ABSTRACT

A refrigerator is provided which includes: a main body having a storage compartment which has an inner wall; a shelf unit partitioning the storage compartment; and a shelf supporter provided on the inner wall of the storage compartment, detachably coupled with the shelf unit, and having a depressed groove. The shelf unit includes: a panel; and at least one stopper detachably connected to the panel and accommodated in the depressed groove to limit movement of the panel in a lengthwise direction of the shelf supporter. Accordingly, the present invention provides a refrigerator of which a shelf unit has an enhanced outer appearance with various designs, thereby improving aesthetic quality.
FIG. 4B
FIG. 4C
REFRIGERATOR INCLUDING SHELVING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS


BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention
[0003] The present invention relates to a refrigerator, and more particularly, to a refrigerator having an improved outer appearance.

[0004] 2. Description of the Related Art
[0005] In general, a refrigerator includes various units for spatial efficiency and a user's convenience in addition to a basic cooling device to keep foods fresh. As such, a shelf is necessarily provided in the refrigerator.

[0006] A conventional refrigerator generally includes a main body formed with a storage compartment; a door opening and closing the storage compartment; and a shelf unit mounted to an inner wall of the storage compartment. FIG. 5 is a partial-enlarged bottom view showing a mounted state of a shelf unit 130 in a conventional refrigerator. The shelf unit 130 is detachably installed on a shelf supporter 140 of an inner wall 111 in the storage compartment, so that foods or other materials are laid on the shelf unit 130. Referring to FIG. 5, the shelf unit 130 includes a glass panel 131 on which the materials are laid; a frame 133 surrounding an edge of the glass panel 131; a stopper 135 protruding from a bottom of the frame 133 and accommodated in a groove 141 to thereby limit the shelf unit 130 from moving in a lengthwise direction along the shelf supporter 140.

[0007] However, the conventional refrigerator has not departed from a prototypical design in which the frame 133 is provided along all four side edges of the glass panel 131 to mount the stoppers 135 to the shelf unit 130. Accordingly, the conventional refrigerator does not satisfy consumers' demand for a more refined design. Further, there is a problem in that the entire shelf unit 130 has to be replaced even though a part of the shelf unit 130, for example, the glass panel 131, the stoppers 135, etc., is damaged.

SUMMARY OF THE INVENTION

[0008] Accordingly, it is an aspect of the present invention to provide a refrigerator of which a shelf unit has an enhanced outer appearance with various designs.

[0009] Further, the present invention provides a refrigerator improved in modularity.

[0010] Additional aspects and/or advantages of the present invention will be set forth in part in the description which follows and, in part, will be apparent from the description, or may be learned by practice of the present invention.

[0011] The foregoing and/or other aspects of the present invention can be achieved by providing a refrigerator including: a main body having a storage compartment, the storage compartment having an inner wall; a shelf unit partitioning the storage compartment, and a shelf supporter provided on the inner wall of the storage compartment, detachably coupled with the shelf unit, and having a depressed groove, the shelf unit comprising: a panel; and at least one stopper detachably connected to the panel and accommodated in the depressed groove to limit movement of the panel in a lengthwise direction of the shelf supporter.

[0012] According to an aspect of the invention, the stopper includes an upper stopper portion and a lower stopper portion coupled across the panel.

[0013] According to an aspect of the invention, one of the upper stopper portion and the lower stopper portion includes a projection, and the other one of the upper stopper portion and the lower stopper portion includes a projection accommodating part to accommodate the projection therein.

[0014] According to an aspect of the invention, the shelf unit includes a decoration unit provided along at least one edge of the panel.

[0015] According to an aspect of the invention, the panel is made from glass, and the decoration unit is made from a metallic material.

[0016] According to an aspect of the invention, the shelf unit includes a breakaway-prevention guide to prevent the shelf unit from breaking away from the shelf supporter in a direction transverse to the lengthwise direction of the shelf supporter.

