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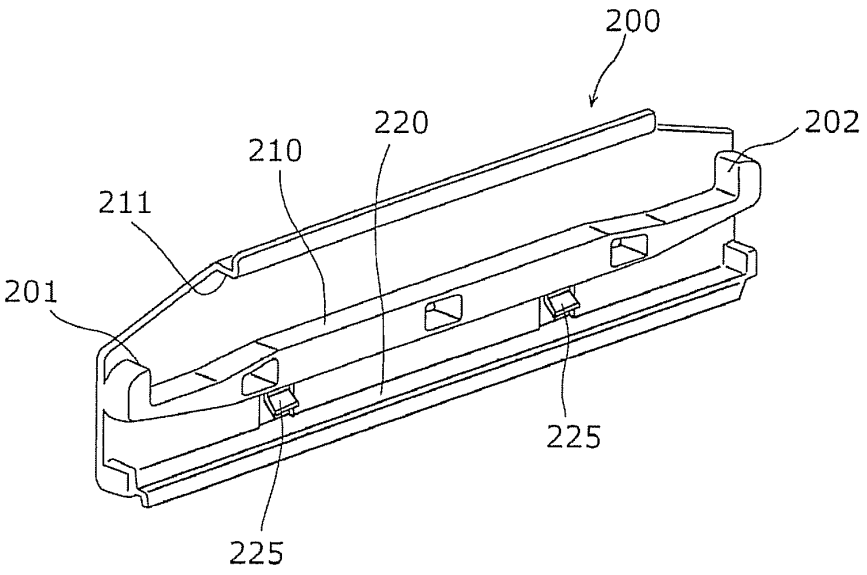
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(54) **REFRIGERATOR**

(57) A refrigerator (100) having: a heat-insulating main body (150); a storage compartment arranged inside of the heat-insulating main body (150) and having an opening at a front face; a shelf (175) and a container (160) arranged in the storage compartment, the refrigerator includes a supporting unit (200) attached to an inner side wall of the storage compartment, and for supporting the shelf (175) and the container (160), in which the supporting unit (200) integrally includes: a shelf support (220) on which an end of the shelf (175) is placed; and a container support (210) vertically aligned with the shelf support, and for slidably supporting the container (160) by supporting an end of the container (160) movable in a front-back direction.

FIG. 8



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Description

[Technical Field]

[0001] The present invention relates to refrigerators, and particularly relates to a supporting structure for a shelf or container arranged inside of a storage compartment.

[Background Art]

[0002] Conventionally, a refrigerator usually has drawer containers considering that the drawer containers allows storing items all the way to the back of the storage compartment without wasting space, and are highly convenient for the user. Since these drawer containers store items such as food, it is important that the food items can be taken in and out of the container easily.

[0003] Accordingly, a technique for making the drawer containers more convenient for the user has been disclosed (for example, see

Patent Literature 1).

[0004] In the refrigerator according to Patent Literature 1, each of the lateral sides of the container for storing items such as food is supported by a double-structure rail. This secures a sufficient pullout length of the container, improving the durability of the entire pullout structure.

[Citation List]

[Patent Literature]

[0005]

[Patent Literature 1] Japanese Unexamined Patent Application Publication No. 2006-78168

[Summary of Invention]

[Technical Problem]

[0006] In recent years, the storage capacity of refrigerator increases, and the number of drawer containers (hereafter simply referred to as "container") attached inside of the storage compartment increases as well.

[0007] Suppose there is a conventional refrigerator which is a vertically long cuboid partitioned by a wall at an intermediate part in the width direction, and has storage compartments of different types provided on the right and left. Such a refrigerator is referred to as a side-by-side (SBS) refrigerator, for example. In the SBS refrigerator, one of the storage compartments is a refrigerator compartment, and the other of the storage compartments is a freezer compartment, for example.

[0008] The refrigerator compartment and the freezer compartment of the SBS refrigerator are vertically long. Accordingly, in addition to the shelves arranged vertically aligned with each other, and containers are arranged vertically aligned with each other under the lowermost shelf.

[0009] As such, when multiple containers are arranged in one storage compartment, reducing the number of containers and increasing the number of the shelves may make the refrigerator more convenient for the user.

[0010] Note that, the containers are generally detachably attached to the refrigerator for maintenance such as cleaning. Accordingly, the user can remove the uppermost container among the multiple containers from the refrigerator, for example.

[0011] However, in this case, the container is merely removed from the storage compartment, exposing an opening of the container under the removed container. In other words, the area for placing items such as food does not actually increase.

[0012] To put it differently, with the conventional refrigerator, the space created by removing the container is not effectively used.

[0013] In view of the problem, it is an object of the present invention to provide a refrigerator with containers which secures the usability even when the containers are removed.

[Solution to Problem]

[0014] In order to solve the problems above, the refrigerator according to the present invention is a refrigerator having: a heat-insulating main body; a storage compartment arranged inside of the heat-insulating main body and having an opening at a front face; a shelf and a container arranged in the storage compartment, the refrigerator including a supporting unit attached to an inner side wall of the storage compartment, and for supporting the shelf and the container, in which the supporting unit integrally includes: a shelf support on which an end of the shelf is placed; and a container support vertically aligned with the shelf support, and for slidably supporting the container by supporting an end of the container movable in a front-back direction.

[0015] With this configuration, the shelf is arranged immediately below or immediately above the container. For example, when the shelf is arranged under the container, it is possible to use the space occupied by the container as an area for placing items such as food by removing the container.

[0016] Furthermore, for example, when the shelf is arranged immediately above the container, by removing the container immediately above the shelf, it is possible to effectively use the area occupied by the container that is removed.

[0017] More specifically, in the refrigerator according to the present invention, the usability is secured even when the container is removed. Furthermore, the supporting unit for these effects produces significant effects by the structural feature.

[0018] More specifically, since the supporting unit in the refrigerator according to the present invention integrally includes the container support and the shelf support, and thus it is possible to make the supporting unit compact, without unnecessarily consuming the inner space of the storage compartment.

[0019] Furthermore, by using such a supporting unit, it is not necessary to manufacture a member for supporting the container and the member for supporting the shelf separately and to attach these members to the refrigerator separately.

[0020] As described above, the present invention is implemented by a method effective and practical in terms of the manufacturing cost and manufacturing process, for example.

[0021] Furthermore, the supporting unit may further include two projections each arranged at an end of the container in a moving direction, and among the two projections, a projection located at a front when the supporting unit is attached to the refrigerator regulates a maximum pullout distance of the container by coming into contact with a fixing unit arranged at an end portion of the container.

[0022] With this structure, the projection located at a front among the two projections serves as a member for regulating the maximum pullout distance of the container.

[0023] For example, when two supporting units are manufactured, either of them may be arranged on the right side of the container, and either of them may be arranged on the left side of the container.

[0024] More specifically, the same supporting units may be used in common for left side and right side of the container. More specifically, as a member for slidably holding the supporting unit, the same member is used on the right and left. Accordingly, it is not necessary to design and manufacture the member for left side and the member for right side separately.

[0025] With this, when manufacturing a refrigerator with a relatively large number of containers, it is possible to suppress the manufacturing cost and it facilitates the management of the members composing the refrigerator, for example.

[0026] Furthermore, the shelf is made of glass.

[0027] With this, stiffness sufficient for placing items such as food can be secured even when a thickness of the plate is made relatively thin.

[0028] The shelf also serves as a lid of the container immediately below the shelf. In this case, the shelf being a glass plate allows achieving sufficient heat-insulating effect and sufficiently retaining moisture inside of the container.

[0029] Furthermore, the supporting unit may further include a fixing member arranged above the shelf support, the fixing member being for fixing the shelf, and movement of the end of the shelf in a vertical direction is regulated when the end of the shelf is interposed between the fixing member and the shelf support.

[0030] With this structure, the shelf is supported by the supporting unit more stably, preventing the shelf from being loose, for example.

[0031] Furthermore, the fixing member may have elasticity that allows the fixing member to extend and contract in length in a direction vertical to the inner side wall, and by the extension and the contraction of the fixing member in length in the direction vertical to the inner side wall, the end of the shelf may be capable of being interposed between the fixing member and the shelf support from above the fixing member, and may be capable of being removed upward from a gap between the fixing member and the shelf support.

