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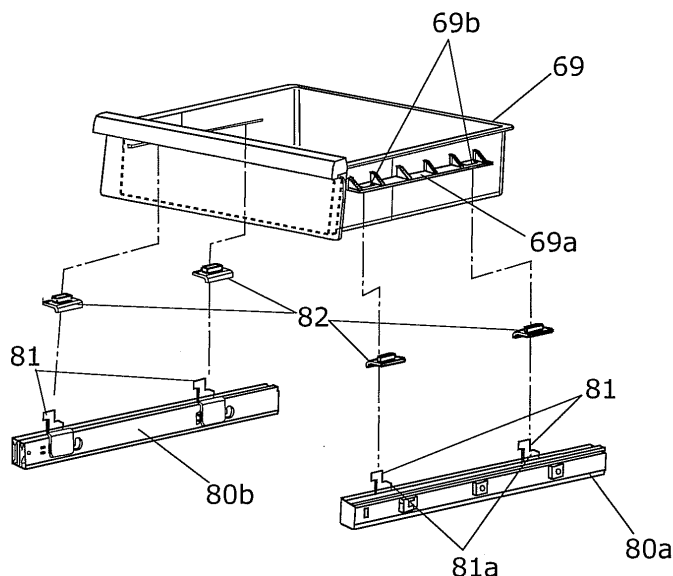
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(54) **REFRIGERATOR**

(57) A refrigerator (30) includes: a heat-insulating main body having a front opening; a container (69) having a top opening; and a rail which allows the container (69) to move back and forth. The rail includes a fixed rail (80a) and a movable rail (80b) which are slidably coupled. The fixed rail (80a) is fastened to the heat-insulating main body. The movable rail (80b) includes a locking member

(81) for locking with the container (69). The container (69) includes an engagement portion (69b) which engages with the locking member (81) of the movable rail (80b). The refrigerator (30) further includes a reinforcing member (82) provided between the locking member (81) and the engagement portion (69b) for retaining engagement between the container (69) and the movable rail (80b).

FIG. 6



Description

[Technical Field]

[0001] The present invention relates to refrigerators, and particularly to a refrigerator including a container attached onto rails so as to be movable back and forth.

[Background Art]

[0002] FIG. 9 is a longitudinal sectional view of a conventional refrigerator 1.

[0003] A container 7 included in the refrigerator 1 illustrated in FIG. 9 has an engagement portion (attachment portion) in direct engagement with a locking member (not illustrated) fixed to a metallic rail (not illustrated) provided inside of the refrigerator 1 (see Patent Literature 1 for an example).

[Citation List]

[Patent Literature]

[0004] [PTL 1] Japanese Unexamined Patent Application Publication No. 2005-195293

[Summary of Invention]

[Technical Problem]

[0005] In the above-described conventional configuration, however, the engagement portion of the container 7 is likely to have a crack due to contacting with the locking member when the container 7 is moved back and forth, and may even drop off due to a load of items in the container 7.

[0006] The present invention, conceived to address the problem, has an object of providing a refrigerator which includes a container having a cracking-proof attachment portion for attaching the container onto a rail.

[Solution to Problem]

[0007] In order to solve the problem, provided is a refrigerator according to an aspect of the present invention including: a heat-insulating main body including an inner case, an outer case, and a foam insulating material filling a space between the inner case and the outer case, the heat-insulating main body having a front opening; a container having a top opening; and a rail which allows the container to move back and forth with respect to the inner case. The rail includes a fixed rail and a movable rail which are slidably coupled. The fixed rail is fastened to the inner case of the heat-insulating main body. The movable rail includes a locking member for locking with the container. The container includes an engagement portion which engages with the locking member of the movable rail. The refrigerator further includes a reinforcing

member provided between the locking member and the engagement portion for retaining engagement between the container and the movable rail.

[0008] With this, the engagement portion of the container and the locking member of the movable rail are engaged with each other via the reinforcing member, so that strength of the engagement portion can be secured.

[Advantageous Effects of Invention]

[0009] The refrigerator according to the present invention has a reinforcing member interposed between a container and a rail, so that a refrigerator in which engagement portions having increased supporting force can be provided.

[Brief Description of Drawings]

[0010]

[FIG. 1] FIG. 1 is a longitudinal sectional view of a refrigerator according to Embodiment 1 of the present invention.

[FIG. 2] FIG. 2 is a frontal view of a main body of the refrigerator according to Embodiment 1 of the present invention.

[FIG. 3] FIG. 3 is a schematic view of an air flow path in Embodiment 1 of the present invention.

[FIG. 4] FIG. 4 is an oblique perspective view of the main body of the refrigerator according to Embodiment 1 of the present invention.

[FIG. 5] FIG. 5 is an oblique perspective view of a container and rails of the refrigerator according to Embodiment 1 of the present invention.

[FIG. 6] FIG. 6 is an exploded oblique perspective view of the container and rails shown in FIG. 5.

[FIG. 7A] FIG. 7A schematically shows a principal mechanism in Embodiment 1 of the present invention.

[FIG. 7B] FIG. 7B schematically shows the principal mechanism in Embodiment 1 of the present invention.

[FIG. 8] FIG. 8 is an oblique perspective view of the principal mechanism in Embodiment 1 of the present invention.

[FIG. 9] FIG. 9 is a longitudinal sectional view of a conventional refrigerator.

[Description of Embodiments]

[0011] A refrigerator according to an aspect of the present invention includes: a heat-insulating main body including an inner case, an outer case, and a foam insulating material filling a space between the inner case and the outer case, the heat-insulating main body having a front opening; a container having a top opening; and a rail which allows the container to move back and forth with respect to the inner case. The rail includes a fixed

rail and a movable rail which are slidably coupled. The fixed rail is fastened to the inner case of the heat-insulating main body. The movable rail includes a locking member for locking with the container. The container includes an engagement portion which engages with the locking member of the movable rail. The refrigerator further includes a reinforcing member provided between the locking member and the engagement portion for retaining engagement between the container and the movable rail. With this, the engagement portion has an increased strength, so that breakage of the engagement portion can be prevented.

[0012] The locking member may be made of metal. The engagement portion may be made of plastic. The reinforcing member may be made of plastic which is softer than the engagement portion. This prevents the engagement portion of the container from being cracked by the locking member made of metal.

[0013] Furthermore, the engagement portion may be formed integrally with a lateral part of the container and include a holed portion having an opening vertically penetrating through the engagement portion. The locking member may have a protrudent shape to protrude upward beyond the movable rail. The reinforcing member may be positioned where the locking member and the holed portion are expected to come into direct contact with each other when the locking member is directly inserted in the holed portion from underneath, and the reinforcing member thereby may be in direct contact with the locking member. Since the reinforcing member is in direct contact with the locking member, the engagement portion is prevented from being damaged such as being cracked.