[0017] The foregoing and/or other aspects of the present invention can be achieved by providing a shelving system to attach a shelf to at least one wall of a refrigerator, including: a shelf unit including a panel having a hole formed penetrating the panel, and at least one stopper coupled to the hole of the panel; and a shelf supporter provided on the at least one wall of the refrigerator and including a depressed groove into which the stopper is accommodated when the shelf unit is coupled with the shelf supporter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The above and/or other aspects and advantages of the present invention will become apparent and more readily appreciated from the following description of the embodiment, taken in conjunction with the accompanying drawings of which:

[0019] FIG. 1 is a schematic perspective view of a refrigerator according to an embodiment of the present invention;

[0020] FIG. 2 is a bottom view of a shelf unit in the refrigerator according to the embodiment of the present invention;

[0021] FIG. 3 is a partial-enlarged sectional view of the shelf unit in the refrigerator according to the embodiment of the present invention, taken along line III-III of FIG. 2;

[0022] FIGS. 4A through 4C are perspective views showing operations of the shelf unit in the refrigerator according to the embodiment of the present invention; and

[0023] FIG. 5 is a partial-enlarged bottom view showing a mounted state of a shelf unit in a conventional refrigerator.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0024] Reference will now be made in detail to the embodiment of the present invention, an example of which is illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout. The embodiment is described below to explain the present invention by referring to the figures.

[0025] As shown in FIGS. 1 and 2, a refrigerator according to an embodiment of the present invention includes a main body 1 formed with a storage compartment 10; a shelf...
unit 40 able to store materials thereon; a shelf supporter 30 (more clearly shown in FIGS. 4A-4C) provided on an inner wall 11 of the storage compartment 10 and coupled with the shelf unit 40; and a stopper 50 preventing the shelf unit 40 from moving in a lengthwise direction of the shelf supporter 30.

Referring to FIG. 1, the storage compartment 10 of the main body 1 is partitioned into a freezer compartment 10a and a refrigerator compartment 10b. Front openings of the freezer and refrigerator compartments 10a and 10b are opened/closed by a freezer door 20a and a refrigerator door 20b, respectively. An upper space of the storage compartment 10 is partitioned by the plurality of shelf units 40, and a lower space of the storage compartment 10 is provided with a plurality of drawers 15.

As shown in FIGS. 4A and 4B, the shelf supporter 30 is provided in the inner wall 11 of the storage compartment 10 and the shelf unit 40 is detachably coupled thereto. The shelf supporter 30 is shaped like a rail to thereby allow the shelf unit 40 to slide. Further, two shelf supporters 30 protrude from opposite inner walls 11 of the storage compartment 10 and face each other. Alternatively, the shelf supporter 30 may be recessed in the inner wall 11 of the storage compartment 10. The shelf supporter 30 protruding from the inner wall 11 of the storage compartment 10 includes a depressed groove 33 depressed at a predetermined portion thereof. The depressed groove 33 is coupled with the stopper 50 in a manner described later. The depressed groove 33 may be formed in one of the opposite shelf supporters 30 or in both opposite shelf supports 30 so as to correspond to one or more stoppers 50.

As shown in FIG. 1, the shelf unit 40 partitions the inner space of the storage compartment 10, thereby allowing materials to be efficiently stored. Referring to FIG. 2, the shelf unit 40 includes a panel 41 on which the materials are laid; and stoppers 50 limiting movement of the panel 41 in the lengthwise direction of the shelf supporter 30. The shelf unit 40 is detachably coupled to the shelf supporter 30 provided in the inner wall 11 of the storage compartment 10.

The panel 41 is shaped like a plate corresponding to the shape of the storage compartment 10. In this embodiment, the panel 41 is shaped like a rectangular plate. Further, the panel 41 can slide onto the shelf supporter 30. Preferably, the panel 41 is made of transparent glass. However, the panel may be made from any type of material that is able to support foodstuffs, etc. Thus, the panel 41 provides a beautiful outer appearance.

