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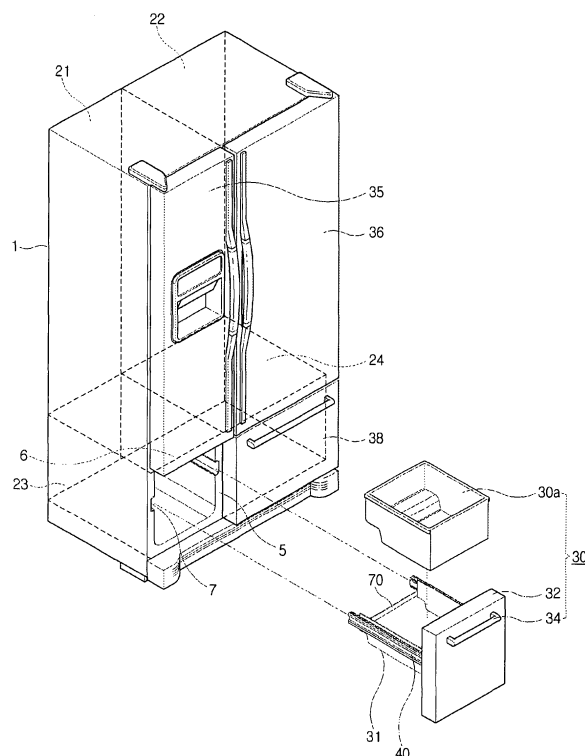
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(54) **Refrigerator**

(57) A refrigerator, with an inner casing (2) forming a drawer type storage compartment (23) and a drawer unit (30) being received in and combined with the drawer type storage compartment (23), the refrigerator having: at least a pair of rail units (40) provided between the inner casing (2) and the drawer unit (70) enabling the drawer unit (30) to slide against the inner casing (2); a support part (7) positioned at the inner casing (2), supporting the rail unit (40), and preventing the rail unit (40) from moving upward and downward; and a combining part combining the rail unit (40) with the support part (7), the combining part enabling the support part (7) to move relative to the rail unit (40) in a direction approximately perpendicular to a surface of the inner casing (2).

FIG. 1



Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Korean Patent Application No. 10-2005-0097639, filed on October 17, 2005, and Korean Patent Application No. 10-2005-0133858, filed on December 29, 2005, in the Korean Intellectual Property Office, the disclosures of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates to a refrigerator, and more particularly, to a refrigerator having a drawer type storage compartment.

Description of the Related Art

[0003] In general, the refrigerator is an apparatus for storing food at a low temperature, and having a main body cabinet in which one or more storage compartments are formed; doors for opening/closing the storage compartments, respectively; and a refrigerating apparatus provided in the main body cabinet for refrigerating each storage compartment. Food is stored in each storage compartment.

[0004] The main body cabinet has an inner casing in which a storage compartment is formed and an outer casing forming an appearance of the refrigerator. And a space formed between the inner casing and the outer casing is filled with a foam member.

[0005] Doors are classified into a hinge type door combined hingeably with the main body cabinet through one side thereof, and a drawer type door that slides in and out of the storage compartment. Of these doors, the drawer type door, such as that disclosed in Korean Patent Application No. 10-2003-0081061, has a door plate provided slidably at each storage compartment to open and close the storage compartment, rail units, each being provided between the respective door plate and the inner casing, and a container basket combined with the door plate and receiving the food to be stored.

[0006] The rail units are installed opposingly facing both side walls of the storage compartment (that is, the inner casing), thus enabling the drawer type door to slide. A combining structure and an operation of such drawer type door are described with reference to FIG. 5 as follows.

[0007] Each rail unit 140 has a guide rail 141 combined with a support section 107 provided in a main body cabinet 101 and one or more slide rails 142 and 143 that slide along the guide rail 141. The main body cabinet 101 includes an inner casing 102, an outer casing (not shown), and a foam member 104 disposed between the inner casing 102 and the outer casing. The guide rail 141

is combined with the support section 107 provided in the main body cabinet 101 by a screw 160, the outermost slide rail 143 (with respect to the inner casing 102 - in other words, the slide rail closes to the drawer type door) is combined with a side of the drawer type door. According to such constitution, a user grasps a handle of the drawer type door and can slidably draw the drawer type door in and out of the storage compartment. The rail units 140 facilitate a sliding movement of the drawer type door.

[0008] In general, the main body cabinet of the refrigerator is manufactured at a normal room temperature (approximately 77° F). On the other hand, the refrigerator is used in a state that the storage compartment is maintained at a comparatively low temperature. Accordingly, once a temperature of the main body cabinet becomes low, the foam member and the inner casing contract and the shapes of these members are deformed e.g., from A to A' in FIG. 5. As an example, when the storage compartment is used as the freezing compartment, an inner temperature thereof is maintained generally at -18° F or below, so that a space between opposite inner surfaces of the inner casing is increased by 3 to 4 mm due to a contraction of the foam member and the inner casing.

[0009] In such a refrigerator, accordingly, once the inner casing is contracted, the rail units combined integrally with the inner casing are moved together with the inner casing, and so a space between the rail units combined to opposite sides of the inner casing becomes wider compared with the space at the normal room temperature. On the other hand, since the door plate and/or the combining member connecting a pair of rail units are configured to have regular intervals and are not influenced by the contraction of the inner casing and the foam member, the drawer type door unit has a problem in that a distance between the rail units over their overall length can not be maintained constantly, and a disposition shape of the rail units is deformed into a trapezoid shape or a lozenge shape, and so a sliding movability of the drawer type door unit decreases.

SUMMARY OF THE INVENTION

[0010] Accordingly, it is an aspect of the present invention to provide a refrigerator that can maintain constantly a space between the rail units though an inner casing is contracted at a low temperature.

[0011] The foregoing and/or other aspects of the present invention can be achieved by providing a refrigerator, with an inner casing forming a drawer type storage compartment and a drawer unit being received in and combined with the drawer type storage compartment, the refrigerator having: at least a pair of rail units provided between the inner casing and the drawer unit enabling the drawer unit to slide against the inner casing; a support part positioned at the inner casing, supporting the rail unit, and preventing the rail unit from moving upward and downward; and a combining part combining the rail unit with the support part, the combining part enabling the

support part to move relative to the rail unit in a direction approximately perpendicular to a surface of the inner casing.

