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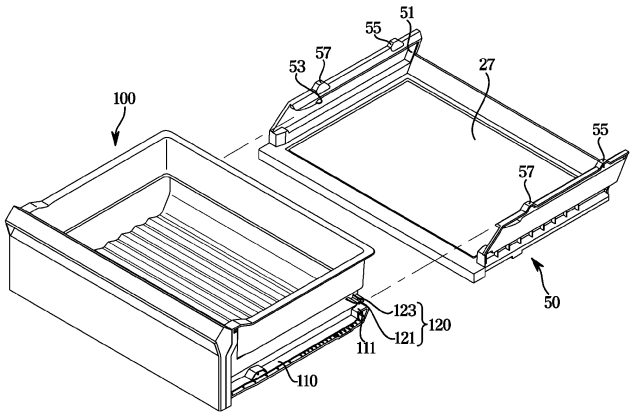
(54) **REFRIGERATOR**

(57) A refrigerator includes a main body, a storage compartment configured such that a front thereof is open inside the main body, a drawer configured to be insertable and withdrawable within the storage compartment, and a guide rail configured to guide the insertion and withdrawal of the drawer and including a catch portion configured to limit an insertion and withdrawal range of the drawer, wherein the drawer includes a stopper formed on both side walls of the drawer and caught by the catch portion to limit the insertion and withdrawal range of the drawer, and a rib formed to be elastic on at least one of both sides of the drawer and configured to dampen the drawer by contacting a plurality of protrusions formed on the guide rail before the stopper contacts the catch portion.

FIG. 4

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## Description

[Technical Field]

**[0001]** The disclosure relates to an improved refrigerator in which a drawer is dampened during insertion and withdrawal of the drawer before its movement is restricted by a stopper, which is perceived by a user.

[Background Art]

**[0002]** In general, a refrigerator, an appliance for keeping food fresh, includes a main body having a storage compartment and a cold air supply system for supplying cold air to the storage compartment. The storage compartment includes a refrigerating compartment in which the food is kept refrigerated at a temperature of about 0°C to 5°C, and a freezing compartment in which the food is kept frozen at a temperature of about 0°C to -30°C.

**[0003]** The refrigerating and freezing compartments are provided with a plurality of shelves, and a drawer, which is a drawer-type door, arranged to allow the stored food to be stored in a moisture-containing state for ease of storage.

**[0004]** The drawer may be inserted into the storage compartment along guide rails formed on both side walls of the storage compartment, or may be withdrawn from the interior of the storage compartment. The drawer may include a stopper that engages a catcher of the guide rail when the drawer is fully inserted or withdrawn, thereby restricting the movement of the drawer.

[Disclosure]

[Technical Problem]

**[0005]** An aspect of the disclosure provides a refrigerator in which a damping structure is formed in a drawer such that the drawer is dampened during insertion and withdrawal of the drawer before its movement is restricted by a stopper, which is perceived by a user.

**[0006]** An aspect of the disclosure provides a refrigerator in which a damping structure provided in a drawer allows the drawer to settle correctly in its designated position during maximum insertion and withdrawal.

**[0007]** An aspect of the disclosed disclosure provides a refrigerator in which a separate damping structure is formed in a drawer in addition to a stopper, so that the drawer is prevented from twisting during insertion and withdrawal of the drawer.

**[0008]** Technical tasks to be achieved in this document are not limited to the technical tasks mentioned above, and other technical tasks not mentioned will be clearly understood by those skilled in the art from the description below.

[Technical Solution]

**[0009]** According to an embodiment of the present disclosure, a refrigerator includes a main body, a storage compartment configured such that a front thereof is open inside the main body, a drawer configured to be insertable and withdrawable within the storage compartment, and a guide rail configured to guide the insertion and withdrawal of the drawer and including a catch portion configured to limit an insertion and withdrawal range of the drawer, wherein the drawer includes a stopper formed on both side walls of the drawer and caught by the catch portion to limit the insertion and withdrawal range of the drawer, and a rib formed to be elastic on at least one of both sides of the drawer and configured to dampen the drawer by contacting a plurality of protrusions formed on the guide rail before the stopper contacts the catch portion.

**[0010]** The guide rail may be formed integrally with a shelf arranged on a lower portion of the drawer, and the plurality of protrusions may be formed such that, in response to the drawer being inserted and withdrawn, the plurality of protrusions contact the rib to cause the rib to be elastically deformed, thereby allowing the drawer to be movable.

**[0011]** The guide rail may be formed integrally with both side walls of the storage compartment, and the plurality of protrusions are formed such that, in response to the drawer being inserted and withdrawn, the plurality of protrusions contact the rib to cause the rib to be elastically deformed, thereby allowing the drawer to be movable.

**[0012]** The rib may be formed on a rear side of both side walls of the drawer, and comprises a damping portion formed in a grooved shape that is recessed downwardly, and a reinforcing rib formed to protrude upwardly from a center of the damping portion to increase a strength of the rib.

**[0013]** The plurality of protrusions may be formed to protrude upwardly from the guide rail and to contact a lower portion of the damping portion when the drawer is moved, thereby elastically deforming the damping portion upwardly, the plurality of protrusions including a first protrusion formed at a rear with respect to the center of the guide rail and a second protrusion formed at a front with respect to the center of the guide rail.

**[0014]** The drawer may further include a guide portion formed on both side walls of the drawer to allow the drawer to be moved along the guide rail, and the stopper may be formed at a rear end of the guide portion.

**[0015]** The catch portion may include a first catch portion formed on a rear side of the guide rail and configured to allow the stopper to be caught to limit the insertion range of the drawer when the drawer is inserted, and a second catch portion formed on a front side of the guide rail and configured to allow the stopper to be caught to limit the withdrawal range of the drawer when the drawer is withdrawn.

**[0016]** In response to the drawer being withdrawn from a state of being inserted into the storage compartment,

the rib may be elastically deformed by the first protrusion, and before the stopper is caught by the second catch portion, the damping portion may be elastically deformed by the second protrusion, and then the stopper may be caught by the second catch portion, thereby completing the withdrawal.

**[0017]** In response to the drawer being inserted from a state of being withdrawn from the storage compartment, the rib may be elastically deformed by the second protrusion, and before the stopper is caught by the first catch portion, the damping portion may be elastically deformed by the first protrusion, and then the stopper may be caught by the first catch portion, thereby completing the insertion.

**[0018]** The rib may be formed on a rear side of both sides of a lower surface of the drawer, and may include a damping portion including a grooved shape that is recessed along a left-to-right direction toward the drawer and is formed by cutting a central portion, and a reinforcing rib to increase a strength of the rib.

**[0019]** The plurality of protrusions may be formed to protrude along the left-to-right direction from the guide rail toward the drawer, and configured to elastically deform the damping portion in response to movement of the drawer by being received in an inside of the damping portion and then released from, or by being received in the inside of the damping portion, the plurality of protrusions including a first protrusion formed at a rear with respect to a center of the guide rail and a second protrusion formed at a front with respect to the center of the guide rail.

**[0020]** The drawer may further include a guide portion formed on both side walls of the drawer to allow the drawer to be moved along the guide rail, and the stopper may be formed at a rear end of the guide portion.

**[0021]** The catch portion may include a first catch portion formed on a rear side of the guide rail and configured to allow the stopper to be caught to limit the insertion range of the drawer when the drawer is inserted, and a second catch portion formed on a front side of the guide rail and configured to allow the stopper to be caught to limit the withdrawal range of the drawer when the drawer is withdrawn.

