

DESCRIPTION

Title of Invention

REFRIGERATOR

Technical Field

5 [0001]

The present invention relates to a refrigerator having, inside thereof, a shelf unit divided into a front section and a rear section respectively positioned on the front portion and the back portion (which hereinafter may be referred to as the back side) of the storage compartment.

10 Background Art

[0002]

A storage compartment of refrigerators is typically divided into sections by shelf units. By having such shelves, refrigerators have a plurality of spaces with enhanced storability of items. One such shelf unit in a known configuration is divided into sections serving as a front shelf and a rear shelf positioned in the part of the storage compartment, the part being close to an opening and the back portion, respectively, of the storage compartment, to keep a sufficient height for the storage space by stowing the front shelf of the divided shelf unit into a position either above or below the rear shelf. This configuration is used to arrange a tall item (e.g., a plastic or glass bottle having a large volume) to be stored in the location where the front shelf has been located before being removed. For example, Patent Literature 1 discloses a refrigerator in which the top opening of an interior case installed in the storage compartment is closed by a top rear shelf and a top front shelf. When putting an item taller than the height of the interior case into the interior case, the user is able to remove the top front shelf and to flip the top front shelf onto the top face of the top rear shelf. As another method, Patent Literature 2 discloses a refrigerator in which a front shelf is slid and stowed beneath a rear shelf.

Citation List

Patent Literature

30 [0003]

Patent Literature 1: Japanese Patent Laid-Open No. 2011-2176

Patent Literature 2: Japanese Patent Laid-Open No. 9-119773

Summary of Invention

Technical Problem

5 [0004]

According to Patent Literature 2, it is necessary to provide a slide rail structure in which the front shelf is supported as being slid into a position directly below the shelf rails supporting the rear shelf. This structure reduces the food storage space. In particular, when the shelf unit is structured by using a glass plate, because the shelf unit is thicker than when the shelf unit is structured by using a plastic molded product, the slide rail structure itself increases in size, which reduces the food storage space.

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[0005]

The present invention is made in view of the foregoing, and an object of the present invention is to provide a refrigerator in which it is possible to form a space for storing a tall item therein, while keeping the food storage space large.

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Solution to Problem

[0006]

A refrigerator according to one embodiment of the present invention includes:
an outer shell having a storage compartment of which a front face is open to form an opening; a shelf rail being provided on an inner wall face of the storage compartment and extending in a front-and-back direction; and a front shelf and a rear shelf supported by the shelf rail, the front shelf being positioned on a part of the storage compartment, the part being closer to the opening than to a back portion of the storage compartment, the rear shelf being positioned on a part of the storage compartment, the part being closer to the back portion than to the opening, wherein the front shelf includes, in a lateral edge part of the front shelf, a claw part engaging with the shelf rail, and the rear shelf has a cut-out part formed in a region corresponding, when the front shelf removed from the shelf rail is placed on a top face of the rear shelf, to a position of the claw part provided to the front shelf.

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Advantageous Effects of Invention

[0007]

According to a refrigerator of one embodiment of the present invention, it is possible to place the front shelf on the top face of the rear shelf while keeping the front shelf level, by arranging the claw part of the front shelf, which is placed on the top face of the rear shelf, to be received into the cut-out part formed in the rear shelf. Accordingly, it is possible to form a space for storing therein a tall item, in the location where the front shelf has been located, while keeping the food storage space large.

Brief Description of Drawings

[0008]

[Fig. 1] Fig. 1 is a perspective view showing, in enlargement, a relevant part of a refrigerator according to Embodiment 1 of the present invention.

[Fig. 2] Fig. 2 is a front view showing, in enlargement, the relevant part of the refrigerator according to Embodiment 1 of the present invention.

[Fig. 3] Fig. 3 is an enlarged cross-sectional view taken at the line X-X indicated in Fig. 2.

[Fig. 4] Fig. 4 is a plan view illustrating a situation in which a shelf unit of the refrigerator according to Embodiment 1 of the present invention is divided into sections serving as a front shelf and a rear shelf.

[Fig. 5] Fig. 5 is a bottom view illustrating the shelf unit of the refrigerator according to Embodiment 1 of the present invention.

