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REFRIGERATOR HAVING THE SAME**(30) **Foreign Application Priority Data**

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CO., LTD.**, Suwon-si (KR)(21) Appl. No.: **12/767,987**(22) Filed: **Apr. 27, 2010**(57) **ABSTRACT**

Disclosed herein are a door guard assembly and a refrigerator having the same. In the door guard assembly, one side of a storage space of the door guard where food is stored is formed of a wooden material so that humidity of the storage space is adjusted.

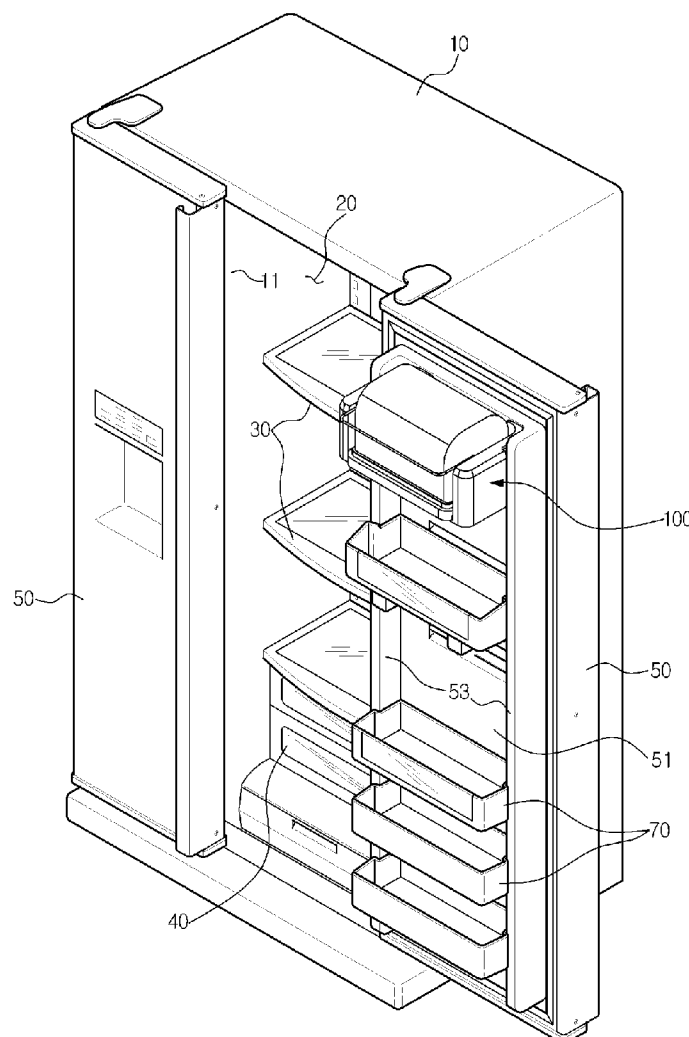


FIG. 1

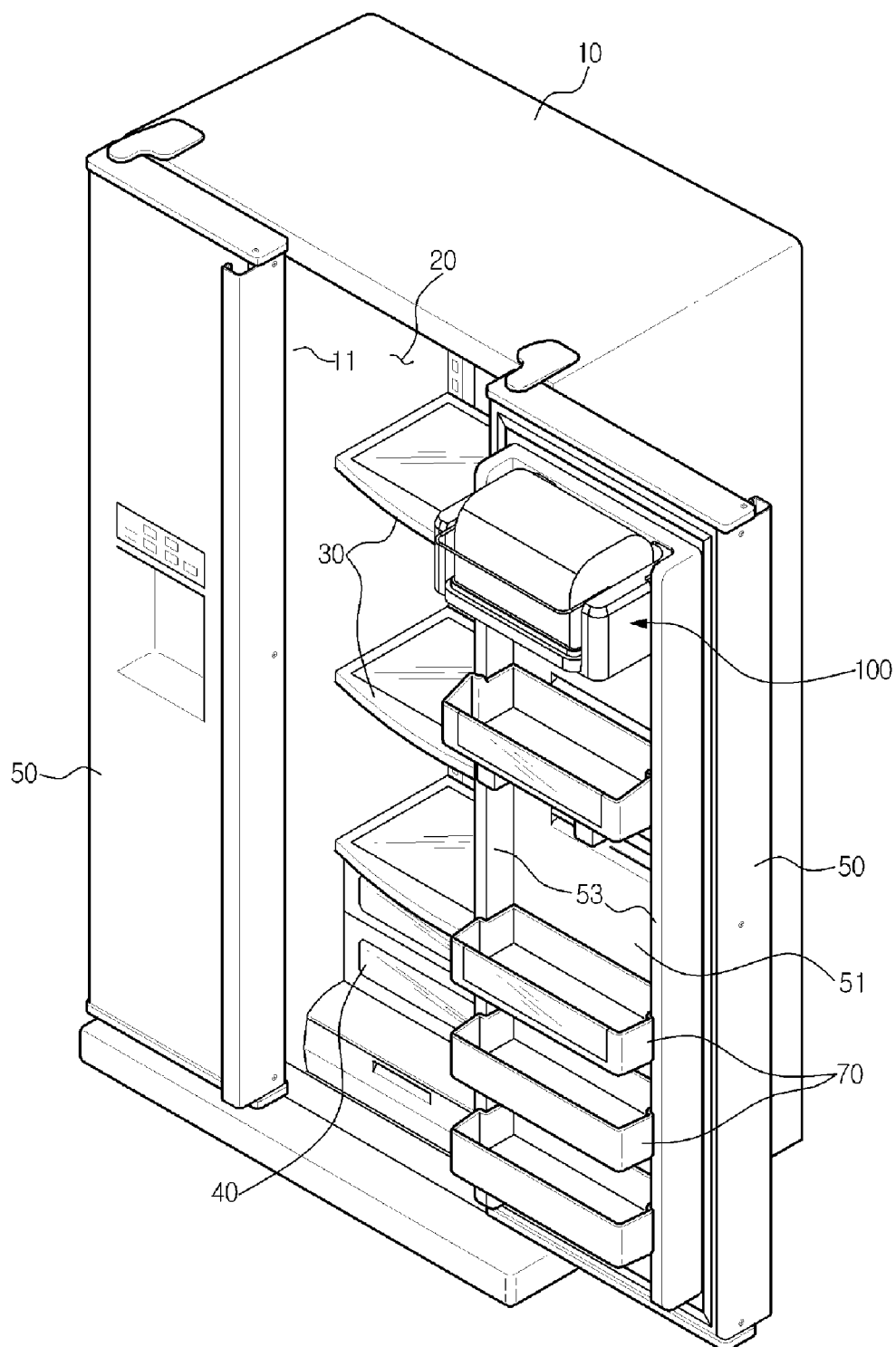


FIG. 2