**[0022]** In response to the drawer being withdrawn from a state of being inserted into the storage compartment, the rib may be elastically deformed while the first protrusion is released from a state of being received in the inside of the damping portion, and before the stopper is caught by the second catch portion, the damping portion may be elastically deformed by the second protrusion to allow the second protrusion to be received in the inside of the damping portion, and then the stopper may be caught by the second catch portion, thereby completing the withdrawal.

**[0023]** In response to the drawer being inserted from a state of being withdrawn from the storage compartment, the rib may be elastically deformed while the second protrusion is released from the state of being received in the inside of the damping portion, and before the stopper is caught by the first catch portion, the damping portion may be elastically deformed by the first protrusion to allow the first protrusion to be received in the inside of the damping portion, and then the stopper may be caught by the first catch portion, thereby completing the insertion.

[Advantageous effects]

**[0024]** According to various embodiments of the present disclosure, the user may be able to perceive when the drawer is inserted and withdrawn before movement of the drawer is restricted by the stopper, thereby improving the emotional quality of the drawer.

**[0025]** According to various embodiments of the present disclosure, the drawer may settle in the correct position during maximum insertion and withdrawal of the drawer.

**[0026]** According to various embodiments of the present disclosure the drawer may be prevented from twisting during insertion and withdrawal of the drawer.

**[0027]** The effects to be obtained from the present disclosure are not limited to those mentioned above, and other effects not mentioned will be apparent to those of skilled in the art from the following description.

[Description of Drawings]

**[0028]**

FIG. 1 is a perspective view illustrating a refrigerator according to an embodiment.

FIG. 2 is a side cross-sectional view of the refrigerator, according to an embodiment.

FIG. 3 is a perspective view illustrating a drawer and a shelf arranged below the drawer, according to an embodiment.

FIG. 4 is a perspective view illustrating the drawer and the shelf shown in FIG. 3 separated.

FIG. 5 is a side cross-sectional view illustrating the drawer fully inserted into the storage compartment, according to an embodiment.

FIG. 6 is a side cross-sectional view of the drawer partially withdrawn from the state in FIG. 5, showing the rib passing over the first protrusion.

FIG. 7 is a side cross-sectional view of the drawer further withdrawn from the state in FIG. 6, showing the rib in contact with the second protrusion.

FIG. 8 is a side cross-sectional view of the drawer fully withdrawn from the state in FIG. 7, showing the

rib passing over the second protrusion.

FIG. 9 is a perspective view illustrating a drawer inserted into the storage compartment, according to an embodiment.

FIG. 10 is a perspective view illustrating the drawer shown in FIG. 9 separated from an inner case.

FIG. 11 is a side cross-sectional view illustrating the drawer fully inserted into the storage compartment, according to an embodiment.

FIG. 12 is a side cross-sectional view of the drawer partially withdrawn from the state in FIG. 11, showing the rib passing over the first protrusion.

FIG. 13 is a side cross-sectional view of the drawer further withdrawn from the state in Fig. 12, showing the rib in contact with the second protrusion.

FIG. 14 is a side cross-sectional view of the drawer fully withdrawn from the state in FIG. 13, showing the rib passing over the second protrusion.

FIG. 15 is a perspective view illustrating a drawer and a shelf arranged below the drawer, according to an embodiment.

FIG. 16 is a perspective view illustrating the drawer and the shelf shown in FIG. 15 separated.

FIG. 17 is a perspective view illustrating the shelf shown in FIG. 16 as viewed from above.

FIG. 18 is a view illustrating the drawer fully inserted into the storage compartment, according to an embodiment.

FIG. 19 is a view of the drawer partially withdrawn from the state in FIG. 18, showing the first protrusion released from an inside of the damping portion of the rib.

FIG. 20 is a view of the drawer further withdrawn from the state in FIG. 19, showing the rib in contact with the second protrusion.

FIG. 21 is a view of the drawer fully withdrawn from the state in FIG. 20, showing the second protrusion received within the damping portion of the rib.

FIG. 22 is a view of the drawer inserted into the storage compartment, according to an embodiment.

FIG. 23 is a view illustrating the drawer shown in FIG. 22 separated from the inner case.

FIG. 24 is a view illustrating the drawer fully inserted into the storage compartment, according to an embodiment.

FIG. 25 is a view of the drawer partially withdrawn from the state in FIG. 24, showing the first protrusion released from the inside of the damping portion of the rib.

FIG. 26 is a view of the drawer further withdrawn from the state in FIG. 25, showing the rib in contact with the second protrusion.

FIG. 27 is a view of the drawer fully withdrawn from the state in FIG. 26, showing the second protrusion received within the damping portion of the rib.

FIG. 28 is a view illustrating the drawer inserted into the storage compartment, according to an embodiment.

FIG. 29 is a view illustrating the drawer and the guide rails shown in FIG. 28 separated from the inner case.

FIG. 30 is a view illustrating the drawer fully inserted into the storage compartment, according to an embodiment.

FIG. 31 is a view of the drawer partially withdrawn from the state in in FIG. 30, showing the first catch passed over the protrusion.

FIG. 32 is a view of the drawer further withdrawn from the state in FIG. 31, showing just before the second catch passing over the protrusion.

FIG. 33 is a view of the drawer fully withdrawn from the state in FIG. 32, showing the second catch passed over the protrusion.

[Modes of the Invention]

**[0029]** Various embodiments of the present document and terms used therein are not intended to limit the technical features described in this document to specific embodiments, and should be understood to include various modifications, equivalents, or substitutes of the corresponding embodiments.

**[0030]** In addition, the same reference numerals or signs shown in the drawings of the disclosure indicate elements or components performing substantially the same function.

**[0031]** Also, the terms used herein are used to describe the embodiments and are not intended to limit and/or restrict the disclosure. The singular forms "a," "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. In this disclosure, the terms "including", "having", and the like

are used to specify features, figures, steps, operations, elements, components, or combinations thereof, but do not preclude the presence or addition of one or more of the features, figures, steps, operations, elements, components, or combinations thereof.

**[0032]** It will be understood that, although the terms "first", "second", "primary", "secondary", etc., may be used herein to describe various elements, but elements are not limited by these terms. These terms are only used to distinguish one element from another element. For example, without departing from the scope of the disclosure, a first element may be termed as a second element, and a second element may be termed as a first element. The term of "and/or" includes a plurality of combinations of relevant items or any one item among a plurality of relevant items.

**[0033]** Further, as used in the disclosure, the terms "front", "rear", "top", "bottom", "side", "left", "right", "upper", "lower", and the like are defined with reference to the drawings, and are not intended to limit the shape and position of any element.

**[0034]** Hereinafter, various embodiments according to the disclosure will be described in detail with reference to the accompanying drawings.

**[0035]** FIG. 1 is a perspective view illustrating a refrigerator according to an embodiment. FIG. 2 is a side cross-sectional view illustrating the refrigerator according to an embodiment.

**[0036]** As shown in FIGS. 1 and 2, the refrigerator may include a main body 10, a storage compartment 20 formed within the main body 10, a door 30 configured to open or close the storage compartment 20, and a cold air supply device configured to supply cold air to the storage compartment 20.

**[0037]** The main body 10 may include an inner case 11 in which the storage compartment 20 is formed, an outer case 13 coupled to an outer side of the inner case 11 to form an exterior of the refrigerator, and an insulation 15 foamed between the inner case 11 and the outer case 13 to thermally insulate the storage compartment 20 and prevent cold air from escaping.

