A refrigerator having a home bar, whose assembly efficiency and aesthetic external appearance are improved, is disclosed. The home bar includes a home bar frame tightly mounted at the inside of an opening, which is formed at a door of the refrigerator door such that the opening communicates with the inside of the refrigerator, a home bar door mounted to the home bar frame such that the home bar door can be hingedly rotated for opening and closing the opening, a coupling-and-releasing unit for coupling the home bar door to the home bar frame and releasing the home bar door from the home bar frame, and at least one hinge member having a rotary shaft movable in the inward and outward directions of the home bar door or the home bar frame such that the rotary shaft can be inserted into or separated from a hinge hole formed at the home bar frame or the home bar door.
FIG. 6
FIG. 9

Diagram showing mechanical components labeled as follows:
- 181
- 187
- 180
- 185, 183, 184
FIG. 16
REFRIGERATOR HAVING HOME BAR


BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a refrigerator having a home bar, and more particularly, to a refrigerator having a home bar wherein the home bar is mounted to a door of the refrigerator, such that the home bar can be hingedly rotated upward and downward, and therefore, the home bar can be closed and opened, allowing foods or beverages to be easily and conveniently put into and taken from the refrigerator.

[0004] 2. Discussion of the Related Art

[0005] Generally, a refrigerator includes a plurality of storage compartments, in which foods are stored in a frozen state or in a chilled state. To the front of the refrigerator are mounted doors for opening and closing the storage compartments.

[0006] In recent years, a home bar has been provided at one of the doors in order to prevent leakage of chilled air due to frequent opening/closing of the door and to allow for a user to easily and conveniently put foods or beverages, which the user wishes to frequently have, into the inside of the door of the refrigerator and take such foods or beverages out of the inside of the door of the refrigerator.

[0007] The home bar includes a home bar door mounted at one side of an opening formed at the door, such that the home bar door can be hingedly rotated upward and downward, for opening and closing the opening. The opening communicates with the interior of the storage compartment of the refrigerator.

[0008] Consequently, the user can hingedly rotate the home bar door of the home bar upward and downward to open and close the opening of the door while the door of the storage compartment of the refrigerator is closed, and then take foods or beverages out of a basket mounted at the inside of the door or put foods or beverages into the basket.

[0009] Hereinafter, the construction and the operation of the conventional home bar will be described in more detail.

[0010] The conventional home bar includes a home bar frame formed along the inside of the opening of the door, and a home bar door mounted to the home bar frame such that the home bar door can hingedly rotated by means of hinge shafts and links. The links serve to restrict the rotating angle of the home bar door.

[0011] The hinge shafts are formed at the lower ends of the opposite sides of the home bar door such that the hinge shafts protrude outward from the home bar door. The hinge shafts are rotatably inserted into hinge holes formed at the lower ends of opposite sides of the home bar frame. Also, one-side ends of the links are rotatably coupled to the inner walls of opposite sides of the home bar frame, and the other-side ends of the links are rotatably coupled to the vicinity of the hinge shafts. As a result, the links are folded and unfolded with respect to the home bar frame as the home bar door is hingedly rotated.

[0012] Also, the home bar door includes a grip, a latch, a lever, and a latch fixing member. The grip is formed at the outside of the upper end of the home bar door such that the grip is depressed approximately in the shape of a hemisphere. As a result, the user can insert his/her fingers into the grip to easily hold the home bar door.

[0013] The latch is formed at one side end of the home bar door, for example, at the center of the upper end of the home bar door, such that the latch is formed in the shape of a hook in the inward direction of the opening. The latch is rotated by the operation of the lever at the inside of the grip such that the latch can be caught by a fastening member disposed inside the home bar frame or the latch can be released from the fastening member.

[0014] When the user wishes to open the home bar door such that the opening formed at the refrigerator door is opened, he/she presses the lever while holding the grip of the home bar door. As a result, the latch, which is connected to the lever, is hingedly rotated about a rotating shaft, and therefore, the latch is released from the fastening member. In this state, the user can hingedly rotate the home bar door in the outward direction of the door while he/she keeps holding the grip, with the result that the opening of the door is opened.

[0015] When the home bar door is hingedly rotated, the links are unfolded. When the home bar door is placed horizontally after the home bar door is hingedly rotated by 90 degrees, the links are maximally unfolded. As a result, the hinged rotation of the home bar door is stopped, and the home bar door is supported by the links.

[0016] However, the conventional home bar of the refrigerator has the following problems.

[0017] First, the user must hingedly rotate the home bar door, while he/she keeps holding the grip, in order to open the conventional home bar door. As a result, the user cannot use one hand while the home bar door is being opened. Consequently, the convenience of use is lowered.

[0018] Secondly, when the user loses his/her hold of the grip of the home bar door for a certain reason while the home bar door is being opened, the home bar door rapidly drops due to its own weight. At this time, the load caused by the drop of the home bar door is directly transmitted to the links. Consequently, great impacts are applied to the links and the coupling structure between the home bar door and the home bar frame.

[0019] When such impacts are repeatedly applied to the coupling structure over a long period of time, the links may be broken. As a result, it is impossible to use the home bar.