[Fig. 6] Fig. 6 is an enlarged view of part A indicated in Fig. 2.

[Fig. 7] Fig. 7(A) is an enlarged cross-sectional view taken at the line Y-Y indicated in Fig. 5; and Fig. 7(B) is an enlarged view of part B indicated in Fig. 7(A).

[Fig. 8] Fig. 8 is a drawing of a view from a direction of a lateral face to explain a manner in which a glass plate is fitted into a frame structuring a rear shelf.

[Fig. 9] Fig. 9 is a drawing of a view from a direction of the bottom face to explain the manner in which the glass plate is fitted into the frame structuring the rear shelf.

[Fig. 10] Fig. 10 is a drawing of a perspective view from a direction of the

bottom face to explain the manner in which the glass plate is fitted into the frame structuring the rear shelf.

[Fig. 11] Fig. 11 is a perspective view showing, in enlargement, a relevant part of the refrigerator according to Embodiment 1 of the present invention to indicate a situation in which the front shelf is placed on the top face of the rear shelf.

[Fig. 12] Fig. 12 is a front view showing, in enlargement, the relevant part of the refrigerator according to Embodiment 1 of the present invention to indicate the situation in which the front shelf is placed on the top face of the rear shelf.

[Fig. 13] Fig. 13 is a plan view of the shelf unit of the refrigerator according to Embodiment 1 of the present invention to indicate the situation in which the front shelf is placed on the top face of the rear shelf.

[Fig. 14] Fig. 14 is a lateral view of the shelf unit of the refrigerator according to Embodiment 1 of the present invention to indicate the situation in which the front shelf is placed on the top face of the rear shelf.

[Fig. 15] Fig. 15(A) is an enlarged cross-sectional view taken at the line Z-Z indicated in Fig. 13; and Fig. 15(B) is an enlarged view of part D indicated in Fig. 15(A).

[Fig. 16] Fig. 16 is an enlarged cross-sectional view of a relevant part of the refrigerator according to Embodiment 1 to indicate the manner in which the front shelf is placed on the top face of the rear shelf.

[Fig. 17] Fig. 17 is an enlarged view of part C indicated in Fig. 12.

[Fig. 18] Fig. 18 is a perspective view showing, in enlargement, a relevant part of a refrigerator according to Embodiment 2 of the present invention.

[Fig. 19] Fig. 19 is a plan view showing, in enlargement, the relevant part of the refrigerator according to Embodiment 2 of the present invention.

[Fig. 20] Fig. 20 is an enlarged cross-sectional view taken at the line V-V indicated in Fig. 19.

Description of Embodiments

[0009]

Embodiment 1.

A refrigerator according to Embodiment 1 of the present invention will be explained below, with reference to Figs. 1 to 17. Fig. 1 is an enlarged perspective view showing a relevant part of the refrigerator according to Embodiment 1 of the present invention. Fig. 2 is an enlarged view showing, the relevant part of the refrigerator according to Embodiment 1 of the present invention.

[0010]

As illustrated in Figs. 1 and 2, a refrigerator 100 includes an outer casing 10 made of one or more steel plates, an inner casing 11 made of resin, and a thermal insulator foamed and filling the space between the outer casing 10 and the inner casing 11. The outer casing 10, the inner casing 11, and the thermal insulator constitute an outer shell 100A of the refrigerator 100. Inside the inner casing 11 of the refrigerator 100, a storage compartment 1 is formed. Although not shown in the drawings, storage compartment doors are provided on the front face of the storage compartment 1. Further, the refrigerator 100 illustrated in Figs. 1 and 2 corresponds to an enlarged view of only an upper section where a refrigeration compartment is provided as the storage compartment 1. Provided beneath the refrigeration compartment is, for example, a freezer compartment or another type of compartment.

[0011]

As illustrated in Figs. 1 and 2, provided inside the storage compartment 1 is an air passage component part 12 that forms a part of the rear face lateral wall of the storage compartment 1 and through which cooling air supplied to the storage compartment 1 passes. The part of the air passage component part 12 positioned inside the storage compartment 1 is structured by using a resin component part and configured to protrude. A thermal insulator is provided on a portion close to the rear face of the resin component part to constitute the wall face on the back portion of the storage compartment 1. Further, provided inside the storage compartment 1 is a temperature adjusting unit 13 to adjust the amount of cooling air sent to the storage compartment 1.