[0012] According to an aspect of the present invention, the support part has a first combining hole positioned thereon; the rail unit has a second combining hole positioned thereon to correspond to the first combining hole; and the combining part has a screw passed through the second combining hole and combined with the first combining hole, the screw having a body portion having a thread to combine with the first combining hole, a head portion radially extended from an axial direction of the screw, and a rail guide portion formed between the body portion and the screw head portion enabling the support part to move relative to the rail unit.

[0013] According to an aspect of the present invention, the rail guide portion has a diameter that is larger than that of the body portion.

[0014] According to an aspect of the present invention, the head portion has an inclined portion with a diameter that progressively increases from the rail guide portion; and the second combining hole has a shape corresponding to a shape of the inclined portion..

[0015] According to an aspect of the present invention, the length of the rail guide portion in the axial direction of the screw is approximately 1 to 3 mm.

[0016] According to an aspect of the present invention, the rail unit has a guide rail combined with the support part; and a slide rail combined with the guide rail and the drawer unit, wherein the slide rail slides against the guide rail, and the second combining hole is positioned on the guide rail.

[0017] According to an aspect of the present invention, the drawer unit has brackets combined with the pair of rail units, respectively; and a coupling member connecting the brackets to maintain an interval between the rail units.

[0018] According to an aspect of the present invention, the support part is depress on a surface of the inner casing for receiving and supporting the rail units and is extended in a longitudinal direction of the rail unit.

[0019] The foregoing and/or other aspects of the present invention can be achieved by providing a refrigerator with an inner casing forming a drawer type storage compartment, an outer casing forming an outer appearance of the drawer type storage compartment, a foam member disposed between the inner casing and the outer casing, and a drawer unit being received in and combined with the drawer type storage compartment, the refrigerator having: at least a pair of rail units provided between the inner casing and the drawer unit enabling the drawer unit to slide against the inner casing; rail brackets, provided at the inner casing and respectively supporting the rail units; and a plurality of combining members, each having a stable support section firmly connecting the rail bracket to the inner casing, and a free support section movably supporting the rail unit in a direction approximately perpendicular to a surface of the inner casing, the

free support section combining the rail bracket and the rail unit.

[0020] According to an aspect of the present invention, the stable support section and the free support section form a single body as the combining member.

[0021] According to an aspect of the present invention, the stable support section and the free support section are formed independently to be combined detachably with each other to form the combining member.

[0022] According to an aspect of the present invention, the inner casing is provided with a depression portion formed on a surface thereof, and the rail bracket is received in the depression portion.

[0023] According to the embodiment of the present invention, the rail bracket has a first combining hole; the rail unit has a second combining hole corresponding to the first combining hole; the stable support section of the combining member has a body portion that combines with the first combining hole; the free support section of the combining member has a rail guide portion extended from the body portion and being received in the second combining hole enabling the inner casing, foam member, and the rail bracket to move relative to the rail unit when the foam member and inner casing contract; the rail unit has a guide rail combined with the rail bracket, and a slide rail that is combined with the guide rail and the drawer unit and slides against the guide rail, the second combining hole being positioned on the guide rail.

[0024] According to an aspect of the present invention, the rail bracket comprises a plate portion on which the first combining hole is formed and a wing portion extended from the plate portion in the direction approximately perpendicular to the surface of the inner casing to support the rail unit.

[0025] According to an aspect of the present invention, the wing portion is formed to support an upper side and a lower side of the rail unit.

[0026] The foregoing and/or other aspects of the present invention can be achieved by providing a refrigerator having: an inner casing; a rail unit provided in the inner casing; and a screw moveably combining the rail unit with the inner casing, the screw having a body portion connected firmly to the inner casing, a head portion having a diameter that is larger than that of the body portion, and a rail guide portion disposed between the body portion and the head portion and having a diameter that is larger than that of the body portion and smaller than that of the head portion, to movably support the rail unit with respect to the inner casing.

[0027] According to an aspect of the present invention, the inner casing has a first combining hole; the rail unit has a second combining hole corresponding to the first combining hole; the body portion has a thread to combine with the first combining hole; and the rail guide portion is received in the second combining hole and enables relative movement of the inner casing with respect to the rail unit in a direction approximately perpendicular to a surface of the inner casing.

[0028] According to an aspect of the present invention, the inner casing the inner casing has a rail bracket to support the rail unit; and the first combining hole is positioned on the rail bracket.

[0029] According to an aspect of the present invention, the rail unit has a guide rail connected to the rail bracket, and a slide rail combined with the guide rail and a drawer unit that moves in and out of the refrigerator via the rail unit; the slide rail slides against the guide rail; and the second combining hole is positioned on the guide rail.

[0030] The foregoing and/or other aspects of the present invention can be achieved by providing a refrigerator, including an inner casing forming a drawer type storage compartment and a drawer unit being received in and combined with the drawer type storage compartment, the refrigerator comprising: a pair of rail units disposed on opposing lateral sides of the drawer, each rail unit comprising a guide rail having a plurality of holes, and a slide rail fixedly connected to the drawer and slidably connected to the guide rail to move the drawer into and out of the refrigerator; and a plurality of screws corresponding to the plurality of holes, each screw being inserted through a corresponding one of the holes, each screw comprising a guide rail portion, a body portion, axially extending from a first end of the guide rail portion, having a diameter smaller than that of the guide rail portion, and being fixedly connected to the inner casing, and a head portion, axially extending from a second end of the guide rail portion opposite the first end, and having a diameter greater than that of the guide rail portion, wherein each hole has a diameter greater than that of the guide rail portion but less than that of the head portion, enabling relative movement of the inner casing with respect to the guide rail in a direction approximately perpendicular to a surface of the inner casing when the inner casing contracts due to a temperature reduction of the refrigerator.

[0031] Additional and/or aspects and advantages of the present invention will be set forth in part in the description that follows and, in part, will be apparent from the description, or may be learned by practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032] The above and/or other aspects and advantages of the present invention will become apparent and more readily appreciated from the following detailed description, taken in conjunction with the accompanying drawings, of which:

FIG. 1 is a perspective view showing a state that a drawer unit of the refrigerator according to a first embodiment of the present invention is opened;
FIG. 2 is an enlarged sectional view showing a constitution of a rail unit and a combining part of FIG. 1;
FIG. 3A is an exploded view of the combining part of FIG. 2;

FIG. 3B is a sectional view showing a location of the combining part and the rail unit under a normal temperature state;

FIG. 3C is a sectional view showing a location of the combining part and the rail unit under a low temperature state;

FIG. 4 is a sectional view illustrating the refrigerator according to a second embodiment of the present invention; and

FIG. 5 is an enlarged sectional view showing a combining state between a combining section and a rail unit of a related refrigerator.