**[0038]** The storage compartment 20 may be divided by the partition 17 into a refrigerating compartment 21, which is an upper storage compartment arranged in an upper portion of the main body 10, and a freezing compartment 23, which is a lower storage compartment arranged in a lower portion of the main body 10. In other words, the refrigerating compartment 21 may be arranged in the upper portion of the inside of the main body 10, and the freezing compartment 23 may be arranged in the lower portion of the refrigerating compartment 21. Although the drawings show the refrigerating compartment 21 arranged in the upper portion of the inside of the main body 10 divided by the partition 17, and the freezing compartment 23 arranged in the lower portion of the refrigerating compartment 21, but the present disclosure is not limited thereto. In other words, a freezing compartment may be arranged in the upper portion of the inside of the main body 10, and a refrigerating compartment may be arranged in the lower portion of the freezing compartment. In addition, the storage compartment in the inside of the main body 10 may not be partitioned by a partition and may be configured as a single refrigerating compartment or a single freezing compartment. In addition, in a case where the storage compartment inside the main body 10 is configured as a single refrigerating compartment or freezing compartment, the storage compartment 20 may be opened and closed by a single door.

**[0039]** The storage compartment 20 may be provided with a plurality of shelves 27 for storing food or the like stacked thereon for convenience of storage therein. In addition, a drawer 100 may be provided within the storage compartment 20 for storing food items or the like so that the food items stored therein may be kept moist. The shelves 27 may be arranged on a lower portion or an upper portion of the drawer 100.

**[0040]** The drawer 100 may be arranged to be insertable into and withdrawable from the storage compartment 20. A guide rail 50 (see FIG. 4) may be arranged within the storage compartment 20 to allow the drawer 100 to be inserted into and withdrawn from the interior of the storage compartment 20. The drawer 100 may include a guide portion 110 (see FIG. 4) that is moved along the guide rail 50. This will be described in more detail below.

**[0041]** The refrigerating compartment 21 and the freezing compartment 23 may be opened or closed by a refrigerating compartment door 31 and a freezing compartment door 33, respectively, which are rotatably coupled to the main body 10, and a plurality of door guards 35 for storing food or the like may be installed on a rear surface of the door 30.

**[0042]** The refrigerator may include a cold air supply device configured to supply cold air to the storage compartment 20. The cold air supply device may include a compressor 41 installed in a machine compartment 25 to compress a refrigerant, a condenser installed in the machine compartment 25 to condense the compressed refrigerant, an expansion valve (not shown) to expand the refrigerant condensed by the condenser, evaporators 42 and 43 installed at a rear side of the storage compartment 20 to generate cold air, and fans 44 and 45 to induce the cold air generated by the evaporators 42 and 43 to be supplied to the storage compartment 20. The evaporators 42 and 43 may include a first evaporator 42 positioned at the rear side of the refrigerating compartment 21 and a second evaporator 43 positioned at the rear side of the freezing compartment 23. The fans 44 and 45 may include a first fan 44 positioned above the first evaporator 42 at the rear side of the refrigerating compartment 21 and a second fan 45 positioned above the second evaporator 43 at the rear side of the freezing compartment 23.

**[0043]** In addition, the cold air supply device may include cold air ducts 46 and 48 that guide cold air induced by the fans 44 and 45 to the storage compartment 20 and

discharges it into the storage compartment 20. The cold air ducts 46 and 48 may include a refrigerating compartment cold air duct 46 arranged at the rear side of the refrigerating compartment 21. The refrigerating compartment cold air duct 46 may include a plurality of cold air discharge holes 47 that discharge cold air generated by the first evaporator 42 into the interior of the refrigerating compartment 21. In other words, cold air may be supplied to the interior of the refrigerating compartment 21 through the cold air discharge holes 47.

**[0044]** The cold air ducts 46 and 48 may include a freezing compartment cold air duct 48 arranged at the rear side of the freezing compartment 23. The freezing compartment cold air duct 48 may include a plurality of cold air discharge holes 49 that discharge cold air generated by the second evaporator 43 into the interior of the freezing compartment 23. In other words, cold air may be supplied into the interior of the freezing compartment 23 through the cold air discharge holes 49.

**[0045]** FIG. 3 is a perspective view illustrating a drawer and a shelf arranged below the drawer, according to an embodiment. FIG. 4 is a perspective view illustrating the drawer and the shelf shown in FIG. 3 separated.

**[0046]** As shown in FIGS. 3 and 4, the shelf 27 may be arranged at a lower portion of the drawer 100. The shelf 27 may be integrally formed with the guide rail 50 that guides the insertion and withdrawal of the drawer 100. The drawer 100 may include the guide portion 110 that allows the drawer 100 to be moved along the guide rail 50 formed on the shelf 27. The guide portion 110 may be formed on both side walls of the drawer 100. The guide rail 50 formed on the shelf 27 to correspond to the guide portion 110 may also be formed integrally on both sides of the shelf 27.

**[0047]** A stopper 111 may be formed at a rear end of the guide portion 110. The stopper 111 may be caught by catch portions 51 and 53 formed on the guide rail 50 to limit the insertion and withdrawal range of the drawer 100. In other words, when the drawer 100 is inserted into the storage compartment 20 (see FIGS. 1 and 2) or withdrawn from the interior of the storage compartment 20, a position at which the stopper 111 is caught by the catch portions 51 and 53 may be the maximum insertion and withdrawal position of the drawer 100.

**[0048]** The catch portions 51 and 53 may include a first catch portion 51 formed on a rear side of the guide rail 50 and configured to allow the stopper 110 to be caught when the drawer 100 is inserted, thereby limiting the insertion range of the drawer 100. In other words, when the drawer 100 is inserted, the position at which the stopper 111 is caught by the first catch portion 51 to limit the insertion may be the maximum insertion position of the drawer 100.

**[0049]** The catch portions 51 and 53 may include a second catch portion 53 formed on a front side of the guide rail 50 and configured to allow the stopper 111 to be caught when the drawer 100 is withdrawn, thereby limiting the withdrawal range of the drawer 100. In other words, when the drawer 100 is withdrawn, the position at which the stopper 111 is caught by the second catch portion 53 to limit the withdrawal may be the maximum withdrawal position of the drawer 100.

**[0050]** A rib 120 may be formed on at least one of both sides of the drawer 100. While the drawings show the ribs 120 being formed on both sides of the drawer 100, respectively, and a plurality of protrusions 55 and 57 also being formed on both guide rails 50, respectively, but the present disclosure is not limited thereto. In other words, the rib 120 may be formed on one of both sides of the drawer 100, and the plurality of protrusions 55 and 57 may also be formed on only one of both guide rails 50. The rib 120 may be formed to protrude from both sides of the drawer 100. The rib 120 may be formed on the rear side of both sides of the drawer 100. The rib 120 may be formed to be elastic. The rib 120 may contact the plurality of protrusions 55 and 57 formed on the guide rail 50 before the stopper 111 contacts the catch portions 51 and 53 to dampen the drawer 100 in the process of inserting and withdrawing the drawer 100.

**[0051]** The rib 120 may include a damping portion 121 formed in a grooved shape that is recessed in a downward direction with respect to an up-and-down direction of the drawer 100. Because the rib 120 is formed to be elastic, the rib 120 comes into contact with the plurality of protrusions 55 and 57 when the drawer 100 is moved for insertion and withdrawal, the damping portion 121 of the rib 120 may be elastically deformed by the plurality of protrusions 55 and 57. When the damping portion 121 of the rib 120 is elastically deformed by the plurality of protrusions 55 and 57, a user may perceive such a condition.

**[0052]** The rib 120 may include a reinforcing rib 123 formed to protrude upwardly from a central portion of the damping portion 121. The reinforcing rib 123 may increase the strength of the rib 120. Since the strength of the rib 120 is increased by the reinforcing rib 123, the rib 120 may withstand an increase in weight, such as food or the like stored in the drawer 100.