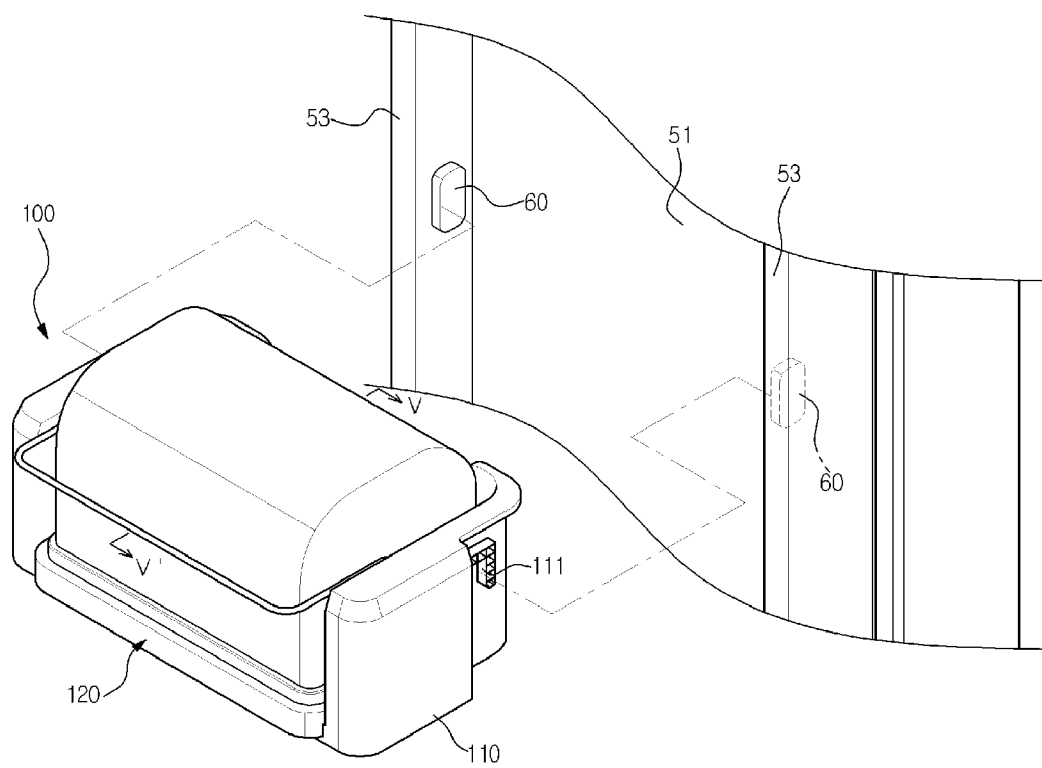


FIG. 3

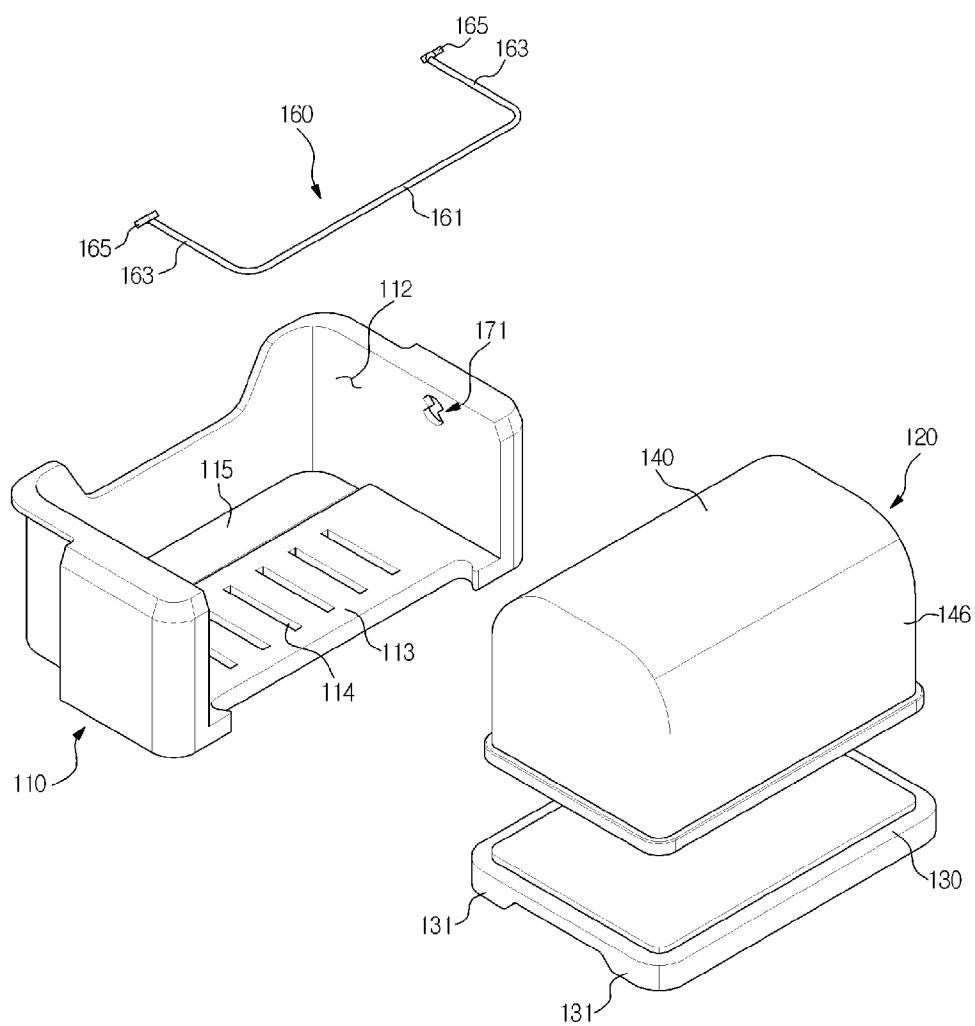


FIG. 4

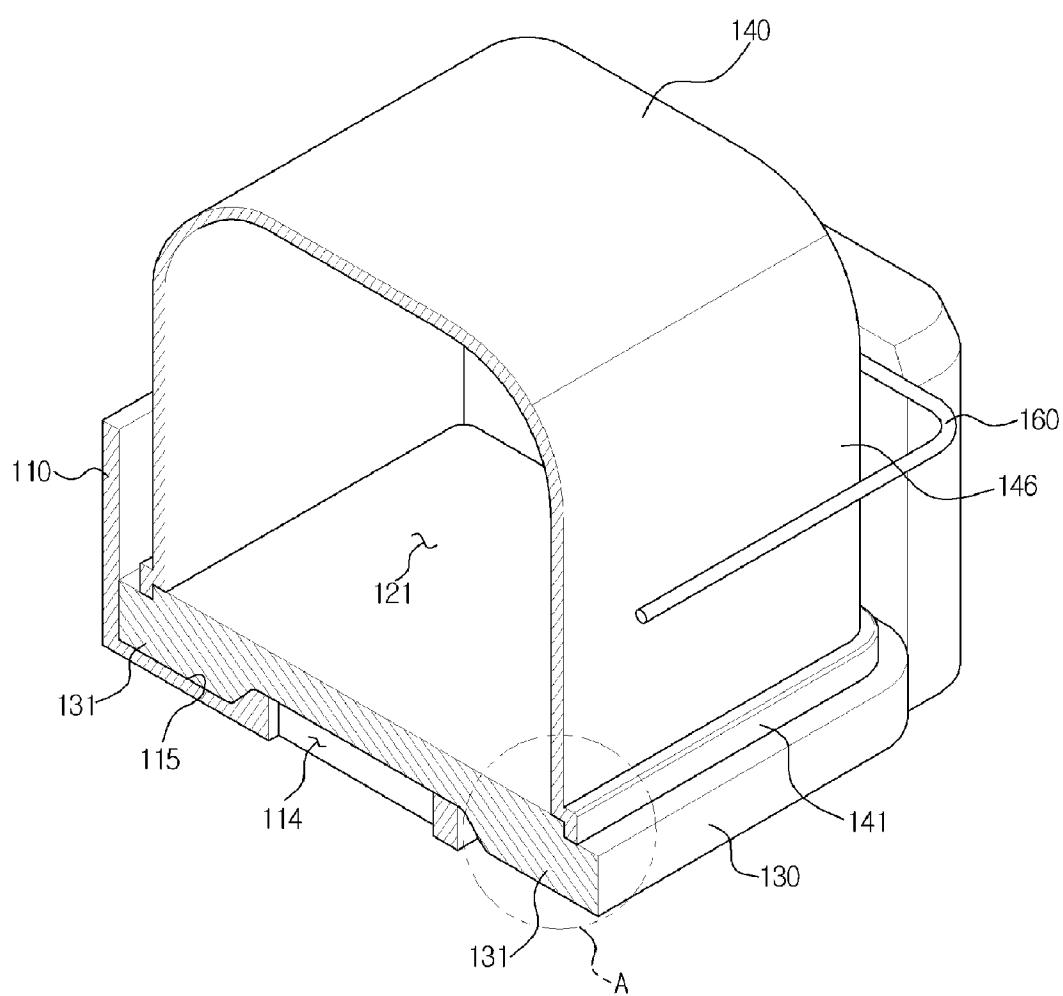


FIG. 5

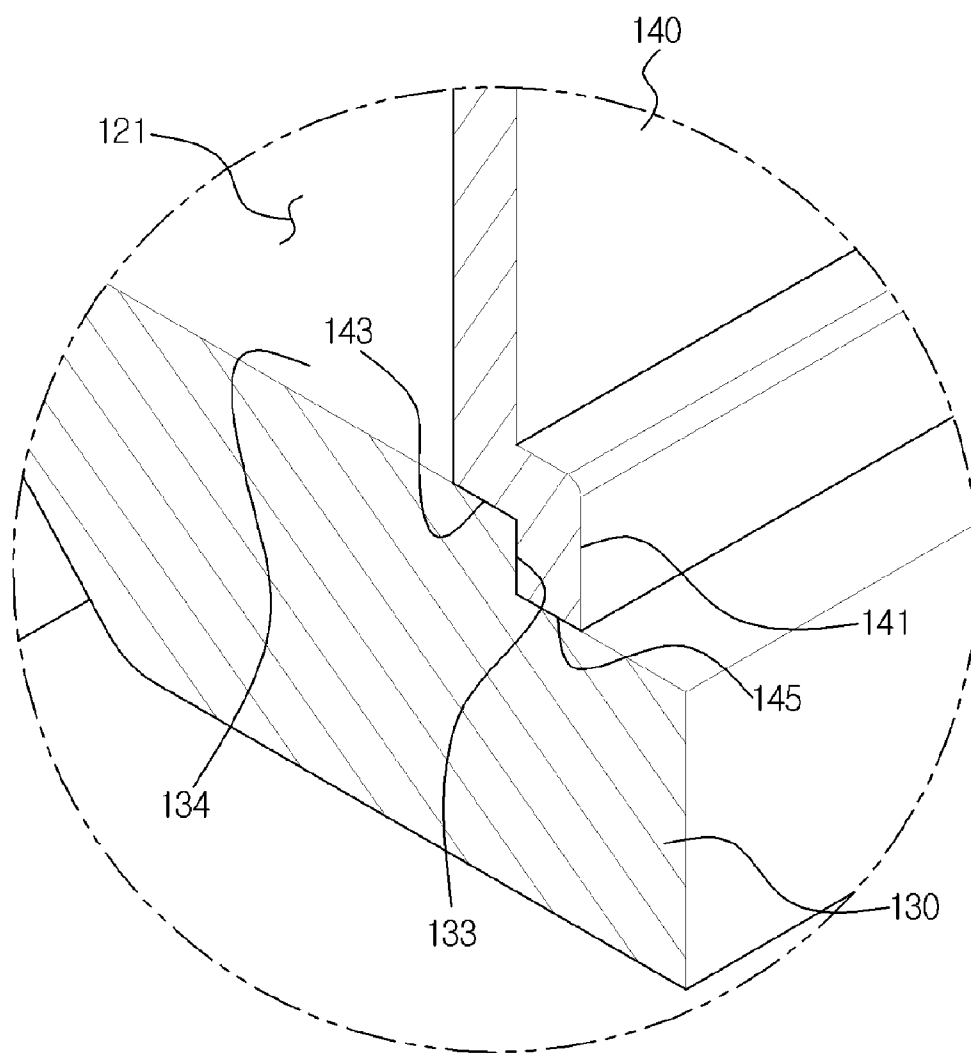


FIG. 6

