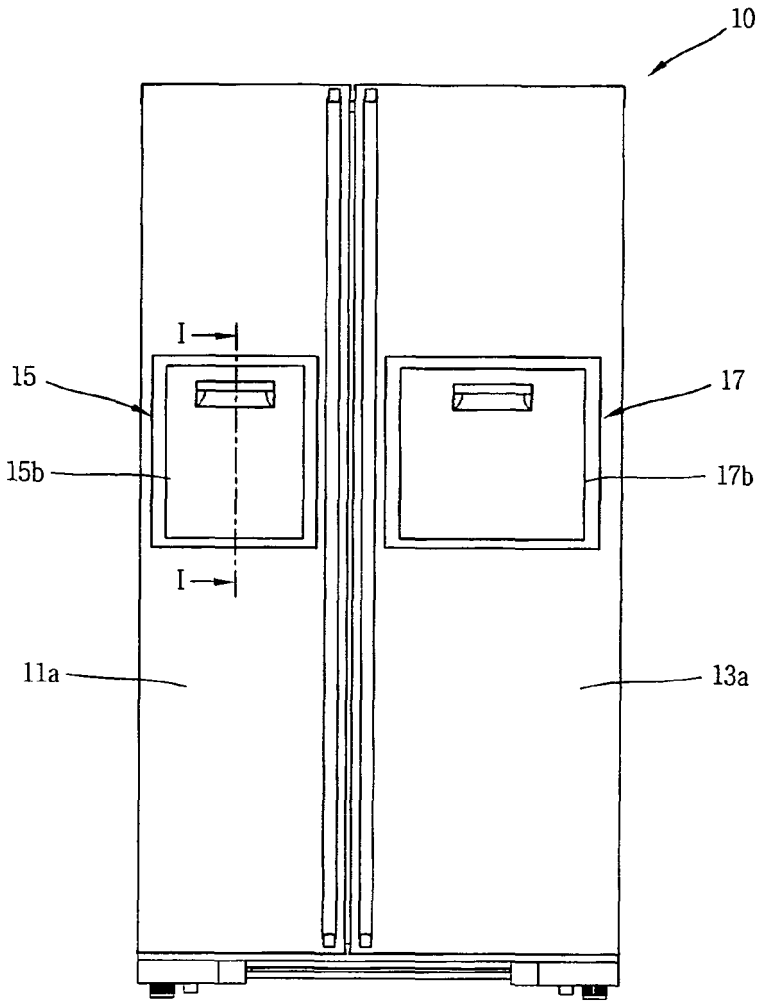
11. Réfrigérateur selon la revendication 10, dans lequel une paire de saillies de guidage (151) formées sur une des surfaces latérales extérieures de la seconde partie de guidage et des surfaces latérales intérieures de la première partie de guidage réalisent un mouvement coulissant dans un état inséré dans une paire de fentes de guidage (142) formées sur une autre des surfaces latérales extérieures de la seconde partie de guidage et des surfaces latérales intérieures de la première partie de guidage.

12. Réfrigérateur selon la revendication 10 ou 11, dans lequel la seconde partie de guidage est formée en une forme d'hexaèdre, dont les surfaces supérieure, inférieure et avant sont ouvertes en correspondance avec la partie de corps, et
dans lequel la seconde partie de guidage guide le bac à accumulation de glace pour qu'il soit introduit dans l'ouverture ou retiré de celle-ci.