[0014] Furthermore, at least two portions of a front portion and a rear portion of the movable rail each may have the locking member. The locking member may include a riser portion extending upward and a projection portion projecting from the riser portion either forward or backward. The projection portion may be locked on an upper end of the holed portion in the engagement portion. With this, the engagement portion can be disengaged from the locking member by shifting the engagement portion back and forth with respect to the locking member.

[0015] An embodiment of the present invention shall be described below using the drawings. It is to be noted that the present invention is not limited to the embodiment.

[Embodiment 1]

[0016] FIG. 1 is a longitudinal sectional view of a refrigerator according to Embodiment 1 of the present invention. FIG. 2 is a frontal view of a main body of the refrigerator according to Embodiment 1 of the present invention. FIG. 3 is a schematic view of an air flow path in Embodiment 1 of the present invention. FIG. 4 is an oblique perspective view of the main body of the refrigerator according to Embodiment 1 of the present inven-

tion. FIG. 5 is an oblique perspective view of a container and rails. FIG. 6 is an exploded oblique perspective view of the container and rails shown in FIG. 5. FIG. 7A and FIG. 7B schematically show a principal mechanism in Embodiment 1 of the present invention. FIG. 8 is an oblique perspective view of the principal mechanism in Embodiment 1 of the present invention.

[0017] Referring to FIG. 1, a heat-insulating main body 31 of a refrigerator 30 includes an outer case 32 mainly made of a steel sheet and an inner case 33 molded of a plastic, such as acrylonitrile butadiene styrene (ABS). The space between the outer case 32 and the inner case 33 is filled with a foam insulating material, such as solid urethane foam, for thermal insulation from ambient temperature. The space inside the inner case 33 is segmented into storage compartments. FIG. 1 shows an exemplary configuration of the storage compartments: a refrigerator compartment 35 at the top; a convertible compartment 36 below the refrigerator compartment 35; and a freezer compartment 37 at the bottom.

[0018] The refrigerator compartment 35 has a front opening at which a refrigerator compartment door 38 is provided. The convertible compartment 36 has a front opening at which a convertible compartment door 39 is provided. The freezer compartment 37 has a front opening at which a freezer compartment door 40 is provided. The doors are attached thereto so as to be opened and closed individually.

[0019] The refrigerator compartment 35 is set at a non-freezing temperature even at the lowest, generally within a range from 1°C to 5°C. The convertible compartment 36 can be set at a temperature switchably between freezing temperatures and refrigeration temperatures within a range from -18°C to 4°C by a degree. The freezer compartment 37 is generally set at a freezing temperature ranging from -22°C to -15°C, and optionally at a lower temperature, for example, a temperature ranging from -30°C to -25°C for a better preservation state of items in a frozen condition.

[0020] The convertible compartment 36 and the freezer compartment 37 are vertically partitioned by a first partition 41. The refrigerator compartment 35 and the convertible compartment 36 are vertically partitioned by a second partition 42.

[0021] A cooling chamber 43 where cool air is generated is provided behind the freezer compartment 37. A cooler 44 is provided inside the cooling chamber 43. The cooling chamber 43 is separated from the freezer compartment 37 by a cover coil 45 which also provides thermal insulation therebetween. A fan is provided above the cooler 44. The fan 46 forcibly causes a flow of cool air generated by the cooler 44. In addition, a defrost heater 47 is provided below the cooler 44. The defrost heater removes frost and ice from the cooler 44.

[0022] Specifically, the defrost heater 47 is a glass tube heater. In particular, when a refrigerant used is hydrocarbon refrigerant gas, a double glass tube heater including double-layered glass tubes is used as the defrost

heater 47 for explosion prevention. The cover coil 45 includes, for example, a plastic decorative plate (not illustrated in the drawings) and a heat insulating member (not illustrated in the drawings) which supports the fan 46 and forms a path for cool air. The heat insulating member is made of a heat insulating material such as polystyrene foam.

[0023] In addition, a duct system 49 is provided behind the convertible compartment 36. The duct system includes an air supply duct 48 through which cool air is supplied to the refrigerator compartment 35 and the convertible compartment 36. The air supply duct 48 includes a refrigerator compartment air supply duct 48a and a convertible compartment air supply duct 48b arranged side by side and extending vertically in the duct system 49. Cool air is supplied to the refrigerator compartment 35 through the refrigerator compartment air supply duct 48a and to the convertible compartment 36 through the convertible compartment air supply duct 48b. The duct system 49 includes a damper device in a buried condition. The damper device 50 is a device for adjusting the rate of air flow to the refrigerator compartment 35 and the convertible compartment 36 by individually controlling the flow rate of cool air flowing through the refrigerator compartment air supply duct 48a and the flow rate of cool air flowing through the convertible compartment air supply duct 48b.

[0024] Flowing through the refrigerator compartment air supply duct 48a and discharged into the refrigerator compartment 35, cool air enters a refrigerator compartment outlet 35b provided in a lower portion of a back face of the refrigerator compartment 35 to return to the cooler 44 through a refrigerator compartment air return duct 51a. Flowing through the convertible compartment air supply duct 48b and discharged into the convertible compartment 36, cool air enters a convertible compartment outlet 36c provided in a back face of the convertible compartment 36 and located in a lower portion of the duct system 49 to return to the cooler 44 through a convertible compartment air return duct 51b.

[0025] Inside the convertible compartment 36, an upper container 69 and a lower container 70 are arranged vertically in two tiers. The upper container 69 and the lower container 70 each have a top opening, and are movable back and forth. An upper inlet 36a from which cool air is discharged into the convertible compartment 36 is provided above the top opening of the upper container 69. On the other hand, a lower inlet 36b from which cool air is discharged into the convertible compartment 36 is provided above the open top of the lower container 70 and below a bottom face of the upper container 69.

[0026] The following will describe a drawer structure of the upper container 69 and the lower container 70 in the convertible compartment 36.

[0027] As illustrated in FIG. 1, the upper container 69 and the lower container 70 are housed in the convertible compartment 36 in two tiers. The refrigerator compartment door 38, convertible compartment door 39, and

freezer compartment door 40 are not illustrated in FIG. 4. Referring to FIG. 4, the upper container 69 and the lower container 70 are both pulled open.

[0028] Each of the upper container 69 and the lower container 70 is coupled with the convertible compartment 36 by means of rails 80 so as to be movable back and forth with respect to the inner case 33.

[0029] Each of the rails 80 includes a fixed rail 80a, a movable rail 80b, and a plurality of bearings (not illustrated in the drawings) provided between the fixed rail 80a and the movable rail 80b.

[0030] First, the fixed rails 80a, the movable rails 80b, and the bearings are assembled into the rails 80 such that the fixed rail 80a and the movable rail 80b of each of the rails 80 are slidable along each other. Then, the upper container 69 is coupled with the convertible compartment 36 so as to be movable back and forth with respect to the inner case 33, by fastening the fixed rails 80a to lateral walls of the inner case 33 facing the storage compartment (convertible compartment 36), and fastening the movable rails 80b to the upper container 69.