[0020] Thirdly, the links of the conventional home bar are exposed to the outside. As a result, the aesthetic external appearance of the home bar is deteriorated when the home bar is opened.

[0021] Fourthly, the conventional home bar has a structure in which the hinge shafts protrude outward from the oppo-
site sides of the home bar door. As a result, the hinge shafts cannot be inserted into the hinge holes of the home bar frame. For this reason, the home bar door is assembled to the home bar frame before the assembly of the home bar frame, and then the home bar frame is assembled to the refrigerator. In this way, the home bar is assembled according to the conventional art.

[0022] In the case that the home bar frame is integrally manufactured with the door, or the external ornament of the home bar frame and the external ornament of the door are integrally manufactured, however, it is not possible to use the above-mentioned conventional assembly process.

SUMMARY OF THE INVENTION

[0023] Accordingly, the present invention is directed to a refrigerator having a home bar that substantially obviates one or more problems due to limitations and disadvantages of the related art.

[0024] An object of the present invention is to provide a refrigerator having a home bar that is capable of accomplishing easy opening of a home bar door simply by a user pushing thereon, thereby improving the convenience of use.

[0025] Another object of the present invention is to provide a refrigerator having a home bar that is capable of preventing the malfunction of a home bar door and relative components due to the rapid dropping of the home bar door when the home bar door is opened and closed.

[0026] A further object of the present invention is to provide a refrigerator having a home bar having improved assembly efficiency and aesthetic external appearance.

[0027] Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

[0028] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a refrigerator has a home bar comprising: a home bar frame tightly mounted at the inside of an opening, which is formed at a door of the refrigerator door such that the opening communicates with the inside of the refrigerator; a home bar door mounted to the home bar frame such that the home bar door can be hingedly rotated for opening and closing the opening; a coupling-and-releasing unit for coupling the home bar door to the home bar frame and releasing the home bar door from the home bar frame; and at least one hinge member having a rotary shaft movable in the inward and outward directions of the home bar door or the home bar frame such that the rotary shaft can be inserted into or separated from a hinge hole formed at the home bar frame or the home bar door.

[0029] It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

[0031] FIG. 1 is a perspective view, in part, illustrating a preferred embodiment of a refrigerator having a home bar according to the present invention;

[0032] FIG. 2 is an exploded perspective view illustrating the structure of a preferred embodiment of a home bar frame of the home bar of the refrigerator shown in FIG. 1;

[0033] FIG. 3 is a perspective view illustrating the structure of a preferred embodiment of a home bar door of the home bar of the refrigerator shown in FIG. 1;

[0034] FIG. 4 is an exploded perspective view illustrating the home bar door shown in FIG. 3;

[0035] FIG. 5 is an exploded perspective view illustrating the coupling structure of a hinge member of the home bar door shown in FIG. 3;

[0036] FIG. 6 is an exploded perspective view illustrating the structure of a preferred embodiment of a hinge member according to the present invention;

[0037] FIG. 7 is a sectional view, in part, illustrating an example of the operation of the hinge member shown in FIG. 6;

[0038] FIG. 8 is a front view illustrating an example of the operation of the hinge member shown in FIG. 6;

[0039] FIG. 9 is an exploded perspective view illustrating the structure of another preferred embodiment of a hinge member according to the present invention;

[0040] FIG. 10 is a perspective view illustrating a home bar door, to which yet another embodiment of a hinge member according to the present invention is applied;

[0041] FIG. 11 is an exploded perspective view illustrating the structure of the hinge member shown in FIG. 10;

[0042] FIGS. 12 and 13 are perspective views, partially cutaway, illustrating an example of the operation of the hinge member shown in FIG. 10;

[0043] FIG. 14 is an exploded perspective view illustrating another preferred embodiment of a home bar frame of a refrigerator having a home bar according to the present invention;

[0044] FIG. 15 is an enlarged perspective view illustrating the home bar frame shown in FIG. 14;

[0045] FIG. 16 is an enlarged perspective view, in part, illustrating the home bar frame shown in FIG. 14 when seen from the rear of the home bar frame; and

[0046] FIG. 17 is a sectional view, in part, illustrating the home bar frame shown in FIG. 14.

DETAILED DESCRIPTION OF THE INVENTION

[0047] Reference will now be made in detail to the preferred embodiments of the present invention, examples of
which are illustrated in the accompanying drawings. Whenever possible, the same reference numbers will be used throughout the drawings to refer to the same or similar parts.

[0048] First, a preferred embodiment of a refrigerator having a home bar according to the present invention will be described in detail with reference to FIGS. 1 to 8.

[0049] As shown in FIG. 1, a storing chamber (not shown) is formed inside a refrigerator body 10 at a door 20 of the refrigerator body 10. An opening 30 is formed at the door 20 of the refrigerator body 10 such that the opening 30 communicates with shelves mounted inside the door 20 of the refrigerator body 10. To the door 20 is mounted a home bar door 50, which can be hingedly rotated upward and downward for closing and opening the opening 30.

[0050] Specifically, the home bar door 50 is coupled to the door 20 such that the home bar door 50 can be hingedly rotated by means of a pair of hinge members 80, which are mounted at the lower ends of opposite sides of the home bar door 50.