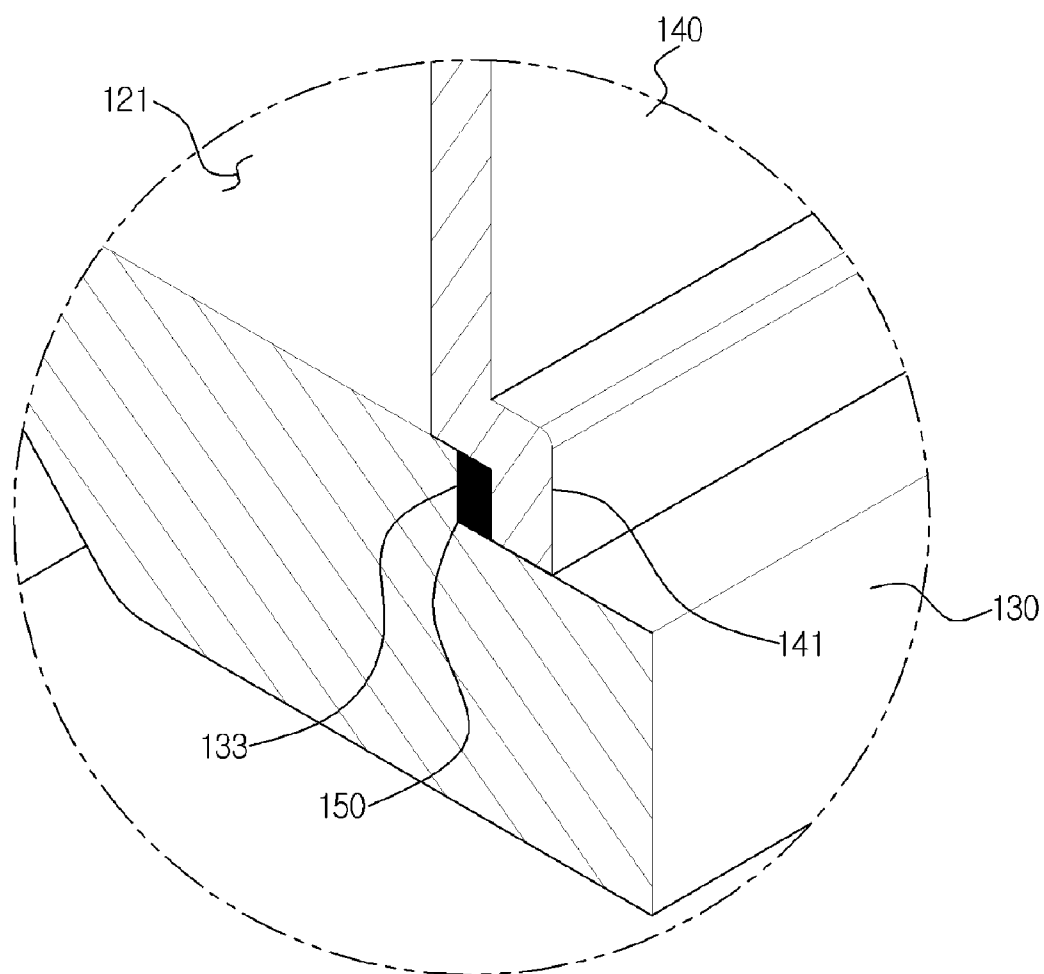


FIG. 7

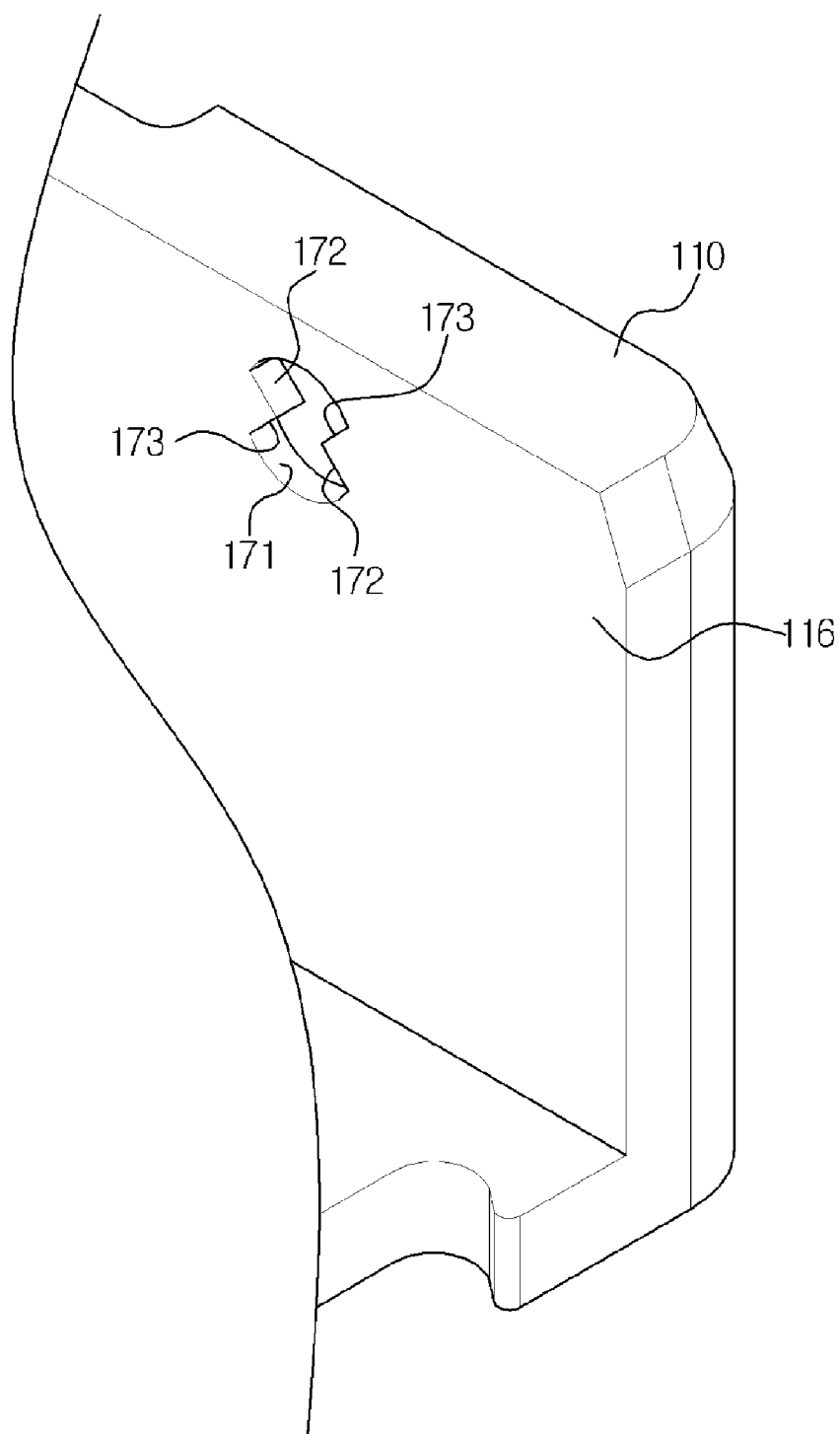


FIG. 8

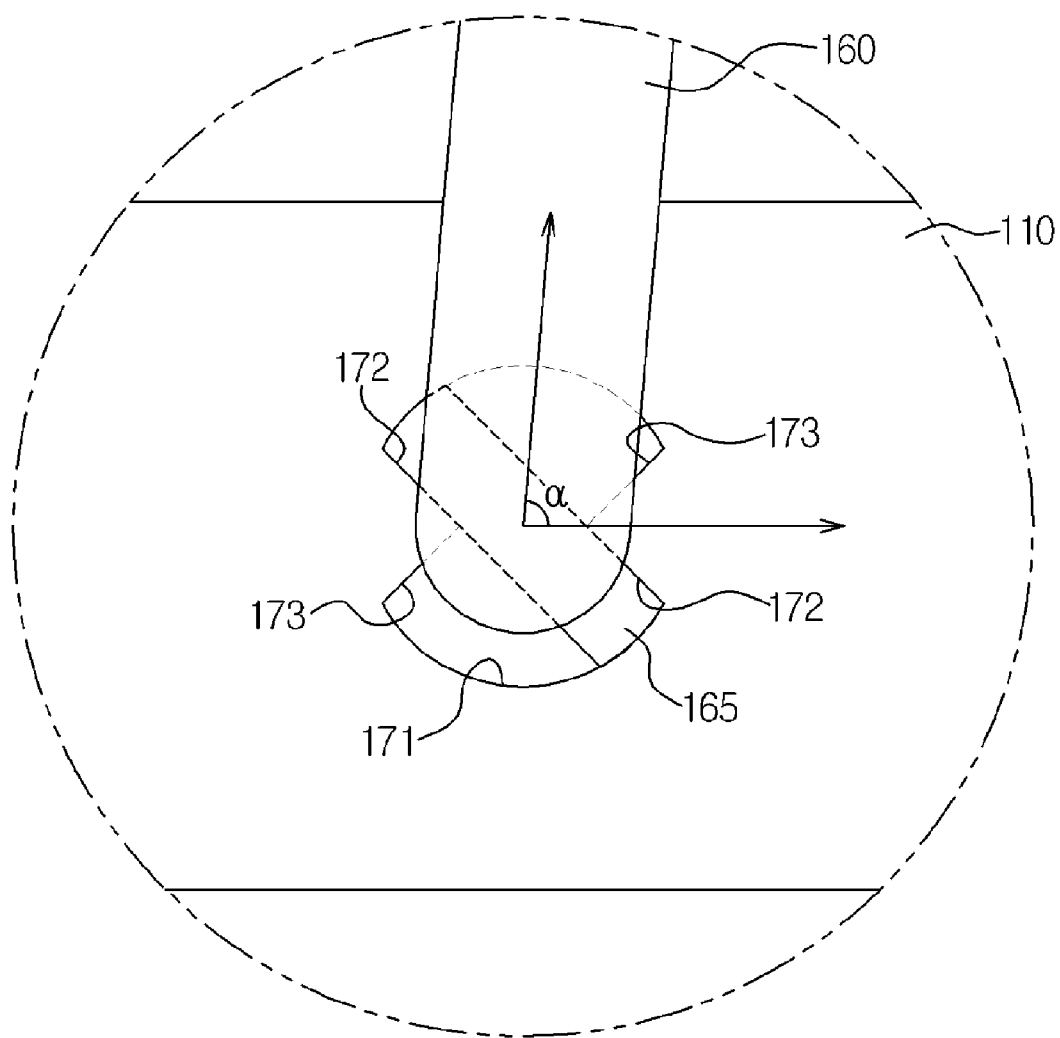


FIG. 9

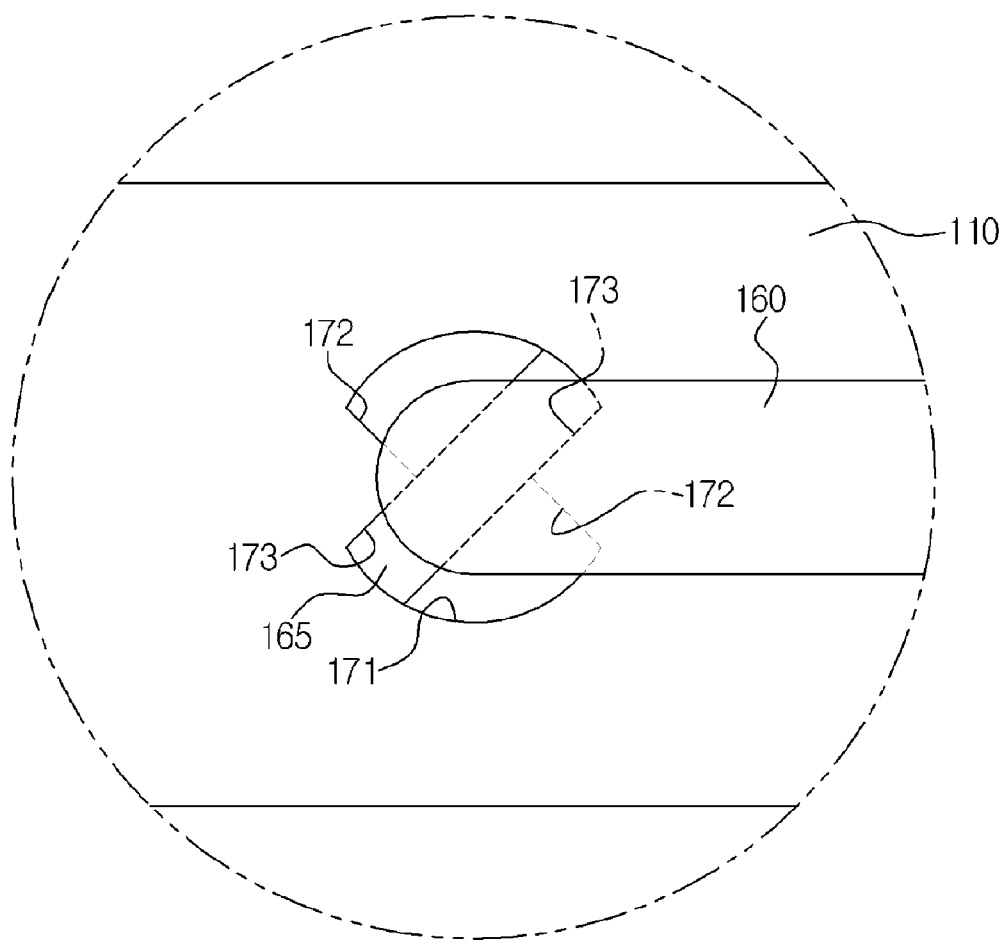
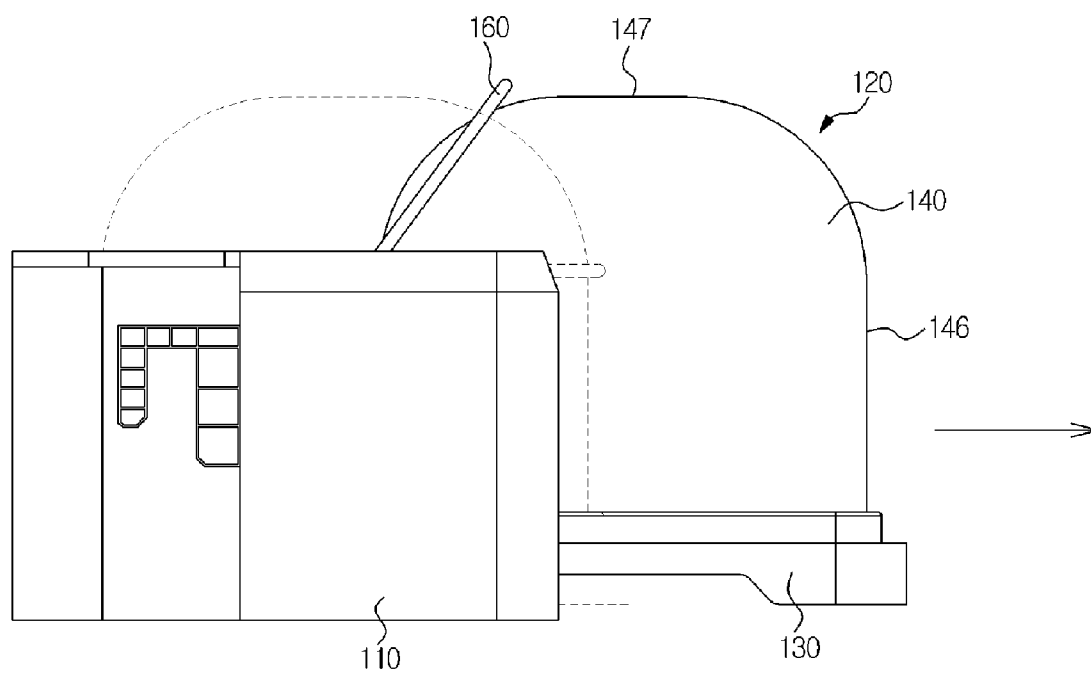