DETAILED DESCRIPTION

[0033] Reference will now be made in detail to embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout. The embodiments are described to explain the present invention by referring to the figures.

[0034] In the description regarding the embodiment of the present invention, although a refrigerator comprising a freezing compartment and a refrigeration compartment is described as one example, the present invention may also be applicable to various kinds of refrigerators used for storing foods at a lower temperature, such as a kimchi refrigerator.

[0035] Referring to FIG. 1, the refrigerator according to an embodiment of the present invention has an inner casing 2 forming storage compartments 21, 22, 23 and 24; an outer casing (not shown) forming an appearance of the refrigerator; a main body cabinet 1 having a foam member 4 disposed between the inner casing 2 and the outer casing; drawer unit 30 opening/closing, drawer type storage compartments 23 and 24 of the storage compartments 21, 22, 23 and 24; rail units 40 provided at opposing sides of the drawer unit 30 and placed between the drawer unit and the inner casing 2, respectively; a support part 7 provided in the inner casing 2; and a combining part 50 for combining movably the rail unit 40 with the support part 7.

[0036] The main body cabinet 1 includes the inner casing 2, forming a plurality of storage compartments 21, 22, 23 and 24 and the outer casing, which is spaced apart from the inner casing 2 and forms an external appearance of the refrigerator. A space between the outer casing and the inner casing 2 is filled with the foam member 4.

[0037] The storage compartments comprise a freezing compartment 21 and a refrigerating compartment 22 partitioned horizontally by a main partition 5; and a first auxiliary storage compartment 23 and a second auxiliary storage compartment 24 partitioned vertically by an auxiliary partition 6. The freezing compartment 21 is provided for storing goods at a temperature below a freezing temperature. For example, a temperature of the freezing compartment 21 is set in the range of approximately -18° F to -25° F. The refrigerating compartment 22 is provided

for storing goods at a temperature above a freezing temperature. For example, a temperature of the refrigerating compartment 22 is set in the range of approximately 0° F to 10° F.

[0038] The first auxiliary storage compartment 23 may be provided as an auxiliary refrigerating compartment in which a refrigeration function is performed to store refrigerated foods. The second auxiliary storage compartment 24 may be provided as an auxiliary freezing compartment in which a freezing function is performed to store frozen foods. Here, the first auxiliary storage compartment 23 and the second auxiliary storage compartment 24 can be used for other purpose and, according to one embodiment, can be constituted as a single auxiliary storage compartment.

[0039] Doors are installed at the main body cabinet 1 to close/open front openings of each of the storage compartments 21, 22, 23 and 24. The door can close/open an opening of each of the storage compartments 21, 22, 23 and 24 in various manners. For example, a freezing compartment door 35 and a refrigerating compartment door 36, as shown in FIG. 1, a side of the door can be installed hingeably at the main body cabinet 1. Also, according to one embodiment, first auxiliary storage compartment door 32 and a second auxiliary storage compartment door 38 are drawer type doors that slide to close/open the respective storage compartments.

[0040] The drawer unit 30, for example, has a door plate 32 for opening/closing a front opening of the auxiliary storage compartment 23 and a container basket 30a placed between the rail units 40 to receive goods to be stored. A handle 34 may be provided at the door plate 32 for easily opening/closing the drawer unit 30. According to one embodiment, the door plate 32 and the container basket 30a are formed integrally with each other. According to another embodiment, the door plate 32 and the container basket 30a are provided to be attachable/detachable to each other.

[0041] Each rail unit 40 is provided between the inner casing 2 and the drawer unit 30 to make the drawer unit 30 slide against the inner casing 2. As shown in FIG. 1, a pair of rail units 40 are disposed and spaced apart from each other at a certain interval. Alternatively, two or more pairs of the rail units may be provided.

[0042] For example, each rail unit 40 has a guide rail 41 coupled with the support part 7 and slide rails 42 and 43, which are combined with the guide rail 41 and the drawer unit 30 and move slidably against the guide rail 41. According to one embodiment, the side rails 41, 42, and 43 are separated by rolling elements 44. The number of the slide rails 42 and 43 can be varied as necessary. For example, according to one embodiment, as shown in FIG. 2, in a case that two slide rails, that is, a first slide rail 42 and a second slide rail 43 are provided, the slide rails are drawn out through two steps. That is, when the drawer unit 30 is drawn out, the first slide rail 42 is drawn out along the guide rail 41, and then the second slide rail 43 is drawn out along the first slide rail 42. If three or

more slide rails are provided, a draw-out distance of the drawer unit 30 can be increased in proportion to the number of the slide rails. According to the embodiment of FIG. 2, slide rail 43, which is the very last to be drawn out, is coupled with a bracket 31 by a fixing member 33. It will be understood that embodiments of the present invention are not limited to successive movements of guide rails 42 and 43. In other words, guide rails 42 and 43 may move at the same time.

[0043] Referring to FIG. 2 and FIG. 3A, the support part 7 is formed at the inner casing 2 to support the rail unit 40. The support part 7 withstands the load of the rail unit 40 and the drawer unit 30 supported by the rail unit 40, and so the support section 7 prevents the load of the rail unit 40 and the drawer unit 30 from being applied to combining part 50. Accordingly, the rail unit 40 can be moved smoothly along a rail guide portion 63 to be described later.

[0044] The support part 7 can be formed in various shapes. For example, as shown in FIG. 2, the support part 7 can be formed to be depressed on the inner casing 2. Alternatively, the support part 7 can be formed to be protruded on the inner casing 2. On the other hand, it is desirable an internal shape of the support part 7 corresponds to a shape of the guide rail 41. Alternatively the combining part 50 can withstand directly the load of the rail unit 40 and the drawer unit 30 without the support part 7.

[0045] To prevent a space between the foam member 4 and the rail unit 40 from being changed when the foam member 4 is contracted at a lower temperature, the combining part 50 movably combines the rail unit 40 with the support part 7.