**[0053]** The plurality of protrusions 55 and 57 may be formed to protrude upwardly from the guide rail 50. In response to the drawer 100 being moved for insertion and withdrawal, the plurality of protrusions 55 and 57 may contact the rib 120 to cause the rib 120 to be elastically deformed. In other words, in response to the drawer 100 being moved for insertion and withdrawal, the plurality of protrusions 55 and 57 may contact a lower portion of the damping portion 121 to elastically deform the damping portion 121 in an upward direction.

**[0054]** The plurality of protrusions 55 and 57 may include a first protrusion 55 formed at the rear with respect to the center of the guide rail 50. The plurality of protrusions 55 and 57 may include a second protrusion 57 formed at the front with respect to the center of the guide rail 50.

**[0055]** In response to the drawer 100 being withdrawn from an inserted state, the rib 120 may be elastically

deformed by the first protrusion 55 and then elastically deformed by the second protrusion 57. After the rib 120 is elastically deformed by the second protrusion 57, the stopper 111 may be caught by the second catch portion 53 to stop the drawer 100. In other words, just before the stopper 111 is caught by the second catch portion 53 to stop the drawer 100, the rib 120 may be elastically deformed by the second protrusion 57, so that the user may perceive such a condition.

**[0056]** In response to the drawer 100 being inserted from a withdrawn state, the rib 120 may be elastically deformed by the second protrusion 57 and then elastically deformed by the first protrusion 55. After the rib 120 is elastically deformed by the first protrusion 55, the stopper 111 may be caught by the first catch portion 51 to stop the drawer 100. In other words, just before the stopper 111 is caught by the first catch portion 51 to stop the drawer 100, the rib 120 may be elastically deformed by the first protrusion 55 to allow the user to perceive such a condition.

**[0057]** Because the rib 120 is dampened by contact with the plurality of protrusions 55 and 57 before the stopper 111 is caught by the catch portions 51 and 53 to stop the drawer 100, the user may perceive such a condition. In other words, before the drawer 100 is stopped, the user may physically perceive that the drawer 100 is about to stop, thereby improving the emotional quality. In addition, because the user may perceive such a condition before the drawer 100 is maximally inserted and withdrawn, the user may avoid using excessive force to ensure that the drawer 100 settles into a correct position (or a designated position) when the drawer 100 is maximally inserted and withdrawn. In addition, the drawer 100 may have two additional portions in which the rib 120 is restrained by being dampened by the plurality of protrusions 55 and 57, in addition to the two portions in which the stopper 111 is caught by the catch portions 51 and 53 during insertion and withdrawal. This may allow the drawer 100 to be prevented from being twisted during insertion and withdrawal. Accordingly, a separate member for preventing the drawer 100 from being twisted may not be required.

**[0058]** FIG. 5 is a side cross-sectional view illustrating the drawer maximally inserted into the storage compartment, according to an embodiment. FIG. 6 is a side cross-sectional view of the drawer partially withdrawn from the state in FIG. 5, showing the rib passing over the first protrusion. FIG. 7 is a side cross-sectional view of the drawer further withdrawn from the state in FIG. 6, showing the rib in contact with the second protrusion. FIG. 8 is a side cross-sectional view of the drawer maximally withdrawn from the state in FIG. 7, showing the rib passing over the second protrusion.

**[0059]** Although the storage compartment is not shown in the drawings, the storage compartment may be the storage compartment 20 shown in FIG. 1 and FIG. 2 in the operation of the drawer 100 being inserted into and withdrawn from the interior of the storage compartment.

**[0060]** As shown in FIG. 5, when the drawer 100 is fully inserted into the storage compartment 20, the stopper 111 may be caught by the first catch portion 51 to prevent the drawer 100 from being moved rearwardly.

**[0061]** In a state in which the drawer 100 is fully inserted into the storage compartment 20, as the drawer 100 is partially withdrawn as shown in FIG. 6, the rib 120 may contact the first protrusion 55. After the rib 120 contacts the first protrusion 55, as the drawer 100 is continued to be withdrawn, the damping portion 121 of the rib 120 may be elastically deformed by the first protrusion 55. After the drawer 100 is withdrawn and the damping portion 121 of the rib 120 is elastically deformed by the first protrusion 55, the rib 120 may pass over the first protrusion 55. At this time, the user may perceive such a condition.

**[0062]** After the rib 120 is elastically deformed by the first protrusion 55 and passes over the first protrusion 55, as the drawer 100 is continued to be withdrawn as shown in FIG. 7, the rib 120 may contact the second protrusion 57. After the rib 120 contacts the second protrusion 57, as the drawer 100 is continued to be withdrawn, the damping portion 121 of the rib 120 may be elastically deformed by the second protrusion 57. After the drawer 100 is withdrawn and the damping portion 121 of the rib 120 is elastically deformed by the second protrusion 57, the rib 120 may pass over the second protrusion 57. At this time, the user may perceive such a condition.

**[0063]** After the rib 120 is elastically deformed by the second protrusion 57 and passes over the second protrusion 57, as the drawer 100 is continued to be withdrawn as shown in FIG. 8, the stopper 111 may be caught by contact with the second catch portion 53. In response to the stopper 111 being caught by the second catch portion 53, the drawer 100 may no longer be withdrawn and may be stopped. This may be the maximum withdrawal position of the drawer 100.

**[0064]** As described above, when the drawer 100 is withdrawn from the interior of the storage compartment 20, the rib 120 may be dampened by being elastically deformed by the second protrusion 57 just before the stopper 111 of the drawer 100 is caught by the second catch portion 53, so that the user may perceive such a condition.

**[0065]** Although the drawings only show the movement of the drawer 100 being withdrawn from the state of being inserted into the interior of the storage compartment 20, it should be understood that the movement of the drawer 100 being inserted from the state of being withdrawn from the interior of the storage compartment 20 may be the opposite to the movement of the drawer 100 being withdrawn while being inserted into the interior of the storage compartment 20.

**[0066]** In other words, when the drawer 100 is in a state of being maximally withdrawn from the interior of the storage compartment 20 as shown in FIG. 8, as the drawer 100 is partially inserted into the storage compartment 20 as shown in FIG. 7, the rib 120 may be elastically

deformed by the second protrusion 57. After the drawer 100 is inserted and the damping portion 121 of the rib 120 is elastically deformed by the second protrusion 57, the rib 120 may pass over the second protrusion 57. At this time, such a condition may be perceived by the user.

**[0067]** After the rib 120 is elastically deformed by the second protrusion 57 and passes over the second protrusion 57, as the drawer 100 is continued to be inserted, the rib 120 may contact the first protrusion 55. After the rib 120 contacts the first protrusion 55, as the drawer 100 is continued to be inserted, the damping portion 121 of the rib 120 may be elastically deformed by the first protrusion 55. After the drawer 100 is inserted and the damping portion 121 of the rib 120 is elastically deformed by the first protrusion 55, the rib 120 may pass over the first protrusion 55, as shown in FIG. 6. At this time, the user may perceive such a condition.

**[0068]** After the rib 120 is elastically deformed by the first protrusion 55 and passes over the first protrusion 55, as the drawer 100 is continued to be inserted as shown in FIG. 5, the stopper 111 may be caught by contact with the first catch portion 51. In response to the stopper 111 being caught by the first catch portion 51, the drawer 100 may no longer be inserted and may be stopped. This may be the maximum insertion position of the drawer 100.

**[0069]** As described above, when the drawer 100 is inserted into the storage compartment 20, the rib 120 may be dampened by being elastically deformed by the first protrusion 55 just before the stopper 111 of the drawer 100 is caught by the first catch portion 51, so the user may perceive such a condition.