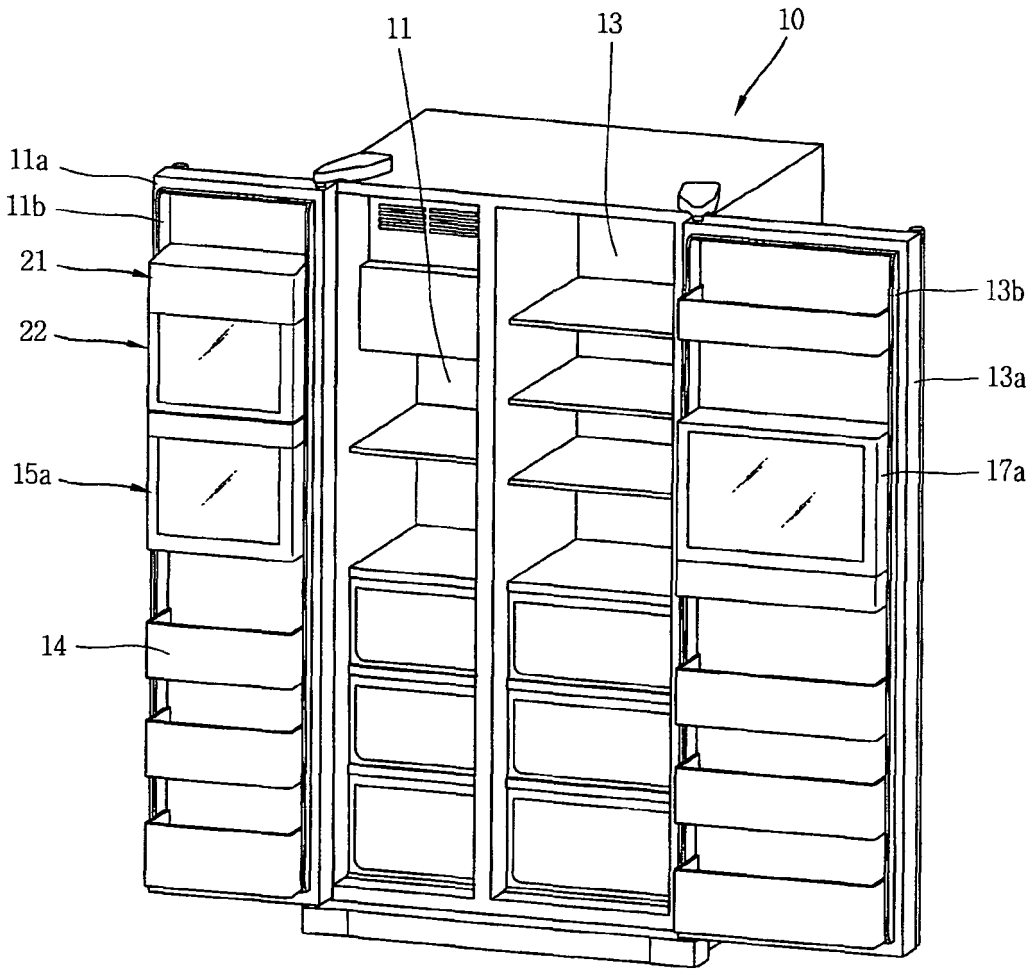
13. Réfrigérateur selon la revendication 10 ou 11, dans lequel la seconde partie de guidage comprend :

des parties de support (155) s'étendant depuis des extrémités inférieures des deux surfaces latérales de la seconde partie de guidage dans une direction d'épaisseur des deux surfaces latérales de la partie de corps, pour supporter le bac à accumulation de glace ; et
une paire de nervures d'interfonctionnement (154) formées sur des extrémités avant supérieures des deux surfaces latérales de la seconde partie de guidage et s'étendant depuis les deux surfaces latérales de la partie de corps dans une direction d'épaisseur, dans lequel une paire de saillies d'interfonctionnement (113) est formée sur des extrémités arrière supérieures des deux surfaces latérales de la partie de corps de sorte que la seconde partie de guidage soit extraite par interfonctionnement avec celle-ci lorsque le bac à accumulation de glace est retiré.