[0032] With this structure, the shelf can be easily attached to and detached from the supporting unit, improving the convenience when cleaning the shelf, for example.

[Advantageous Effects of Invention]

[0033] The present invention can provide a refrigerator which includes a container, and secures usability even when the container is removed.

[Brief Description of Drawings]

[0034]

[FIG. 1] FIG. 1 is a perspective view illustrating an external appearance of the refrigerator according to Embodiment of the present invention.

[FIG. 2] FIG. 2 is a perspective view illustrating an external appearance of the refrigerator with a first sub door and a second sub door open.

[FIG. 3] FIG. 3 is a perspective view illustrating an external appearance of the refrigerator with a first main door and a second main door open.

[FIG. 4] FIG. 4 is a sectional view illustrating containers and shelves each arranged between the containers.

[FIG. 5] FIG. 5 illustrates a positional relationship of the containers, shelves, and supporting units according to Embodiment.

[FIG. 6] FIG. 6 is a sectional view illustrating the supporting unit according to Embodiment supporting the container and the shelf.

[FIG. 7] FIG. 7 is a perspective view illustrating the external appearance of the two supporting units and a rail member attached to the inner portion on the left side of the freezer compartment.

[FIG. 8] FIG. 8 is a perspective view illustrating the external appearance of the supporting unit according to Embodiment.

[FIG. 9] FIG. 9 is a perspective view illustrating an external appearance of the rail member according to Embodiment.

[FIG. 10] FIG. 10 is a cross-sectional view illustrating an engaging relationship between the container and the supporting unit according to Embodiment.

[FIG. 11] FIG. 11 is a drawing illustrating how the shelf is attached to the supporting unit in Embodiment.

[Description of Embodiments]

[0035] The following shall describe an Embodiment of the refrigerator according to the present invention with reference to the drawings.

[0036] First, the basic structure of the refrigerator 100 shall be described with reference to FIGS. 1 to 3.

[0037] FIG. 1 is a perspective view illustrating an external appearance of the refrigerator 100 according to Embodiment of the present invention.

[0038] FIG. 2 is a perspective view illustrating the external appearance of the refrigerator 100 with the first sub door 112 and the second sub door 122 open.

[0039] FIG. 3 is a perspective view illustrating the external appearance of the refrigerator 100 with the first main door 111 and the second main door 121 open.

[0040] The refrigerator 100 according to Embodiment is an apparatus for storing the items inside by refrigeration or by freezing. Furthermore, the refrigerator 100 is a side-by-side (SBS) refrigerator.

[0041] As illustrated in these drawings, the refrigerator 100 includes a heat-insulating main body 150, a first main door 111, and a second main door 121.

[0042] The heat-insulating main body 150 is composed of a heat-insulating wall made by filling a space between an inner case and an outer case with foam insulation. The inner case is made by vacuum forming resin such as ABS, and the outer case is made of metal such as a pre-coated steel plate.

[0043] In addition, the first main door 111 has an opening 113 provided at the front face and the first sub door 112 which freely opens and closes at the opening 113. The second main door 121 includes an opening 123 provided at the front face and the second sub door 122 which freely opens and closes at the opening 123.

[0044] The first main door 111 freely opens and closes at the opening of the refrigerator compartment arranged on the right of the user when facing the heat-insulating main body 150. In this Embodiment, the first main door 111 is attached to the heat-insulating main body 150 by a hinge (not illustrated) such that the first main door 111 swings around the axis vertically extending in front of the right side wall as the center. Furthermore, the first main door 111 is a vertically long rectangle arranged from the top to the bottom of the refrigerator 100, and the axis passes through the right end portion of the first main door 111.

[0045] The second main door 121 freely opens and closes at the opening of the freezer compartment arranged on the left of the user when facing the heat-insulating main body 150. In this Embodiment, the second main door 121 is attached to the heat-insulating main body 150 by a hinge (not illustrated) such that the second main door 121 swings around the axis vertically extending in front of the left side wall of the heat-insulating main body 150 as the center. Furthermore, the second main door 121 is a vertically long rectangle arranged from the top to the bottom of the refrigerator 100, and the axis passes through the left end portion of the second main door 121.

[0046] The opening 113 is a portion forming a through hole passing through the first main door 111 in the thickness direction. The user of the refrigerator 100 can take out of the items stored behind the first main door 111, and can store the items behind the first main door 111, through the opening 113.

[0047] The first sub door 112 freely opens and closes at the opening 113. In this Embodiment, the first sub door 112 is attached to the first main door 111 by an axis member such that the first sub door 112 swings around an axis laterally extending at the lower end portion of the opening 113. Furthermore, the axis passes through the lower end portion of the first sub door 112.

[0048] The second sub door 122 freely opens and closes at the opening 123 for receiving ice supplied from the inside of the refrigerator 100 and other items.

[0049] A control board for controlling the operation of the refrigerator 100 is stored at the top of the heat-insulating main body 150, and a board cover 158 covering the space for storing the control board is attached.

[0050] The space inside of the heat-insulating main body 150 is partitioned by the partition 153 into a right part and a left part, forming a refrigerator compartment on the right and a freezer compartment on the left.

[0051] Multiple shelves 175 for placing items such as food are attached to the upper part of the refrigerator compartment. Note that, although not illustrated in FIG. 3, multiple shelves 175 are also attached to the upper part of the freezer compartment, in the same manner as the refrigerator compartment.

[0052] Furthermore, at the lower parts of the refrigerator compartment and freezer compartment, containers for storing items such as food are attached.

[0053] More specifically, a first freezer container 160, a second freezer container 165, and a third freezer container 170 are installed in the freezer compartment. A first refrigerator container 180, a second refrigerator container 185, and a third refrigerator container 190 are installed in the refrigerator compartment.

[0054] In the refrigerator 100 according to this Embodiment, the shelves 175 are arranged between the containers.

[0055] FIG. 4 is a sectional view illustrating containers and shelves arranged between the containers.

[0056] Note that, FIG. 4 is a sectional view of the freezer compartment of the refrigerator 100 cut in parallel with the YZ plane. Furthermore, illustration of a compressor and other components arranged at the lower back of the freezer compartment is omitted.

[0057] As illustrated in FIG. 4, the shelves 175 are arranged between the first freezer container 160 and the second freezer container 165, and between the second

freezer container 165 and the third freezer container 170.

[0058] Furthermore, although not illustrated in FIG. 4, the refrigerator compartment has the same structure, and the shelves 175 are arranged between the first refrigerator container 180 and the second refrigerator container 185, and between the second refrigerator container 185 and the third refrigerator container 190.

[0059] Note that, the installation structure of the containers and the shelves 175 in the refrigerator compartment is identical to the installation structure of the containers and the shelves 175 in the freezer compartment. Accordingly, the following description focuses on the installation structure of the containers and the shelves 175 in the freezer compartment.

[0060] In the refrigerator 100 according to this Embodiment, side end portions of a container and a shelf 175 is supported by one supporting unit 200.

[0061] FIG. 5 illustrates a positional relationship of the containers, the shelves 175, and the supporting unit 200 according to this Embodiment.

[0062] FIG. 6 is a sectional view illustrating the supporting unit 200 supporting the container and the shelf 175 according to the Embodiment.

[0063] FIG. 7 is a perspective view illustrating an external appearance of two supporting units 200 and one rail member 230 attached to the left inner side of the freezer compartment.

[0064] Note that, in FIGS. 5 and 7, two supporting units 200 arranged at the inner side wall on the left of the freezer compartment (back side in FIG. 5) are illustrated. In addition, the supporting units 200 are attached at positions opposite to the two supporting units 200 on the right inner side wall of the freezer compartment (front side in FIG. 5).

[0065] Furthermore, FIG. 6 is a sectional view illustrating a periphery of the first freezer container 160 when the freezer compartment of the refrigerator 100 is cut in parallel with the YZ plane.

[0066] Furthermore, in FIG. 7, the freezer compartment cut in parallel with the YZ plane is illustrated, and the illustration of components such as the first main door 111 and the second main door 121 is omitted.