[0051] As shown in FIG. 2, at the inside of the opening 30 is mounted a home bar frame 40, which is formed in the shape of a rectangular frame.

[0052] At the center of the upper end of the home bar door 50 is formed a fastening member 70, which protrudes toward the opening 30. At the center of the upper end of the home bar frame 40 is mounted a latch assembly 60, which is actuated, by a pushing operation, for holding or releasing the fastening member 70.

[0053] As shown in FIG. 3, the home bar frame 40 is attached to the inner circumferential surface of the opening 30. To the front of the home bar frame 40 is coupled an external ornament, which is formed in the same shape as the front of the door 20.

[0054] In opposite sides of the home bar frame 40 are formed hinge holes 42, in which rotating shafts 84 of the hinge members 80 (see FIG. 3) are securely inserted, respectively. At the center of the upper end of the home bar frame 40 is formed an insertion groove 61, in which the latch assembly 60 is securely inserted.

[0055] At the front of the latch assembly 60 is formed a slot 62, in which the fastening member 70 is fitted. Although not shown in the drawing, the latch assembly 60 has a holding mechanism for holding or releasing the fastening member 70 when the home bar door 50 is pushed, and therefore, the fastening member 70 is pushed. Specifically, the holding mechanism is constructed in the latch assembly 60. When the fastening member 70 is pushed, the holding mechanism is rotated, while the holding mechanism is in contact with the fastening member, such that an opening formed at the tip end of the fastening member 70 is hooked by the holding mechanism or the hooked state of the fastening member 70 is released. Specifically, when the fastening member 70, which is inserted into the slot 62 of the latch assembly 60, is pressed by an external force, the tip end of the fastening member 70 pushes a hook of the holding mechanism, and therefore, the hook is caught in the opening formed at the tip end of the fastening member 70 while the hook is rotated. As a result, the fastening member 70 is securely held. When the fastening member 70 is pressed again, the hook of the holding mechanism is rotated, and therefore, the hooked state of the fastening member 70 is released. As a result, the home bar door 50 is set free.

[0056] Also, the latch assembly 60 is inserted in a latch groove 61 of the home bar frame 40. Furthermore, the latch assembly 60 is buried in a filling material, such as an insulating material, filled in the home bar frame 40, whereby the latch assembly 60 is securely mounted in the home bar frame 40.

[0057] As shown in FIGS. 3 to 5, the home bar door 50 is made of a plate member having the same shape as the opening 30 such that the front of the opening 30 can be covered by the home bar door 50.

[0058] The fastening member 70 is formed in the shape of a plate having an opening formed at the center thereof. The fastening member 70 is assembled at the inside of a fastening groove 71 formed at the center of the upper end of the home bar door 50 in the outward direction.

[0059] The home bar door 50 includes a base plate 51, a cover plate 52, and a foam material 53.

[0060] The base plate 51 is formed in the shape of a box having one surface opened to the home bar frame 40. At the lower ends of opposite sides of the base plate 51 are formed pluralities of screw-coupling bosses 55, which are used to fix the hinge members 80. At the lower end of at least one side of the base plate 51 is also formed a manipulation slot 58, into which a tool used to move the rotating shaft 84 of the corresponding hinge member 80 in the inward and outward directions of the base plate 51 is inserted. The manipulation slot 58 extends in the extending direction of the rotating shaft 84 of the hinge member 80.

[0061] The cover plate 52 has the same size as the open part of the base plate 51 such that the cover plate 52 can be fitted in the base plate 51. The cover plate 52 faces the front of the door 20 of the refrigerator 10 while the home bar door 50 is closed. At this time, it is preferable that the outer surface of the cover plate 52 constitute the same surface as the outer surface of the door 20 of the refrigerator 10.

[0062] The foam material 53 is a filling material, which is filled between the base plate 51 and the cover plate 52. The foam material 53 serves as a heat shield for shielding the home bar door 50 from heat. Also, the foam material 53 supports the insides of the base plate 51 and the cover plate 52. The foam material 53 is constructed such that a liquid-state filling material can be hardened to a predetermined hardness, after a predetermined period of time elapses, to securely support the hinge members 80.

[0063] On the other hand, each hinge member 80 is movable at the corresponding side of the home bar door 50 in the inward and outward directions of the home bar door 50 such that one end of each hinge member 80 can be easily inserted into and separated from the corresponding hinge hole 42 of the home bar frame 40 while each hinge member 80 is coupled to the home bar door 50.

[0064] FIGS. 6 to 8 illustrate the construction and the operation of a preferred embodiment of the hinge member 80 as described above.

[0065] As shown in FIGS. 6 and 7, the hinge member 80 includes a fixing case 81, which is fixed to the home bar door 50, a hinge part 82 mounted in the fixing case 81 such that
the hinge part 82 can be moved in the longitudinal direction of the fixing case 81, the hinge part 82 being inserted into or separated from the hinge hole 42 of the home bar frame 40, and a spring 86 for elastically supporting the hinge part 82 inside the fixing case 81.