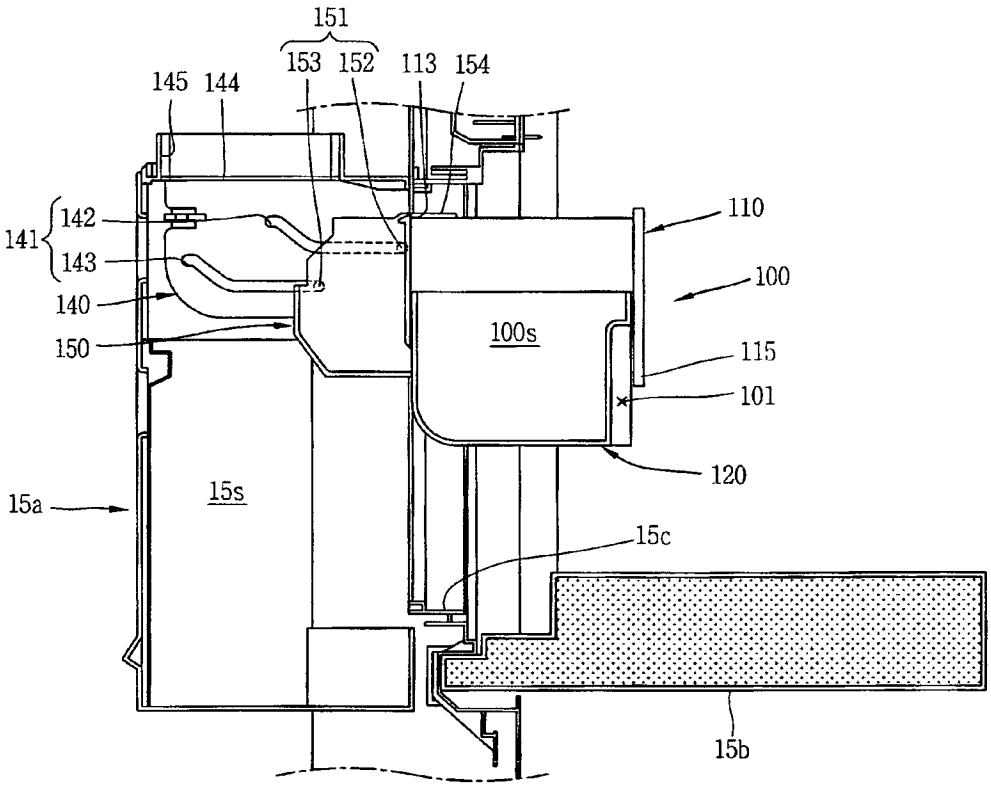
[Fig. 1]



[Fig. 2]



[Fig. 3]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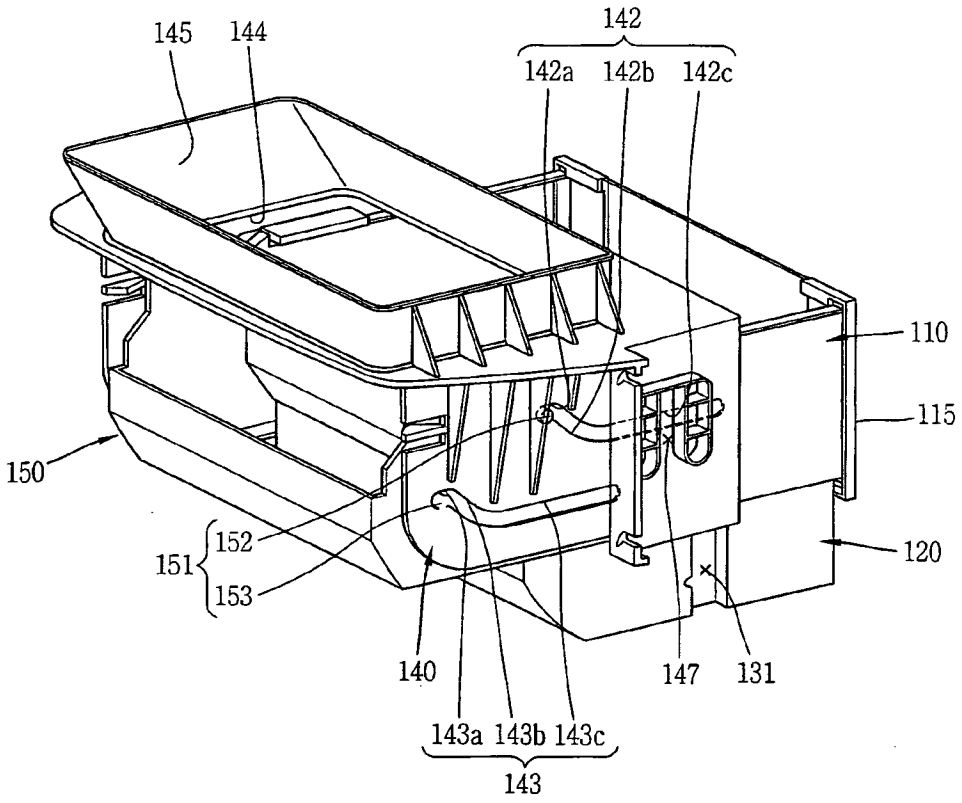
15s
15c