[0031] In the same way as the upper container 69, the lower container 70 is also coupled with the convertible compartment 36 by means of rails 80 so as to be movable back and forth with respect to the inner case 33. Accordingly, in the one convertible compartment 36, two sets of the rails 80, that is, an upper set and a lower set are provided on the lateral walls facing the convertible compartment 36, and the upper container 69 and the lower container 70 are movable back and forth independently from each other.

[0032] Since the bearings are already provided between the fixed rail 80a and movable rail 80b assembled together, a clearance between the fixed rail 80a and the movable rail 80b can be minimized.

[0033] Furthermore, the rails 80 fastened to the lateral walls of the inner case 33 facing the convertible compartment 36 are laterally symmetrical and provided on both sides of the inner case 33 so that the rails 80 has higher slidability for a back-and-forth motion of the upper container 69.

[0034] After the rails 80 are fastened to the inner case 33, the upper container 69 is engaged with locking members 81 fastened to the movable rails 80b with hooks or screws or fixed by, for example, welding so that the upper container 69 can move together with the movable rail 80b. Furthermore, when the upper container 69 is fully open (pulled out all the way), the upper container 69 is detachable by lifting it from the inner case 33.

[0035] Specifically, the upper container 69 has flange parts 69a on its outer lateral walls. The flange parts 69a protrude outward from the outer lateral walls and extend along the front-back direction of the upper container 69. Each of the flange parts 69a is provided with flange reinforcement ribs 69c for reinforcement of the flange parts 69a. The flange reinforcement ribs 69c are approximately perpendicular to the longitudinal direction of the flange part 69a and connect the flange parts 69a and the outer

lateral walls of the upper container 69.

[0036] Each of the flange parts 69a further has holed portions in at least two portions including a front portion and a rear portion. The holed portions 69b each has an opening having an approximately rectangular shape and vertically penetrating through the flange part 69a. The holed portions 69b serve as the engagement portions for engagement between the upper container 69 and the rails 80. More specifically, the upper container 69 and the rails 80 are engaged with each other by setting the locking members 81 provided on the movable rails 80b in the holed portions 69b of the flange parts 69a.

[0037] Furthermore, when the upper container 69 is fastened to the locking members 81, the locking members 81 are inserted from underneath into the holed portions 69b having reinforcing members 82 set in the respective holed portions 69b. In other words, the reinforcing members 82 are interposed between the holed portions 69b and the respective locking members 81.

[0038] Specifically, the fixed rails 80a and the movable rails 80b are metallic rails. The upper container 69 is a transparent plastic case, which is, more specifically, made of general-purpose polystyrene (GPPS) widely used for transparent items. The locking members 81 are also metallic parts. Peripheral portions of the respective holed portions 69b in the flange part 69a are made of the same material as the upper container 69, and therefore may be broken in a back-and-forth motion of the upper container 69 when the upper container 69 is fastened with the locking members 81 directly inserted in the holed portions 69b.

[0039] In order to prevent such direct contact of the locking members 81 with the peripheral portions of the holed portions 69b (the wall included in each of the holed portions 69b), the reinforcing members 82 made of plastic softer than the material of the holed portions 69b, such as polypropylene resin (PP resin), are interposed between the holed portions 69b and the locking members 81.

[0040] Specifically, each of the reinforcing members 82 is formed as an integrated combination of a protrusion portion 82a and a support portion 82b. The protrusion portion 82a can be set in the holed portion 69b. The support portion 82b is supported on the top face of the movable rail 80b. More specifically, the protrusion portion 82a protrudes upward beyond the top face of the support portion 82b. Furthermore, the protrusion portion 82a has an opening 82c vertically penetrating through the protrusion portion 82a. The support portion 82b has an approximately rectangular shape which is larger than the protrusion portion 82a in projected area (as viewed from above or below).

[0041] The protrusion portion 82a is set in the holed portion 69b. At this time, the top end of the protrusion portion 82a is above the top end of the holed portion 69b, and the peripheral portion of the holed portion 69b is covered with the protrusion portion 82a. Then, the locking member 81 is inserted in the opening 82c provided in the

protrusion portion 82a.

[0042] As a result, the locking member 81 inserted in the opening 82c is in direct contact not with the peripheral portion of the holed portion 69b but with the reinforcing member 82. Thus, the locking member 81, which is made of metal, is in contact with the reinforcing member 82, which is made of PP resin, so that the peripheral portion of the holed portion 69b of the upper container 69 can be prevented from being damaged in a back-and-forth motion of the upper container 69.

[0043] The locking members 81 are provided in at least two portions of each of the movable rails 80b including a free end portion (front portion) and a fixed end portion (rear portion) of the movable rail 80b so as to correspond to the holed portions 69b. Each of the locking members 81 is formed as an integrated combination of a fastening portion 81a, a riser portion 81b, and a projection portion 81c. The fastening portion 81a rises from the top face of the movable rail 80b. The riser portion 81b further rises from the fastening portion 81a and is shorter in depth (the depth refers to the longitudinal direction of the movable rail 80b, that is, the front-back direction) than the fastening portion 81a. The projection portion 81c is positioned above the riser portion 81b and projects from the riser portion 81b either forward or backward along the longitudinal direction of the movable rail 80b (forward in this example). The fastening portion 81a is configured to have a depth dimension almost identical to a longitudinal dimension of the opening 82c.

[0044] The following will describe working and functions of the refrigerator 30 in the above-described configuration.

[0045] First, movable rails 80b on the right and left sides are pulled out forward with respect to the fixed rails 80a of the rail 80 fastened to the inner case 33 so that the movable rails 80b are fully extended. Next, the upper container 69 is placed from above in a position where the upper container 69 is engaged with the metallic locking members 81 fastened to the movable rails 80b.

[0046] Each of the reinforcing members 82 is fastened to a corresponding one of the flange parts 69a of the upper container 69 with the protrusion portion 82a of the reinforcing member 82 set in the holed portion 69b in the flange part 69a from underneath. Each of the holed portions 69b has the reinforcing member 82 fastened thereto.

[0047] As the locking member 81 is inserted into the opening 82c of the reinforcing member from underneath, first the projection portion 81c of the locking member 81 passes through the opening 82c, and then the riser portion 81b reaches the opening 82c. The upper container 69 is farther lowered until the lower end of the opening 82c reaches the upper end of the fastening portion 81a. Then, the upper container 69 is farther lowered while being shifted toward the back of the refrigerator until the fastening portion 81a fits in the opening 82c. The fastening portion 81a and the opening 82c are almost identical in depth so that they interlock without backlash therebe-

tween.

[0048] In this configuration, the upper container 69 cannot be removed easily only by lifting the rear part of the upper container 69 as illustrated in FIG. 7A because the projection portions 81c of the locking members 81 in the rear part are locked on the upper end of the openings 82c (the upper ends of the holed portions 69b) of the reinforcing members 82. Similarly, the upper container 69 cannot be removed easily only by lifting the front part of the upper container 69 as illustrated in FIG. 7B because the projection portions 81c of the locking members 81 in the front part are locked on the upper end of the openings 82c (the upper ends of the holed portions 69b) of the reinforcing members 82.