[0046] According to one embodiment, the combining part 50 includes a plurality of first combining holes or pockets 51 formed on the support part 7; a plurality of second combining holes 52 formed on the rail units 40 and corresponding to the first combining holes 51; and a plurality of screws 60, each being passed through the second combining hole 52 and screw-combined with the first combining hole 51. The number of the first combining holes 51 and the second combining holes 52 can be varied as necessary.

[0047] The screw 60 is divided into a body portion 61, a head portion 62, and the rail guide portion 63.

[0048] The body portion 61 is passed through the second combining hole 52 and screw-combined with the first combining hole 51. A thread is formed on an outer circumference surface of the body portion 61 to screw-combine the body portion 61 with the first combining hole 51.

[0049] The head portion 62 extends from the screw 60 at one end of the body portion 61 to prevent the guide rail 41 from being separated from the support part 7. The head portion 62 can be formed in various shapes. For example, as shown in FIG. 2, the head portion 62 can be configured with an inclined portion 62a whose diameter is progressively increased from the rail guide portion 63 toward an end thereof and an stepped portion 62b pre-

venting the guide rail 41 from being separated from the support part 7. As shown in FIG. 2, if the inclined portion 62a is formed at the head portion 62, the guide rail 41 is relatively moved in the direction opposite to a direction in which the inner casing 2 is contracted, and so the screw 60 can be moved to its normal position. Also, with the inclined portion 62a, a support strength for the guide rail 41 can be increased by increasing a contact area between the guide rail 41 and the screw 60, which enables a reduction in a thickness of the guide rail 41. Alternatively, the screw 60 can be formed with only the stepped portion 62b without the inclined portion 62a.

[0050] The rail guide portion 63 is positioned between the body portion 61 and the head portion 62 so that, when the foam member 4 is contracted, the guide rail 41 can be moved relatively in the direction opposite to a direction in which the inner casing 2 is contracted. That is, if inner casing 2 contracts, the guide rail 41 can be maintained in an absolute position. In other words, if inner casing 2 contracts, guide rail 41 doesn't move with inner casing 2. According to such a structure, although the foam member 4 is contracted, a space between the rail units 40 can be maintained constantly. According to one embodiment, the screw 60 may be formed such that an outer diameter of the rail guide portion 63 is larger than that of the body portion 61.

[0051] A length of the rail guide portion 63 can be varied depending on an amount of contraction of the foam member 4 and the inner casing 2. For example, in a case that a width of the inner casing 2 of the freezing compartment 21 is increased by 3~4mm by a contraction of the foam member 4 and inner casing 2, the screw 60 can be designed such that a length of the rail guide portion 63 is 1.5 to 2mm, which is a half of amount of contraction of the foam member 4 and inner casing 2.

[0052] A coupling member 70 (see FIG. 1) is provided to connect end portions of a pair of brackets 31 to which the rail units 40 are combined, and so a distance between the rail units 40 is maintained. The coupling member 70 can be made of any material that does not have elasticity. According to such structure, the bracket 31, to which the rail unit 40 is combined by the fixing member 33, is combined with the door plate 32 through one end thereof, and the other end of the bracket 31 is coupled with the coupling member 70, and so a distance between the rail units 40 can be maintained.

[0053] Hereinafter, an operation of the present invention will be described with reference to FIG. 3B and FIG. 3C.

[0054] First, referring to FIG. 3B, the body portion 61 of the screw 60 is passed through the second combining hole 52 formed on the guide rail 41 and combined with the first combining hole 51 formed on the support part 7. At this time, since the rail guide portion 63 has an outer diameter that is larger than that of the body portion 61, the rail guide portion 63 is passed through the second first combining hole 52, but not received in the first combining hole 51. The second combining hole 52 has a

shape corresponding to a shape of the head portion 62. In this embodiment, since the screw 60 is further provided with the rail guide portion 63 between the body portion 61 and the head portion 62, at a normal room temperature, the screw head portion 62 protrudes from a surface of the guide rail 41 as much as a length of the rail guide portion 63.

[0055] Next, referring to FIG. 3C, in a case that the a cooling operation for the storage compartments 23 and 24 begins, the foam member 4 and the inner casing 2 contract, and so a surface of the inner casing 2 is transferred from a position A (original location) to a position A'. At this time, since the guide rail 41 has a movable margin as much as a length of the rail guide portion 63, the guide rail 41 is not moved according to the contraction of the inner casing 2, but can be maintained at its original location. Accordingly, although the inner casing 2 is contracting and a space between opposite surfaces of the inner casing 2 forming the storage compartments 23 and 24 is increased when the cooling operation is performed, a space between a pair of rail units 40 is constantly maintained, so that a sliding movability of the drawer unit 30 is enhanced.

[0056] Below, a refrigerator according to a second embodiment of the present invention is described with reference to FIG. 4.

[0057] FIG. 4 is a sectional view showing the refrigerator according to the second embodiment of the present invention. As shown in FIG. 4, the refrigerator is provided with a rail bracket 17 that is provided at the inner casing 2 to support the rail unit 40; and a combining member having a stable support section combined firmly to the rail bracket 17 and a free support section movably supporting the rail unit 40 in a direction approximately perpendicular to a surface of the inner casing 2.

[0058] Unlike the support part 7 in the first embodiment, which is formed as a part of the inner casing 2 and provided to support the rail unit 40, the rail bracket 17 is provided at the inner casing 2 as a separate member to support the rail unit 40. The rail bracket 17 is made of material such as metal or the like, having a high strength and rigidity to reinforce a supporting force of the rail bracket 17 for the rail unit 40 to be supported to the inner casing 2. The rail bracket 17 is received and supported in a depression portion 2a of the inner casing 2. A surface of the inner casing 2 is concaved to form the depression portion 2a for supporting the rail bracket 17. A groove 2b is formed on the depression portion 2a of the inner casing 2 in the direction approximately perpendicular to the plate surface of the inner casing 2. A protrusion 18a to be received in the groove 2b is formed on a plate portion 18 of the rail bracket 17. According to the above structure, the rail bracket 17 is stably supported to the inner casing 2, and so the rail unit 40 can be supported by the rail bracket 17. According to another embodiment, the depression portion 2a is not formed on the inner casing 2, and so the rail bracket 17 is supported to the flat plate surface of the inner casing 2. According to another em-

bodiment, the rail bracket 17 is combined with or supported to the inner casing 2 through conventional combining means such as the screw and the like. Alternatively, According to yet another embodiment, the rail bracket 17 is supported to the inner casing 2 by foaming integrally when the foam member 4 is foamed.