[0012]

On the inner wall faces of the storage compartment 1, pairs made up of left and

right shelf rails 5a to 5g each protruding toward the inside of the storage compartment 1 and extending in the front-and-back direction of the storage compartment 1 are installed on multiple levels (seven levels in the example shown in Figs. 1 and 2) set in the up-and-down direction of the storage compartment 1. In each of the pairs of shelf rails 5a to 5g, the left rail and the right rail has equal height to each other. Each of the pairs of shelf rails 5a to 5g is positioned substantially horizontally from the portion, close to an opening, of the storage compartment, toward the back portion of the storage compartment 1. On each of the pairs of shelf rails 5a to 5g, a shelf unit 2 on which items (e.g., food items) are to be placed is installed to be positioned substantially parallel to the ceiling (or the bottom face) of the storage compartment 1. As illustrated in Figs. 1 and 2, the shelf unit 2 is provided to enhance storability for items by dividing the storage compartment 1 into sections and forming a plurality of spaces. In the illustrated embodiment, the shelf unit 2 is provided only for the shelf rails 5a positioned on the fifth level from the top; however, for example, the shelf unit 2 may be provided to each of all the pairs of shelf rails 5a to 5g or may be provided to only one or more pairs selected from among the pairs of shelf rails 5a to 5g.

[0013]

Fig. 3 is an enlarged cross-sectional view taken at the line X-X indicated in Fig. 2. Fig. 4 is a plan view in which the shelf unit of the refrigerator according to Embodiment 1 of the present invention is divided into sections serving as a front shelf and a rear shelf. Fig. 5 is a bottom view illustrating the shelf unit of the refrigerator according to Embodiment 1 of the present invention. Fig. 6 is an enlarged view of part A indicated in Fig. 2. Fig. 7(A) is an enlarged cross-sectional view taken at the line Y-Y indicated in Fig. 5. Fig. 7(B) is an enlarged view of part B indicated in Fig. 7(A). As indicated in Figs. 3 and 4, the shelf unit 2 is structured with a front shelf 3 and a rear shelf 4 that are two sections divided in the front-and-back direction of the shelf rails 5a. The front shelf 3 and the rear shelf 4 are supported while the left and the right lateral edges thereof are placed on the top faces of the same pair of shelf rails 5a. The front shelf 3 and the rear shelf 4 are installed to be level on mutually the same flat plane in the storage compartment 1. As illustrated in Figs. 4 and 5,

when the front shelf 3 and the rear shelf 4 are combined with each other, the shelf unit 2 has a substantially rectangular shape.

[0014]

As illustrated in Figs. 3 and 4, the front shelf 3 includes: a glass plate 30 that
5 has a substantially oblong rectangular shape and on which items are to be placed;
and a frame 31 that is made of synthetic resin and is attached to the outer perimeter
of the glass plate 30. As illustrated in Fig. 5, the frame 31 includes, on the bottom
face thereof, a forward holding piece 31a provided in a forward edge part, lateral
holding pieces 31b provided in left and right lateral edge parts, and a rearward
10 holding piece 31c provided in a rearward edge part. The frame 31 is thus attached
as the holding pieces 31a to 31c are hooked onto the glass plate 30.

[0015]

As illustrated in Figs. 5 and 6, at the left and the right ends in terms of the width
direction of the forward portion thereof, the front shelf 3 is provided with claw parts 32
15 restraining movements in the up-and-down directions while being engaged with the
shelf rails 5a. The left and the right claw parts 32 are each shaped to curve
outwardly and are each provided to protrude downward from the bottom face of the
front shelf 3. It is possible to slide the front shelf 3 in the front-and-back directions by
moving the claw parts 32 along the shelf rails 5a. It is possible to easily remove the
20 front shelf 3 from the shelf rails 5a by sliding the front shelf 3 forward and taking the
claw parts 32 off the shelf rails 5a. For example, it is possible to place the removed
front shelf 3 on the top face of the rear shelf 4 or to arrange the detached front shelf 3
to be supported by any other one of the pairs of shelf rails 5b to 5g. Further, the
detached front shelf 3 may be washed and cleaned and may also be replaced with a
25 new shelf, if damaged.