[0049] It is thereby possible to prevent abrupt drop-off of the upper container 69 from the movable rails 80b.

[0050] The upper container 69 can be removed from the movable rails 80b when the upper container 69 is fully open by lifting the front and rear parts of the upper container 69 at one time (in other words, lifting the upper container 69 while keeping it horizontal) and shifting the upper container 69 in the direction of the front part when the opening 82c is at a level corresponding to the riser portion 81b, and then farther lifting the upper container 69. The upper container 69 is then ready to be cleaned.

[0051] In addition, the rail 80 and the locking member 81 made of metal provide rigidity. Furthermore, the upper container 69 made of PS plastic having high transparency provides increased visibility of items inside the upper container 69 when pulled out.

[0052] The upper container 69 is fastened to the locking members 81 with the reinforcing members 82 made of plastic softer than the material for the upper container 69 and interposed between the upper container 69 and the locking members 81, and thereby can be moved back and forth together with the movable rails 80b. This configuration prevents the upper container 69 from cracking and breaking due to contact with a metallic member. In this configuration, breakage or the like of the upper container 69 due to strength of the upper container 69 made of plastic and fastening to the rails 80 made of metal is reliably prevented.

[0053] The upper container 69 and the movable rails 80b are coupled with each other by fastening the locking members 81 to the holed portions 69b via the reinforcing members 82. Here, the upper container 69 made of transparent plastic having higher hardness and locking members 81 made of metal are fastened to each other via the reinforcing members 82 made of plastic having lower hardness, so that the transparent upper container 69 can be prevented from breaking and cracking. As a result, reliability for back-and-forth motion can be secured.

[0054] Strength of the holed portions 69b can be farther increased by providing each of the holed portions 69b between two adjacent ones of the flange reinforcement ribs 69c to reinforce the peripheral portions of the holed portions 69b.

[0055] The above description of the upper container

69 is also applicable to the lower container 70.

[0056] Although the embodiment of the present invention is described with reference to the drawings, the present invention is not limited to the embodiment shown in the drawings. Various modifications and variations of the embodiments shown in the drawings are covered by the scope of the present invention as long as they are the same as or equivalent to the present invention.

[Industrial Applicability]

[0057] The present invention is applicable to a home-use refrigerator and a commercial-use refrigerator.

[Reference Signs List]

[0058]

- 1, 30 Refrigerator
- 7 Container
- 31 Heat-insulating main body
- 32 Outer case
- 33 Inner case
- 34 Foam heat-insulating material
- 35 Refrigerator compartment
- 35b Refrigerator compartment outlet
- 36 Convertible compartment
- 36a Upper outlet
- 36b Lower outlet
- 36c Convertible compartment outlet
- 37 Freezer compartment
- 38 Refrigerator compartment door
- 39 Convertible compartment door
- 40 Freezer compartment door
- 41 First partition
- 42 Second partition
- 43 Cooling chamber
- 44 Cooler
- 45 Cover coil
- 46 Fan
- 47 Defrost heater
- 48 Air supply duct
- 48a Refrigerator compartment air supply duct
- 48b Convertible compartment air supply duct
- 49 Duct system
- 50 Damper device
- 51a Refrigerator compartment air return duct
- 51b Convertible compartment air return duct
- 69 Upper container
- 69a Flange part
- 69b Holed portion
- 69c Flange reinforcement rib
- 70 Lower container
- 80 Rail
- 80a Fixed rail
- 80b Movable rail
- 81 Locking member

81a Fastening portion
 81b Riser portion
 81c Projection portion
 82 Reinforcing member
 82a Protrusion portion
 82b Support portion
 82c Opening

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a rear portion of the movable rail each has the locking member,
 the locking member includes a riser portion extending upward and a projection portion projecting from the riser portion either forward or backward, and the projection portion is locked on an upper end of the holed portion in the engagement portion.

Claims

10 Amended claims under Art. 19.1 PCT

1. A refrigerator comprising:

a heat-insulating main body including an inner case, an outer case, and a foam insulating material filling a space between the inner case and the outer case, the heat-insulating main body having a front opening;
 a container having a top opening; and
 a rail which allows the container to move back and forth with respect to the inner case, wherein the rail includes a fixed rail and a movable rail which are slidably coupled, the fixed rail is fastened to the inner case of the heat-insulating main body,
 the movable rail includes a locking member for locking with the container,
 the container includes an engagement portion which engages with the locking member of the movable rail, and
 the refrigerator further comprises a reinforcing member provided between the locking member and the engagement portion for retaining engagement between the container and the movable rail.

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2. The refrigerator according to Claim 1, wherein the locking member is made of metal, the engagement portion is made of plastic, and the reinforcing member is made of plastic which is softer than the engagement portion.

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3. The refrigerator according to Claim 1 or Claim 2, wherein the engagement portion is formed integrally with a lateral part of the container and includes a holed portion having an opening vertically penetrating through the engagement portion, the locking member has a protrudent shape to protrude upward beyond the movable rail, and the reinforcing member is positioned where the locking member and the holed portion are expected to come into direct contact with each other when the locking member is directly inserted in the holed portion from underneath, and the reinforcing member is thereby in direct contact with the locking member.

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4. The refrigerator according to any one of Claims 1 to 3, wherein at least two portions of a front portion and

1. Currently amended) A refrigerator comprising:

a heat-insulating main body including an inner case, an outer case, and a foam insulating material filling a space between the inner case and the outer case, the heat-insulating main body having a front opening;
 a container having a top opening; and
 a rail which allows the container to move back and forth with respect to the inner case, wherein the rail includes a fixed rail and a movable rail which are slidably coupled, the fixed rail is fastened to the inner case of the heat-insulating main body,
 the movable rail includes a locking member for locking with the container,
 the container includes an engagement portion which engages with the locking member of the movable rail,
 the engagement portion is a holed portion having an opening vertically penetrating through the engagement portion, and
 the refrigerator further comprises a reinforcing member provided between the locking member and the engagement portion for retaining engagement between the container and the movable rail.

2. The refrigerator according to Claim 1, wherein the locking member is made of metal, the engagement portion is made of plastic, and the reinforcing member is made of plastic which is softer than the engagement portion.

3. Currently amended) The refrigerator according to Claim 1 or Claim 2, wherein the engagement portion is formed integrally with a lateral part of the container the locking member has a protrudent shape to protrude upward beyond the movable rail, and the reinforcing member is positioned where the locking member and the holed portion are expected to come into direct contact with each other when the locking member is directly inserted in the holed portion from underneath, and the reinforcing member is thereby in direct contact with the locking member.

