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(54) **REFRIGERATOR HAVING COOLING AIR LEAKAGE PREVENTING MEMBER**

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(57) **ABSTRACT**

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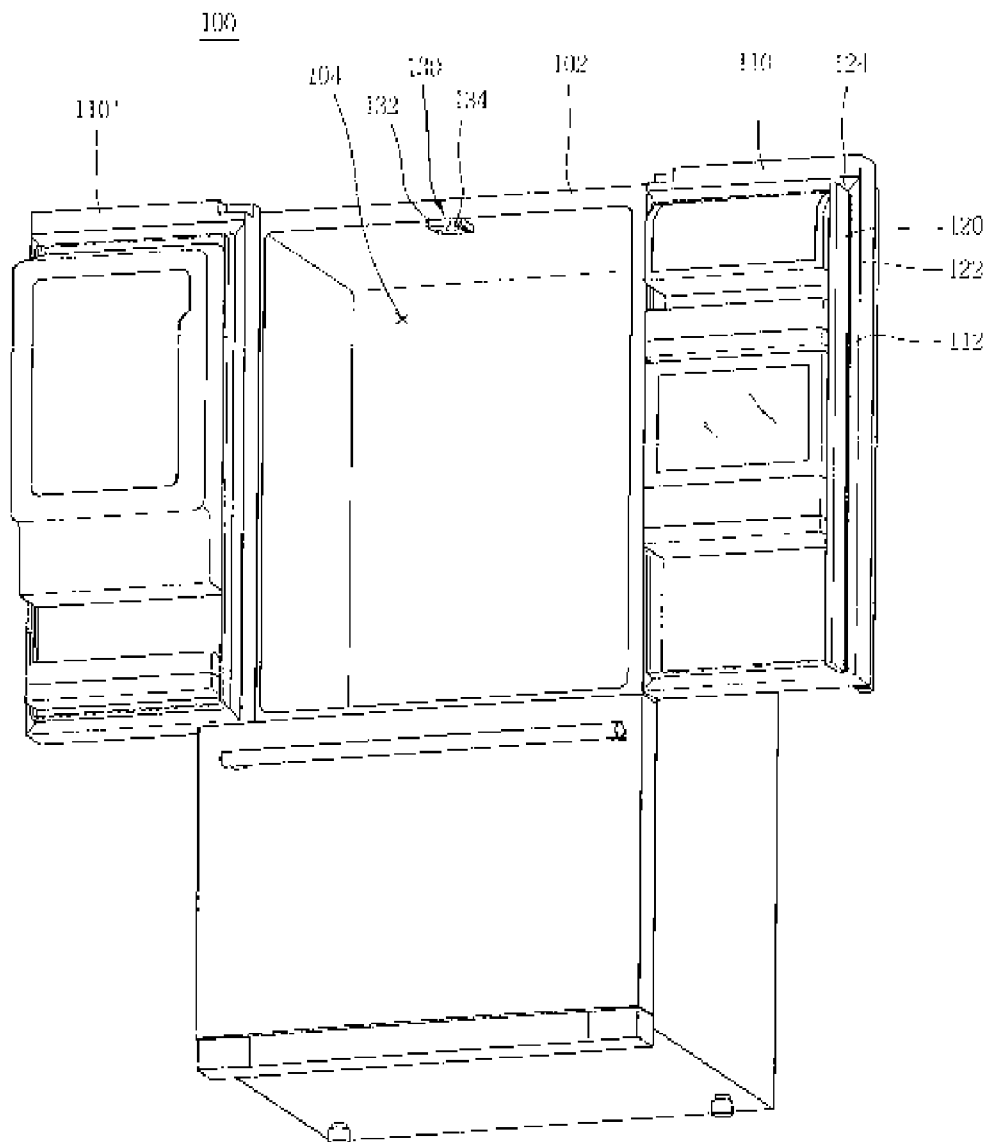
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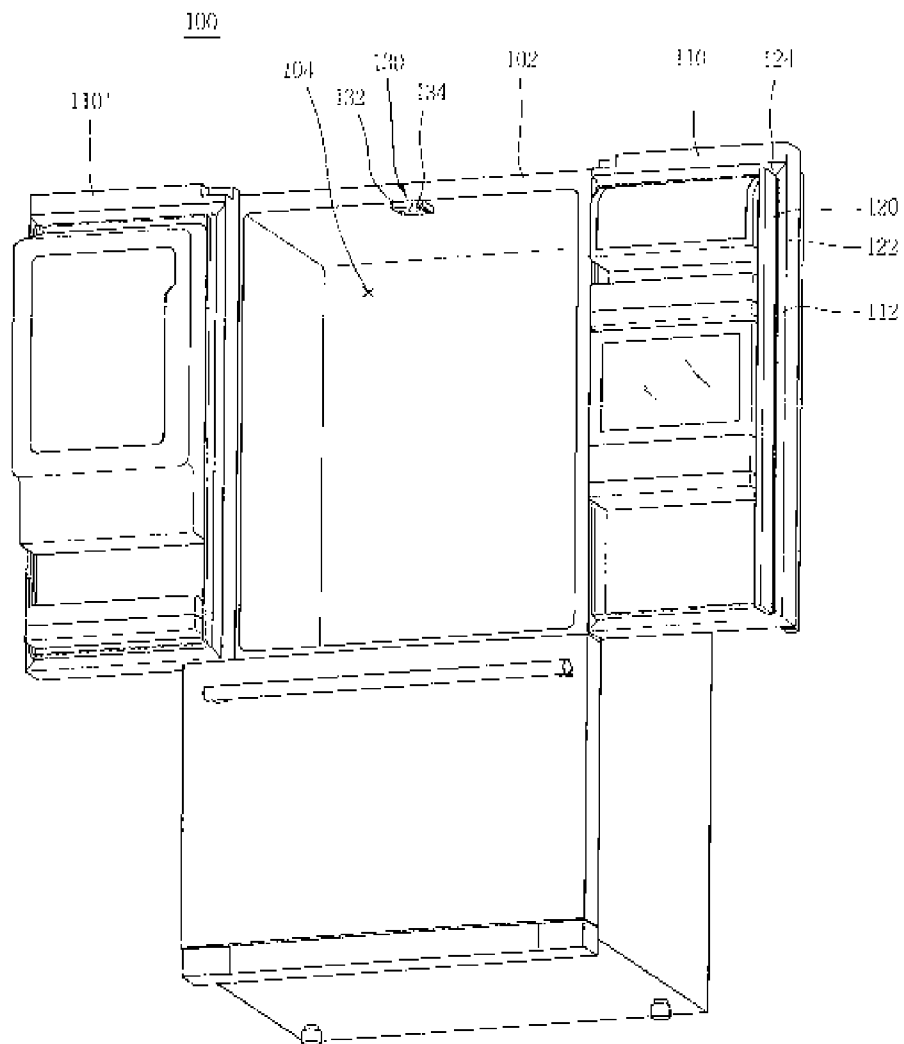
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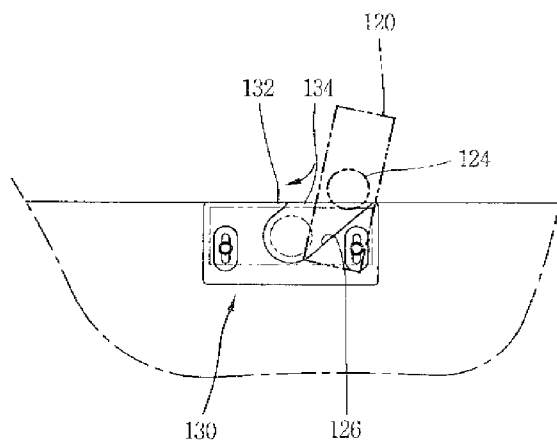
Disclosed is a refrigerator having a cooling air leakage preventing member, the refrigerator including refrigerator a cabinet providing a storage space, a pair of doors disposed at right and left sides of a front surface of the cabinet and coupled to the cabinet by hinges, a cooling air leakage preventing member rotatably mounted to a free end portion of one of the doors and disposed longitudinal to the door, the cooling air leakage preventing member having a guide protrusion, and a guide installed at the cabinet and having a guide groove engaged with the guide protrusion upon opening or closing the door so as to rotate the cooling air leakage preventing member.