[0016]

As illustrated in Figs. 3 to 5, at the left and the right ends in terms of the width
direction of the rear portion thereof, the front shelf 3 has protruding parts 34 to be
fitted to the cut-out shapes of the rear shelf 4. The protruding parts 34 are shaped to
30 correspond to the cut-out shapes of the rear shelf 4 when the front shelf 3 is

supported by the same shelf rails 5a as those by which the rear shelf 4 is supported. Because the shape of the rear portion of the front shelf 3 corresponds to the shape of the rear shelf 4, there is no gap between the front shelf 3 and the rear shelf 4, and it is therefore possible to safely place items thereon. Further, because the front shelf 3
5 has the protruding parts 34 at the left and the right ends in terms of the width direction of the rear portion thereof, the central section of the rearward edge part has a recessed shape. Accordingly, when the front shelf 3 is removed from the shelf rails 5a to be placed on the top face of the rear shelf 4 or to be used while being supported by any other one of the pairs of shelf rails 5b to 5g, it is possible to prevent the front
10 shelf 3 from interfering with the air passage component part 12.

[0017]

Further, as illustrated in Figs. 4, 5, and 7, in a rearward edge part thereof, the front shelf 3 is provided with two protrusion parts 33 positioned apart from each other, the protrusion parts 33 each protruding toward the rear shelf 4 and abutting against
15 the bottom face of the forward edge part of the rear shelf 4. Because the forward portion of the front shelf 3 is restrained from moving in the up-and-down directions by the claw parts 32, even when an item in a storage space provided under the front shelf 3 pushes up from underneath, for example, the forward portion of the front shelf 3 is able to stay in a level state without being thrust and raised upward. In
20 contrast, the front shelf 3 is not provided with the claw parts 32 at the rearward portion that could prevent the thrust in the up-and-down direction. The reason for not being provided with the claw parts 32 is that, if the rear portion were provided with claw parts, when the front shelf 3 is placed on the top face of the rear shelf 4, the claw parts would prevent the front shelf 3 from being level. Accordingly, if an item in
25 the storage space provided under the front shelf 3 pushed up from underneath, the rear portion of the front shelf 3 would be thrust upward and become unable to maintain the level state. It would therefore be impossible to keep the items placed on the top face of the front shelf 3 in a stable manner. To cope with this situation, the refrigerator 100 according to Embodiment 1 is configured to prevent the rear
30 portion of the front shelf 3 from being thrust upward by arranging the protrusion

parts 33 to abut against the bottom face of the forward edge part of the rear shelf 4 of which movements in the up-and-down directions are restrained by the claw parts 42. In this situation, the size and the number of the protrusion parts 33 are not limited to those illustrated in the drawing. It is possible to change the specifics of the protrusion parts 33 as appropriate in accordance with the type of the refrigerator.

[0018]

As illustrated in Figs. 3 to 5, the rear shelf 4 includes: a glass plate 40 on which items are to be placed; and a frame 41 that is made of synthetic resin and is attached to the outer perimeter of the glass plate 40. The rear shelf 4 has cut-out parts 44 formed at the left and the right ends in terms of the width direction of the forward portion thereof. The cut-out parts 44 are formed in the glass plate 40 and in the frame 41, respectively. Further, the rear shelf 4 has a cut-out part 46 having a recessed shape, on the rear portion of the frame 41. The rear shelf 4 is thus shaped so as to be prevented from interfering with the air passage component part 12, when the rearward edge part thereof is arranged to abut against the wall face on the back portion of the storage compartment.

[0019]

The frame 41 is provided with a forward holding piece 41a, lateral holding pieces 41b, and a rearward holding piece 41c, respectively, on the bottom face of the forward edge part except for the cut-out parts 44, the bottom face of the left and the right lateral edge part, and the bottom face of the rearward edge part. The frame 41 is attached, as the holding pieces 41a to 41c are hooked onto the glass plate 40.