As shown in FIG. 3, the panel 41 is formed with a passing groove 43 to which the stopper 50 is coupled. In the embodiment, the passing groove 43 is formed by a hole penetrating the panel 41, but not limited thereto. Alternatively, the passing groove 43 may be formed in one side of the panel 41. Further, passing groove 43 may be recessed at end portions on one surface of the panel 41. Here, the passing groove 43 is preferably positioned corresponding to the position of the depressed groove 33.

As shown in FIG. 3, the stopper 50 is detachably coupled to the panel 41 and limits the movement of the panel 41 in the lengthwise direction of the shelf supporter 30. The stopper 50 is accommodated in the depressed groove 33. The stopper includes an upper stopper portion 51 and a lower stopper portion 55. The upper stopper portion 51 and the lower stopper portion 55 are coupled to each other across the panel 41. The upper stopper portion 51 is placed on a top of the panel 41, and the lower stopper portion 55 is placed on a bottom of the panel 41 to be accommodated in the depressed groove 33.

The stopper 50 can be positioned at any place on the panel 41 along the lengthwise direction of the shelf supporter 30. Here, the stopper 50 is coupled to the passing groove 43 of the panel 41 and accommodated in the depressed groove 33 of the shelf supporter 30. The stopper 50 can be different in color from the panel 41. Accordingly, the stopper 50 provides a beautiful outer appearance.

The upper stopper portion 51 includes a head 52 which is larger than the passing groove 43 of the panel 41, and a projection 53 protruding from the head 52 and inserted into the passing groove 43 of the panel 41. Preferably, an outer diameter of the projection 53 is smaller than or approximately equal to an inner diameter of the passing groove 43. Meanwhile, a hooking groove 54 is formed on an outer surface of the projection 53. The hooking groove 54 is recessed on the outer surface of an end of the projection 53.

The hooking groove 54 will be further described in the following description of the lower stopper portion 55.

The lower stopper portion 55 is coupled with the upper stopper portion 51 across the panel 41. The lower stopper portion 55 is formed with a projection accommodating part 56 to accommodate the projection 53 of the upper stopper portion 51. An inner surface of the projection accommodating part 56 is formed with a hooking protrusion 57 engaging within the hooking groove 53 of the upper stopper portion 51. Accordingly, when the projection 53 of the upper stopper portion 51 is accommodated in the projection accommodating part 56 of the lower stopper portion 55, the hooking protrusion 57 of the projection accommodating part 56 is hooked to the hooking groove 54 of the projection 53, thereby preventing the upper stopper portion 51 and the lower stopper portion 55 from separating from each other. Here, the hooking protrusion 57 and the hooking groove 54 are preferably disposed under the panel 41. Further, the upper stopper portion 51 and the lower stopper portion 55 may be made of an elastic material, so as to be coupled resiliently.

In the embodiment, the hooking groove 54 is provided in the upper stopper portion 51 and the hooking protrusion 57 is provided in the lower stopper portion 55, but the position of the hooking groove 54 and the hooking protrusion 57 are not limited thereto. Alternatively, the hooking protrusion 57 may be provided in the upper stopper portion 51 and the hooking groove 54 may be provided in the lower stopper portion 55.

Thus, the position of the upper stopper portion 51 and the lower stopper portion 55 may be exchanged with respect to the panel 41.

In the refrigerator according to the embodiment of the present invention, the shelf unit 40 further includes a decoration unit 60 provided along at least one edge of the panel 41. The decoration unit 60 may preferably be made of metal. For example, the decoration unit 60 may be provided along a front edge of the panel 41 and may be made of stainless steel. The decoration unit 60 is coupled to the panel 41 while accommodating a front region of the panel 41. Thus, the decoration unit 60 gives a beautiful and high-grade image to the shelf unit 40. Further, the decoration unit 60 may be detachable from the panel 41.

In the embodiment as shown in FIG. 2, the stopper 50 includes the upper stopper portion 51 and the lower
stopper portion 55, which are fitted to each other, but the position of the upper stopper portion 51 and the lower stopper portion 55 are not limited thereto. Alternatively, the upper stopper portion 51 and the lower stopper portion 55 may be formed as a single body and may be detachably coupled to the panel 41. Further, the upper stopper portion 51 and the lower stopper portion 55 may have a screw-coupling structure.