**[0070]** FIG. 9 is a perspective view illustrating a drawer according to an embodiment being inserted into the storage compartment. FIG. 10 is a perspective view illustrating the drawer shown in FIG. 9 separated from the inner case.

**[0071]** As shown in FIGS. 9 and 10, a guide rail 60 configured to guide the insertion and withdrawal of the drawer 100 may be integrally formed on both side walls of the storage compartment 20. In other words, the guide rail 60 may be integrally formed on the inner case 11. The drawer 100 may include the guide portion 110 that allows the drawer 100 to be moved along the guide rail 60 formed on both side walls of the storage compartment 20. The guide portion 110 may be formed on both side walls of the drawer 100. The guide portion 110 may be formed at a position corresponding to the guide rail 60 formed on both side walls of the storage compartment 20.

**[0072]** The stopper 111 may be formed at the rear end of the guide portion 110. The stopper 111 may be caught by catch portions 61 and 63 formed on the guide rail 60 to limit the insertion and withdrawal range of the drawer 100. In other words, when the drawer 100 is inserted into or withdrawn from the interior of the storage compartment 20, a position at which the stopper 111 is caught by the catch portions 61 and 63 may be the maximum insertion and withdrawal position of the drawer 100.

**[0073]** The catch portions 61 and 63 may include a first catch portion 61 formed on a rear side of the guide rail 60 and configured to allow the stopper 111 to be caught when the drawer 100 is inserted, thereby limiting the insertion range of the drawer 100. In other words, when the drawer 100 is inserted, the position at which the stopper 111 is caught by the first catch portion 61 to limit the insertion may be the maximum insertion position of the drawer 100.

**[0074]** The catch portions 61 and 63 may include a second catch portion 63 formed on a front side of the guide rail 60 and configured to allow the stopper 111 to be caught when the drawer 100 is withdrawn, thereby limiting the withdrawal range of the drawer 100. In other words, when the drawer 100 is withdrawn, the position at which the stopper 111 is caught by the second catch portion 63 to limit the withdrawal may be the maximum withdrawal position of the drawer 100.

**[0075]** The ribs 120 may be formed on both sides of the drawer 100. The ribs 120 may be formed to protrude from both sides of the drawer 100. The ribs 120 may be formed on the rear side of both sides of the drawer 100. The ribs 120 may be formed to be elastic. The ribs 120 may contact a plurality of protrusions 65 and 67 formed on the guide rail 60 before the stopper 111 contacts the catch portions 61 and 63 to dampen the drawer 100 in the process of inserting and withdrawing the drawer 100.

**[0076]** The rib 120 may include the damping portion 121 formed in a grooved shape that is recessed in the downward direction with respect to the up-and-down direction of the drawer 100. Because the rib 120 is formed to be elastic, the rib 120 comes into contact with the plurality of protrusions 65 and 67 when the drawer 100 is moved for insertion and withdrawal, the damping portion 121 of the rib 120 may be elastically deformed by the plurality of protrusions 65 and 67. When the damping portion 121 of the rib 120 is elastically deformed by the plurality of protrusions 65 and 67, the user may perceive such a condition.

**[0077]** The rib 120 may include the reinforcing rib 123 formed to protrude upwardly from the central portion of the damping portion 121. The reinforcing rib 123 may increase the strength of the rib 120. Since the strength of the rib 120 is increased by the reinforcing rib 123, the rib 120 may withstand an increase in weight, such as food or the like stored in the drawer 100.

**[0078]** The plurality of protrusions 65 and 67 may be formed to protrude upwardly from the guide rail 60. In response to the drawer 100 being moved for insertion and withdrawal, the plurality of protrusions 65 and 67 may contact the rib 120 to cause the rib 120 to be elastically deformed. In other words, in response to the drawer 100 being moved for insertion and withdrawal, the plurality of protrusions 65 and 67 may contact the lower portion of the damping portion 121 to elastically deform the damping portion 121 in the upward direction.

**[0079]** The plurality of protrusions 65 and 67 may include a first protrusion 65 formed at the rear with respect to the center of the guide rail 60. The plurality of protru-

sions 65 and 67 may include a second protrusion 67 formed at the front with respect to the center of the guide rail 60.

**[0080]** In response to the drawer 100 being withdrawn from the inserted state, the rib 120 may be elastically deformed by the first protrusion 65 and then elastically deformed by the second protrusion 67. After the rib 120 is elastically deformed by the second protrusion 67, the stopper 111 may be caught by the second catch portion 63 to stop the drawer 100. In other words, just before the stopper 111 is caught by the second catch portion 63 to stop the drawer 100, the rib 120 may be elastically deformed by the second protrusion 67 to allow the user to perceive such a condition.

**[0081]** In response to the drawer 100 being inserted from the withdrawn state, the rib 120 may be elastically deformed by the second protrusion 67 and then elastically deformed by the first protrusion 65. After the rib 120 is elastically deformed by the first protrusion 65, the stopper 111 may be caught by the first catch portion 61 to stop the drawer 100. In other words, just before the stopper 111 is caught by the first catch portion 61 to stop the drawer 100, the rib 120 may be elastically deformed by the first protrusion 65 to allow the user to perceive such a condition.

**[0082]** Because the rib 120 is dampened by contact with the plurality of protrusions 65 and 67 before the stopper 111 is caught by the catch portions 61 and 63 to stop the drawer 100, the user may perceive such a condition. In other words, before the drawer 100 is stopped, the user may perceive that the drawer 100 is about to be stop, thereby improving the emotional quality. In addition, because the user may perceive such a condition before the drawer 100 is fully inserted and withdrawn, the user may avoid using excessive force to ensure that the drawer 100 settles into the correct position when the drawer 100 is fully inserted and withdrawn. In addition, the drawer 100 may have two additional portions in which the rib 120 is restrained by being dampened by the plurality of protrusions 65 and 67, in addition to the two portion in which the stopper 111 is caught by the catch portions 61 and 63 during insertion and withdrawal. This may allow the drawer 100 to be prevented from being twisted during insertion and withdrawal. Accordingly, a separate member for preventing the drawer 100 from being twisted may not be required.

**[0083]** FIG. 11 is a side cross-sectional view illustrating the drawer maximally inserted into the storage compartment, according to an embodiment. FIG. 12 is a side cross-sectional view of the drawer partially withdrawn from the state in FIG. 11, showing the rib passing over the first protrusion. FIG. 13 is a side cross-sectional view of the drawer further withdrawn from the state in Fig. 12, showing the rib in contact with the second protrusion. FIG. 14 is a side cross-sectional view of the drawer maximally withdrawn from the state in FIG. 13, showing the rib passing over the second protrusion.

**[0084]** As shown in FIG. 11, when the drawer 100 is fully inserted into the storage compartment 20, the stopper 111 may be caught by the first catch portion 61 to prevent the drawer 100 from moving rearwardly.

**[0085]** In a state in which the drawer 100 is fully inserted into the storage compartment 20, as the drawer 100 is partially withdrawn as shown in FIG. 12, the rib 120 may contact the first protrusion 65. After the rib 120 contacts the first protrusion 65, as the drawer 100 is continued to be withdrawn, the damping portion 121 of the rib 120 may be elastically deformed by the first protrusion 65. After the drawer 100 is withdrawn and the damping portion 121 of the rib 120 is elastically deformed by the first protrusion 65, the rib 120 may pass over the first protrusion 65. At this time, the user may perceive such a condition.