[0066] The hinge part 82 includes a damping part 83 coupled to the fixing case 81 such that the damping part 83 can be moved in the longitudinal direction of the fixing case 81, but cannot be rotated, and a rotating shaft 84 mounted to the damping part 83 such that the rotating shaft 84 can be rotated relative to the damping part 83. Consequently, when the home bar door 50 is rotated, the fixing case 81 and the damping part 83 are rotated about the rotating shaft 84.

[0067] Although not shown in the drawings, the rotating shaft 84 is constructed such that the rotating shaft 84 can be slowly rotated relative to the damping part 83 while the rotating shaft 84 runs into resistance caused by a damping mechanism mounted in the damping part 83, for example, a spring mounted in the damping part 83 or oil filled in the damping part 83. Furthermore, the rotating shaft 84 is constructed such that the rotation of the rotating shaft 84 is restricted within a predetermined range of angle, for example, an angle of 90 degrees. When the rotating shaft 84 is rotated in the reverse direction with respect to the damping part 83, on the other hand, it is preferable that the resistance between the rotating shaft 84 and the damping part 83 be not generated.

[0068] A movable pin 85 is mounted to one side of the damping part 83 such that the movable pin 85 can be elastically moved in the inward and outward directions of the damping part 83.

[0069] The fixing case 81 is formed in the shape of a rectangular box opened at opposite ends thereof. At one side of the fixing case 81 is formed a horizontally-elongated guide slot 87, in which the movable pin 85 is inserted such that the movable pin 85 can be guided along the guide slot 87. The guide slot 87 is formed at the position corresponding to the manipulation slot 58, which is formed at the corresponding side of the home bar door 50. Consequently, when the damping part 83 is coupled to the fixing case 81, the movable pin 85 is inserted through the guide slot 87 and then through the manipulation slot 58, or is exposed to the outside at least through the manipulation slot 58.

[0070] The spring 86 may be constructed using a normal compression coil spring having an elastic force such that one end of the spring 86 is supported at the inner end of the fixing case 86, and the other end of the spring 86 is elastically supported by the rotating shaft 84.

[0071] At the upper and lower parts of the fixing case 81 are integrally formed upper and lower coupling parts 88 for fixing the fixing case 81 to the home bar door 50, respectively. Plurality of screw-coupling holes 89 are formed at the upper and lower coupling parts 88, respectively. The screw-coupling holes 89 are formed at the positions corresponding to the screw-coupling boss 55 of the home bar door 50. Screws are threadedly inserted into the screw-coupling boss 55 through the screw-coupling holes 89. As a result, the hinge member 80 is securely fixed to the home bar door 50.

[0072] Hereinafter, the assembly process of the home bar of the refrigerator with the above-described construction according to the present invention will be described in detail.

[0073] The home bar frame 40 is coupled to the inner circumferential surface of the opening 30 of the refrigerator door 20. Subsequently, an engineer moves at least one of the rotating shafts of the hinge members 80 mounted at the opposite sides of the home bar door 50 in the inward and outward directions of the home bar door 50 such that the hinge members 80 can be easily inserted into the hinge holes 42 formed in the opposite sides of the home bar frame 40.

[0074] The above assembly process will be described in more detail. The engineer inserts a tool through the manipulation slot 58 of the home bar door 50, as shown in FIG. 8, while the engineer inserts the rotating shaft 84 of one of the hinge members 80 in the corresponding hinge hole 42 of the home bar frame 40.

[0075] As the engineer moves the movable pin 85 along the guide slot 87 and the manipulation slot 58 using the tool, the damping part 83 and the rotating shaft 84 mounted to the damping part 83 are moved inward along the fixing case 81. As a result, the tip end of the rotating shaft 84 is moved to the inside of the home bar door 50, and therefore, the part protruding from the home bar door 50 disappears. Of course, when the tip end of the movable pin 85 extends outward from the manipulation slot 58, it is possible for the engineer to manipulate the movable pin 85 by hand, instead of using the tool.

[0076] In this state, the engineer inserts the other side of the home bar door 50 into the home bar frame 40. As a result, the rotating shafts 84 of the hinge members 80 are aligned with the hinge holes 42 of the home bar frame 40. At this time, when the engineer removes the tool, the damping parts 83 are moved outward by the operation of the springs 86 disposed inside the hinge members 80, and therefore, the rotating shafts 84 are securely inserted into the hinge holes 42. Consequently, the home bar door 50 is rotatably coupled to the home bar frame 40.

[0077] The separation of the home bar door 50 from the home bar frame 40 is carried out in reverse order of the above-described assembly process. Specifically, the engineer inserts the tool into the manipulation slot 58 formed at one side of the home bar door 50 to manipulate the movable pin 85 such that the rotating shaft 84 of one of the hinge members 80 is separated from the corresponding hinge hole 42 formed at one side of the home bar frame 40. Consequently, the home bar door 50 is partially separated from the home bar frame 40. Subsequently, the engineer separates the rotating shaft 84 of the other hinge member 80 from the corresponding hinge hole 42. In this way, the home bar door 50 can be fully separated from the home bar frame 40 with ease and convenience.