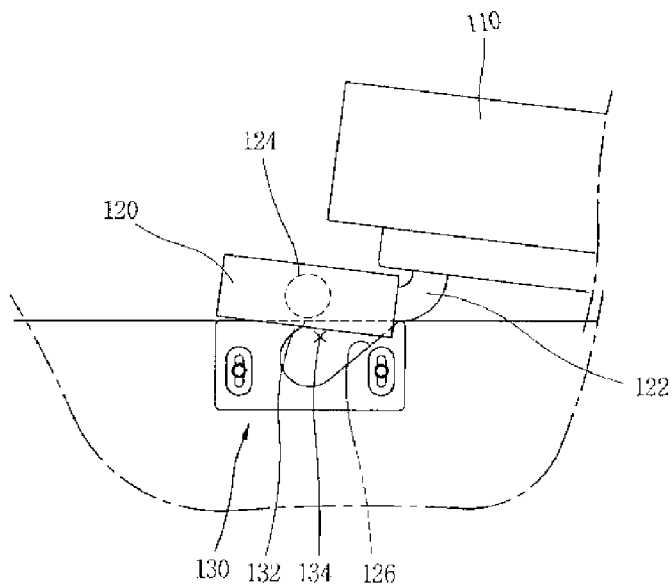
[Fig. 1]