**[0086]** After the rib 120 is elastically deformed by the first protrusion 65 and passes over the first protrusion 65, as the drawer 100 is continue to be withdrawn as shown in FIG. 13, the rib 120 may contact the second protrusion 67. After the rib 120 contacts the second protrusion 67, as the drawer 100 is continued to be withdrawn, the damping portion 121 of the rib 120 may be elastically deformed by the second protrusion 67. After the drawer 100 is withdrawn and the damping portion 121 of the rib 120 is elastically deformed by the second protrusion 67, the rib 120 may pass over the second protrusion 67. At this time, the user may perceive such a condition.

**[0087]** After the rib 120 is elastically deformed by the second protrusion 67 and passes over the second protrusion 67, as the drawer 100 is continued to be withdrawn as shown in FIG. 14, the stopper 111 may be caught by contact with the second catch portion 63. In response to the stopper 111 being caught by the second catch portion 63, the drawer 100 may no longer be withdrawn and may be stopped. This may be the maximum withdrawal position of the drawer 100.

**[0088]** As described above, when the drawer 100 is withdrawn from the interior of the storage compartment 20, the rib 120 may be dampened by being elastically deformed by the second protrusion 67 just before the stopper 111 of the drawer 100 is caught by the second catch portion 63, so the user may perceive such a condition.

**[0089]** Although the drawings only show the movement of the drawer 100 being withdrawn from the state of being inserted into the interior of the storage compartment 20, it should be understood that the movement of the drawer 100 being inserted from the state of being withdrawn from the interior of the storage compartment 20 may be the opposite to the movement of the drawer 100 being withdrawn from the state of being inserted into the interior of the storage compartment 20.

**[0090]** In other words, when the drawer 100 is in a state of being maximally withdrawn from the interior of the storage compartment 20 as shown in FIG. 14, as the drawer 100 is partially inserted into the storage compartment 20 as shown in FIG. 13, the rib 120 may be elastically deformed by the second protrusion 67. After the

drawer 100 is inserted and the damping portion 121 of the rib 120 is elastically deformed by the second protrusion 67, the rib 120 may pass over the second protrusion 67. At this time, the user may perceive such a condition.

**[0091]** After the rib 120 is elastically deformed by the second protrusion 67 and passes over the second protrusion 67, as the drawer 100 is continued to be inserted, the rib 120 may contact the first protrusion 65. After the rib 120 contacts the first protrusion 65, as the drawer 100 is continued to be inserted, the damping portion 121 of the rib 120 may be elastically deformed by the first protrusion 65. After the drawer 100 is inserted and the damping portion 121 of the rib 120 is elastically deformed by the first protrusion 65, the rib 120 may pass over the first protrusion 65, as shown in FIG. 12. At this time, the user may perceive such a condition.

**[0092]** After the rib 120 is elastically deformed by the first protrusion 65 and passes over the first protrusion 65, as the drawer 100 is continued to be inserted as shown in FIG. 11, the stopper 111 may be caught by contact with the first catch portion 61. In response to the stopper 111 being caught by the first catch portion 61, the drawer 100 may no longer be inserted and may be stopped. This may be the maximum insertion position of the drawer 100.

**[0093]** As described above, when the drawer 100 is inserted into the storage compartment 20, the rib 120 may be dampened by being elastically deformed by the first protrusion 65 just before the stopper 111 of the drawer 100 is caught by the first catch portion 61, so that the user may perceive such a condition.

**[0094]** FIG. 15 is a perspective view illustrating a drawer and a shelf arranged below the drawer, according to an embodiment. FIG. 16 is a perspective view illustrating the drawer and the shelf shown in FIG. 15 separated. FIG. 17 is a perspective view illustrating the shelf shown in FIG. 16 as viewed from above.

**[0095]** As shown in FIGS. 15 to 17, the shelf 27 may be arranged on the lower portion of the drawer 100. The shelf 27 may be integrally formed with a guide rail 70 configured to guide the insertion and withdrawal of the drawer 100. The drawer 100 may include the guide portion 110 that allows the drawer 100 to be moved along the guide rail 70 formed on the shelf 27. The guide portion 110 may be formed on both side walls of the drawer 100. The guide rail 70 formed on the shelf 27 to correspond to the guide portion 110 may also be integrally formed on both sides of the shelf 27.

**[0096]** The stopper 111 may be formed on the rear end of the guide portion 110. The stopper 111 may be caught by catch portions 71and 73 formed on the guide rail 70 to limit the insertion and withdrawal range of the drawer 100. In other words, when the drawer 100 is inserted into or withdrawn from the interior of the storage compartment 20 (see FIG. 1 and FIG. 2), a position at which the stopper 111 is caught by the catch portions 71and 73 may be the maximum insertion and withdrawal position of the drawer 100.

**[0097]** The catch portions 71and 73 may include a first catch portion 71 formed on a rear side of the guide rail 70 and configured to allow the stopper 111 to be caught when the drawer 100 is inserted, thereby limiting the insertion range of the drawer 100. In other words, when the drawer 100 is inserted, the position at which the stopper 111 is caught by the first catch portion 71 to limit the insertion may be the maximum insertion position of the drawer 100.

**[0098]** The catch portions 71and 73 may include a second catch portion 73 formed on a front side of the guide rail 70 and configured to allow the stopper 111 to be caught when the drawer 100 is withdrawn, thereby limiting the withdrawal range of the drawer 100. In other words, when the drawer 100 is withdrawn, the position at which the stopper 111 is caught by the second catch portion 73 to limit the withdrawal may be the maximum withdrawal position of the drawer 100.

**[0099]** A rib 130 may be formed on both sides of the drawer 100. While the drawings show that ribs 130 being formed on both sides of the drawer 100, respectively, and a plurality of protrusions 75 and 77 also being formed on both guide rails 70, respectively, but the present disclosure is not limited thereto. In other words, the rib 130 may be formed on one of both sides of the drawer 100, and the plurality of protrusions 75 and 77 may be formed on only one of both guide rails 50. The ribs 130 may be formed on the rear side of both sides of a lower surface of the drawer 100. The ribs 130 may be formed to be elastic. The ribs 130 may allow the drawer 100 to be dampened by the plurality of protrusions 75 and 77 formed on the guide rail 70 before the stopper 111 contacts the catch portions 71 and 73 in the process of inserting and withdrawing the drawer 100.

**[0100]** The rib 130 may include a damping portion 131 formed in a grooved shape that is recessed along a left-to-light direction toward the drawer 100. A central portion of the damping portion 131 may be formed by being cut. Because the rib 130 is formed to be elastic, the rib 130 comes into contact with the plurality of protrusions 75 and 77 when the drawer 100 is moved for insertion and withdrawal, the damping portion 131 of the rib 130 may be elastically deformed by the plurality of protrusions 75 and 77. When the damping portion 131 of the rib 130 is elastically deformed by the plurality of protrusions 75 and 77, the user may perceive such a condition.

**[0101]** The rib 130 may include a reinforcing rib 133 to increase the strength of the rib 130. Since the strength of the rib 130 is increased by the reinforcing rib 133, the rib 130 may withstand an increase in weight, such as food or the like stored in the drawer 100.

**[0102]** The plurality of protrusions 75 and 77 may be formed to protrude in the left-to-right direction from the guide rail 50 toward the drawer 100. In response to the drawer 100 being moved for insertion and withdrawal, the plurality of protrusions 75 and 77 may contact the rib 130 to cause the rib 130 to be elastically deformed. In other words, in response to the drawer 100 being moved for insertion and withdrawal, the plurality of protrusions 75

and 77 may elastically deform the damping portion 131 by being received in and then released from the inside of the damping portion 131, or by being received from the outside of the damping portion 131 in the inside of the damping portion 131.

**[0103]** The plurality of protrusions 75 and 77 may include a first protrusion 75 formed at the rear with respect to the center of the guide rail 70. The plurality of protrusions 75 and 77 may include a second protrusion 77 formed at the front with respect to the center of the guide rail 70.