15b

[Fig. 4]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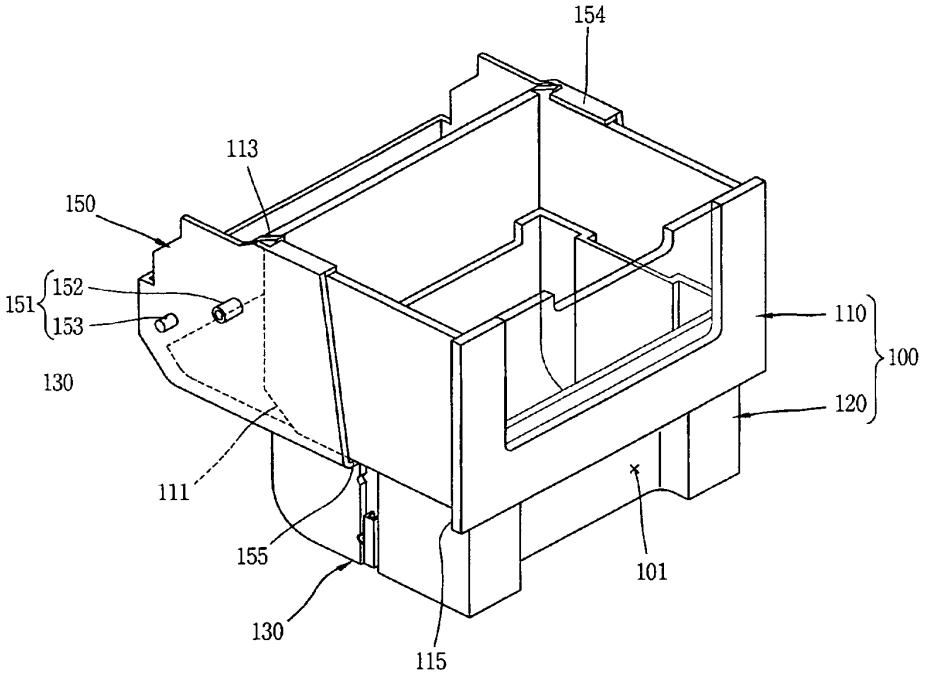
[Fig. 5]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