[0067] As illustrated in FIGS. 5 and 6, the end on the left side of the shelf 175 between the first freezer container 160 and the second freezer container 165 is supported by the supporting unit 200 which supports the left side end portion of the first freezer container 160 movable in the front-back direction (the Y axis direction in FIG. 5).

[0068] The left-side end of the shelf 175 between the second freezer container 165 and the third freezer container 170 is supported by the supporting unit 200 which supports the left side end portion of the second freezer container 165 movable in the front-back direction.

[0069] The left side end portion of the third freezer container 170 is supported by a rail member 230 movable in the front-back direction.

[0070] Note that it is not necessary to arrange a shelf 175 under the third freezer container 170 at the lowermost part of the freezer compartment. Accordingly, the rail member 230 does not have a structure for supporting the shelf 175.

[0071] As described above, in the refrigerator 100 according to Embodiment, a shelf 175 is arranged between containers. This is very convenient for the user.

[0072] For example, when the user of the refrigerator 100 removes the first freezer container 160, the top face of the shelf 175 attached to the supporting unit 200 supporting the first freezer container 160 is exposed.

[0073] With this, the space in the freezer compartment occupied by the first freezer container 160 is effectively used as an area for placing items such as food.

[0074] In this Embodiment, the shelf 175 is a glass plate. With this, stiffness sufficient for placing items such as food can be secured even when a thickness of the plate is made relatively thin.

[0075] Furthermore, the shelf 175 between the containers also serves as a lid of the container immediately below the shelf 175. Here, the shelf 175 being a glass plate is effective for sufficient heat-insulation and sufficiently retaining moisture in the container.

[0076] Furthermore, the supporting unit 200 integrally includes a member for holding the container such as the first freezer container 160 and the shelf 175. Accordingly, it is possible to compose compact structure for supporting the container and the shelf 175. Furthermore, it is not necessary to manufacture members for support and to separately attach the members to the refrigerator 100. Thus, as described in the refrigerator 100 according to this Embodiment, this structure is beneficial for a refrigerator with a relatively large number of containers, in terms of suppressing the manufacturing cost and simplifying the manufacturing process, for example.

[0077] FIG. 8 is a perspective view illustrating the external appearance of the supporting unit 200 according to Embodiment.

[0078] FIG. 9 is a perspective view illustrating the external appearance of the rail member 230 according to Embodiment.

[0079] As illustrated in FIG. 8, the supporting unit 200 according to Embodiment integrally includes a container support 210 which slidably holds the container by supporting the end portion of the container movable in the front-back direction, and a shelf support 220 for placing the end of the shelf 175. Note that, the supporting unit 200 is manufactured, for example, as an integral part by injection molding of a resin.

[0080] Furthermore, above the container support 210, a regulating wall 211 for regulating the forward tilt of the container when the container is pulled out is arranged.

[0081] Furthermore, the supporting unit 200 has two projections (a first projection 201 and a second projection 202) each at end of the container in the moving direction for regulating a maximum pullout distance of the container.

[0082] The supporting unit 200 further includes a fixing member 225 arranged above the shelf support 220 and

is for fixing the shelf 175.

[0083] As illustrated in FIG. 9, the rail member 230 in the Embodiment includes a container support 240 slidably supporting the container by supporting the end portion of the container movable in the front-back direction.

[0084] The rail member 230 further includes a regulating wall 241 above the container support 210, and has a projection (the first projection 231 and the second projection 232) at each end in the moving direction of the container.

[0085] As described above, as illustrated in FIGS. 8 and 9, each of the supporting unit 200 and the rail member 230 has a lateral shape identical or substantially identical with the perpendicular line passing through the center of the supporting unit 200 (chain lines in FIGS. 8 and 9) as the center.

[0086] With this, the supporting unit 200 and the rail member 230 can be attached to the inner side wall on the right side or the inner side wall on the left side of the storage compartment such as the freezer compartment.

[0087] For example, it is assumed that FIG. 8 illustrates the supporting unit 200 attached to the left side inner wall of the freezer compartment. In this case, if the supporting unit 200 is rotated 180 degrees with the chain line as the center, the drawing illustrates the supporting unit 200 attached to the right side inner wall of the freezer compartment.

[0088] More specifically, in the refrigerator 100 according to Embodiment, only two members, namely, the supporting unit 200 and the rail member 230 support containers and shelves 175 between the containers.

[0089] In other words, in the refrigerator 100 according to Embodiment, a common member is used for the supporting member on the right side of the container and for the supporting member on the left side of the container.

[0090] Furthermore, the distance between the first projection 201 and the second projection 202 is determined suitable for a container with the longest pullout distance among the containers, considering convenience, for example. The distance between the first projection 231 and the second projection 232 is determined in the same manner.

[0091] Accordingly, it is not necessary to design and manufacture supporting members dedicated for the containers each corresponding to the size of containers, or to design and manufacture supporting member for the right side and the supporting member for the left side sepa rately.

[0092] As described above, the supporting unit 200 and the rail member 230 that can be attached to both the left side and right side inner walls of the storage compartment have different parts for regulating the maximum pullout distance of the container, depending on whether the supporting unit 200 and the rail member 230 are attached to the left inner side wall or the right inner side wall.

[0093] More specifically, among the first projection 201 and the second projection 202, the projection located at the front when attached to the refrigerator 100 regulates the maximum pullout distance of the container.

[0094] In the same manner, among the first projection 231 and the second projection 232 in the rail member 230, the projection located at the front also serves a part regulating the maximum pullout distance of the container.

[0095] FIG. 10 is a cross-sectional view illustrating an engaging relationship between the container and the supporting unit 200 according to Embodiment.

[0096] As illustrated in FIG. 10, the supporting unit 200 supporting the end portion on the left of the second freezer container 165 (back side in FIG. 10) is attached to the left side inner wall of the freezer compartment. In this case, the first projection 201 is located at the front.

[0097] When the second freezer container 165 is pulled out, the first projection 201 comes into contact with a fixing part 166 in the second freezer container 165. With this, the maximum pullout distance of the second freezer container 165 is regulated.

[0098] Furthermore, the second freezer container 165 includes a tilt restricting unit 167 behind the fixing unit 166. When the second freezer container 165 is pulled out, the tilt restricting unit 167 comes into contact with a regulating wall 211 of the supporting unit 200, restricting the forward tilt of the second freezer container 165 within a predetermined range.

[0099] Note that, in the state illustrated in FIG. 10, the second freezer container 165 can be removed from the refrigerator 100 by lifting the front side of the second freezer container 165 to release the engagement between the fixing part 166 and the second freezer container 165.

[0100] Here, the fixing unit 166 and the tilt restricting unit 167 are also provided at the end portion on the right side of the second freezer container 165 (front side in FIG. 10).

[0101] Furthermore, the supporting unit 200 supporting the end portion on the right side of the second freezer container 165 is attached to the right side inner wall of the freezer compartment, and in this supporting unit 200, the second projection 202 is positioned at the front.

[0102] More specifically, in this case, the second projection 202 serves as a member for regulating the maximum pullout distance of the second freezer container 165.

[0103] Note that, the first freezer container 160 also includes a fixing unit and the tilt restricting unit identical to those in the second freezer container 165, and the first freezer container 160 is also slidably and detachably supported by the supporting units 200 arranged on the right and left of the first freezer container 160.

[0104] The third freezer container 170 also includes the fixing unit and the tilt restricting unit identical to those in the second freezer container 165, and is also slidably and detachably supported by the rail members 230 arranged on the right and left of the third freezer container 170.

[0105] As such, in the refrigerator 100 in this Embodiment, the member for supporting the container (the sup-

porting unit 200 and the rail member 230) is common for the right and left. With this point, it is beneficial for the refrigerator with a relatively large number of containers such as the refrigerator 100 in terms of the manufacturing cost and management on the members composing the refrigerator 100, for example.

[0106] Furthermore, as described above, the supporting unit 200 includes the fixing member 225 for fixing the shelf 175.

[0107] A fixing member 225 has elasticity that allows the fixing member 225 to extend and contract in a length vertical to the inner side wall to which the supporting unit 200 is attached. This allows the shelf 175 to be easily detached from and attached to the supporting unit 200, and the movement of the shelf 175 in the vertical direction is regulated. In other words, the looseness of the shelf 175 can be prevented.