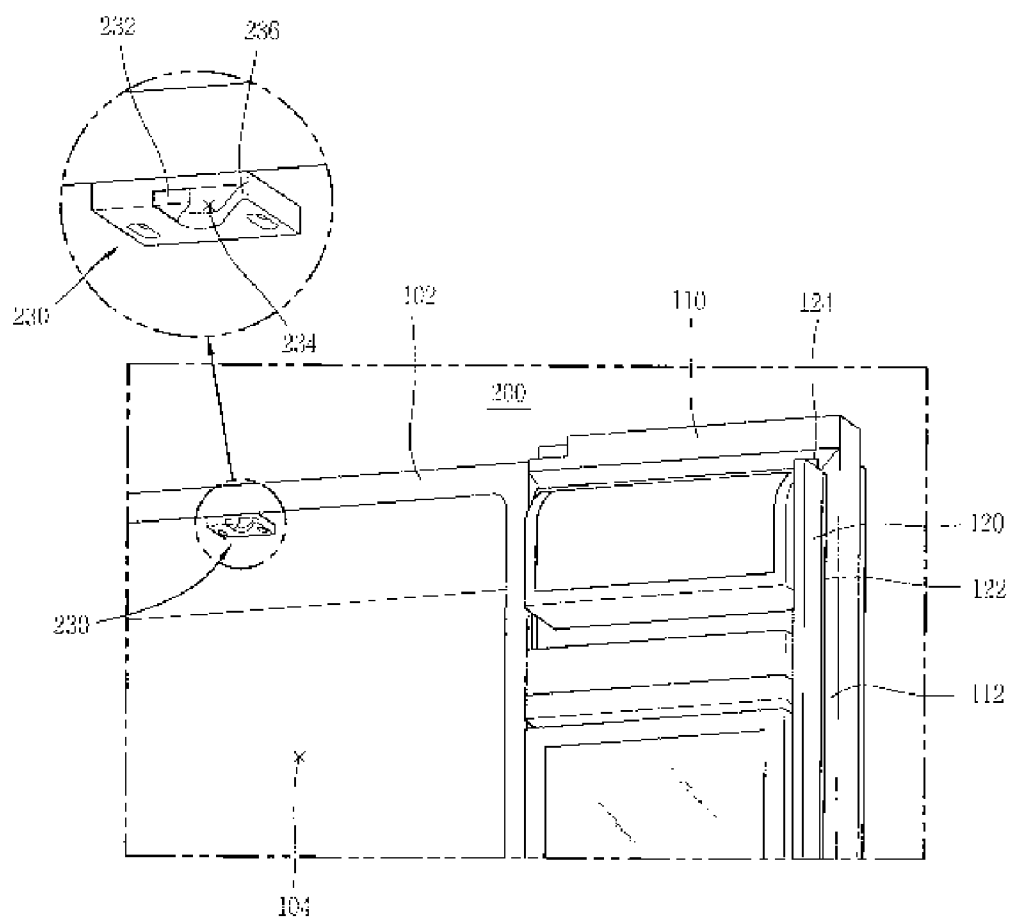
[Fig. 2]