4. The refrigerator according to any one of Claims 1 to 3, wherein at least two portions of a front portion and a rear portion of the movable rail each has the locking member,
the locking member includes a riser portion extending upward and a projection portion projecting from the riser portion either forward or backward, and the projection portion is locked on an upper end of the holed portion in the engagement portion.

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FIG. 1

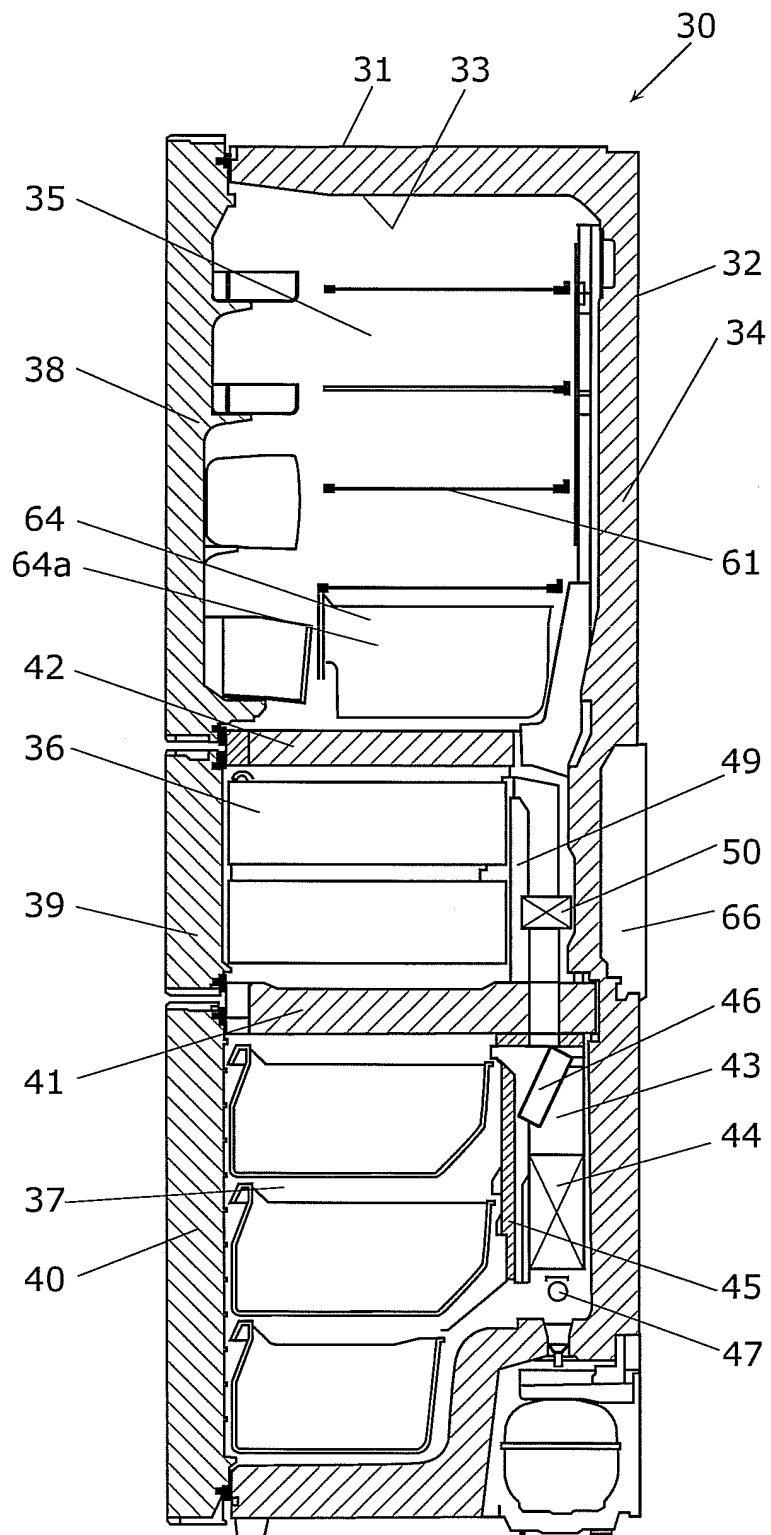


FIG. 2

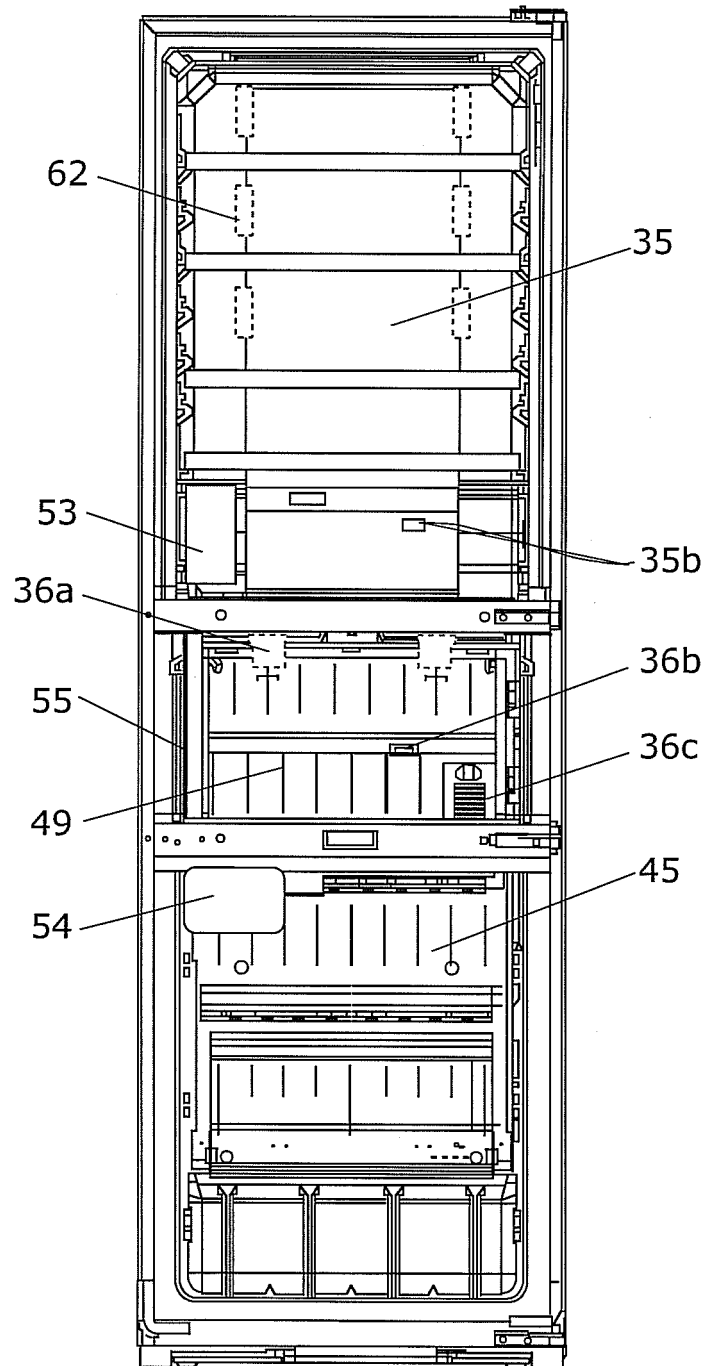