[0108] FIG. 11 illustrates how the shelf 175 is attached to the supporting unit 200 in Embodiment.

[0109] As illustrated in FIG. 11, the end of the shelf 175 is inserted above the fixing member 225, and the shelf 175 is pressed downward (the drawing on the left of FIG. 11). Here, the fixing member 225 receives a downward pressing force from the end, shortening the length in a direction vertical to the inner side wall (the drawing in the middle of FIG. 11).

[0110] When the end passes the tip of the fixing member 225, the fixing member 225 restores its original shape by the elasticity. With this, the end is interposed between the fixing member 225 and the shelf support 220 (the drawing on the right of FIG. 11).

[0111] As such, the end of the shelf 175 is interposed between the fixing member 225 and the shelf support 220. With this, the shelf 175 is attached to the supporting unit 200, and its position in the vertical direction is fixed.

[0112] Note that, with the shelf 175 attached to the supporting unit 200, the end portion of the shelf 175 can be lifted above the fixing member 225 by pressing the tip of the fixing member 225.

[0113] More specifically, the end portion of the shelf 175 is removable upward from a gap between the fixing member 225 and the shelf support 220.

[0114] As such, the shelf 175 can be easily attached to and detached from the supporting unit 200.

[0115] With this, when cleaning the shelf 175, for example, the user of the refrigerator 100 can easily take the shelf 175 out of the refrigerator 100 for cleaning, and can easily attach the shelf 175 to the refrigerator 100 after cleaning.

[0116] Note that, in the supporting unit 200 in this Embodiment, the container support 210 is provided above the shelf support 220.

[0117] However, the container support 210 and the shelf support 220 may be provided vertically opposite to each other. For example, a shelf support 220 may be provided above the container support 210 which supports the upper end portion of the container such as the first freezer container 160 movable in the front-back direction.

[0118] In this case, the supporting unit 200 supports the container by hanging, and the shelf 175 is arranged above the container.

[0119] Here, it is assumed that the supporting unit 200 with the structure described above supports the second freezer container 165 and the shelf 175. In this case, when the first freezer container 160 is removed, the top face of the shelf 175 is exposed, allowing the user to use the space occupied by the first freezer container 160 as an area for placing items such as food.

[0120] The Embodiment of the present invention has been described above. The technical feature of the present invention is effective for a refrigerator with a container.

[0121] Accordingly, the present invention is applicable, not only to an SBS refrigerator such as the refrigerator 100 according to Embodiment, but also to various types of refrigerator with container.

[Industrial Applicability]

[0122] The present invention can provide a refrigerator including a container, and secures usability even when the container is removed. Therefore, the present invention is effective for refrigerators with various types and size such as refrigerators for household use and professional use.

[Reference Signs List]

[0123]

100	Refrigerator
111	First main door
112	First sub door
113	Opening
121	Second main door
122	Second sub door
123	Opening
150	Heat-insulating main body
153	Partition
158	Board cover
160	First freezer container
165	Second freezer container
166	Fixing unit
167	Tilt restricting unit
170	Third freezer container
175	Shelf
180	First refrigerator container
185	Second refrigerator container
190	Third refrigerator container
200	Supporting unit
201, 231	First projection
202, 232	Second projection
210, 240	Container support
211, 241	Regulating wall
220	Shelf support
225	Fixing member

230 Rail member

Claims

1. A refrigerator having: a heat-insulating main body; a storage compartment arranged inside of the heat-insulating main body and having an opening at a front face; a shelf and a container arranged in the storage compartment, said refrigerator comprising a supporting unit attached to an inner side wall of the storage compartment, and for supporting the shelf and the container,
wherein said supporting unit integrally includes:

    a shelf support on which an end of the shelf is placed; and
    a container support vertically aligned with said shelf support, and for slidably supporting the container by supporting an end of the container movable in a front-back direction.

2. The refrigerator according to Claim 1,
wherein said supporting unit further includes two projections each arranged at an end of the container in a moving direction, and
among the two projections, a projection located at a front when said supporting unit is attached to the refrigerator regulates a maximum pullout distance of the container by coming into contact with a fixing unit arranged at an end portion of the container.

3. The refrigerator according to Claim 1,
wherein the shelf is made of glass.

4. The refrigerator according to one of Claims 1 to 3,
wherein said supporting unit further includes a fixing member arranged above said shelf support, said fixing member being for fixing the shelf, and
movement of the end of the shelf in a vertical direction is regulated when the end of the shelf is interposed between said fixing member and said shelf support.

5. The refrigerator according to Claim 4,
wherein said fixing member has elasticity that allows said fixing member to extend and contract in length in a direction vertical to the inner side wall, and
by the extension and the contraction of said fixing member in length in the direction vertical to the inner side wall, the end of the shelf is capable of being interposed between said fixing member and said shelf support from above said fixing member, and is capable of being removed upward from a gap between said fixing member and said shelf support.