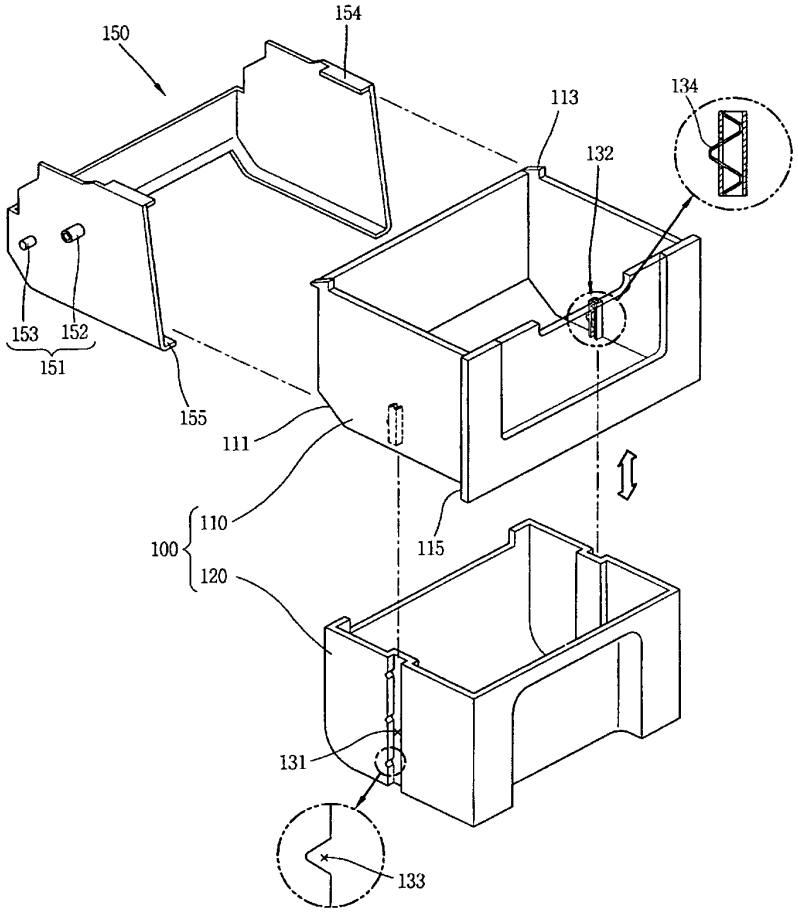
[Fig. 6]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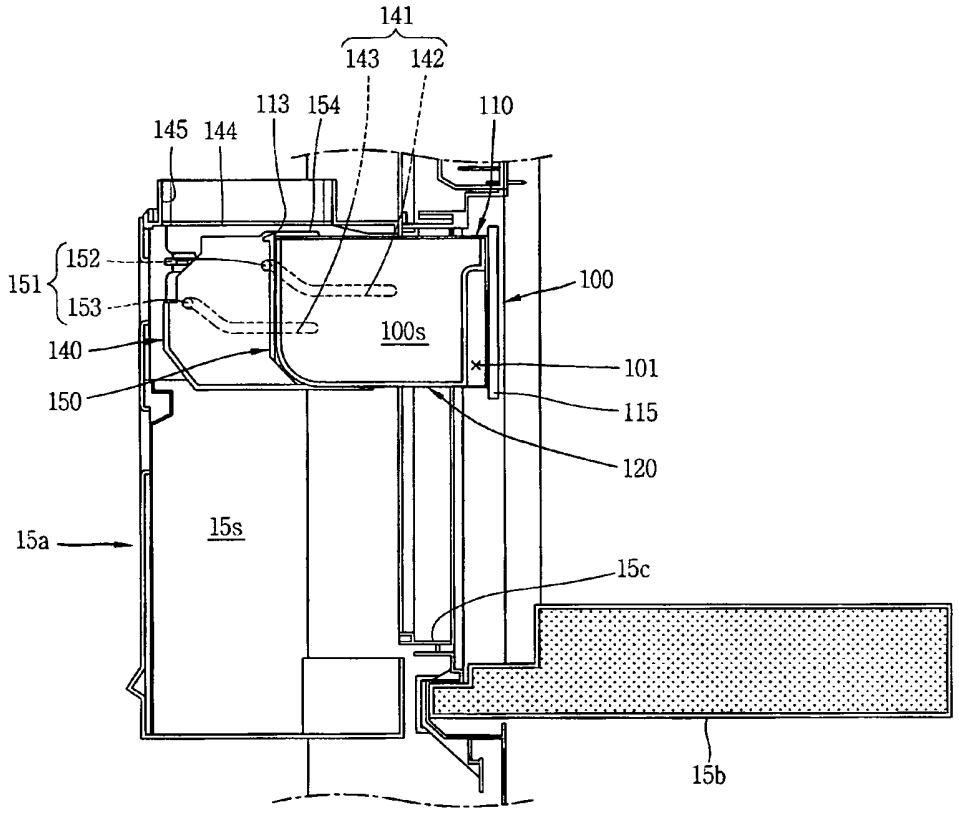
[Fig. 7]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