FIG. 3

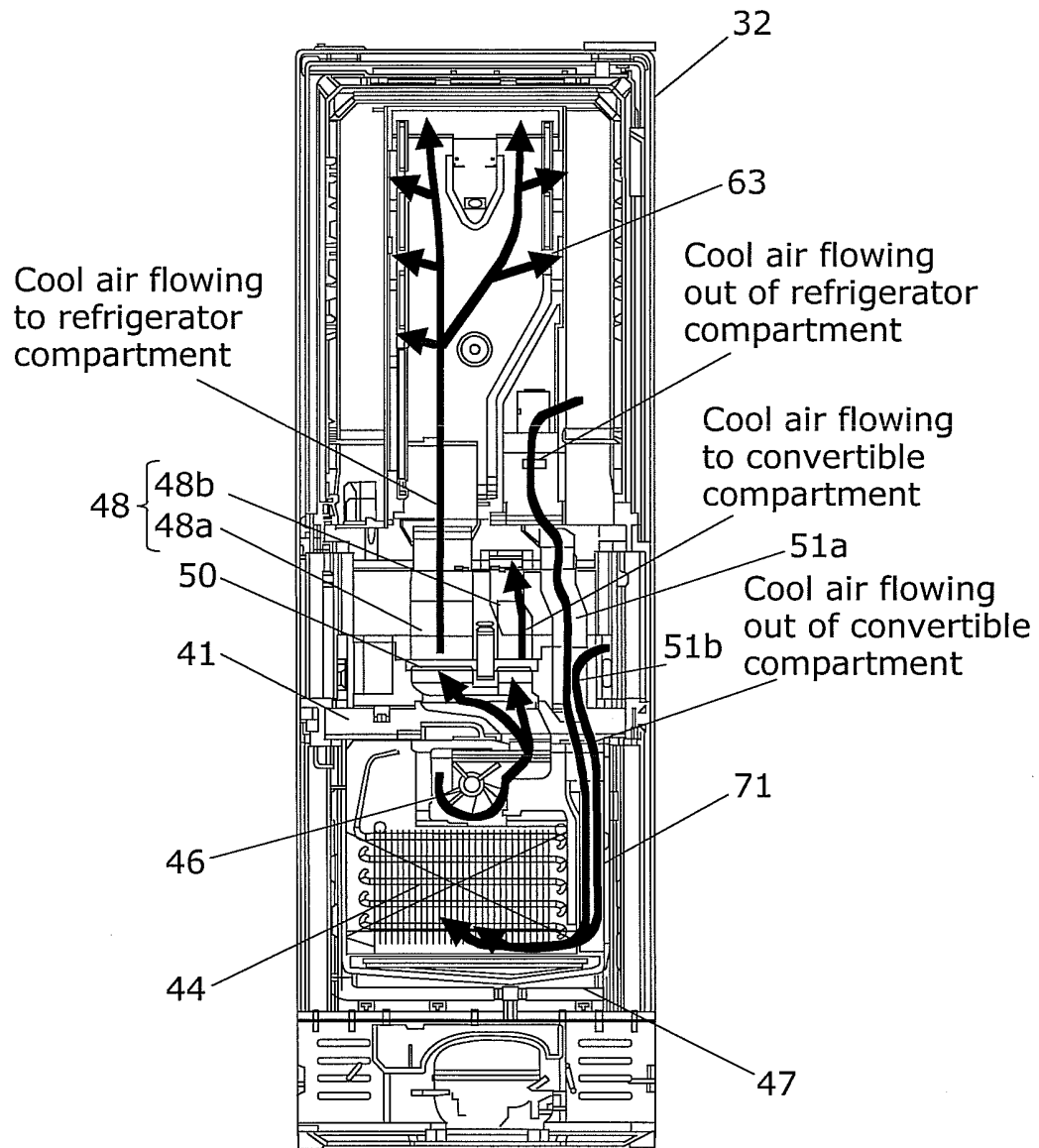


FIG. 4

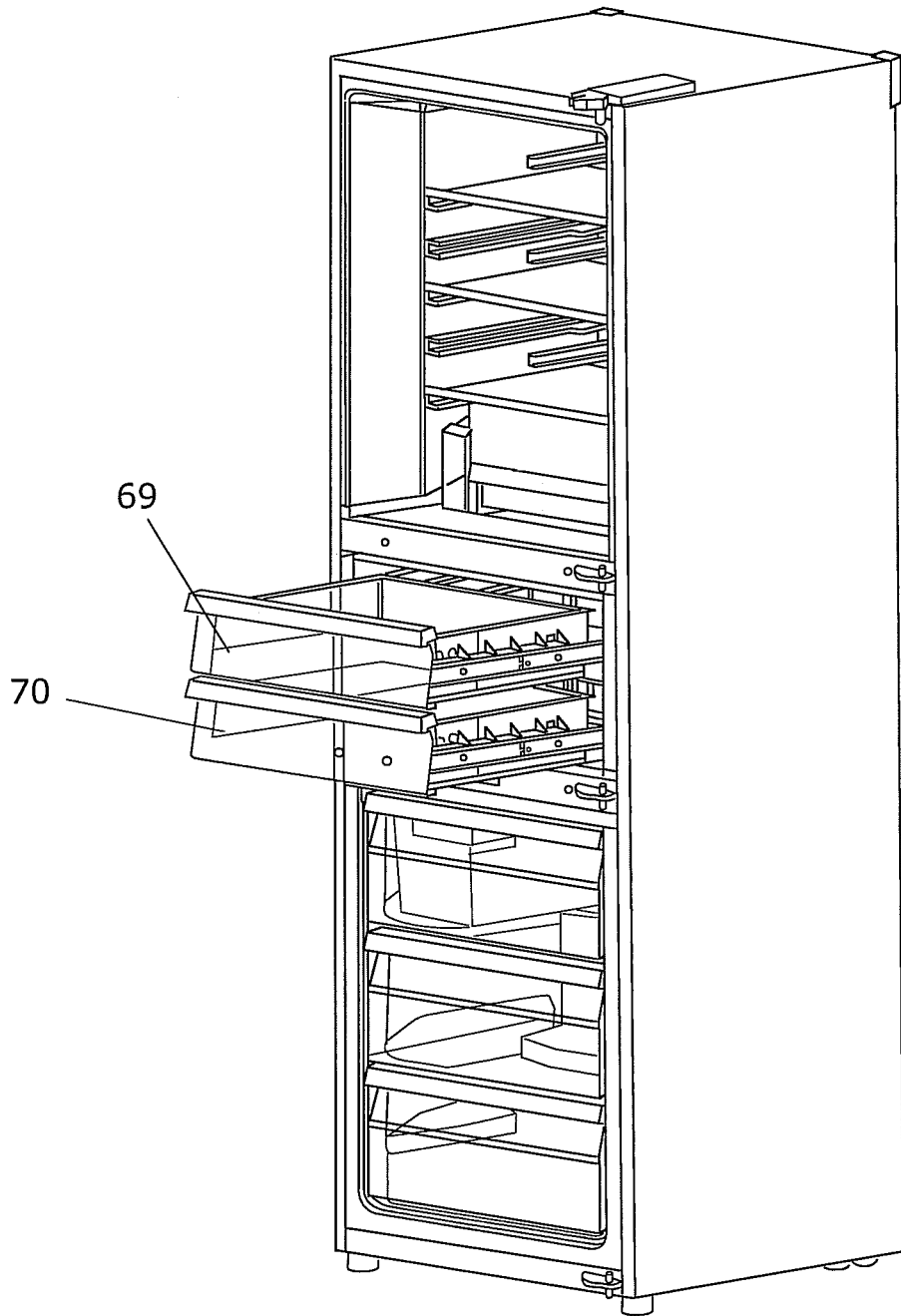


FIG. 5

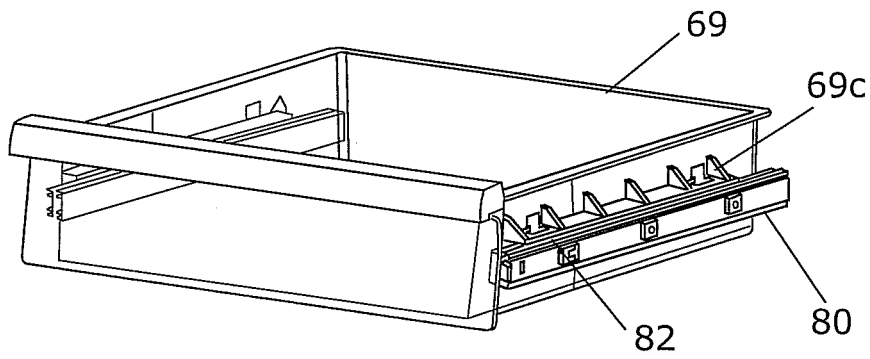


FIG. 6

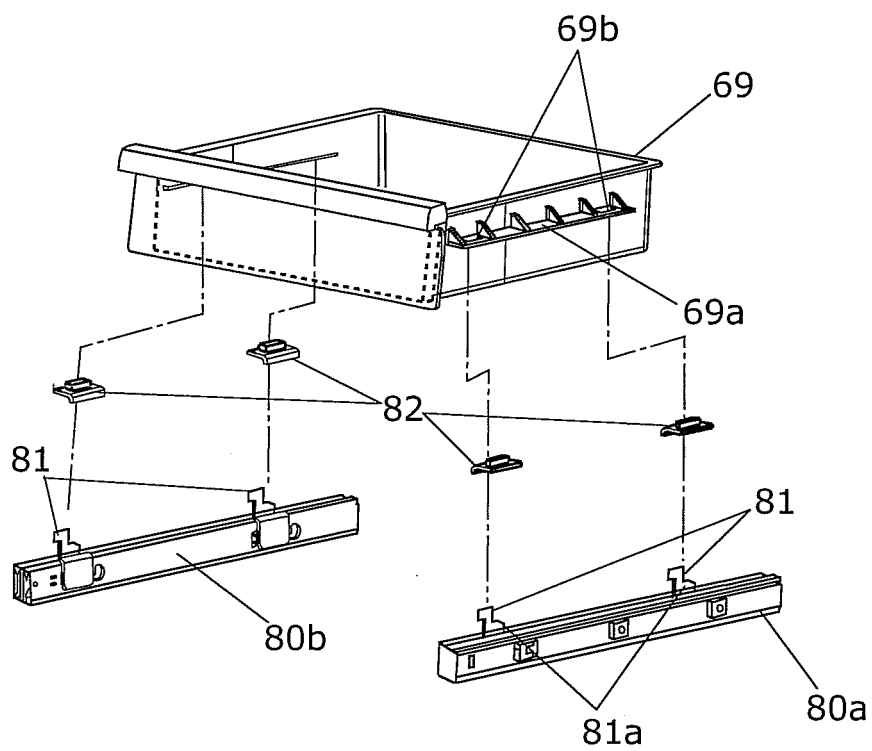


FIG. 7A

Lift rear part of container

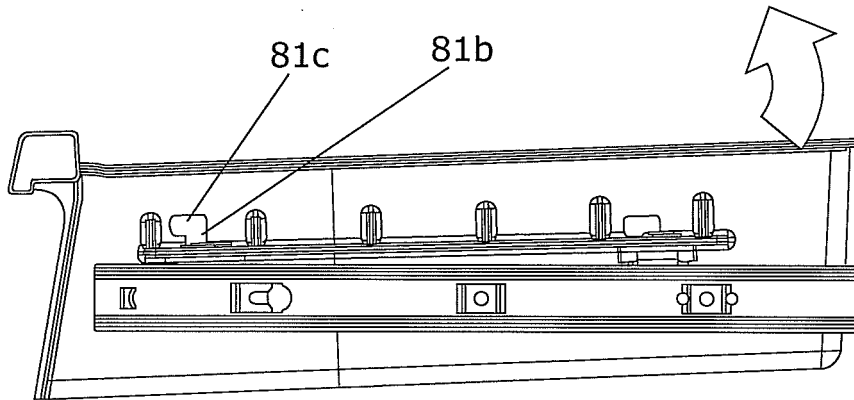


FIG. 7B

Lift front part of container

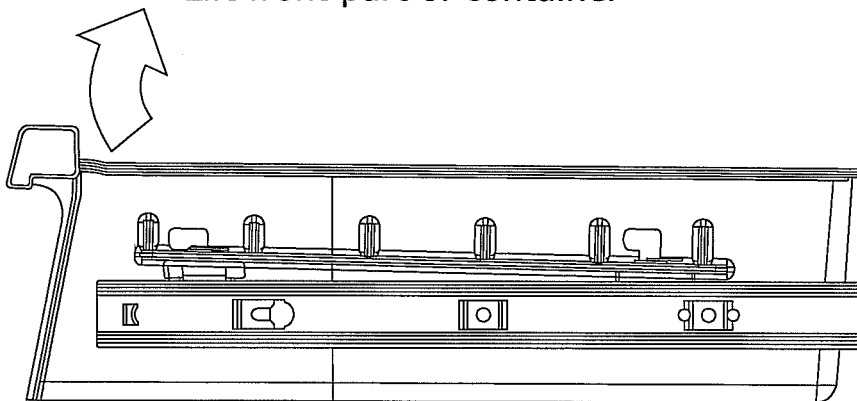


FIG. 8

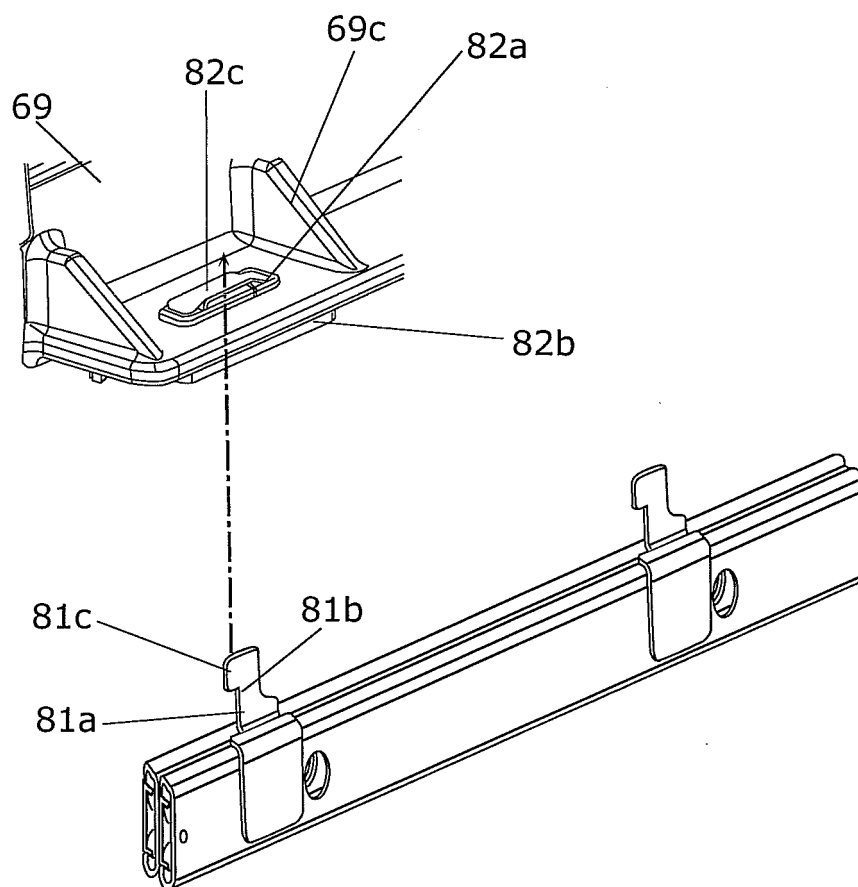
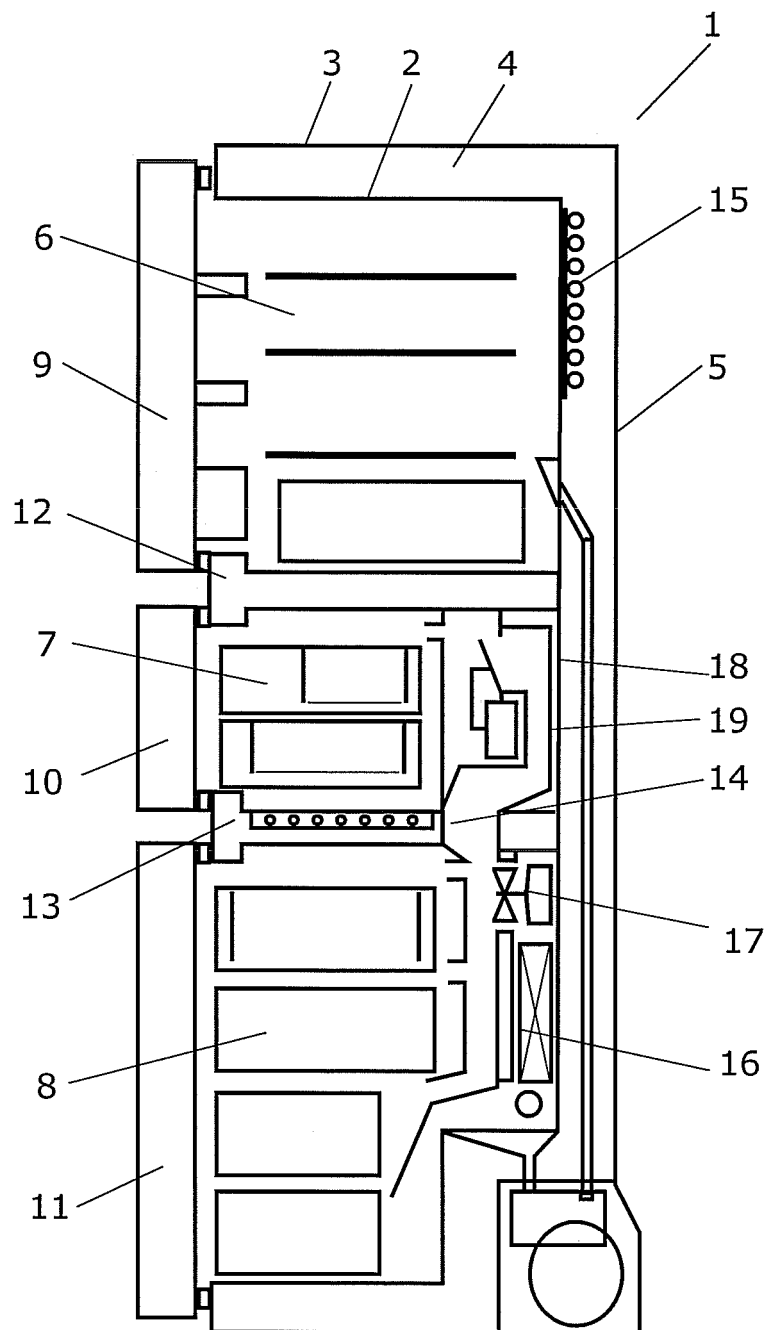


FIG. 9



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2011/004273

A. CLASSIFICATION OF SUBJECT MATTER <i>F25D25/00 (2006.01) i, F25D23/02 (2006.01) i</i>		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) <i>F25D25/00, F25D23/02</i>		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched <i>Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2011</i> <i>Kokai Jitsuyo Shinan Koho 1971-2011 Toroku Jitsuyo Shinan Koho 1994-2011</i>		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2008-45846 A (Toshiba Corp.),	1
Y	28 February 2008 (28.02.2008),	2
A	claims; paragraphs [0001] to [0038]; fig. 1 to 9	3, 4
Y	JP 4353315 B1 (Panasonic Corp.),	2
A	28 October 2009 (28.10.2009),	3, 4
	claims; paragraphs [0001] to [0134]; fig. 1 to 12	
A	JP 2005-195293 A (Matsushita Electric Industrial Co., Ltd.),	1-4
	21 July 2005 (21.07.2005),	
	entire text; all drawings	
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 05 October, 2011 (05.10.11)		Date of mailing of the international search report 18 October, 2011 (18.10.11)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

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REFERENCES CITED IN THE DESCRIPTION

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