[0059] A combining pin, a combining bar or other member can be used as the combining member provided for movably combining the rail unit 40 with the rail bracket 17. According to one embodiment, the screw 60 is used as the combining member. The first combining holes 51 are positioned on the rail bracket 17 and the inner casing 2, and the second combining holes 52 are provided on the rail unit 40 corresponding to the first combining holes 51, respectively. The body portion 61 of the screw 60, on which the thread is formed for combining with the first combining hole 51, act as the stable support section of the combining member, and the rail guide portion 63, extended from the body portion 61 and received in the second combining hole 52 to enable the rail unit 40 to move when the foam member 4 contracts, acts as the free support section of the combining member.

[0060] The rail bracket 17 is provided with the plate portion 18, on which the first combining holes 51 are positioned, and a wing portion 19 extended from the plate portion 18 in a direction approximately perpendicular to the surface of the inner casing 2 to support the rail unit 40. The wing portion 19 is formed to support an upper side and a lower side of the rail unit 40. According to another embodiment, the wing portion 19 is formed to support only a lower side of the rail unit 40.

[0061] Since the wing portion 19 withstands the load of the rail unit 40 and the drawer unit 30 supported by the rail unit 40, the wing portion 19 prevents the load of the rail unit 40 and the drawer unit 30 from being applied to the screw 60 and the second combining hole 52, so that the guide rail 41 can be moved smoothly along the rail guide portion 63.

[0062] In the refrigerators according to embodiments of the present invention, the rail unit 40 is firmly supported to the inner casing 2 by the support part 7 or to the rail bracket 17 in the approximately perpendicular direction in which the load of the drawer unit 30 is applied and is firmly supported to the inner casing 2 by the combining part 60 in the direction in which the drawer unit 30 slides. Also, the rail unit 40 is supported movably to the inner casing 2 by the combining part 60 in the direction approximately perpendicular to a surface of the inner casing 2.

[0063] In the refrigerator according to the present invention, as described above, although a space between opposite surfaces of the inner casing is changed by a contraction of the foam member and inner casing caused by the low temperature operation of the storage compartment, a space between the rail units can be constantly maintained, so that a sliding movability of the drawer unit can be enhanced when the operation of the storage compartment is carried out at the low temperature.

[0064] Although a few embodiments of the present in-

vention have been shown and described, the present invention is not limited to the described embodiments. Instead, it will be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined by the claims and their equivalents.

10 Claims

1. A refrigerator, including an inner casing forming a drawer type storage compartment and a drawer unit being received in and combined with the drawer type storage compartment, the refrigerator comprising:

at least a pair of rail units provided between the inner casing and the drawer unit enabling the drawer unit to slide against the inner casing; a support part positioned at the inner casing, supporting the rail unit, and preventing the rail unit from moving upward and downward; and a combining part combining the rail unit with the support part, the combining part enabling the support part to move relative to the rail unit in a direction approximately perpendicular to a surface of the inner casing.

2. The refrigerator according to claim 1, wherein:

the support part has a first combining hole positioned thereon; the rail unit has a second combining hole positioned thereon to correspond to the first combining hole; and the combining part comprises a screw passed through the second combining hole and combined with the first combining hole, the screw comprising a body portion having a thread to combine with the first combining hole, a head portion radially extended from an axial direction of the screw, and a rail guide portion formed between the body portion and the screw head portion enabling the support part to move relative to the rail unit.

3. The refrigerator according to claim 2, wherein the rail guide portion has a diameter that is larger than that of the body portion.
4. The refrigerator according to claim 3, wherein the head portion comprises an inclined portion with a diameter that progressively increases from the rail guide portion; and the second combining hole has a shape corresponding to a shape of the inclined portion.

5. The refrigerator according to claim 2, wherein the length of the rail guide portion in the axial direction of the screw is approximately 1 to 3 mm.
6. The refrigerator according to claim 2, wherein the rail unit comprises:
- a guide rail combined with the support part; and a slide rail combined with the guide rail and the drawer unit, wherein the slide rail slides against the guide rail, and the second combining hole is positioned on the guide rail.
7. The refrigerator according to claim 6, wherein the drawer unit comprises:
- brackets combined with the pair of rail units, respectively; and a coupling member connecting the brackets to maintain an interval between the rail units.
8. The refrigerator according to claim 1, wherein the support part is a depression positioned on a surface of the inner casing to receive and support the rail unit, the depression being extended in a longitudinal direction of the rail unit.
9. A refrigerator, including an inner casing forming a drawer type storage compartment, an outer casing forming an outer appearance of the drawer type storage compartment, a foam member disposed between the inner casing and the outer casing, and a drawer unit being received in and combined with the drawer type storage compartment, the refrigerator comprising:
- at least a pair of rail units provided between the inner casing and the drawer unit enabling the drawer unit to slide against the inner casing; rail brackets, provided at the inner casing and respectively supporting the rail units; and a plurality of combining members, each having a stable support section firmly connecting the rail bracket to the inner casing, and a free support section movably supporting the rail unit in a direction approximately perpendicular to a surface of the inner casing, the free support section combining the rail bracket and the rail unit.
10. The refrigerator according to claim 9, wherein the stable support section and the free support section form a single body as the combining member.
11. The refrigerator according to claim 9, wherein the stable support section and the free support section are formed independently to be combined detachably with each other to form the combining member.
12. The refrigerator according to claim 9, wherein:
- the inner casing is provided with a depression portion formed on a surface thereof; and the rail bracket is received in the depression portion.
13. The refrigerator according to claim 9, wherein:
- the rail bracket has a first combining hole; the rail unit has a second combining hole corresponding to the first combining hole; the stable support section of the combining member comprises a body portion that combines with the first combining hole; the free support section of the combining member comprises a rail guide portion extended from the body portion and being received in the second combining hole enabling the inner casing, foam member, and the rail bracket to move relative to the rail unit when the foam member and inner casing contract; the rail unit comprises a guide rail combined with the rail bracket, and a slide rail that is combined with the guide rail and the drawer unit and slides against the guide rail, the second combining hole being positioned on the guide rail.
14. The refrigerator according to claim 13, wherein the rail bracket comprises:
- a plate portion on which the first combining hole is formed; and a wing portion extended from the plate portion in the direction approximately perpendicular to the surface of the inner casing, to support the rail unit.
15. The refrigerator according to claim 14, wherein the wing portion is formed to support an upper side and a lower side of the rail unit.
16. A refrigerator, comprising:
- an inner casing; a rail unit provided in the inner casing; and a screw moveably combining the rail unit with the inner casing, the screw comprising a body portion connected firmly to the inner casing, a head portion having a diameter that is larger than that of the body portion, and a rail guide portion disposed between the body portion and the head portion and having a diameter that is larger than that of the body portion

and smaller than that of the head portion, to movably support the rail unit with respect to the inner casing.