[0078] Hereinafter, the operation of the home bar of the refrigerator according to the present invention will be described.

[0079] When a user presses the home bar door 50 while the home bar door 50 is closed, the home bar door 50 is moved a predetermined distance into the refrigerator. At this time, the fastening member 70 is also pressed. As the fastening member 70 is pressed, the tip end of the fastening member 70 pushes a hook actuating part (not shown) provided in the latch assembly 60. As a result, the hook actuating part is rotated, and therefore, the hook (not shown) is separated from the opening of the fastening member 70. Consequently, the fastening member 70 is released.
At this time, the hook actuating member (not shown) elastically pushes the tip end of the fastening member 70.

As a result, the home bar door 50 is pushed outward, and is then hingedly rotated while the home bar door 50 drops due to its own weight. At this time, the home bar door 50 is hingedly rotated about the rotating shafts 84 of the hinge members 80. While the home bar door 50 is hingedly rotated, the hinge members 80 run into resistance caused by the springs (not shown) mounted in the damping parts 83 or the oil filled in the damping parts 83. As a result, the dropping speed of the home bar door 50 is decreased, and therefore, the home bar door 50 is hingedly rotated at low speed.

When the home bar door 50 is hingedly rotated by approximately 90 degrees, the restricting force is generated between the damping parts 83 and the rotating shafts 84 of the hinge members 80. As a result, the further rotation of the home bar door 50 is prevented. Consequently, the home bar door 50 is placed almost horizontally. In this state, the user can take foods out of the refrigerator through the opening 30 of the refrigerator door 20 or put foods into the refrigerator through the opening 30 of the refrigerator door 20.

When the user wishes to close the opening formed at the refrigerator door 20, on the other hand, he/she holds the upper end of the home bar door 50 and hingedly rotates the home bar door 50 upward. As a result, the home bar door 50 is hingedly rotated about the rotating shafts 84 of the hinge members 80. At this time, it is preferable that the resistance between the rotating shafts 84 and the damping parts 83 be not generated as described above.

When the user hingedly rotates the home bar door 50 by approximately 90 degrees such that the upper end of the home bar door 50 is brought into contact with the upper end of the home bar frame 40, the fastening member 70 of the home bar door 50 is inserted into the latch assembly 60 of the home bar frame 40. At this time, the tip end of the fastening member 70 pushes the hook actuating part (not shown) of the latch assembly 60. As a result, the hook actuating part is rotated, and therefore, the hook (not shown) is caught in the opening of the fastening member 70. Consequently, the fastening member 70 is securely held in the latch assembly 60.

In the above-described embodiment, the fastening member 70 is mounted at the home bar door 50. However, it is also possible that the fastening member 70 is mounted at the home bar frame 40 while the latch assembly 60 is mounted at the home bar door 50.

In the above-described embodiment, the fastening member 70 and the latch assembly 60 are mounted to the upper ends of the home bar door 50 and the home bar frame 40, respectively. However, it is also possible that the fastening member 70 and the latch assembly 60 are mounted to the sides of the home bar door 50 and the home bar frame 40, respectively.

FIG. 9 is an exploded perspective view illustrating another preferred embodiment of the hinge member as described above. The hinge member 180 according to this embodiment is substantially identical in construction to the hinge member 80 according to the previous embodiment.

However, the hinge member 180 according to this second embodiment is different from the hinge member 80 according to the previous first embodiment in that a circular pin hole 187, instead of the elongated guide slot 87 (see FIG. 6), is formed at a fixing case 181.

Consequently, in this embodiment, the engineer does not move a movable pin 185 in the longitudinal direction of the fixing case 181, but the engineer pushes the movable pin 185 into a damping part 183 such that the movable pin 185 can be separated from the pin hole 187, and then the engineer pushes a rotating shaft 184 by hand such that the damping part 183 can be moved inward into the fixing case 181.

When the engineer removes an external force after the damping part 183 is pushed into the fixing case 181, the damping part 183 is returned to its original position, where the damping part 183 is disposed outside the fixing case 181, by the elastic force of a spring (not shown). At this time, the movable pin 185 is inserted again into the pin hole 187 by its elastic force, whereby the position of the damping part 183 is fixed.

Hereinafter, yet another embodiment of a hinge member 280 of a home bar of a refrigerator according to the present invention will be described with reference to FIGS. 10 to 13.

The hinge member 280 according to this third embodiment includes a fixing case 281, which is fixed to the home bar door 50, a driving part 282, a damping part 284, a rotating shaft 286, and a spring 287.

The fixing case 281 is formed in the shape of a hollow rectangular box. At one side of the fixing case 281 is formed a shaft hole 281a, through which the rotating shaft 286 is inserted. At the other side of the fixing case 281 is formed a lever hole 281b. Inside the fixing case 281 is formed a guide groove 281c, which extends along the moving direction of the damping part 284.

The driving part 282 has a body, which is formed approximately in the shape of a cylinder such that the body can be rotatably inserted in the fixing case 281. At one end of the driving part 282 is formed a lever 283, which is inserted through the lever hole 281b. The lever 283 protrudes outward from the end of the driving part 282 in the radial direction of the driving part 282. The tip end of the lever 283 is exposed to the outside through a manipulation slot 258 formed at the home bar door 50 such that a user can manipulate the lever 283 using a tool.