FIG. 10



DOOR GUARD ASSEMBLY AND REFRIGERATOR HAVING THE SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Korean Patent Application. No. 2009-0037286, filed on Apr. 28, 2009 in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference.

BACKGROUND

[0002] 1. Field

[0003] Embodiments of the present invention relate to a refrigerator having a door guard assembly that stores articles such as small-sized food.

[0004] 2. Description of the Related Art

[0005] Generally, a refrigerator is an apparatus that keeps food fresh at a low temperature by supplying cold air to a storage chamber.

[0006] The storage chamber includes a plurality of shelves and containers to receive the food. A door guard is mounted on the inside of a door that opens and closes the storage chamber, to store beverage bottles or cans and other small-size food. The door guard is generally formed of plastic and equipped with a storage space to store the food. Such a storage space may have an open structure, or a half-open structure by having a cover to open and close the storage space.

[0007] However, both the open and the half-open door guards may directly contact the external air and therefore are exposed to risk of germs, and mold. This limits freshness of the food being stored. Furthermore, a dedicated moisture supplying device may additionally be provided to the door guard in order to maintain a proper humidity in the storage space.

SUMMARY

[0008] Therefore, it is an aspect of the present invention to provide a door guard assembly having an airtight container capable of adjusting humidity in a storage space, and a refrigerator having the same.

[0009] It is another aspect of the present invention to provide a door guard assembly having excellent convenience and stability in receiving items when mounted to the inside of a door, and a refrigerator having the same.

[0010] Additional aspects of the 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 invention.

[0011] The foregoing and/or aspects of the present invention may be achieved by providing a door guard assembly including a storage chamber, a door that opens and closes the storage chamber, and an airtight container defining a storage space, and the airtight container includes a tray made of a humidity-adjustable material, and a cover member that covers the tray.

[0012] The tray may be made of a wooden material. The wooden material may include at least one of teak, iroko, beech, mahogany, oak, ash and maple. The refrigerator may further include a door guard mounted to an inside of the door so that the airtight container is more stably mounted. The refrigerator may further include a door guard mounted to an inside of the door, and a bottom surface of the door guard may be defined by the tray.

[0013] The door guard may include a separation prevention member restraining separation of the airtight container received in the door guard. The separation prevention member may include a locking bar member which is mounted along an outside of the cover member to be rotated as the airtight container moves from the door guard and is lowered by its own weight, thereby surrounding the cover member as the airtight container is received in the door guard.

[0014] The separation prevention member may include a locking bar member rotatably mounted at the door guard, and stopping members connected to both ends of the locking bar member to restrict a rotational range of the locking bar member.

[0015] Here, each of the stopping members may include a first stopping part restricting the locking bar member at a lifted position thereof, and a second stopping part restricting the locking bar member at a lowered position thereof.

[0016] The tray may include a stepped part, whereas the cover member includes a connection rib engaged in tight contact with the stepped part. A packing member may be provided between the stepped part and the connection rib. The tray may include a leg part disposed at a lower part, whereas the door guard includes a mounting depression formed on a bottom surface thereof.

[0017] The foregoing and/or other aspects of the present invention may also be achieved by providing a door guard assembly including a storage chamber, a door that opens and closes the storage chamber, and an airtight container defining a storage space, wherein the airtight container includes a tray made of a wooden material, and a cover member made of a transparent material to cover the tray.

[0018] The foregoing and/or other aspects of the present invention may also be achieved by providing a door guard assembly including a door guard mounted to an inner wall of a door that opens and closes a storage chamber, and an airtight container received in the door guard and adapted to adjust humidity therein, wherein the airtight container includes a tray made of a wooden material, and a cover member that covers the tray.

[0019] The door guard assembly may further include a locking bar member rotatably mounted to the door guard to surround a front side of the cover member when the airtight container is received in the door guard.

[0020] The locking bar member may include a fixed part surrounding the front side of the cover member, supporting parts bent from both ends of the fixing part, and hinge parts formed at one end of each of the supporting parts.

[0021] The door guard may include hinge recesses connected with the hinge parts, and the hinge recesses each include a first stopping part restricting the maximum lifted angle of the locking bar member so that the locking bar member is lowered by its own weight, and a second stopping part restricting the maximum lowered angle so that the locking bar member fixes the cover member.

[0022] The tray may include a stepped part, the cover member includes a connection rib brought into tight contact with the circumference of the stepped part, and the connection rib includes a first tight contact part tightly contacting a first side of the stepped part and a second tight contact part tightly contacting a second side of the stepped part.

[0023] A packing member may be provided between the stepped part and the connection rib. The cover member may be formed of a transparent material.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] These and/or other aspects of the invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

[0025] FIG. 1 is a perspective view briefly showing the structure of a refrigerator according to an embodiment of the present invention;

[0026] FIG. 2 is a perspective view showing the connection structure of a door guard assembly of the refrigerator according to the embodiment of the present invention;

[0027] FIG. 3 is an exploded perspective view of the door guard assembly according to the embodiment of the present invention;

[0028] FIG. 4 is a sectional view of FIG. 2, cut along line V-V';

[0029] FIG. 5 is an enlarged view of a section 'A' of FIG. 4;

[0030] FIG. 6 is an enlarged view of another version of the section 'A' shown in FIG. 4;

[0031] FIG. 7 is a perspective view showing a part of the door guard assembly according to the embodiment of the present invention;

[0032] FIG. 8 and FIG. 9 are sectional views showing the operational state of a locking bar member of the refrigerator according to the embodiment of the present invention; and

[0033] FIG. 10 is a sectional view showing the operational state of the door guard assembly of the refrigerator according to the present embodiment.

DETAILED DESCRIPTION OF EMBODIMENT

[0034] Reference will now be made in detail to the embodiment, 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.