FIG. 1

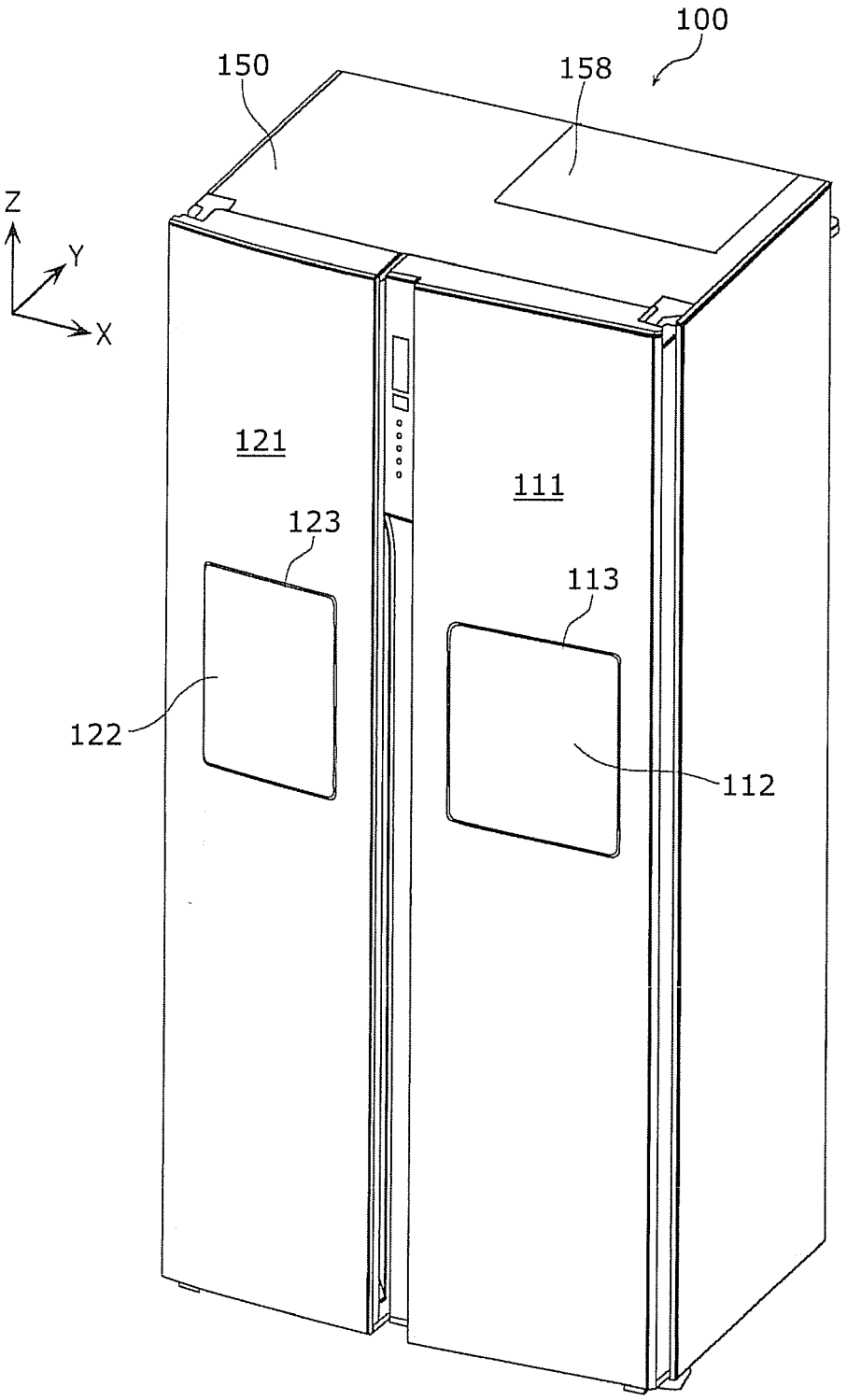


FIG. 2

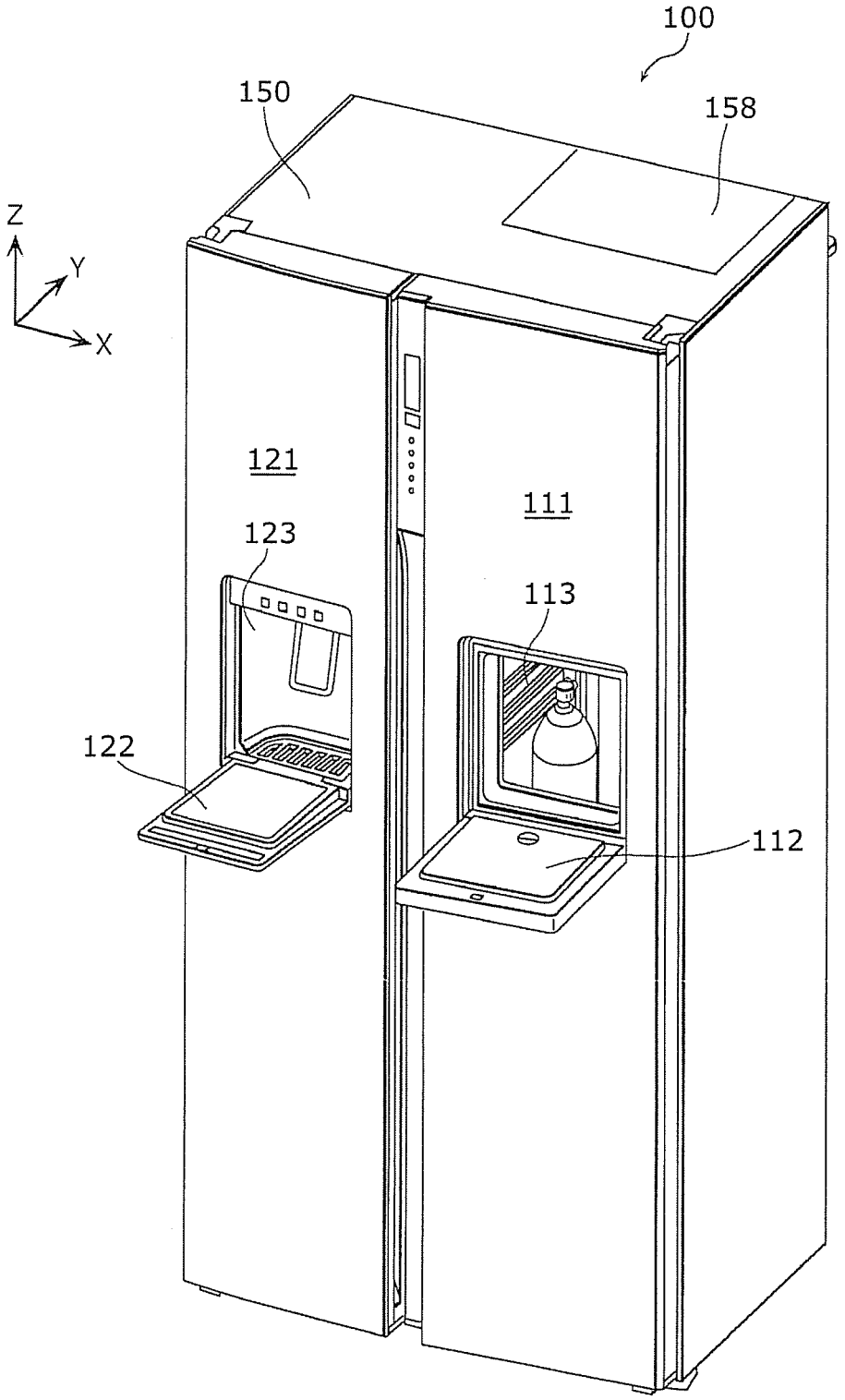


FIG. 3

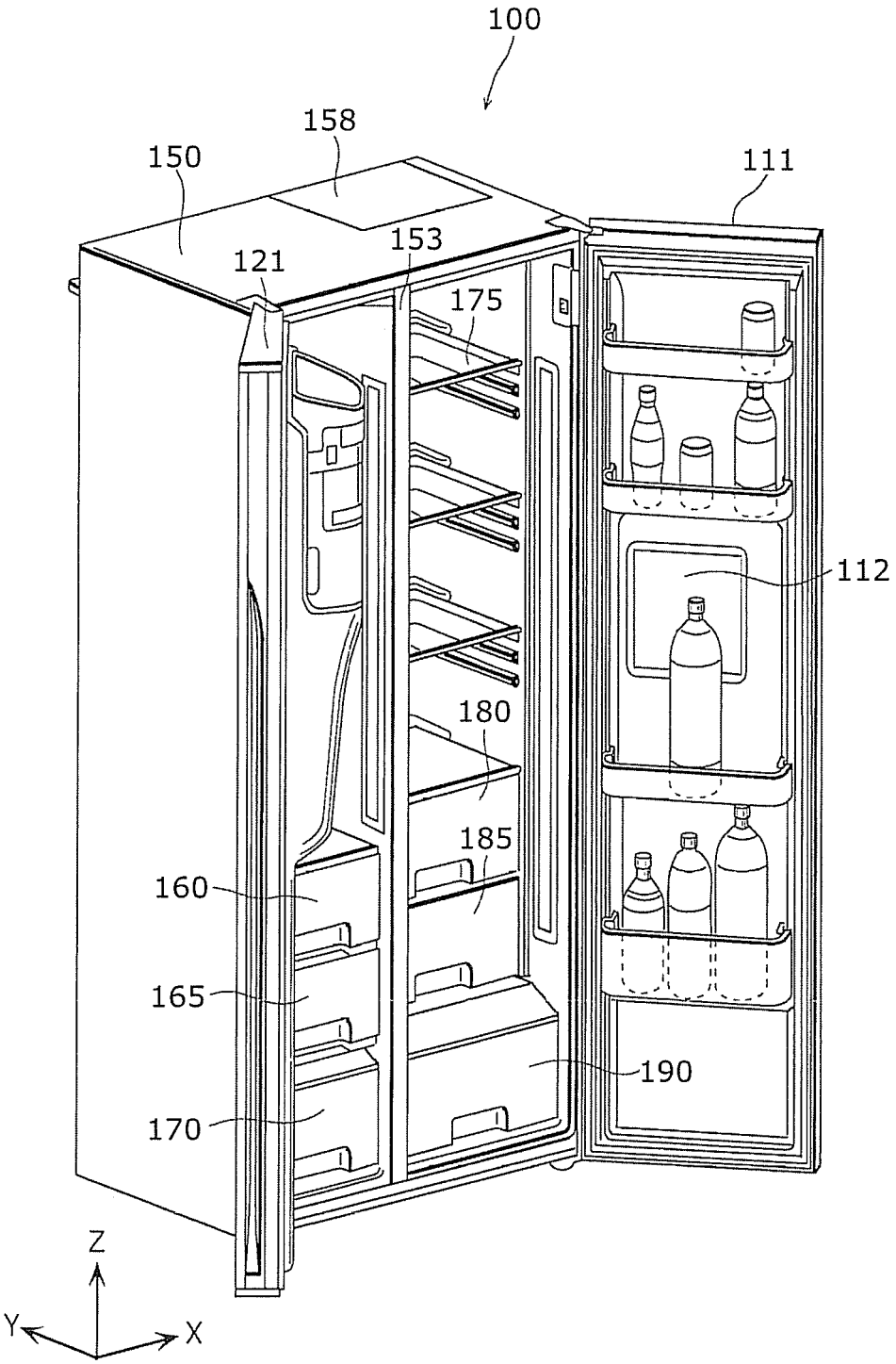


FIG. 4

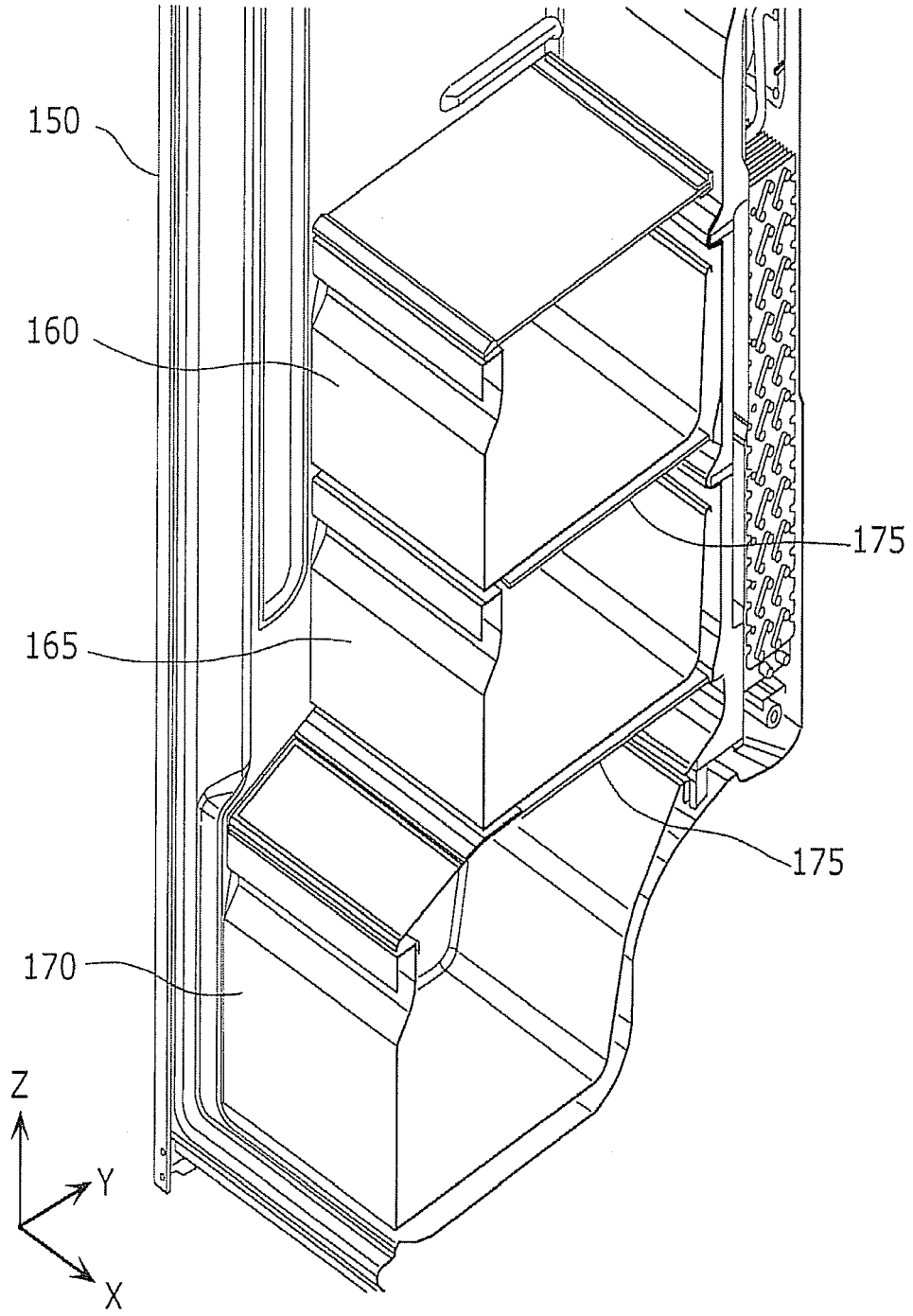


FIG. 5

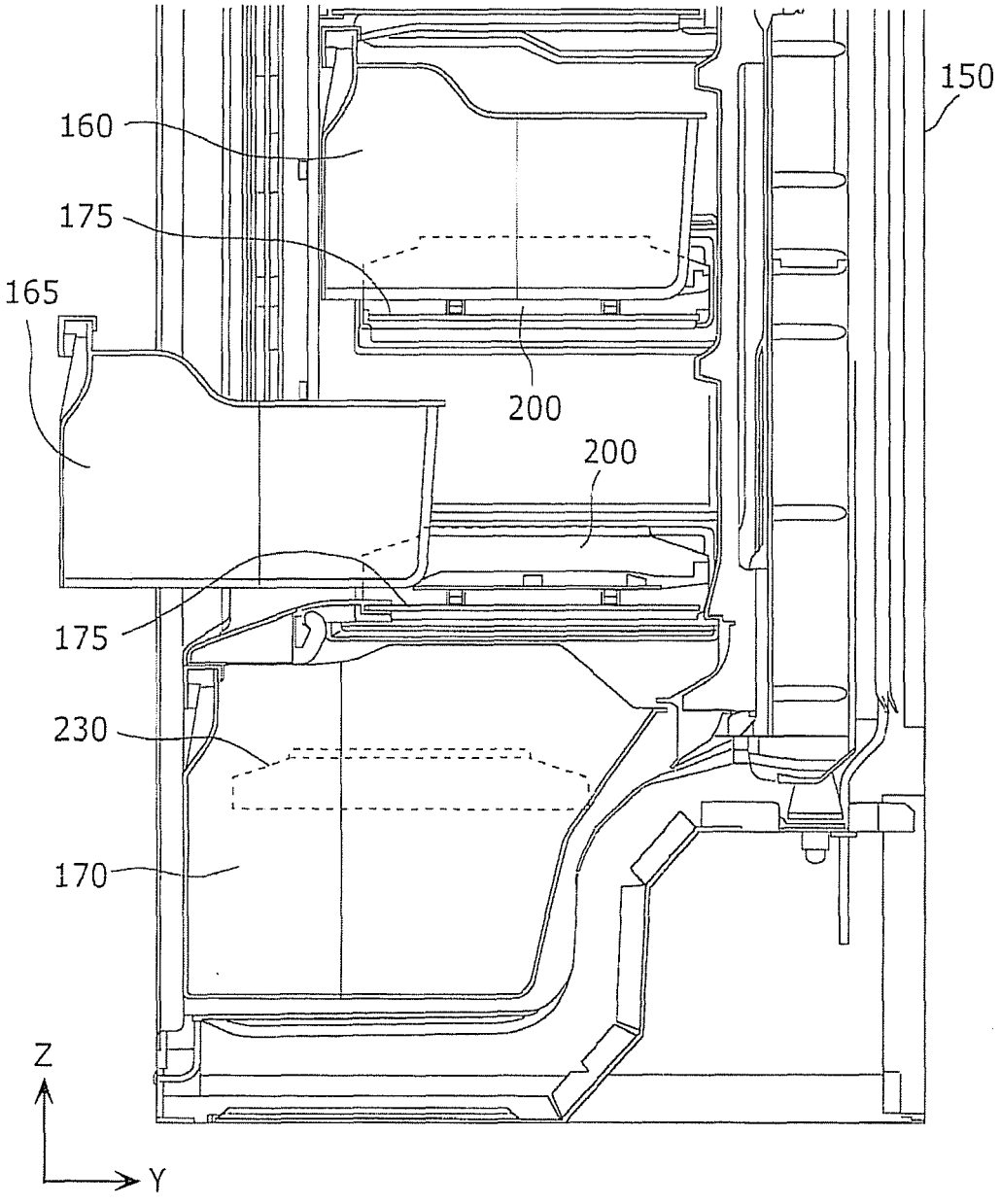


FIG. 6

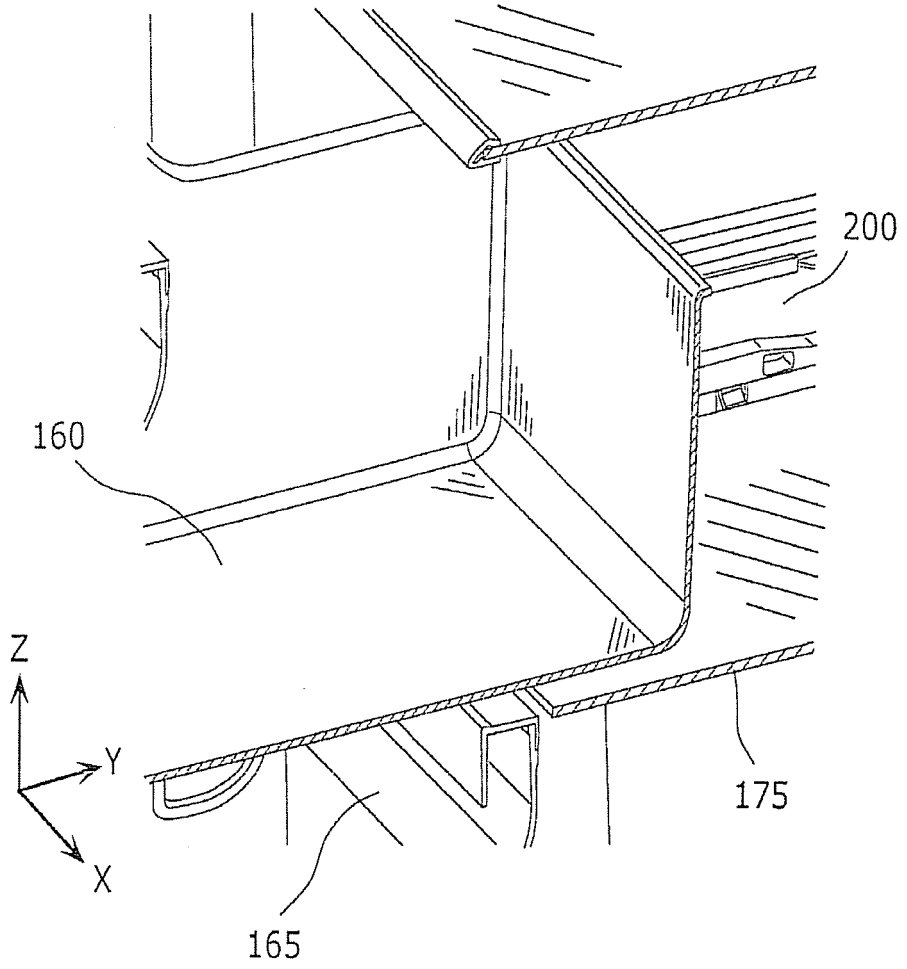


FIG. 7

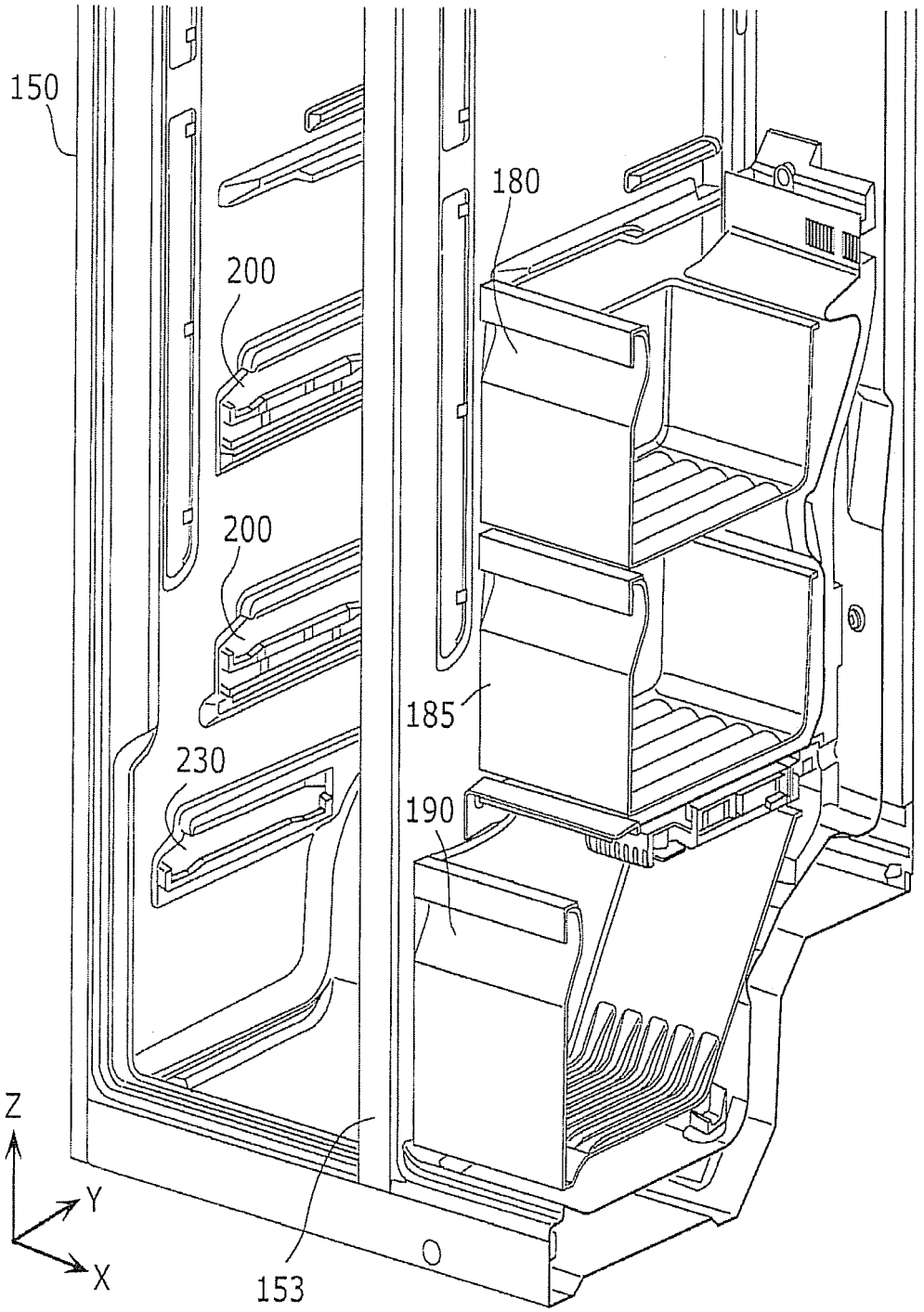


FIG. 8

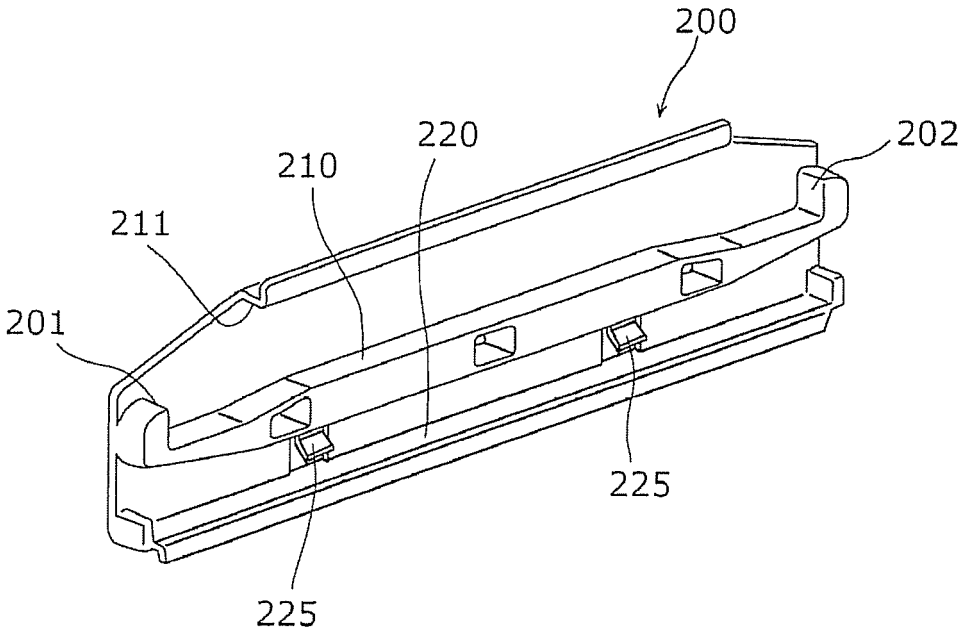


FIG. 9

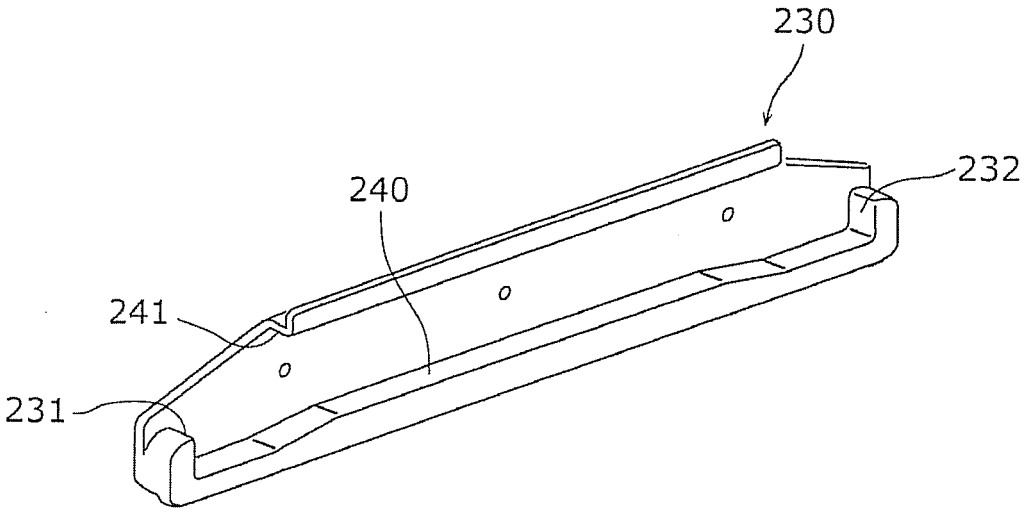


FIG. 10

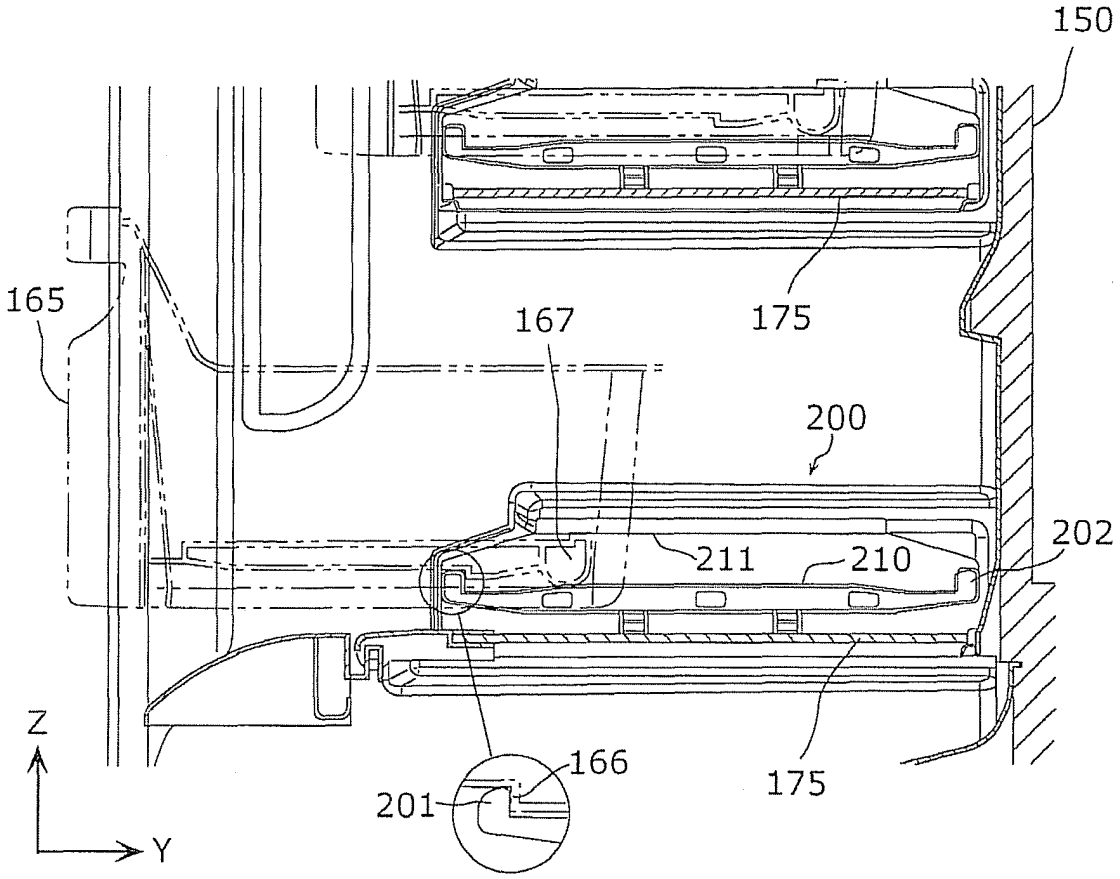
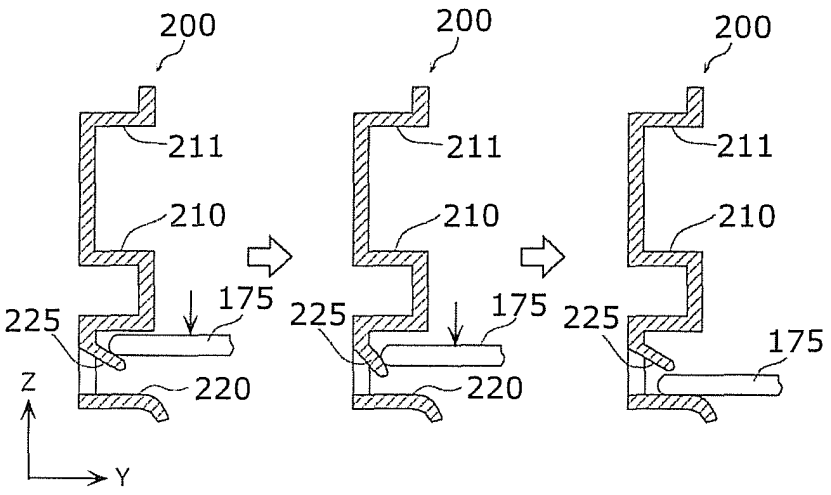

150
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FIG. 11