[0020]

Fig. 8 is a drawing of a view from a direction of a lateral face to explain a manner in which the glass plate is fitted into the frame structuring the rear shelf. Fig. 9 is a drawing of a view from a direction of the bottom face to explain the manner in which the glass plate is fitted into the frame forming the rear shelf. Fig. 10 is a drawing of a perspective view from a direction of the bottom face to explain the manner in which the glass plate is fitted into the frame forming the rear shelf. As illustrated in Figs. 8 to 10, on the bottom face of the frame 41 being inverted, the

glass plate 40 of the rear shelf 4 is inserted, with the cut-out side first, toward the cut-out parts 44 of the frame 41, while being tilted at an angle. Because the glass plate 40 and the frame 41 both have the left and the right ends thereof cut out on the forward portion, the contact area immediately after the insertion is kept small, when
5 the glass plate 40 is inserted into the frame 41. It is therefore possible to keep frictional resistance small. In other words, the rear shelf 4 of the refrigerator 100 of Embodiment 1 is configured so that it is possible to easily insert the glass plate 40 into the frame 41. It is therefore possible to enhance efficiency in the assembly work.

10 [0021]

Further, in central sections in the front-and-back direction at the left and the right ends in terms of the width direction, the rear shelf 4 is provided with claw parts 42 each protruding downward. The left and the right claw parts 42 are each shaped to curve outwardly and restraining movements of the rear shelf 4 in the up-and-down
15 directions by being engaged with the shelf rails 5a. In other words, the refrigerator 100 of Embodiment 1 is configured so that the rear shelf 4 is always in a level state without being thrust upward and tilted by an item in the storage space provided underneath the rear shelf 4. It is therefore possible to safely use the refrigerator 100. Further, it is possible to freely slide the rear shelf 4 in the front-and-back
20 directions and to remove the rear shelf 4 by moving, in the front-and-back directions, the claw parts 42 engaged with the shelf rails 5a. The removed rear shelf 4 may be washed and cleaned and may also be replaced with a new shelf, if damaged.

[0022]

Further, as illustrated in Figs. 3 and 4, the rear shelf 4 has step parts 45
25 against which the projecting parts 35 abut in the front-and-back direction, when the front shelf 3 is placed on the top face of the rear shelf 4. Alternatively, the front shelf 3 and the rear shelf 4 may each be configured to have fitted parts made up of projections and recesses fitted to each other when the front shelf 3 is placed on the top face of the rear shelf 4.

30 [0023]

Next, the situation in which the front shelf 3 is placed on the top face of the rear shelf 4 will be explained. Fig. 11 is a perspective view showing, in enlargement, a relevant part of the refrigerator according to Embodiment 1 of the present invention to indicate the situation in which the front shelf is placed on the top face of the rear shelf.

5 Fig. 12 is an enlarged front view showing, in enlargement, the relevant part of the refrigerator according to Embodiment 1 of the present invention to indicate the situation in which the front shelf is placed on the top face of the rear shelf. Fig. 13 is a plan view of the shelf unit of the refrigerator according to Embodiment 1 of the present invention to indicate the front shelf placed on the top face of the rear shelf.

10 Fig. 14 is a lateral view of the shelf unit of the refrigerator according to Embodiment 1 of the present invention to indicate the situation in which the front shelf is placed on the top face of the rear shelf. Fig. 15(A) is an enlarged cross-sectional view taken at the line Z-Z indicated in Fig. 13. Fig. 15(B) is an enlarged view of part D indicated in Fig. 15(A). Fig. 16 is an enlarged cross-sectional view of a relevant part of the refrigerator according to Embodiment 1 to indicate the manner in which the front shelf is placed on the top face of the rear shelf. Fig. 17 is an enlarged view of part C indicated in Fig. 12.

[0024]

In general, in the storage compartment 1 of refrigerators, the storage space is divided into sections by the shelf units 2 to enhance storability for items. However, when an item to be stored is tall, it may not be possible to store the item, depending on the size of the storage spaces divided into sections. To address this, the refrigerator 100 of Embodiment 1 is configured so that, as illustrated in Figs. 11 to 13, the front shelf 3 removed from the shelf rails 5a is placed on the top face of the rear shelf 4, to enlarge the storage space in the location where the front shelf 3 has been located.