17. The refrigerator according to claim 16, wherein: 5

the inner casing has a first combining hole;
the rail unit has a second combining hole corresponding to the first combining hole;
the body portion has a thread to combine with the first combining hole; and 10
the rail guide portion is received in the second combining hole and enables relative movement of the inner casing with respect to the rail unit in a direction approximately perpendicular to a surface of the inner casing. 15

18. The refrigerator according to claim 17, wherein:

the inner casing comprises a rail bracket to support the rail unit; and 20
the first combining hole is positioned on the rail bracket.

19. The refrigerator according to claim 18, wherein: 25

the rail unit comprises
a guide rail connected to the rail bracket, and
a slide rail combined with the guide rail and a drawer unit that moves in and out of the refrigerator via the rail unit; 30
the slide rail slides against the guide rail; and
the second combining hole is positioned on the guide rail. 35

20. A refrigerator, including an inner casing forming a drawer type storage compartment and a drawer unit being received in and combined with the drawer type storage compartment, the refrigerator comprising: 40

a pair of rail units disposed on opposing lateral sides of the drawer, each rail unit comprising
a guide rail having a plurality of holes, and
a slide rail fixedly connected to the drawer and slidably connected to the guide rail to move the drawer into and out of the refrigerator; and 45
a plurality of screws corresponding to the plurality of holes, each screw being inserted through a corresponding one of the holes, each screw comprising 50
a guide rail portion,
a body portion, axially extending from a first end of the guide rail portion, having a diameter smaller than that of the guide rail portion, and being fixedly connected to the inner casing, and 55
a head portion, axially extending from a second end of the guide rail portion opposite the first end, and having a diameter greater than that of

the guide rail portion,

wherein each hole has a diameter greater than that of the guide rail portion but less than that of the head portion, enabling relative movement of the inner casing with respect to the guide rail in a direction approximately perpendicular to a surface of the inner casing when the inner casing contracts due to a temperature reduction of the refrigerator.