**[0104]** In response to the drawer 100 being withdrawn from an inserted state, the rib 130 may be elastically deformed as the first protrusion 75 is released from a state of being received inside the damping portion 131, and then be elastically deformed as the second protrusion 77 is received inside the damping portion 131. After the rib 130 is elastically deformed by the second protrusion 77, the stopper 111 may be caught by the second catch portion 73 to stop the drawer 100. In other words, just before the stopper 111 is caught by the second catch portion 73 to stop the drawer 100, the rib 130 may be elastically deformed by the second protrusion 77, so that the user may perceive such a condition.

**[0105]** In response to the drawer 100 being inserted from a withdrawn state, the rib 130 may be elastically deformed as the second protrusion 77 is released from the state of being received within the damping portion 131, and then be elastically deformed as the first protrusion 75 is received within the damping portion 131. After the rib 130 is elastically deformed by the first protrusion 75, the stopper 111 may be caught by the first catch portion 71 to stop the drawer 100. In other words, just before the stopper 111 is caught by the first catch portion 71 to stop the drawer 100, the rib 130 may be elastically deformed by the first protrusion 75, so that the user may perceive such a condition.

**[0106]** Because the rib 130 is dampened by the plurality of protrusions 75 and 77 before the stopper 111 is caught by the catch portions 71and 73 to stop the drawer 100, the user may perceive such a condition. In other words, before the drawer 100 is stopped, the user may perceive that the drawer 100 is about to stop, thereby improving the emotional quality. In addition, because the user may perceive such a condition before the drawer 100 is maximally inserted and withdrawn, the user may avoid using excessive force to ensure that the drawer 100 settles into the correct position when the drawer 100 is maximally inserted and withdrawn. In addition, the drawer 100 may have two additional portions in which the rib 130 is restrained by being dampened by the plurality of protrusions 75 and 77, in addition to the two portions in which the stopper 111 is caught by the catch portions 71and 73 during insertion and withdrawal. This may allow the drawer 100 to be prevented from being twisted during insertion and withdrawal. Accordingly, a separate member for preventing the drawer 100 being twisted may not be required. In addition, because the elastic rib 130 push the drawer 100 away from the guide rails 70 on both sides of the drawer 100, it may assist in maintain a gap with the guide rail 70, thereby improving the appearance quality.

**[0107]** FIG. 18 is a view illustrating the drawer maximally inserted into the storage compartment, according to an embodiment. FIG. 19 is a view of the drawer partially withdrawn from the state in FIG. 18, showing the first protrusion released from the inside of the damping portion of the rib. FIG. 20 is a view of the drawer further withdrawn from the state in FIG. 19, showing the rib in contact with the second protrusion. FIG. 21 is a view of the drawer maximally withdrawn from the state in FIG. 20, showing the second protrusion received within the damping portion of the rib.

**[0108]** Although the storage compartment is not shown in the drawings, the storage compartment may be the storage compartment 20 shown in FIG. 1 and FIG. 2 in the operation of the drawer 100 being inserted into and withdrawn from the interior of the storage compartment.

**[0109]** As shown in FIG. 18, when the drawer 100 is fully inserted into the storage compartment 20, the stopper 111 may be caught by the first catch portion 71 to prevent the drawer 100 from moving rearwardly. In this case, the first protrusion 75 may be received within the damping portion 131 of the rib 130.

**[0110]** In a state in which the drawer 100 is fully inserted into the storage compartment 20, as the drawer 100 is partially withdrawn as shown in FIG. 19, the first protrusion 75 may be released from the inside of the damping portion 131 of the rib 130. In response to the first protrusion 75 being released from the inside of the damping portion 131, the rib 130 may be elastically deformed by the first protrusion 75. At this time, the user may perceive such a condition.

**[0111]** In a state in which the rib 130 is elastically deformed by the first protrusion 75 and the first protrusion 75 is released from the inside of the damping portion 131, as the drawer 100 is continued to be withdrawn as shown in FIG. 20, the rib 130 may contact the second protrusion 77.

**[0112]** After the rib 130 contacts the second protrusion 77, as the drawer 100 is continued to be withdrawn, the rib 130 may be elastically deformed as the second protrusion 77 is received within the damping portion 131 of the rib 130 as shown in FIG. 21. At this time, the user may perceive such a condition.

**[0113]** In response to the rib 130 being elastically deformed by the second protrusion 77 and the second protrusion 77 being received within the damping portion 131, the stopper 111 may be caught by contact with the second catch portion 73. In response to the stopper 111 being caught by the second catch portion 73, the drawer 100 may no longer be withdrawn and may be stopped. This may be the maximum withdrawal position of the drawer 100.

**[0114]** As described above, when the drawer 100 is withdrawn from the interior of the storage compartment

20, the rib 130 may be dampened by being elastically deformed by the second protrusion 77 just before the stopper 111 of the drawer 100 is caught by the second catch portion 73, so that the user may perceive such a condition.

**[0115]** Although the drawings only show the movement of the drawer 100 being withdrawn from the state of being inserted into the interior of the storage compartment 20, it should be understood that the movement of the drawer 100 being inserted from the state of being withdrawn from the interior of the storage compartment 20 may be the opposite to the movement of the drawer 100 being withdrawn from the state of being inserted into the interior of the storage compartment 20.

**[0116]** In other words, when the drawer 100 is in a state of being maximally withdrawn from the interior of the storage compartment 20 as shown in FIG. 21, the second protrusion 77 may be in a state of being received within the damping portion 131 of the rib 130.

**[0117]** In a state in which the drawer 100 is maximally withdrawn from the interior of the storage compartment 20, as the drawer 100 is partially inserted as shown in FIG. 20, the second protrusion 77 may be released from the inside of the damping portion 131 of the rib 130. In response to the second protrusion 77 being released from the inside of the damping portion 131, the rib 130 may be elastically deformed by the second protrusion 77. At this time, the user may perceive such a condition.

**[0118]** In a state in which the rib 130 is elastically deformed by the second protrusion 77 and the second protrusion 77 is released from the inside of the damping portion 131, as the drawer 100 is continued to be inserted as shown in FIG. 19, the rib 130 may contact the first protrusion 75.

**[0119]** After the rib 130 contacts the first protrusion 75, as the drawer 100 is continued to be inserted, the rib 130 may be elastically deformed as the first protrusion 75 is received within the damping portion 131 of the rib 130 as shown in FIG. 18. At this time, the user may perceive such a condition.

**[0120]** In response to the rib 130 being elastically deformed by the first protrusion 75 and the first protrusion 75 being received within the damping portion 131, the stopper 111 may be caught by contact with the first catch portion 71. In response to the stopper 111 being caught by the first catch portion 71, the drawer 100 may no longer be inserted and may be stopped. This may be the maximum insertion position of the drawer 100.

**[0121]** As described above, when the drawer 100 is inserted into the storage compartment 20, the rib 130 may be dampened by being elastically deformed by the first protrusion 75 just before the stopper 111 of the drawer 100 is caught by the first catch portion 71, so that the user may perceive such a condition.

**[0122]** FIG. 22 is a perspective view illustrating the drawer inserted into the storage compartment, according to an embodiment. FIG. 23 is a perspective view illustrating the drawer shown in FIG. 22 separated from the inner case.

**[0123]** As shown in FIGS. 22 and 23, the guide rail 80 configured to guide the insertion and withdrawal of the drawer 100 may be integrally formed on both side walls of the storage compartment 20. In other words, the guide rail 80 may be integrally formed on the inner case 11. The drawer 100 may include the guide portion 110 that allows the drawer 100 to be moved along the guide rail 80 formed on both side walls of the storage compartment 20. The guide portion 110 may be formed on both side walls of the drawer 100. The guide portion 110 may be formed at a position corresponding to the guide rail 60 formed on both side walls of the storage compartment 20.