[0025]

As illustrated in Fig. 14, the front shelf 3 placed on the top face of the rear shelf 4 is placed on the top faces of the shelf rails 5a, while the claw parts 32 are received in the cut-out parts 44 of the rear shelf 4. As illustrated in Fig. 17, the claw parts 32

of the front shelf 3 are placed on the top faces of the shelf rails 5a. It is therefore possible to maintain stability of the level state of the front shelf 3. Further, as illustrated in Figs. 15 and 16, the position of the front shelf 3 is determined by having the projecting parts 35 abut against the step parts 45 of the rear shelf 4. In this situation, as illustrated in Fig. 14, the front shelf 3 placed on the top face of the rear shelf 4 is configured so that the bottom face of the forward portion is in contact with the top faces of the step parts 45, while the bottom faces of the protrusion parts 33 are in contact with the frame 41 of the rear shelf 4. In other words, each of the step parts 45 has such a height that the front shelf 3 placed on the top face of the rear shelf 4 is level, in accordance with the size and the shapes of the protrusion parts 33. Further, as illustrated in Fig. 14, it is desirable to configure the front shelf 3 to have such a dimension that the forward edge of the front shelf 3 is either in the same position as that of the forward edge of the rear shelf 4 or positioned farther in the back than the forward edge of the rear shelf 4. The reason is that these structures prevent the front shelf 3 from protruding out from the rear shelf 4 and hindering the storing of items.

[0026]

Further, as illustrated in Figs. 11, 12, and 17, on inner faces positioned adjacent to the rear face lateral wall part of the storage compartment 1, it is also acceptable to provide rise prevention rails 6 being positioned above the front shelf 3 and protruding toward the inside of the storage compartment 1. Because the front shelf 3 is placed on the top face of the rear shelf 4, the front shelf 3 is restrained from moving in the up-and-down directions even when being thrust from underneath, by the rear shelf 4 of which movements in the up-and-down directions are restrained by the claw parts 42. However, when a load in the vertical direction acts on a forward portion of the front shelf 3 from above, there is a possibility that the rear portion of the front shelf 3 might rise. To cope with this situation, the refrigerator 100 of Embodiment 1 is configured to prevent the rear portion of the front shelf 3 from rising, by using the rise prevention rails 6, so that it is possible to place food and other items thereon in a stable manner. Because each of the rise prevention rails 6 is provided

in such a position that is adjacent to the rear face lateral wall part where the user does not frequently store food items and where the rise prevention rails 6 are not so conspicuous. It is therefore possible to avoid reduction of the food storage space or impairing the appearance.

5 [0027]

Therefore, according to the refrigerator 100 of one embodiment of the present invention, it is possible to place the front shelf 3 on the top face of the rear shelf 4 to be level, because it is possible to arrange the claw parts 32 of the front shelf 3 placed on the top face of the rear shelf 4 to be received in the cut-out parts 44 formed in the rear shelf 4. Accordingly, unlike in the conventional technique described above, there is no need to provide a slide rail structure in which the front shelf 3 would be stowed as being slid on the bottom face of the rear shelf 4. Consequently, it is possible to form a space for storing therein a tall item, in the location where the front shelf 3 has been located, while keeping the food storage space large.

15 [0028]

Further, according to the refrigerator 100 of one embodiment of the present invention, the rear portion of the front shelf 3 has the protruding parts 34 that can be fitted to the shapes of the cut-out parts 44 of the rear shelf 4. Accordingly, there is no gap formed between the front shelf 3 and the rear shelf 4. It is therefore possible to safely place items thereon.

20 [0029]

Further, according to the refrigerator 100 of one embodiment of the present invention, the rearward edge part of the front shelf 3 is provided with the protrusion parts 33 each of which protrudes toward the rear shelf 4 and abuts against the bottom face of the rear shelf 4. Accordingly, even when the front shelf 3 is pushed from underneath by an item in the storage space provided underneath the front shelf 3, the front shelf 3 is prevented from being thrust upward. It is therefore possible to maintain the front shelf 3 in a level state.