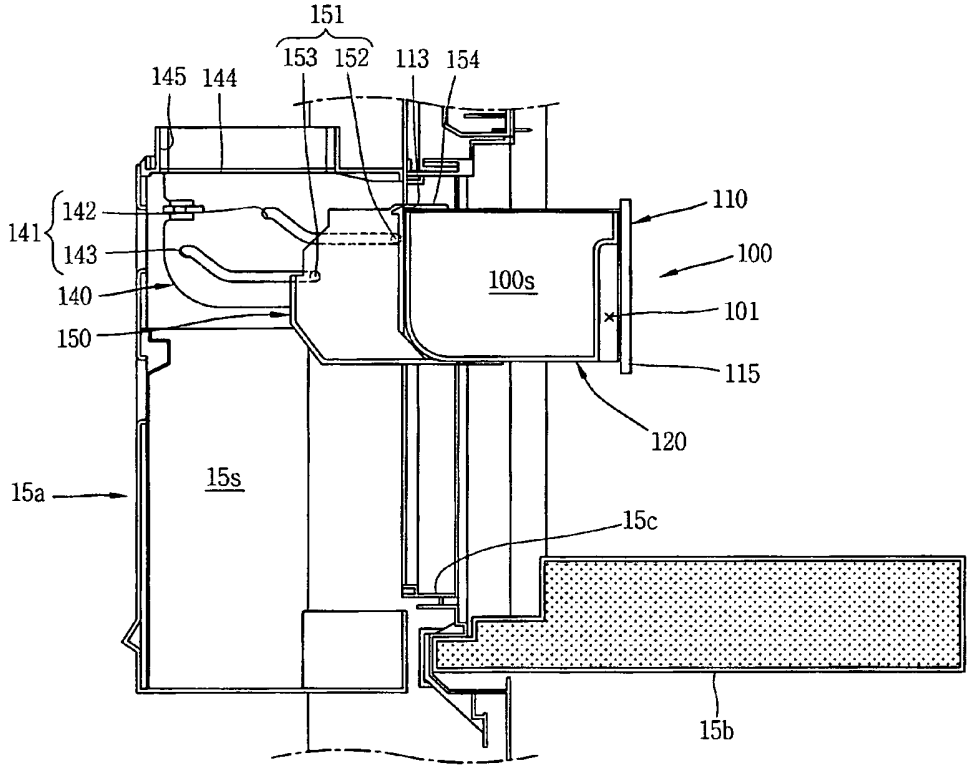
[Fig. 8]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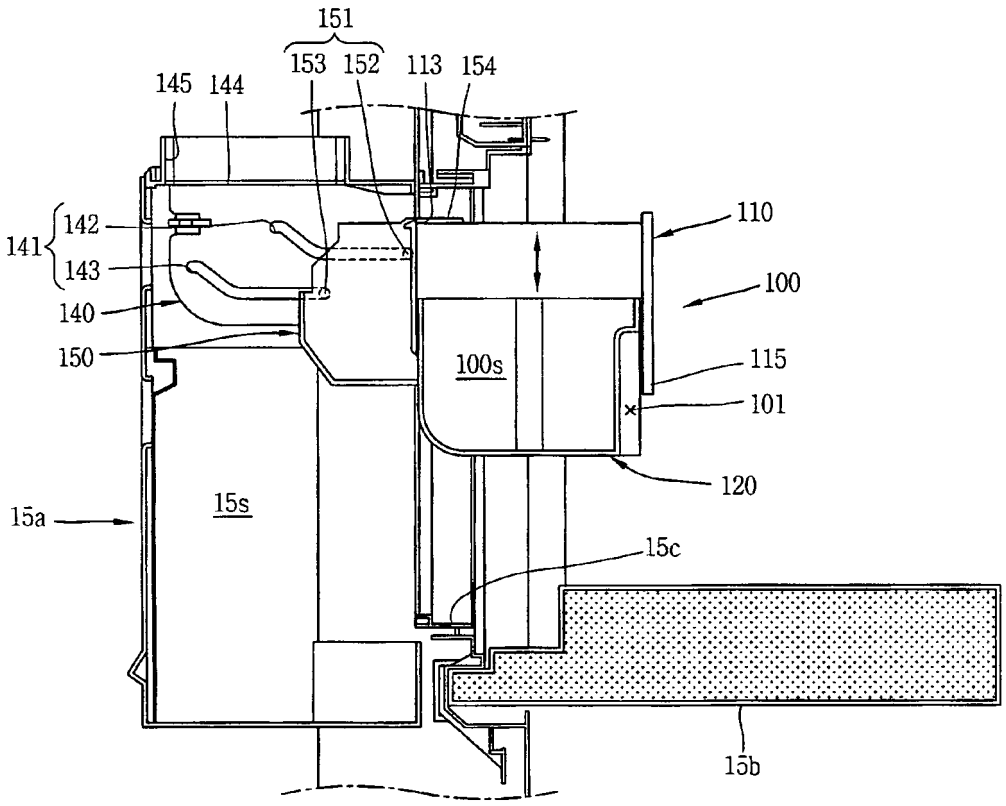