[0039] According to the embodiment of the present invention as shown in FIG. 2, the shelf unit 40 further includes a breakaway-prevention guide 73 provided in the panel 41 preventing the shelf unit 40 from breaking away in a direction transverse to the lengthwise direction of the shelf supporter 30. In addition, a rear frame 70 is provided in the back of the panel 41. The rear frame 70 may be formed by, for example, injection molding and may be provided with the breakaway-prevention guide 73.

[0040] The rear frame 70 is placed in the back of the panel 41. The back of the rear frame 70 is shaped corresponding to the shape of a duct 13, shown in FIG. 1, through which cool air is supplied to the storage compartment 10. Here, the rear frame 70 can be made of plastic, for example, for easier processing.

[0041] The breakaway-prevention guide 73 guides the shelf unit 40 to slide and couple with the shelf supporter 30. Further, the breakaway-prevention guide 73 prevents the shelf unit 40 from breaking away from the shelf supporter 30 in the state that the shelf unit 40 is coupled to the shelf supporter 30. The breakaway-prevention guide 73 protrudes from a bottom of the rear frame 70 and is bent toward the inner wall 11 of the storage compartment 10. The breakaway-prevention guide 73 is shaped to surround the shelf supporter 30. The breakaway-prevention guide 73 may be provided at opposite end parts or one end part of the rear frame 70. A predetermined gap is provided between the breakaway-prevention guide 73 and the shelf supporter 30 so that the shelf unit 40 can be tilted to the shelf supporter 30 when the shelf unit 40 is coupled to the shelf supporter 30. Accordingly, the shelf unit 40 can be readily coupled to the shelf supporter 30.

[0042] Below, operations of the refrigerator according to the embodiment of the present invention will be described with respect to FIGS. 3 through 4C.

[0043] First, the projection 53 of the upper stopper portion 51 is inserted in the passing groove 43 of the panel 41. Then, the projection accommodating part 56 of the lower stopper portion 55 is fitted to the projection 53 of the upper stopper portion 51. When the projection 53 is fitted to the projection accommodating part 56, the hooking protrusion 57 and the hooking groove 54 are hooked to each other. Here, the upper stopper portion 51 and the lower stopper portion 55 may be made of elastic materials, so that the coupling of the hooking protrusion 57 and the hooking groove 54 are elastically maintained as being hooked. Accordingly, the panel 41 and the stopper 50 form the shelf unit 40.

[0044] Then, the shelf unit 40 slides and couples with the shelf supporter 30. At this time, the front of the shelf unit 40 is lifted up and the breakaway-prevention guide 73 is coupled to the shelf supporter 30. The shelf unit 40 is then pressed in an insertion direction, so that the shelf unit 40 is tilted to the shelf supporter 30 at a predetermined angle and guided to slide on the shelf supporter 30 by the breakaway-prevention guide 73. When the shelf unit 40 is completely inserted, the shelf unit 40 is seated on the shelf supporter 30, thereby placing the stopper 50 in the depressed groove 33. Thus, the stopper 50 is accommodated in the depressed groove 33 of the shelf supporter 30, thereby limiting movement of the shelf unit 40 in the lengthwise direction of the shelf supporter 30. Further, the breakaway-prevention guide 73 prevents the shelf unit 40 from moving in a direction transverse to the lengthwise direction of the shelf supporter 30.

[0045] As described above, the panel 41 may be made of a transparent material, and the stopper 50 includes the upper stopper portion 51 and the lower stopper portion 55 which are coupled to the passing groove 43 of the panel 41, thereby providing the shelf unit 40 with a beautiful and high grade image.

[0046] Further, the panel 41 and the stopper 50 are detachable to each other, so that the panel 41 may be replaced only when the panel 41 is damaged and the stopper 50 may be replaced only when the stopper 50 is damaged. Accordingly, the modularity is enhanced in preparation for future damage of the shelf unit 40.