[0035] FIG. 1 schematically shows the structure of a refrigerator according to an embodiment of the present invention, and FIG. 2 is a perspective view showing the connection structure of a door guard assembly of the refrigerator.

[0036] As shown in FIG. 1, the refrigerator includes a main body 10 including a storage chamber 20, and a door 50 opening and closing the storage chamber 20.

[0037] According to this embodiment, the storage chamber 20 is sectioned by a partition 11 into the left and the right of the main body 10. However, the storage chamber 20 may be sectioned into upper and lower parts, or only one storage chamber 20 may be provided. The storage chamber 20 may be used as a refrigerating chamber or a freezing chamber.

[0038] At least one shelf 30 to put food thereon is mounted at an upper part of the storage chamber 20. A drawer-type container 40 to store vegetables and fruit is mounted at a lower part.

[0039] A pair of liners 53 are formed at an inner wall 51 of the door 50, being extended in a vertical direction at a lateral interval, to mount a plurality of door guards 70 to receive relatively small food or beverage bottles.

[0040] Additionally, a door guard assembly 100 is formed between the pair of liners 53 disposed at the upper part of the

door 50, to prevent inhabitation of microbes such as mold and germs, and to adjust humidity.

[0041] Referring to FIG. 2, the door guard assembly 100 includes a door guard 110 mounted to the inner wall 51 of the door 50 opening and closing the storage chamber 20, and an airtight container 120 which is humidity-adjustable and removably received in the door guard 110.

[0042] The door guard assembly 100 may be removably mounted to the inner wall 51 of the door 50. For this, locking recesses 111 are formed, being opened downward, on both sides of the door guard 110 while locking projections 60 are formed at the pair of liners 53 to be inserted in the locking recesses 111.

[0043] FIG. 3 is an exploded perspective view of the door guard assembly of the refrigerator, and FIG. 4 is a sectional view of FIG. 2, cut along a line V-V'.

[0044] Referring to FIG. 3, the door guard 110 removably mounted to the inner wall 51 substantially has a box form holding a receiving part 112 to receive the airtight container 120.

[0045] The receiving part 112 of the door guard 110 may be opened at the top and to one side for convenient insertion and removal of the airtight container 20.

[0046] At least one cold air inlet hole 114 is formed on a bottom surface 113 of the door guard 110. In addition, a mounting depression 115 may be formed in a predetermined depth at the rear side of the bottom surface 113.

[0047] The cold air inlet hole 114 guides the cold air in the storage chamber 20 to the receiving part 112 of the door guard 110 so that the cold air is supplied to the airtight container 120.

[0048] The airtight container 120 includes a tray 130 to put the food thereon, and a cover member 140 defining a storage space 121 (FIG. 4) by covering an upper side of the tray 130 so that the food put on the tray 130 is not exposed directly to the external air.

[0049] Although the storage space 121 is formed by the cover member 140 in this embodiment, embodiments of the present invention are not limited to such a structure. For example, the tray 130 may be formed in a shape corresponding to the container 120 so that the storage space 121 is provided within the tray 130.

[0050] The tray 130 may be made of wood to be capable of adjusting humidity in the storage space 121 to be in a hermetic state. The cover member 140 may be formed of a transparent material so that the state of food put on the tray 130 can be checked from the outside.

[0051] More specifically, since microfibers of wood contract and expand in accordance with the amount of moisture, the wooden tray 130 may automatically adjust the humidity, accordingly restraining generation and inhabitation of microbes such as mold and germs.

[0052] Also, since wood has antibacterial, disinfectant and air-purifying properties, the wooden tray 130 may effectively prevent deterioration and decay of food being stored for a long time and thereby extend the length of freshness of the food.

[0053] Various wooden materials that are strong enough to not be affected by the humidity of the storage chamber 20 may be used for the material of the tray 130. According to the embodiment of the present invention, the tray 130 may be teak, iroko, beech, mahogany, oak, ash or maple, each of which, has excellent strength and natural pattern and feel.

[0054] Although wood is used to efficiently adjust the humidity, the tray 130 according to embodiments of the present invention may be formed of other materials.

[0055] The airtight container 120 equipped with the wooden tray 130 may be used as a dairy product storage when mounted in the storage chamber since this element maintains a proper temperature for storage of dairy products such as cheese.

[0056] Leg parts 131 are formed at both lower sides of the tray 130. As shown in FIG. 4, the leg parts 131 may be formed in a shape corresponding to the mounting depression 115 of the door guard 110 to be received in the mounting depression 115 when the airtight container 120 is received in the receiving part 112 of the door guard 110.

[0057] According to such a structure, movement of the tray 130 is restricted while the airtight container 120 is being inserted in the receiving part 112 of the door guard 110.

[0058] Furthermore, the cover member 140 and the tray 130 of the airtight container 120 may prevent entry of the external air into the storage space 121 while achieving a hermetic structure wherein the humidity is adjustable through the wooden tray 130.

[0059] FIG. 5 is an enlarged view of a section 'A' of FIG. 4. FIG. 6 is an enlarged view of another version of the section 'A' of FIG. 4. Referring to FIG. 5, a stepped part 133 is formed near an upper edge of the tray 130 whereas a connection rib 141 is formed along a lower edge of the cover member 140 to be brought into tight contact with the circumference of the stepped part 133.

[0060] The connection rib 141 includes a first tight contact part 143 tightly contacting a first side 134 of the stepped part 133, and a second tight contact part 145 tightly contacting a second side 135 of the stepped part 133.

[0061] Therefore, a gap between the cover member 140 and the tray 130 is airtightly sealed twice by the first and the second tight contact parts 143 and 145, thereby reducing the possibility of entry of the air into the storage space 121.

[0062] Additionally, as shown in FIG. 6, a packing member 150 having an excellent contacting force may be provided between the cover member 140 and the tray 130 to enhance the airtightness between the cover member 140 and the tray 130.

[0063] As described above, the door guard assembly 100 according to the embodiment of the present invention includes the door guard 110 mounted to the inner wall 51 of the door 50, and the airtight container 120 received in the door guard 110. However, embodiments of the present invention are not limited to the suggested embodiment. Therefore, for example, the door guard 110 may include the storage space 121 and a wooden bottom surface 113 such that the cover member 140 sealing the storage space 121 is connected to the door guard 110.

[0064] The door guard 110 may include a separation prevention member to restrain the airtight container 120 from being separated from the door guard 110 by inertia when the door 50 is opened and closed after the airtight container 120 is received in the receiving part 112 of the door guard 110.

[0065] The separation prevention member may have a locking structure such as a hook structure restricting the airtight container 120. According to the embodiment, as shown in FIG. 3, the separation prevention member may include a locking bar member 160 pivotably mounted to the door guard 110 to be automatically lifted and lowered according to movement of the airtight container 120 with respect to the

door guard 110, and a stopping member that restricts the pivoting range of the locking bar member 160.