FIG. 1

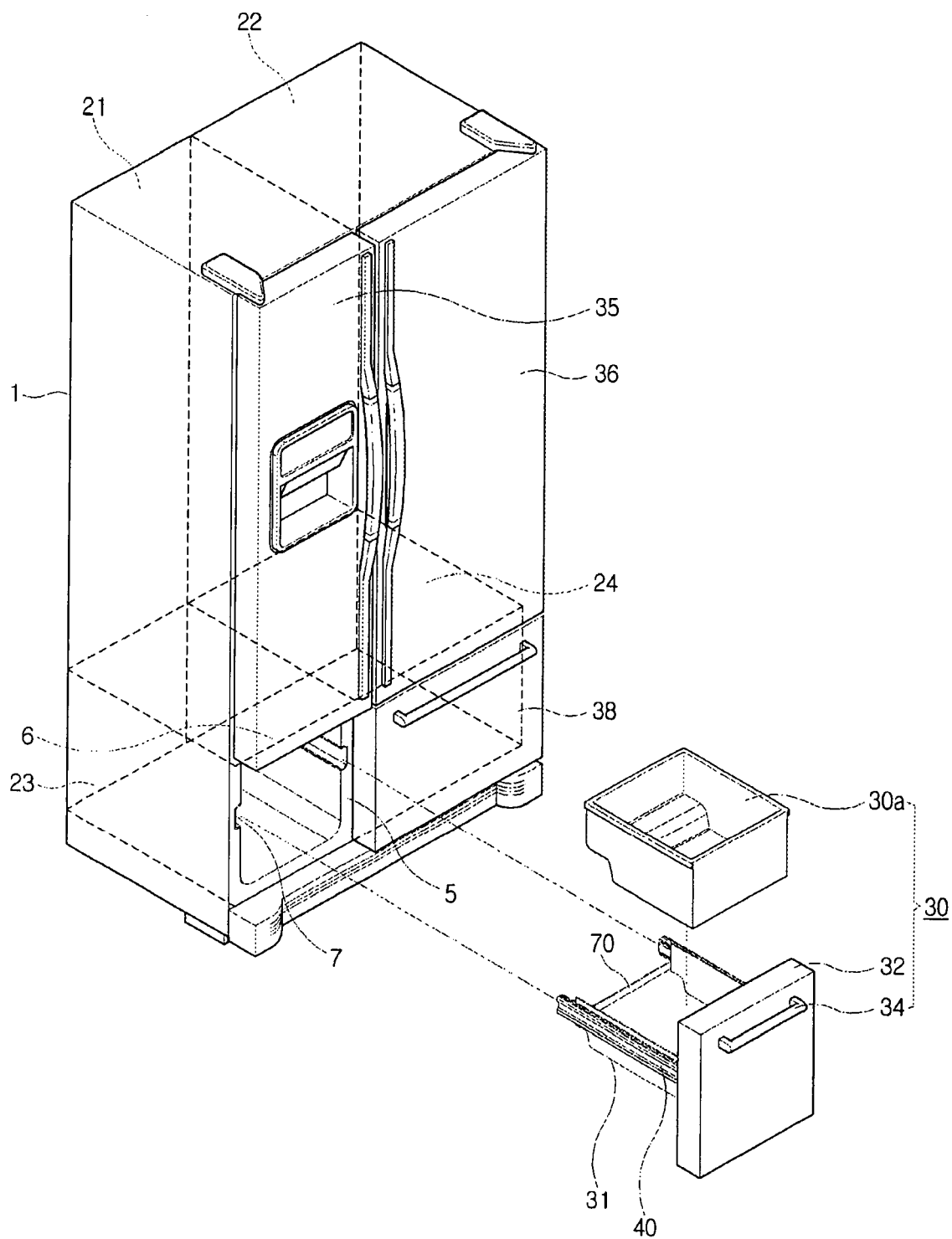


FIG. 2

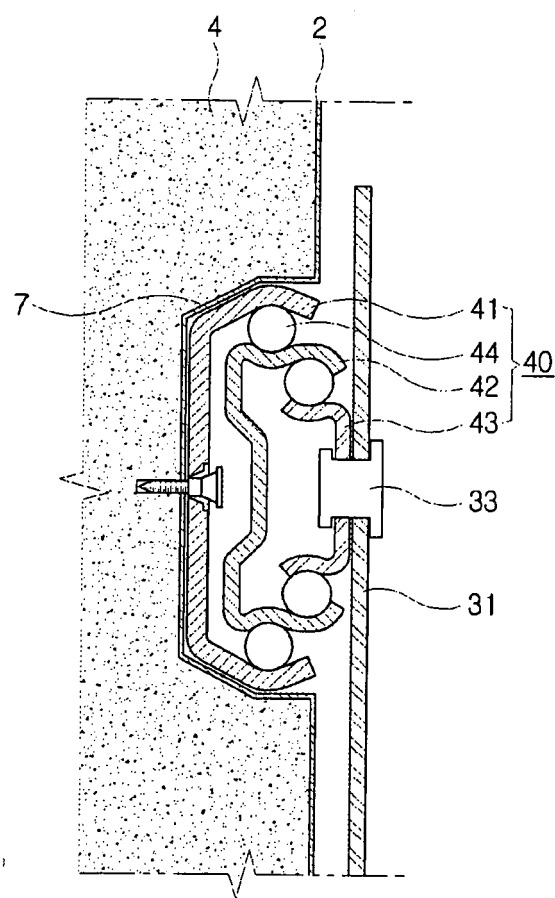


FIG. 3A

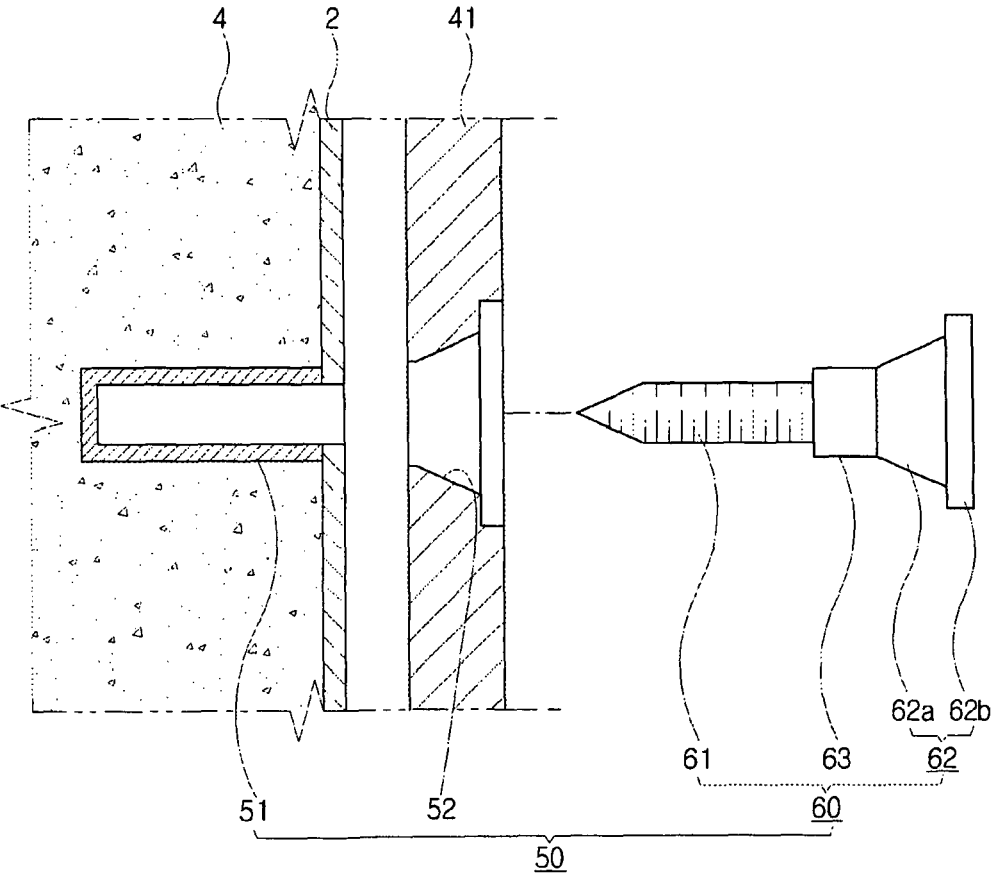


FIG. 3B

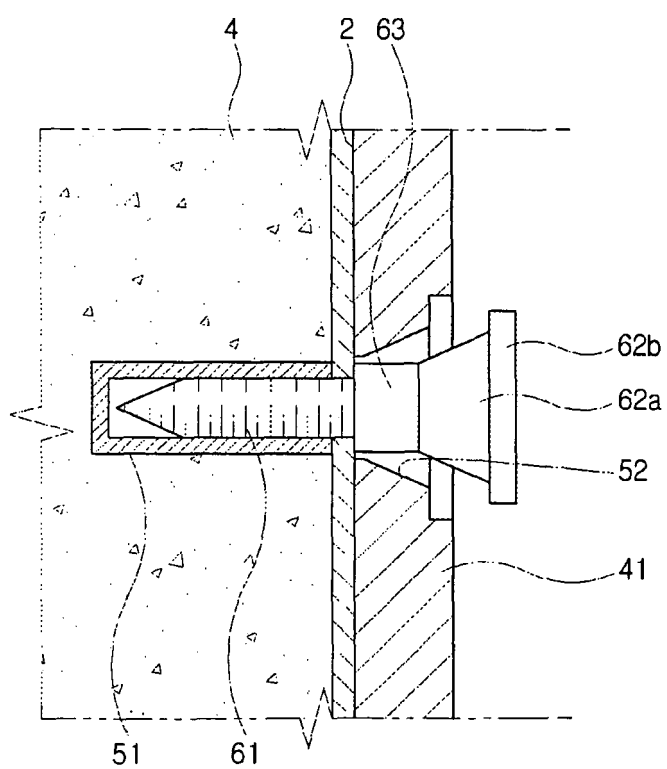


FIG. 3C