At the body of the driving part 282 are alternately formed concave parts 282a and convex parts 282b. The concave parts 282a are formed at the body of the driving part 282 such that the concave parts 282a are depressed approximately in the shape of a triangle. On the other hand, the convex parts 282b are formed at the body of the driving part 282 such that the convex parts 282b protrude approximately in the shape of a triangle. The concave parts 282a and convex parts 282b are arranged such that the concave parts 282a and convex parts 282b are symmetrical to each other.

One concave part 282a and one convex part 282b may be formed at the body of the driving part 282 such that a single inclined surface is formed by the front of the driving part 282. In this embodiment, however, it is preferable that
two concave parts $282_a$ and two convex parts $282_b$ be formed at the body of the driving part $282$, whereby the operation accuracy of the driving part $282$ is guaranteed.

[0097] Also, each convex part $292_a$ has a flat tip end. Consequently, when the tip ends of the convex parts $292_b$ are brought into contact with the tip ends of convex parts $284_b$ of the damping part $284$, which will be described hereinafter, the tip ends of the convex parts $292_b$ and the tip ends of the convex parts $284_b$ are not moved so long as any particular external force is not applied to the tip ends of the convex parts $292_b$ and the tip ends of the convex parts $284_b$.

[0098] The damping part $284$ is generally formed in the same shape as the driving part $282$. Specifically, concave parts $284_a$ and convex parts $284_b$, which have the same shape as the concave parts $282_a$ and convex parts $282_b$ of the driving part $282$, are formed at the damping part $284$. At one side of the damping part $284$ is formed a guide protrusion $285$, which is engaged in the guide groove $281_c$ of the fixing case $281$.

[0099] The rotating shaft $286$ is securely inserted in the hinge hole $42$ formed at the home bar frame $40$. The rotating shaft $286$ is connected to one side of the damping part $284$ such that the rotating shaft $286$ can be rotated relative to the damping part $284$. Like the hinge member $280$ according to the previous embodiment, the hinge member $280$ according to this embodiment is preferably constructed such that a spring is mounted in the damping part $284$, or hydraulic oil is filled in the damping part $284$, the rotation of the hinge member $280$ is slowly accomplished after the rotating shaft is rotated by an angle of predetermined degrees relative to the damping part $284$, and the rotating angle is restricted to 90 degrees.

[0100] Of course, unlike this embodiment, the rotating shaft $286$ and the damping part $284$ may be integrally formed. In this case, the rotating shaft $284$ is not fixed to the home bar frame $40$, but is rotatably connected to the home bar frame $40$. Also, the rotating shaft cannot serve to decrease the rotating speed of the home bar door $50$ when the home bar door $50$ is hingedly rotated while the home bar door $50$ drops downward.

[0101] On the other hand, the spring $287$ is fitted on the rotating shaft $286$. One end of the spring $287$ is brought into contact with one side of the damping part $284$, and the other end of the spring $287$ is supported by the inner wall of one side of the fixing case $281$. Consequently, the spring $287$ serves to push the damping part $284$ toward the driving part $282$.

[0102] Hereinafter, the operation of the hinge member $280$ with the above-stated construction will be described in detail.

[0103] When an engineer inserts a tool into the manipulation slot $258$ of the home bar door $50$ to move the lever $283$ in one direction, as shown in FIG. 12, the driving part $282$ is rotated in one direction. As a result, the convex parts $282_b$ of the driving part $282$ are engaged with the concave parts $284_a$ of the damping part $284$, and therefore, the damping part $284$ and the rotating shaft $286$ are moved inward into the fixing case $281$ by the elastic force of the spring $287$.

[0104] Consequently, the end of the rotating shaft $286$ is inserted inward into the home bar door $50$, and therefore, no part protrudes from the home bar door $50$. In this state, the engineer can easily and conveniently separate the home bar door $50$ from the home bar frame $40$ or easily and conveniently push the home bar door $50$ inward into the home bar frame $40$.

[0105] When the engineer moves the lever $282$ in the reverse direction as shown in FIG. 13, on the other hand, the driving part $282$ is rotated in the direction opposite to the rotating direction of FIG. 12. Before the driving part $282$ is rotated in the opposite direction, the convex parts $282_b$ of the driving part $282$ are engaged with the concave parts $284_a$ of the damping part $284$. When the driving part $282$ is rotated in the opposite direction, the inclined surfaces of the convex parts $282_b$ of the driving part $282$ push the corresponding inclined surfaces of the concave parts $284_a$ of the damping part $284$. As a result, the damping part $284$ is moved toward the outside of the fixing case $281$ against the elastic force of the spring $287$.

[0106] At this time, the guide protrusion $285$ of the damping part $284$ is moved along the guide groove $281_c$ of the fixing case $281$ for guiding the movement of the damping part $284$.