[0047] Also, the decoration unit 60 is provided in the front edge of the panel 41, thereby providing a beautiful and high grade image.

[0048] Accordingly, the embodiment of the present invention provides a refrigerator in which a shelf unit has an enhanced outer appearance with various designs, thereby improving aesthetic quality.

[0049] Further, the present invention provides a refrigerator improved in modularity.

[0050] Although an embodiment of the present invention has been shown and described, it will be appreciated by those skilled in the art that changes may be made in this embodiment without departing from the principles and spirit of the invention, the scope of which is defined in the appended claims and their equivalents.

What is claimed is:
1. A refrigerator, comprising:
   a main body having a storage compartment, the storage compartment having an inner wall;
   a shelf unit partitioning the storage compartment; and
   a shelf supporter provided on the inner wall of the storage compartment, detachably coupled with the shelf unit, having a depressed groove, the shelf unit comprising:
   a panel, and
   at least one stopper detachably connected to the panel and accommodated in the depressed groove to limit movement of the panel in a lengthwise direction of the shelf supporter.
2. The refrigerator according to claim 1, wherein the stopper comprises an upper stopper portion and a lower stopper portion coupled across the panel.
3. The refrigerator according to claim 2, wherein one of the upper stopper portion and the lower stopper portion comprises a projection, and the other one of the upper stopper portion and the lower stopper portion comprises a projection accommodating part to accommodate the projection therein.
4. The refrigerator according to claim 1, wherein the shelf unit comprises a decoration unit provided along at least one edge of the panel.
5. The refrigerator according to claim 4, wherein the panel is made from glass, and the decoration unit is made from a metallic material.
6. The refrigerator according to claim 2, wherein the shelf unit comprises a decoration unit provided along at least one edge of the panel.

7. The refrigerator according to claim 6, wherein the panel is made from glass, and the decoration unit is made from a metallic material.

8. The refrigerator according to claim 3, wherein the shelf unit comprises a decoration unit provided along at least one edge of the panel.

9. The refrigerator according to claim 8, wherein the panel is made from glass, and the decoration unit is made from a metallic material.

10. The refrigerator according to claim 1, wherein the shelf unit further comprises a breakaway-prevention guide to prevent the shelf unit from breaking away from the shelf supporter in a direction transverse to a lengthwise direction of the shelf supporter.

11. A shelving system to attach a shelf to at least one wall of a refrigerator, comprising:
   a shelf unit comprising:
   a panel having a hole formed penetrating the panel, and
   at least one stopper coupled to the hole of the panel; and
   a shelf supporter provided on the at least one wall of the refrigerator and including a depressed groove into which the stopper is accommodated when the shelf unit is coupled with the shelf supporter.

12. The shelving system according to claim 11, wherein the refrigerator includes an air duct and the panel includes a rear frame provided in a back of the panel and having a shape corresponding to the air duct.

13. The shelving system according to claim 12, wherein the rear frame includes a breakaway-prevention guide extending from the rear frame.

14. The shelving system according to claim 13, wherein the breakaway prevention guide prevents the shelf unit from breaking away from the shelf supporter in a direction transverse to a lengthwise direction of the shelf supporter.

15. The shelving system according to claim 11, wherein the at least one stopper includes an upper stopper portion and a lower stopper portion coupled through the hole of the panel.

16. The shelving system according to claim 15, wherein at least one of the upper stopper portion and the lower stopper portion includes a head and a projection protruding from the head and the other of the upper stopper portion and the lower stopper portion includes a projection accommodating part, the head being larger than the hole of the panel and an outer diameter of the projection being smaller than or equal to an inner diameter of the hole.

17. The shelving system according to claim 16, wherein an inner surface of the projection accommodating part includes a hooking protrusion and an outer surface of the projection includes a hooking groove into which the hooking protrusion is engagable.

18. The shelving system according to claim 11, wherein an edge of the panel includes a decoration unit.