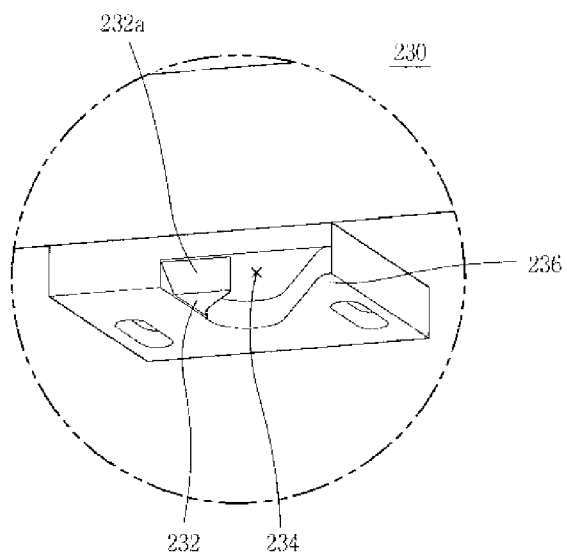
[Fig. 3]



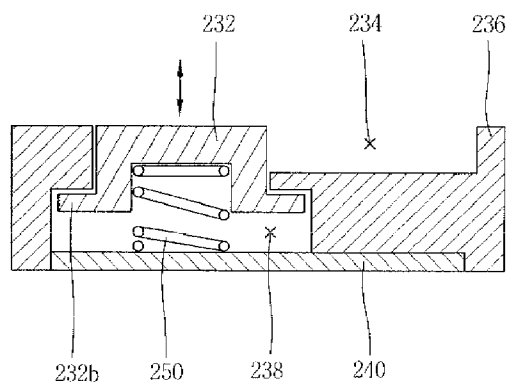
[Fig. 4]



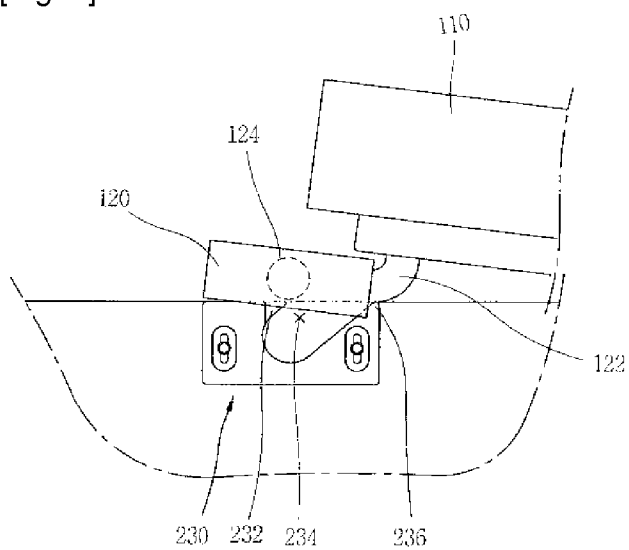
[Fig. 5]



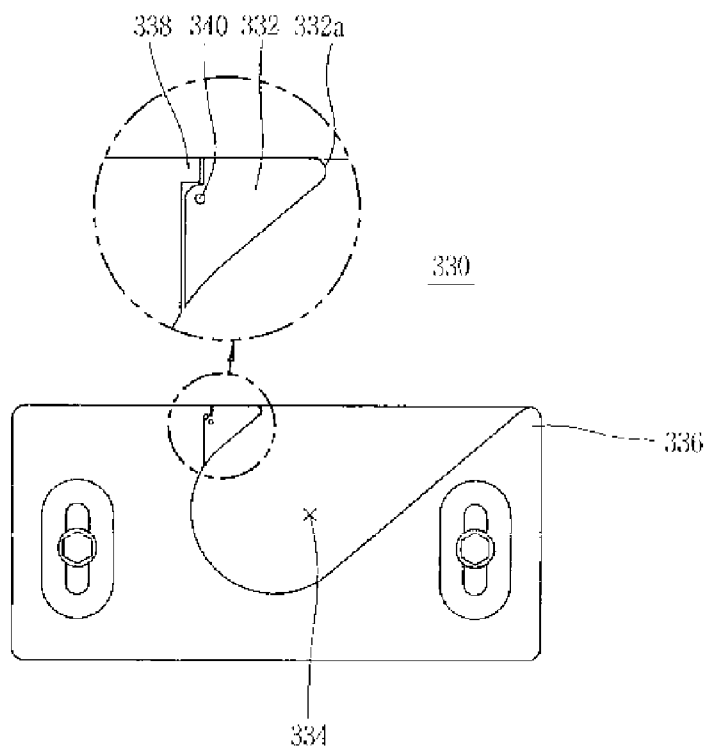
[Fig. 6]