[Fig. 9]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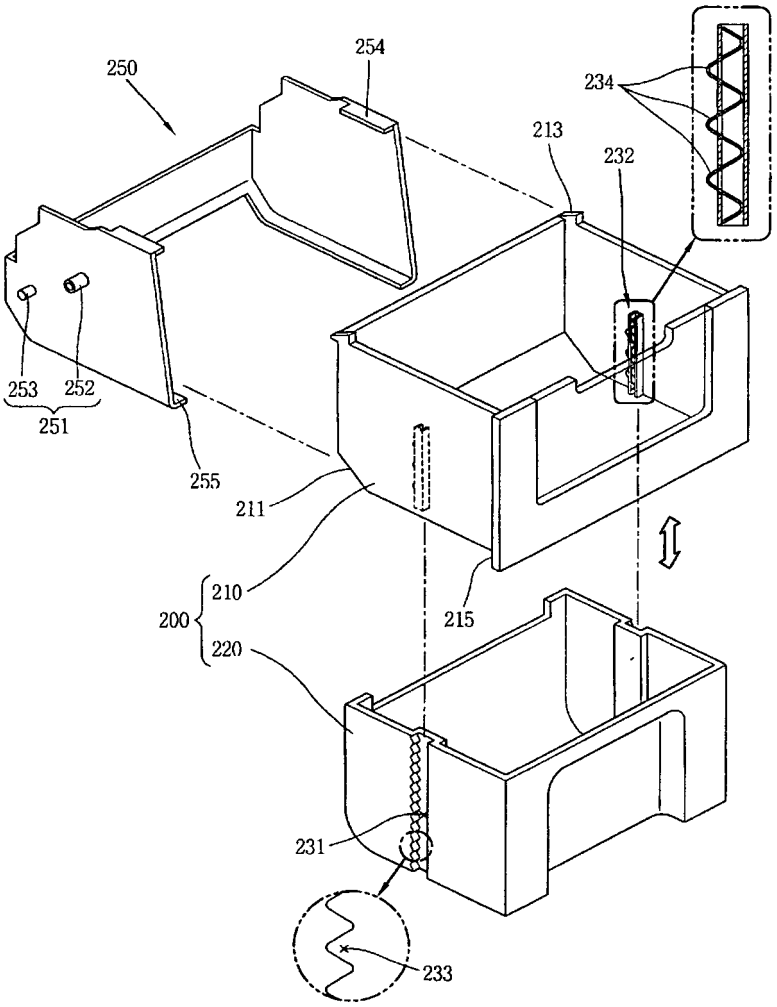
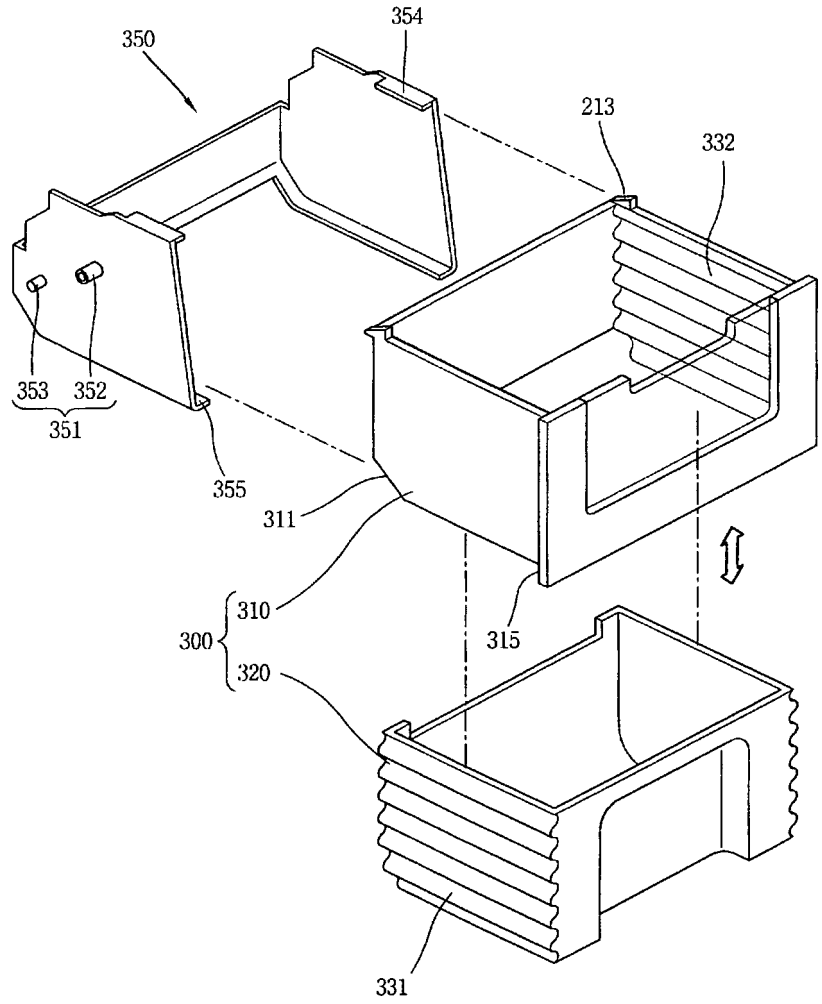
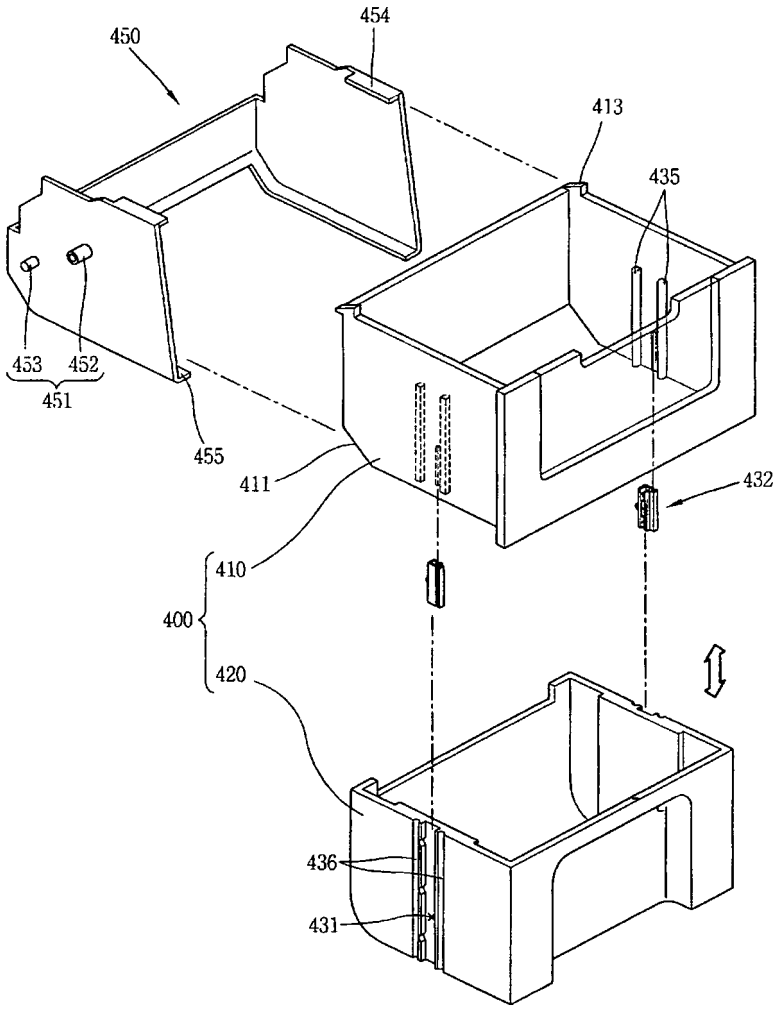
[Fig. 10]



[Fig. 11]



[Fig. 12]



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Patent documents cited in the description

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