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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/001442

A. CLASSIFICATION OF SUBJECT MATTER
F25D25/00(2006.01)i, *F25D25/02*(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F25D25/00, F25D25/02

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

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2010
Kokai Jitsuyo Shinan Koho	1971-2010	Toroku Jitsuyo Shinan Koho	1994-2010

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 16088/1980(Laid-open No. 119988/1981) (Hitachi, Ltd.), 12 September 1981 (12.09.1981), claims; page 2, line 3 to page 5, line 6; fig. 1 to 9 (Family: none)	1-5
Y	JP 3-236586 A (Toshiba Corp.), 22 October 1991 (22.10.1991), claims (Family: none)	1-5

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

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Date of the actual completion of the international search 22 April, 2010 (22.04.10)	Date of mailing of the international search report 18 May, 2010 (18.05.10)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/001442

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2008-49115 A (Matsushita Electric Industrial Co., Ltd.), 06 March 2008 (06.03.2008), claim 6 & EP 2124003 A1 & WO 2008/099634 A1 & CN 101611281 A	1-5
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 36205/1984(Laid-open No. 162049/1984) (Sanyo Electric Co., Ltd.), 30 October 1984 (30.10.1984), claims (Family: none)	4-5
A	JP 2006-78168 A (LG Electronics Inc.), 23 March 2006 (23.03.2006), entire text; all drawings & JP 2006-78168 A & GB 2417671 A & DE 102005042145 A & KR 10-2006-0022426 A	1-5
A	JP 2001-248961 A (Yukiharu MIYAMURA), 14 September 2001 (14.09.2001), entire text; all drawings (Family: none)	1-5

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Patent documents cited in the description

- JP 2006078168 A **[0005]**