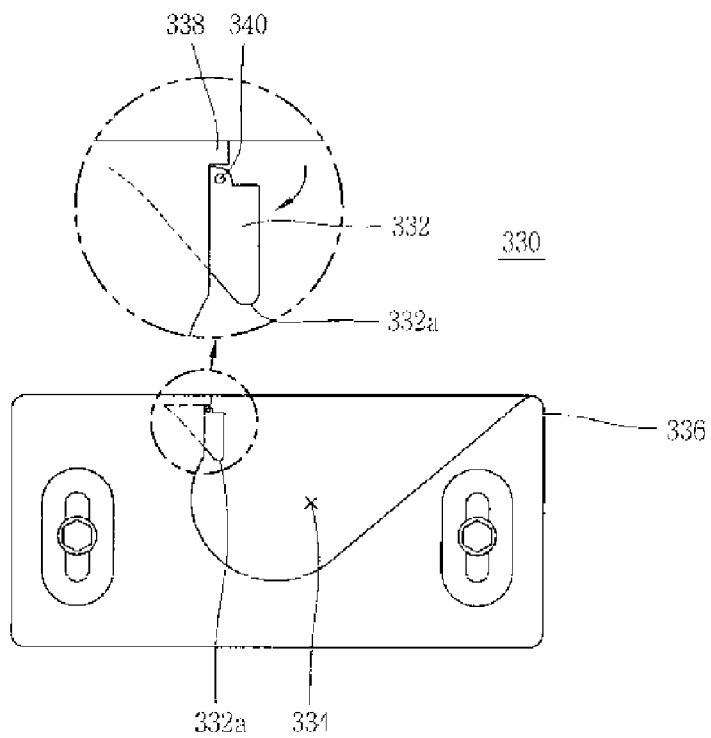
[Fig. 7]



[Fig. 8]



[Fig. 9]



REFRIGERATOR HAVING COOLING AIR LEAKAGE PREVENTING MEMBER

TECHNICAL FIELD

[0001] The present invention relates to a refrigerator having a cooling air leakage preventing member, and particularly, to a refrigerator having a member for preventing (or minimizing) cooling air from being leaked between doors of the refrigerator.

BACKGROUND ART

[0002] In general, a refrigerator includes a cabinet (or main body) providing a space functioning as a freezing chamber and a refrigerating chamber, and doors for opening and closing each of the freezing chamber and the refrigerating chamber. Here, each chamber is typically provided with a single door, but for a large refrigerator used for a specific purpose, two doors may be installed at one freezing or refrigerating chamber. Such structure has been employed in home refrigerators in recent time, in which demands on the large refrigerator increase, as well as the refrigerator used for the specific purpose.

[0003] With this structure, in order to make two doors smoothly rotated to be open or closed, a preset gap should be present between the two doors. However, such gap may cause leakage of cooling air therethrough, so a member for preventing (or minimizing) the leakage of the cooling air through the gap is needed. To this end, a cooling air leakage preventing member is installed at an end portion of one of the two doors to extend in a longitudinal direction of the door.

[0004] FIG. 1 is a perspective view showing an embodiment of a refrigerator having such cooling air leakage preventing member. Referring to FIG. 1, a refrigerator 100 includes a cabinet (or main body) 102 having a refrigerating chamber 104 occupying the entire upper portion thereof, and a pair of doors 110 and 110' coupled to the cabinet 102 by hinges for opening and closing a front surface of the refrigerating chamber 104. A gasket 112 is mounted onto an inner side surface of each door 110 and 110' for close contact between the cabinet 102 and each door 110 and 110'.

[0005] Also, a cooling air leakage preventing member 120 in a bar shape extending in a longitudinal direction of the refrigerator is installed at a free end side of one of the doors 110 and 110'. The cooling air leakage preventing member 120 has one end rotatably mounted onto the door 110 via an elastic connection means 122. In the closed state of the two doors 110 and 110', the cooling air leakage preventing member 120 comes in contact with the gasket of another door 110' to prevent (or minimize) the leakage of the cooling air between the doors 110 and 110'.

[0006] Here, the door is capable of being open only when the cooling air leakage preventing member 120, as shown in FIG. 1, is disposed longitudinal to the door. Accordingly, there is provided a guide 130 mounted to an upper portion of the cabinet 102 for locating the cooling air leakage preventing member 120 as shown in FIG. 1 when opening the door, and locating the cooling air leakage preventing member 120 at a level with the door when closing the door.