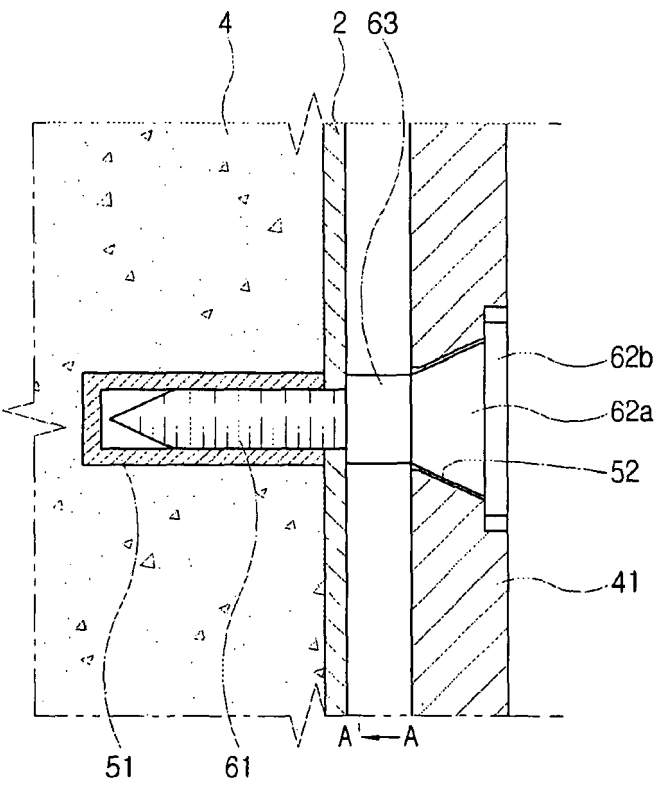


FIG. 4

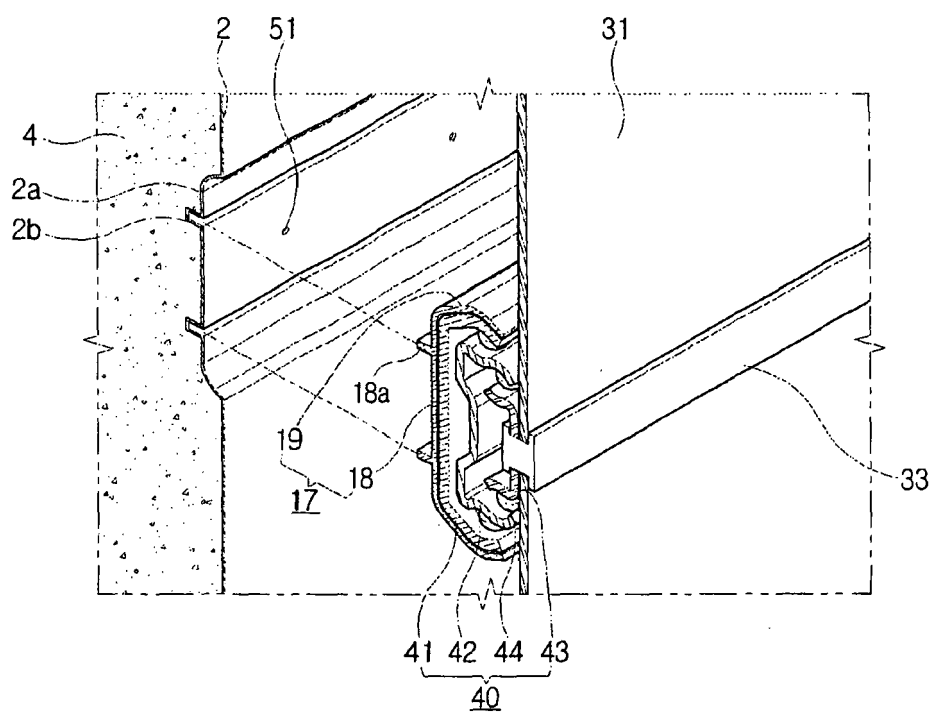
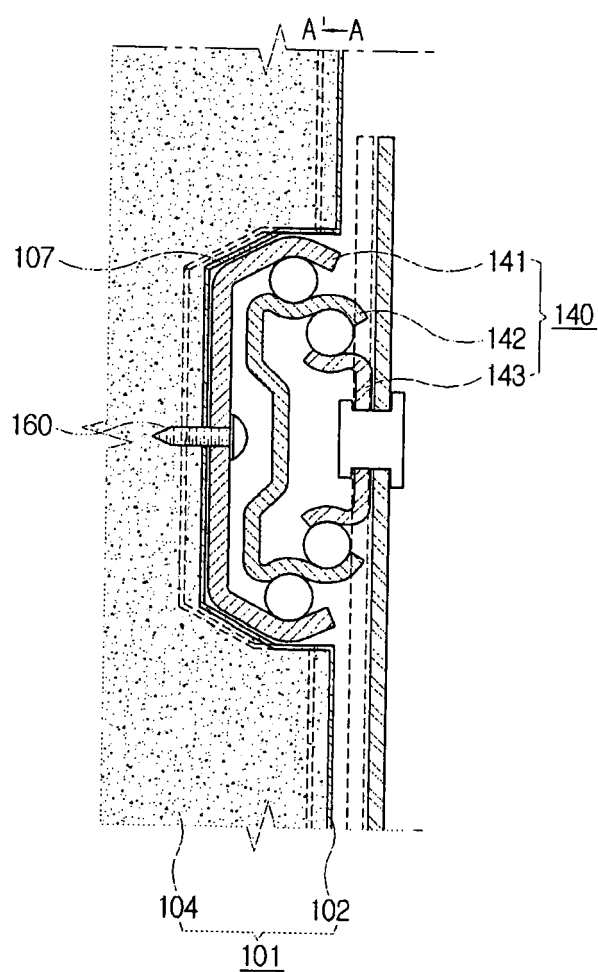


FIG. 5
(RELATED ART)



REFERENCES CITED IN THE DESCRIPTION

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