25 [0030]

30 In addition, according to the refrigerator 100 of one embodiment of the present

invention, the front shelf 3 has formed the projecting parts 35 projecting downward from the bottom face thereof. The rear shelf 4 has formed the step parts 45 against which the projecting parts 35 abut in the front-and-back direction, when the front shelf 3 is placed on the top face of the rear shelf 4. Accordingly, there is no possibility that the front shelf 3 being placed on the top face of the rear shelf 4 will pop out forward unexpectedly. Consequently, it is possible to enhance safety.

[0031]

When the refrigerator 100 according to the one embodiment of the present invention is used, the forward edge of the front shelf 3 placed on the top face of the rear shelf 4 is either in the same position as that of the forward edge of the rear shelf 4 or positioned farther in the back than the forward edge of the rear shelf 4. Consequently, there is no possibility that the front shelf 3 will protrude from the rear shelf 4 and hinder the storing of items.

[0032]

According to the refrigerator 100 of the one embodiment of the present invention, on the inner wall faces of the storage compartment 1, the rise prevention rails 6 are provided to be positioned above the front shelf 3 and to protrude toward the inside of the storage compartment 1, when the front shelf 3 is placed on the top face of the rear shelf 4. Accordingly, even when a load in the vertical direction acts on the forward portion of the front shelf 3, it is possible to prevent the rear portion of the front shelf 3 from rising. It is therefore possible to place food and other items thereon in a stable manner.

[0033]

Embodiment 2.

Next, a refrigerator according to Embodiment 2 of the present invention will be explained with reference to Figs. 18 to 20. Fig. 18 is a perspective view showing, in enlargement, a relevant part of the refrigerator according to Embodiment 2 of the present invention. Fig. 19 is a plan view showing, in enlargement, the relevant part of the refrigerator according to Embodiment 2 of the present invention. Fig. 20 is an enlarged cross-sectional view taken at the line V-V indicated in Fig. 19. Some of the

constituent elements that are the same as those in the refrigerator 100 of Embodiment 1 will be referred to by using the same reference characters, and the explanations thereof will be omitted.

[0034]

5 A refrigerator 110 of Embodiment 2 is configured, as illustrated in Figs. 18 to 20, so that the front shelf 3 is installed directly underneath the rear shelf 4. The front shelf 3 removed from the shelf rails 5a is supported by shelf rails 5b configured to have a length equal to the length of the front shelf 3 in the front-and-back direction. On the inner wall faces of the storage compartment 1, rise prevention rails 7 are
10 provided to be positioned above the front shelf 3 and to protrude toward the inside of the storage compartment 1, when the front shelf 3 is installed on the shelf rails 5b. As a result, the forward portion of the front shelf 3 is restrained by the claw parts 32 from moving in the up-and-down directions, whereas the rear portion of the front shelf 3 is restrained by the rise prevention rails 7 from moving in the up-and-down
15 directions.

[0035]

 Accordingly, unlike in the conventional technique described above, the refrigerator according to Embodiment 2 does not require a slide rail structure in which the front shelf 3 would be stowed as being slid on the bottom face of the rear shelf 4,
20 either. Consequently, it is possible to form a space for storing therein a tall item, in the location where the front shelf 3 has been located, while keeping the food storage space large.

[0036]

 The present invention has been thus explained on the basis of the
25 embodiments; however, the present invention is not limited by the configurations in the embodiments described above. For example, the glass plate 30 may be configured by using synthetic resin and may be modified as appropriate within the technical scope of the present invention. In short, it should be noted that the gist (the technical scope) of the present invention includes various scopes of
30 modifications, adaptive use, and usage that may be adopted as necessary by a so-

called person skilled in the art.

Reference Signs List

[0037]

1 storage compartment 2 shelf unit 3 front shelf 4 rear shelf
5 5a to 5g shelf rail 6, 7 rise prevention rail 10 outer casing 11 inner
casing 12 air passage component part 13 temperature adjusting unit
30, 40 glass plate 31, 41 frame 31a, 41a forward holding piece
31b, 41b lateral holding piece 31c, 41c rearward holding piece 32, 42
claw part 33 protrusion part 34 protruding part 35 projecting part
10 44, 46 cut-out part 45 step part 100, 110 refrigerator 100A
outer shell.