[0007] FIG. 2 is a planar view showing a structure of the guide. Referring to FIG. 2, the guide 130 includes a stopper 132 and a guide groove 134. A guide protrusion 124 formed at an upper end portion of the cooling air leakage preventing member 120 is inserted in the guide groove 134 to allow

rotation of the cooling air leakage preventing member 120. In detail, When a door is closed in a state where the cooling air leakage preventing member 120 is longitudinal to the door, the guide protrusion 124 is inserted into the guide groove 134 to be guided, thereby allowing the rotation of the cooling air leakage preventing member 120.

[0008] On the other hand, when the door is open, the guide protrusion 124 is stopped at the stopper 132 such that the cooling air leakage preventing member 120 rotates into the state shown in FIG. 1.

[0009] The employment of the cooling air leakage preventing member 120 can enhance space utility of the refrigerating chamber and prevent leakage of cooling air. However, this type of cooling air leakage preventing member is in danger of damages. That is, when the cooling air leakage preventing member 120 is rotated into a state parallel to the door 110 by an external force under the open state of the door 110 (see FIG. 3), upon closing the door, the guide protrusion 124 may collide with the stopper 132. Consequently, the door may not be closed properly, and in more serious cases, the door may be broken.

DISCLOSURE OF INVENTION

Technical Problem

[0010] Therefore, to address the problems of the related art, an object of the present invention is to provide a refrigerator, whose doors are allowed to be smoothly closed even if a cooling air leakage preventing member is not in a fixed position.

Solution to Problem

[0011] To achieve these and other advantages and in accordance with one aspect of the present invention, as embodied and broadly described herein, there is provided a refrigerator including a cabinet providing a storage space, a pair of doors disposed at right and left sides of a front surface of the cabinet and coupled to the cabinet by hinges, a cooling air leakage preventing member rotatably mounted to a free end portion of one of the doors and disposed longitudinal to the door, the cooling air leakage preventing member having a guide protrusion, and a guide installed at the cabinet and having a guide groove engaged with the guide protrusion upon opening or closing the door so as to rotate the cooling air leakage preventing member, wherein the cooling air leakage preventing member is rotatable between a first position for sealing a gap between the pair of doors, and a second position of being engaged into the guide groove, wherein the guide further comprises a restricting member for expanding an inlet of the guide groove responsive to contact with the guide protrusion when the door is closed in a state where the cooling air leakage preventing member is at the first position.

[0012] In the one aspect of the present invention, when the guide protrusion is bumped into a side wall of the guide, the inlet of the guide groove is allowed to be extended, thereby preventing (or minimizing) occurrence of problems, such as damage on the guide member, improper closing of the door and the like.

[0013] Here, the restricting member may be located at a side wall of the inlet side of the guide groove. The restricting member may include a stopper mounted to be movable into the guide, and an elastic member for applying an elastic force to maintain a protruded state of the stopper. Here, the stopper may allow the guide groove to perform its original function

with maintaining the external protruded state thereof when no external force is applied by the elastic member. When the stopper is bumped against the guide protrusion, the stopper may be allowed to be moved into the guide so as to render the guide protrusion inserted into the guide groove.

[0014] Here, the stopper may configure a part of the side wall of the inlet side of the guide groove.

[0015] The stopper may be mounted in the guide to be movable in a longitudinal direction of the door. In this case, a front surface of the stopper may configure an inclination surface.

[0016] Besides, the stopper may be mounted in the guide to be rotatable based upon a rotational shaft in parallel to the longitudinal direction of the door.

Advantageous Effects of Invention

[0017] In accordance with the aspects of the present invention with the configuration, even when the door is closed in a state where the cooling air leakage preventing member is not at a fixed position, the inlet of the guide groove is extended by virtue of the restricting unit, thereby allowing the guide protrusion to be smoothly engaged into the guide groove without impact, resulting in preventing (or minimizing) the door from being closed properly or the cooling air leakage preventing member from being damaged.