[0107] When the damping part $284$ is fully moved toward the outside of the fixing case $281$, the tip ends of the convex parts $284_b$ of the damping part $284$ are brought into contact with the corresponding tip ends of the convex parts $282_b$ of the driving part $282$. As described above, the tip ends of the convex parts $284_b$ of the damping part $284$ and the corresponding tip ends of the convex parts $282_b$ of the driving part $282$ are flat. Consequently, the damping part $284$ does not slip on the driving part $282$, and therefore, the damping part $284$ is maintained at the position where the damping part $284$ is fully moved outward.

[0108] Hereinafter, the embodiment of a home bar frame $140$ constituting a home bar of a refrigerator according to the present invention will be described with reference to FIGS. 14 to 19.

[0109] The home bar frame $140$ according to this embodiment includes hinge holes $141$, into which the rotating shafts $84$ (see FIG. 3) of the hinge members $80$ (see FIG. 3) are inserted, and reinforcing members for securely supporting the rotating shafts $84$ inserted in the hinge holes $141$.

[0110] The hinge holes $141$ are formed at the lower ends of opposite sides of the home bar frame $140$ such that the hinge holes $141$ are opened at the front part thereof. The hinge holes $141$ are formed in the sectional shape of a polygon, which is identical or similar to the sectional shape of the rotating shafts $84$, whereby the rotating shafts $84$ of the hinge members $80$ are prevented from being fixed.

[0111] Each of the reinforcing members includes a front plate $142$ coupled to the open front part of the corresponding hinge hole $141$ for supporting the front part of the corresponding rotating shaft $84$ inserted in the corresponding hinge hole $141$, and a reinforcing bracket $143$ coupled to the home bar frame $140$ at the rear of the corresponding hinge hole $141$ for reinforcing the rear part of the corresponding hinge hole $141$.

[0112] The front plate $142$ is made of a rectangular metal plate. The front plate $142$ is fixed to the home bar frame $140$ while the front plate $142$ is located in a locating groove.
which is formed in the shape of a concave above and below the front part of the corresponding hinge hole 141.

The reinforcing bracket 143 is made of a metal material. As shown in FIGS. 16 and 17, the reinforcing bracket 143 includes a rear plate 144 for covering the rear part of the corresponding hinge hole 141, which protrudes toward the rear of the home bar frame 140, a pair of side plates 145, and a fixing part 146, which is fixed to the home bar frame 40.

The rear plate 144 is formed in the shape of a plate such that the rear plate 144 can be adjacent to the rear part of the corresponding hinge hole 141. The side plates 145 support the upper and lower sides of the rear part of the corresponding hinge hole 141. The side plates 145 are securely fixed to the front plate 142 by means of screws coupled from the outside of the front plate 142.

The fixing part 146 is fixed to the home bar frame 140 by means of screws while the upper end and one side of the fixing part 146 is in contact with the home bar frame 140. The fixing part 146 serves to fix the reinforcing bracket 143 to the home bar frame 140.

The hinge holes 141 and the reinforcing members are covered by an external ornament or an insulating material after the home bar frame 140 is coupled to the inside of the opening 30 (see FIG. 1) of the refrigerator door 20 (see FIG. 1).

When the reinforcing members 142 and 143 are coupled to the hinge holes of the home bar frame 140 as described above, the breakage of the home bar frame 40 is prevented, and therefore, the home bar door 50 is prevented from not being hingedly rotated, even though strong impacts or repetitive loads are applied to the hinge holes 141, in which the rotating shafts 84 of the hinge members 80 are fitted, due to a certain cause when the home bar door is hingedly rotated.

Furthermore, even when the rotating shafts 84 of the hinge members 80 cannot be moved inward and outward, it is possible to fit the rotating shafts 84 of the hinge members 80 into the hinge holes 141 and then to couple the reinforcing members 142 and 143 to the hinge holes 141, whereby the hinge members 80 can be easily and conveniently coupled to the home bar frame 40.

As apparent from the above description, the home bar door mounted to the refrigerator door is opened and closed simply by a user pushing thereon. Consequently, the present invention has the effect of accomplishing easy opening/closing of the home bar door, and therefore, improving the convenience of use.

According to the present invention, the rotating shafts of the hinge members are constructed such that the rotating shafts of the hinge members can be moved in the inward and outward direction of the home bar door, and therefore, it is possible to couple the home bar door to the home bar frame, while the home bar frame is mounted to the refrigerator door, without changing the structure of the home bar frame or disassembling the home bar frame. Consequently, the present invention has the effect of allowing an easy assembly process of the home bar frame and the home bar door.

Furthermore, the home bar door is slowly opened by the damping units mounted in the hinge members. Consequently, the present invention has the effect of preventing the occurrence of excessive impacts applied to the hinge members due to the abrupt opening of the home bar door and preventing the home bar door due to the breakdown of the hinge members.

It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the inventions. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

What is claimed is:

1. A refrigerator having a home bar, the home bar comprising:

   a home bar frame tightly mounted at the inside of an opening, which is formed at a door of the refrigerator such that the opening communicates with the inside of the refrigerator;

   a home bar door mounted to the home bar frame such that the home bar door can be hingedly rotated for opening and closing the opening;

   a coupling-and-releasing unit for coupling the home bar door to the home bar frame and releasing the home bar door from the home bar frame; and

   at least one hinge member having a rotary shaft movable in the inward and outward directions of the home bar door or the home bar frame such that the rotary shaft can be inserted into or separated from a hinge hole formed at the home bar frame or the home bar door.