CLAIMS

[Claim 1]

A refrigerator comprising:

an outer shell having a storage compartment of which a front face is open to
5 form an opening;

a shelf rail being provided on an inner wall face of the storage compartment
and extending in a front-and-back direction; and

a shelf divided into a front shelf and a rear shelf supported by the shelf rail, the
front shelf being positioned on a part of the storage compartment, the part being
10 closer to the opening than to a back portion of the storage compartment, the rear
shelf being positioned on a part of the storage compartment, the part being closer to
the back portion than to the opening, wherein

the front shelf includes a claw part engaging with the shelf rail in a lateral edge
part of the front shelf, and a projecting part projecting downward from a bottom face
15 of the front shelf,

the rear shelf has

a cut-out part formed in a region corresponding, when the front shelf
removed from the shelf rail is placed on a top face of the rear shelf, to a position of
the claw part provided to the front shelf, and

20 a step part against which the projecting part abuts in a front-and-back
direction when the front shelf is placed on the top face of the rear shelf, and

the step part has such a height that the front shelf is level when the front shelf
is placed on the top face of the rear shelf.

[Claim 2]

25 A refrigerator comprising:

an outer shell having a storage compartment of which a front face is open to
form an opening;

a shelf rail being provided on an inner wall face of the storage compartment
and extending in a front-and-back direction; and

30 a shelf divided into a front shelf and a rear shelf and being supported by the

shelf rail, the front shelf being positioned on a part of the storage compartment, the part being closer to the opening than to a back portion of the storage compartment, the rear shelf positioned on a part of the storage compartment, the part being closer to the back portion than to the opening, wherein

5 the front shelf includes a claw part engaging with the shelf rail in a lateral edge part of the front shelf, a projecting part projecting downward from a bottom face of the front shelf, a protrusion part provided at a rearward edge part of the front shelf and protruding toward the rear shelf and abutting against a bottom face of the rear shelf, the rear shelf has

10 a cut-out part formed in a region corresponding, when the front shelf removed from the shelf rail is placed on a top face of the rear shelf, to a position of the claw part provided to the front shelf, and

 a step part against which the projecting part abuts in a front-and-back direction when the front shelf is placed on the top face of the rear shelf, and

15 the step part has such a height that the front shelf is level when the front shelf is placed on the top face of the rear shelf.

[Claim 3]

 The refrigerator of claim 1 or 2, wherein

 the claw part is provided on a forward portion of the front shelf,

20 the cut-out part is formed on a forward portion of the rear shelf, and

 a rear portion of the front shelf has a protruding part that can be fitted to a shape of the cut-out part of the rear shelf.

[Claim 4]

 The refrigerator of any one of claims 1 to 3, wherein

25 the front shelf has such a dimension that, when the front shelf is placed on the top face of the rear shelf, a forward edge of the front shelf is either in a same position as that of a forward edge of the rear shelf or positioned farther back than the forward edge of the rear shelf.

[Claim 5]

30 The refrigerator of any one of claims 1 to 4, further comprising

on the inner wall face of the storage compartment, a rise prevention rail is provided to be positioned, when the front shelf is placed on the top face of the rear shelf, above the front shelf and to protrude toward an inside of the storage compartment.

5 [Claim 6]

The refrigerator of any one of claims 1 to 5, wherein the rear shelf includes a glass plate having a cut-out part and a frame attached along an outer perimeter of the glass plate, and

10 the glass plate is inserted, with the cut-out part side thereof facing the cut-out part of the frame.

[Claim 7]

The refrigerator of any one of claims 1 to 6, wherein the shelf rail is provided on each of multiple levels formed in an up-and-down direction of the storage compartment, and

15 at least one of the shelf rails provided on the multiple levels has a length equal to that of the front shelf in the front-and-back direction.

[Claim 8]

The refrigerator of claim 7, further comprising
20 on the inner wall face of the storage compartment, a rise prevention rail is provided to, when the front shelf is placed on the shelf rail having the length equal to that of the front shelf in the front-and-back direction, be positioned above the front shelf and to protrude toward an inside of the storage compartment.