BRIEF DESCRIPTION OF DRAWINGS

[0018] FIG. 1 is a perspective view showing an exemplary embodiment of a refrigerator having a cooling air leakage preventing member;

[0019] FIG. 2 is a planar view showing a guide of FIG. 1;

[0020] FIG. 3 is a planar view showing a state where a guide protrusion comes in contact with (or is bumped into) a guide;

[0021] FIG. 4 is a perspective view showing an exemplary embodiment of a refrigerator having a cooling air leakage preventing member in accordance with the present invention;

[0022] FIG. 5 is an enlarged perspective view showing a guide of FIG. 4;

[0023] FIG. 6 is a sectional view showing an internal structure of the guide shown in FIG. 5;

[0024] FIG. 7 is a sectional view showing an operational state of the embodiment shown in FIG. 4;

[0025] FIG. 8 is a planar view showing another embodiment of the guide; and

[0026] FIG. 9 is a planar view showing an operational state of the guide shown in FIG. 8.

MODE FOR THE INVENTION

[0027] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. It will also 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 invention. Thus, it is intended that the present invention cover modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

[0028] Description will now be given in detail of a refrigerator having a cooling air leakage preventing member in accordance with exemplary embodiments according to the present invention, with reference to the accompanying drawings.

[0029] FIG. 4 is a perspective view showing one exemplary embodiment of a refrigerator in accordance with the present invention. Here, for the sake of brief description with reference to the drawings, the same or equivalent components to those shown in FIG. 1 will be provided with the same reference numbers, and description thereof will not be repeated.

[0030] Referring to FIG. 4, two doors 110 and 110' may be installed at a front surface of a refrigerating chamber 104, and a cooling air leakage preventing member 120 may be rotatably mounted to the door 110 present at a left side. FIG. 4 shows that the cooling air leakage preventing member 120 is disposed perpendicular to the door 110. The position is referred to as a second position for the sake of explanation. The cooling air leakage preventing member 120 may alternately be disposed in parallel to the door 110. In this case, the cooling air leakage preventing member 120 may come closely in contact with a gasket of the door 110' present at a right side so as to seal a gap between the two doors 110 and 110', and this position is referred to as a first position.

[0031] In the meantime, a guide 230 may be installed near an upper end portion of the refrigerating chamber 104. Here, the guide 230 does not have to be installed only in the refrigerating chamber 104. Alternatively, the guide 230 may be installed in a freezing chamber or the like when two side-by-side type doors are installed at one space.

[0032] FIG. 5 is an enlarged perspective view of the guide 230. As shown in FIG. 5, a guide groove 234 may be formed at a lower surface of the guide 230 such that a guide protrusion 124 formed on the cooling air leakage preventing member 120 is inserted therein. The guide groove 234 may slantingly extend from a right side of a front surface of the guide 230 to a left side of a rear surface of the guide 230, and be provided with an inlet for allowing engagement with the guide protrusion 124.

[0033] A stopper 232 may be disposed at a left side of the inlet. The stopper 232 may be installed to be slidable into the guide 230, and the sliding direction is in parallel to a longitudinal direction of the door 110. A front surface 232a of the stopper 232 may form an inclination surface. The inlet may be present between the stopper 232 and a right barrier 236, which define a width of the inlet.

[0034] FIG. 6 is a sectional view showing an internal structure of the guide 230. As shown in FIG. 6, a space 238 for accommodation of the stopper 232 may be formed in the guide 230, and fixing flanges 232b may be formed at a lower surface of the stopper 232. The width of the space 238 may be the same as or slightly wider than a width between the fixing flanges 232b, thereby allowing the stopper 232 to be smoothly slidable within the space 238. In addition, a coil spring 250 may be disposed at a lower surface of the fixing flanges 232b such that the stopper 232 can be kept in a protruded state.

[0035] In addition, a cover 240 may be secured with the lower surface of the guide 230 so as to allow insertion of the stopper 232 into the space 238. In some cases, the cover 240 may be omitted.

[0036] Hereinafter, an operation of the exemplary embodiment will be described with reference to FIG. 7. FIG. 7 is a planar view showing an operation of closing the door 120 in a state where the cooling air leakage preventing member 120 is present at the first position. At the first position, the guide protrusion 124 formed on the cooling air leakage preventing member 120 comes in contact with a front surface of the stopper 232. In this state, if the door 110 is further rotated, the

guide protrusion 124 pushes the front surface of the stopper 232 with stronger pressure, and such pressure makes the stopper 232 slid upwardly.