2. The refrigerator according to claim 1, wherein the at least one hinge member includes:

   a fixing case fixed to the home bar door or the home bar frame;

   a damping part coupled to the fixing case such that the damping part can be moved in the longitudinal direction of the fixing case, the rotating shaft being rotatably mounted to one end of the damping part; and

   an elastic member for elastically supporting the damping part with respect to the fixing case.

3. The refrigerator according to claim 2, wherein the at least one hinge member further includes:

   a damping mechanism mounted in the damping part for reducing the rotating speed of the rotating shaft, when the rotating shaft is rotated in one direction, and restricting the rotating angle of the rotary shaft;

   a guide slot formed at one side of the fixing case such that the guide slot extends in the moving direction of the rotary shaft;

   a manipulation slot formed at the home bar door or the home bar frame such that manipulation slot communicates with the guide slot; and

   a movable pin formed at the damping part such that the movable pin protrudes outward from the damping part,
the movable pin being exposed to the outside through the guide slot and the manipulation slot.

5. The refrigerator according to claim 2, wherein the at least one hinge member further includes:

- a pin hole formed at one side of the fixing case such that the pin hole is bored through the side of the fixing case;
- a manipulation pin hole formed at the home bar door or the home bar frame such that manipulation pin hole communicates with the pin hole; and
- a movable pin formed at the damping part such that the movable pin protrudes outward from the damping part, the movable pin being exposed to the outside through the pin hole and the manipulation pin hole, the movable pin being movable in the inward and outward directions of the damping part.

6. The refrigerator according to claim 2, wherein the at least one hinge member further includes:

- a coupling part formed at one side of the fixing case such that the coupling part extends outward from the fixing case, the coupling part having a plurality of screw-coupling holes, through which the coupling part is coupled to the home bar door or the home bar frame by means of screws.

7. The refrigerator according to claim 1, wherein the at least one hinge member includes:

- a fixing case fixed to the home bar door or the home bar frame, the fixing case being formed in the shape of a box;
- a driving part rotatably mounted in the rear part of the fixing case, the driving part being provided at one side thereof with concave parts and convex parts, which have inclined surfaces;
- a lever formed at the driving part, the lever protruding outside the fixing case such that the lever can be movable;
- an actuating part mounted in the fixing case such that the actuating part can be linearly moved, the actuating part being provided at one side thereof with concave parts and convex parts, which have inclined surfaces corresponding to the inclined surfaces of the concave parts and the convex parts of the driving part, the rotating shaft being mounted to the other side of the actuating part such that the rotating shaft protrudes outside the fixing case; and
- an elastic member for elastically supporting the actuating part with respect to the fixing case.

8. The refrigerator according to claim 7, wherein the at least one hinge member further includes:

- a guide protrusion formed at one side of the actuating part such that the guide protrusion protrudes from the actuating part; and
- a guide groove formed inside the fixing case, while the guide groove extends along the moving direction of the actuating part such that the guide protrusion is engaged in the guide groove, for guiding the movement of the actuating part.

9. The refrigerator according to claim 7, wherein

- the lever protrudes through a lever hole, formed at the rear side of the fixing case, which extends in the rotating direction of the lever, and
- the home bar door or the home bar frame is provided at one side thereof, to which the fixing case is fixed, with a manipulation slot, which is formed in the same shape as the lever hole, such that the lever is exposed to the outside through the manipulation slot.

10. The refrigerator according to claim 7, wherein the concave parts and the convex parts of the driving part and the concave parts and the convex parts of the actuating part are formed in pairs.

11. The refrigerator according to claim 1, wherein

- the hinge hole, which is formed at the home bar frame or the home bar door such that the rotating shaft can be securely inserted into the hinge hole, is concaved toward the interior of the home bar frame or the home bar door, and
- a reinforcing member is mounted in front and rear of the hinge hole for preventing the separation of the rotating shaft from the hinge hole and reinforcing the strength of the rear part of the hinge hole.

12. The refrigerator according to claim 11, wherein the reinforcing member includes:

- a front plate coupled to the front of the home bar frame or the home bar door for closing the open front part of the hinge hole; and
- a reinforcing bracket securely coupled to the home bar frame or the home bar door, the reinforcing bracket including a rear plate for covering the tip end of the rear part of the hinge hole, and side plates for covering opposite sides of the rear part of the hinge hole.

13. The refrigerator according to claim 12, wherein the rear plate and the side plates are integrally formed.

14. The refrigerator according to claim 12, wherein the front plate and the side plates are fixed to each other by means of the same fixing unit.

15. The refrigerator according to claim 1, wherein the coupling-and-releasing unit includes:

- a fastening member formed at the home bar door such that the fastening member protrudes toward the inside of the opening; and
- a latch assembly fixedly mounted to the home bar frame, the latch assembly having a holding mechanism for catching the tip end of the fastening member by the pressing force of the fastening member.

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