[0066] The locking bar member 160 includes a fixed part 161 surrounding a front side 146 of the cover member 140 when the airtight container 120 is inserted in the receiving part 112 of the door guard 110, supporting parts 163 bent from both ends of the fixed part 161, and hinge parts 165 formed in a rectangular shape at one end of each of the supporting parts 163.

[0067] The stopping member may include hinge recesses 171 in which the hinge parts 165 are rotatably inserted. In this embodiment, as shown in FIG. 7, the hinge recesses 171 may be formed on a sidewall 116 of the door guard 110.

[0068] Each of the hinge recesses 171 includes stopping parts that restrict the rotational range of the locking bar member 160, and more particularly, includes first stopping parts 172 restricting the maximum lifted angle α of the locking bar member 160 and second stopping parts 173 restricting the maximum lowered angle.

[0069] As shown in FIG. 8, when the hinge parts 165 of the locking bar member 160 are lifted within the hinge recesses 171, the upward rotation of the hinge parts 165 is restricted by the first stopping parts 172.

[0070] More particularly, the first stopping parts 172 are disposed such that the maximum lifted angle α of the locking bar member 160 becomes about 85°. Accordingly, the locking bar member 160 is lowered by its own weight after being lifted to the maximum position.

[0071] In addition, as shown in FIG. 9, when the locking bar member 160 is lowered, the downward rotation of the hinge parts 165 is restricted by the second stopping parts 173. For this, the second stopping parts 173 are disposed such that the maximum lowered angle of the locking bar member 160 becomes about 0°.

[0072] With the above structure, insertion and removal of the airtight container 120 with respect to the door guard 110 may be more conveniently performed since the locking bar member 160 is automatically lifted and lowered.

[0073] As shown in FIG. 10, when the airtight container 120 is inserted in the door guard 110, the locking bar member 160 is disposed at the position (dashed line) corresponding to the maximum lowered angle by its own weight. When the airtight container 120 is separated from the door guard 110 in an arrowed direction in the drawing, the locking bar member 160 is automatically lifted up to the position corresponding to the maximum lifted angle (solid line) along an upper surface 147 of the cover member 140, thereby releasing the airtight container 120.

[0074] As described above, the door guard assembly 100 according to the embodiment of the present invention may more efficiently maintain freshness of food being stored in the storage space 121 by using the wooden tray 130 capable of adjusting the humidity. In addition, convenience of insertion and separation of the airtight container 120 may be enhanced by using the locking bar member 160 automatically lifted and lowered according to movements of the airtight container 120. Furthermore, since the airtight container 120 is not undesirably separated from the door guard 110 as the door 50 is opening and closing, the operational stability is improved.

[0075] As is apparent from the above description, a door guard assembly according to the embodiment of the present invention and a refrigerator having the same may be able to maintain freshness of food being stored in a storage space for a long time, by using a wooden tray which adjusts humidity.

[0076] In addition, the door guard assembly improves convenience in putting in food by using a locking bar member that is automatically lifted and lowered according to movements of an airtight container. Furthermore, since the airtight container is not easily separated as the door is opened and closed, the operation stability may be enhanced.

[0077] Although an embodiment of the present invention has been shown and described, it would 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 claims and their equivalents.

What is claimed is:

1. A refrigerator comprising:
 - a storage chamber;
 - a door that opens and closes the storage chamber; and
 - an airtight container defining a storage space, wherein the airtight container includes a tray made of a humidity-adjustable material, and a cover member that covers the tray.
2. The refrigerator according to claim 1, wherein the tray is made of a wooden material.
3. The refrigerator according to claim 2, wherein the wooden material comprises teak, iroko, beech, mahogany, oak, ash or maple.
4. The refrigerator according to claim 1, further comprising a door guard mounted to an inside of the door to stably mount the airtight container.
5. The refrigerator according to claim 1, further comprising:
 - a door guard mounted to an inside of the door, wherein a bottom surface of the door guard is defined by the tray.
6. The refrigerator according to claim 4, wherein the door guard includes a separation prevention member restraining separation of the airtight container received in the door guard.
7. The refrigerator according to claim 6, wherein the separation prevention member comprises a locking bar member which is mounted along an outside of the cover member to be rotated as the airtight container moves from the door guard and is lowered by its own weight thereby surrounding the cover member as the airtight container is received in the door guard.
8. The refrigerator according to claim 6, wherein the separation prevention member comprises:
 - a locking bar member rotatably mounted at the door guard; and
 - stopping members connected to both ends of the locking bar member to restrict a rotational range of the locking bar member.
9. The refrigerator according to claim 8, wherein each of the stopping members comprises:
 - a first stopping part restricting the locking bar member when the locking bar member is at a lifted position; and
 - a second stopping part restricting the locking bar member when the locking bar member is at a lowered position.
10. The refrigerator according to claim 1, wherein the tray comprises a stepped part and the cover member comprises a connection rib engaged in tight contact with the stepped part.

11. The refrigerator according to claim 10, further comprising a packing member provided between the stepped part and the connection rib.

12. The refrigerator according to claim 4, wherein the tray comprises a leg part disposed at a lower part whereas the door guard comprises a mounting depression formed on a bottom surface thereof.

13. A door guard assembly comprising:

- a storage chamber;
- a door that opens and closes the storage chamber; and
- an airtight container holding a storage space, wherein the airtight container defining a tray made of a wooden material, and a cover member made of a transparent material to cover the tray.

14. A door guard assembly comprising:

- a door guard mounted to an inner wall of a door that opens and closes a storage chamber; and
- an airtight container received in the door guard and adapted to adjust humidity therein, wherein the airtight container includes a tray made of a wooden material, and a cover member that covers the tray.

15. The door guard assembly according to claim 14, further comprising a locking bar member rotatably mounted to the door guard to surround a front side of the cover member when the airtight container is received in the door guard.

16. The door guard assembly according to claim 15, wherein the locking bar member comprises:

- a fixed part surrounding a front side of the cover member;
- a plurality of supporting parts bent from both ends of the fixing part; and
- a plurality of hinge parts respectively formed at one end of each of the supporting parts.

17. The door guard assembly according to claim 16, wherein the door guard comprises a plurality of hinge recesses connected with the hinge parts, and the hinge recesses each comprise a first stopping part restricting a maximum lifted angle of the locking bar member so that the locking bar member is lowered by its own weight, and a second stopping part restricting a maximum lowered angle of the locking bar so that the locking bar member fixes the cover member.

18. The door guard assembly according to claim 14, wherein the tray comprises a stepped part, the cover member comprises a connection rib brought into tight contact with the circumference of the stepped part, and the connection rib comprises a first tight contact part tightly contacting a first side of the stepped part and a second tight contact part tightly contacting a second side of the stepped part.

19. The door guard assembly according to claim 18, further comprising a packing member provided between the stepped part and the connection rib.

20. The door guard assembly according to claim 14, wherein the cover member comprises a transparent material.

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