[0037] Here, the inclination surface of the stopper 232 may serve to convert the pressure applied from the guide protrusion 124 in the horizontal direction into pressure applied in a longitudinal direction. Once the stopper 232 is slid into the guide 230, the inlet is accordingly extended, whereby the guide protrusion 124 can be inserted into the guide groove 234. Hence, the cooling air leakage preventing member 120 can be inserted into the guide groove 234 even at the first position, resulting in preventing (or minimizing) the door from being closed properly or the cooling air leakage preventing member 120 from being damaged due to impacts.

[0038] When the door in the closed state is open, the stopper 232 serves to prevent separation of the guide protrusion 124. Accordingly, the guide protrusion 124 moves along a rear surface of the stopper 232 so as to rotate the cooling air leakage preventing member 120 to the second position.

[0039] Meanwhile, the stopper 232 does not always have to be slid in the longitudinal direction. Alternatively, the stopper 232 may be configured to be slidable in parallel to a bottom surface of the refrigerator. In this case, the stopper 232 may be slid in parallel at the surface of the guide to extend the inlet.

[0040] Also, the stopper 232 does not always have to perform a sliding motion. Another embodiment may be considered in which the stopper 232 rotates to extend the inlet.

[0041] FIG. 8 is a planar view showing another embodiment of the guide. Referring to FIG. 8, a guide 330 may include a guide groove 334 for guiding the guide protrusion therein. A stopper 332 may be disposed at one side of an inlet of the guide groove 334. A barrier 336 present at a position facing the stopper 332 may define the width of the inlet together with the stopper 332.

[0042] The stopper 332 may be rotatably mounted in a horizontal direction with respect to the guide 330 by virtue of a hinge shaft 340. Here, a stopper 338 for restricting a rotating range of the stopper 332 may be formed at a front surface of the guide 330. The stopper 338 may come in contact with the front surface of the stopper 332 so as to restrict the stopper 332 from being protruded outside the guide 330. Also, a front end portion 332a of the stopper 332 may be in a round form, thereby preventing (or minimizing) the guide protrusion from being caught at the front end portion 332a during operation.

[0043] FIG. 9 is a planar view showing a rotated state of the stopper 332 responsive to a contact with the guide protrusion. Referring to FIG. 9, when the guide protrusion presses the front surface of the stopper 332, the stopper 332 rotates in a clockwise direction in FIG. 9 to be inserted into the guide 330.

Accordingly, the width of the inlet is extended, which allows the guide protrusion to be inserted into the guide groove 334.

[0044] In the meantime, FIG. 9 exemplarily shows, but not limited to, the configuration that the stopper rotates in parallel to the surface of the guide. Alternatively, the stopper may rotate in a direction longitudinal to the surface of the guide. In this case, the hinge shaft 340 may be located in parallel to the surface of the guide.

- 1. A refrigerator comprising:
 - a cabinet providing a storage space;
 - a pair of doors disposed at right and left sides of a front surface of the cabinet and coupled to the cabinet by hinges;
 - a cooling air leakage preventing member rotatably mounted to a free end portion of one of the doors and disposed longitudinal to the door, the cooling air leakage preventing member having a guide protrusion; and
 - a guide installed at the cabinet and having a guide groove engaged with the guide protrusion upon opening or closing the door so as to rotate the cooling air leakage preventing member,
 wherein the cooling air leakage preventing member is rotatable between a first position for sealing a gap between the pair of doors, and a second position of being engaged into the guide groove,
 - wherein the guide further comprises a restricting member for expanding an inlet of the guide groove responsive to contact with the guide protrusion when the door is closed in a state where the cooling air leakage preventing member is at the first position.
- 2. The refrigerator of claim 1, wherein the restricting member is located at a side wall of the inlet side of the guide groove.
- 3. The refrigerator of claim 2, wherein the restricting member comprises:
 - a stopper mounted to be movable into the guide; and
 - an elastic member for applying an elastic force to maintain a protruded state of the stopper.
- 4. The refrigerator of claim 3, wherein the stopper configures a part of a side wall of the inlet side of the guide groove.
- 5. The refrigerator of claim 4, wherein the stopper is mounted in the guide to be movable in a longitudinal direction of the door.
- 6. The refrigerator of claim 5, wherein a front surface of the stopper configures an inclination surface.
- 7. The refrigerator of claim 4, wherein the stopper is mounted in the guide to be rotatable based upon a rotational shaft in parallel to the longitudinal direction of the door.

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