**[0124]** The stopper 111 may be formed at the rear end of the guide portion 110. The stopper 111 may be caught by catch portions 81 and 83 formed on the guide rail 80 to limit the insertion and withdrawal range of the drawer 100. In other words, when the drawer 100 is inserted into or withdrawn from the interior of the storage compartment 20, a position at which the stopper 111 is caught by the catch portions 81 and 83 may be the maximum insertion and withdrawal of the drawer 100.

**[0125]** The catch portions 81 and 83 may include a first catch portion 81 formed on a rear side of the guide rail 80 and configured to allow the stopper 111 to be caught when the drawer 100 is inserted, thereby limiting the insertion range of the drawer 100. In other words, when the drawer 100 is inserted, the position at which the stopper 111 is caught by the first catch portion 81 to limit the insertion may be the maximum insertion position of the drawer 100.

**[0126]** The catch portions 81 and 83 may include a second catch portion 83 formed on a front side of the guide rail 80 and configured to allow the stopper 111 to be caught when the drawer 100 is withdrawn, thereby limiting the withdrawal range of the drawer 100. In other words, when the drawer 100 is withdrawn, the position at which the stopper 111 is caught by the second catch portion 83 to limit the withdrawal may be the maximum withdrawal position of the drawer 100.

**[0127]** The ribs 130 may be formed on both sides of the drawer 100. The ribs 130 may be formed on the rear side of both sides of the lower surface of the drawer 100. The ribs 130 may be formed to be elastic. The ribs 130 may allow the drawer 100 to be dampened by a plurality of protrusions 85 and 87 formed on the guide rail 80 before the stopper 111 contacts the catch portions 81 and 83 during the process of inserting and withdrawing the drawer 100.

**[0128]** The rib 130 may include the damping portion 131 formed in a grooved shape that is recessed along the left-to-right direction toward the drawer 100. The central portion of the damping portion 131 may be formed by being cut. Because the rib 130 is formed to be elastic, the rib 130 comes into contact with the plurality of protrusions 85 and 87 when the drawer 100 is moved for insertion and withdrawal, the damping portion 131 of the rib 130 may be elastically deformed by the plurality of protrusions 85 and

87. When the damping portion 131 of the rib 130 is elastically deformed by the plurality of protrusions 85 and 87, the user may perceive such a condition.

**[0129]** The rib 130 may include the reinforcing rib 133 to increase the strength of the rib 130. Since the strength of the rib 130 is increased by the reinforcing rib 133, the rib 130 may withstand an increase in weight, such as food or the like stored in the drawer 100.

**[0130]** The plurality of protrusions 85 and 87 may be formed to protrude in the left-to-right directions from the guide rail 80 toward the drawer 100. In response to the drawer 100 being moved for insertion and withdrawal, the plurality of protrusions 85 and 87 may contact the rib 130 to cause the rib 130 to be elastically deformed. In other words, in response to the drawer 100 being moved for insertion and withdrawal, the plurality of protrusions 85 and 87 may elastically deform the damping portion 131 by being received in and then released from the inside of the damping portion 131, or by being received from the outside of the damping portion 131 in the inside of the damping portion 131.

**[0131]** The plurality of protrusions 85 and 87 may include a first protrusion 85 formed at the rear with respect to the center of the guide rail 80. The plurality of protrusions 85 and 87 may include a second protrusion 87 formed at the front with respect to the center of the guide rail 80.

**[0132]** In response to the drawer 100 being withdrawn from the inserted state, the rib 130 may be elastically deformed as the first protrusion 85 is released from the state of being received inside the damping portion 131, and then be elastically deformed as the second protrusion 87 is received inside the damping portion 131. After the rib 130 is elastically deformed by the second protrusion 87, the stopper 111 may be caught by the second catch portion 83 to stop the drawer 100. In other words, just before the stopper 111 is caught by the second catch portion 83 to stop the drawer 100, the rib 130 may be elastically deformed by the second protrusion 87, so that the user may perceive such a condition.

**[0133]** In response to the drawer 100 being inserted from the withdrawn state, the rib 130 may be elastically deformed as the second protrusion 87 is released from the state of being received within the damping portion 131, and then be elastically deformed as the first protrusion 85 is received within the damping portion 131. After the rib 130 is elastically deformed by the first protrusion 85, the stopper 111 may be caught by the first catch portion 81 to stop the drawer 100. In other words, just before the stopper 111 is caught by the first catch portion 81 to stop the drawer 100, the rib 130 may be elastically deformed by the first protrusion 85, so that the user may perceive such a condition.

**[0134]** Because the rib 130 is dampened by the plurality of protrusions 85 and 87 before the stopper 111 is caught by the catch portions 81 and 83 to stop the drawer 100, the user may perceive such a condition. In other words, before the drawer 100 is stopped, the user may perceive that the drawer 100 is about to stop, thereby improving the emotional quality. In addition, because the user may perceive such a condition before the drawer 100 is maximally inserted and withdrawn, the user may avoid using excessive force to ensure that the drawer 100 settles into the correct position when the drawer 100 is maximally inserted and withdrawn. In addition, the drawer 100 may have two additional portions in which the rib 130 is restrained by being dampened by the plurality of protrusions 85 and 87, in addition to the two portions in which the stopper 111 is caught by the catch portions 81 and 83 during insertion and withdrawal. This may allow the drawer 100 to be prevented from being twisted during insertion and withdrawal. Accordingly, a separate member for preventing the drawer 100 to being twisted may not be required. In addition, because the elastic rib 130 push the drawer 100 away from the guide rail 80 on both sides of the drawer 100, it may assist in maintain the gap with the guide rail 80, thereby improving the appearance quality.

**[0135]** FIG. 24 is a view illustrating the drawer maximally inserted into the storage compartment, according to an embodiment. FIG. 25 is a view of the drawer partially withdrawn from the state in FIG. 24, showing the first protrusion released from the inside of the damping portion of the rib. FIG. 26 is a view of the drawer further withdrawn from the state in FIG. 25, showing the rib in contact with the second protrusion. FIG. 27 is a view of the drawer maximally withdrawn from the state in FIG. 26, showing the second protrusion received within the damping portion of the rib.

**[0136]** Although the storage compartment is not shown in the drawings, the storage compartment may be the storage compartment 20 shown in FIG. 1 and FIG. 2 in the operation of the drawer 100 being inserted into and withdrawn from the interior of the storage compartment.

**[0137]** As shown in FIG. 24, when the drawer 100 is fully inserted into the storage compartment 20, the stopper 111 may be caught by the first catch portion 81 to prevent the drawer 100 from moving rearwardly. In this case, the first protrusion 85 may be received within the damping portion 131 of the rib 130.

**[0138]** In a state in which the drawer 100 is fully inserted into the storage compartment 20, as the drawer 100 is partially withdrawn as shown in FIG. 25, the first protrusion 85 may be released from the inside of the damping portion 131 of the rib 130. In response to the first protrusion 85 being released from the inside of the damping portion 131, the rib 130 may be elastically deformed by the first protrusion 85. At this time, the user may perceive such a condition.

**[0139]** In a state in which the rib 130 is elastically deformed by the first protrusion 85 and the first protrusion 85 is released from the inside of the damping portion 131, as the drawer 100 is continued to be withdrawn as shown in FIG. 26, the rib 130 may contact the second protrusion 87.

**[0140]** After the rib 130 contacts the second protrusion

87, as the drawer 100 is continued to be withdrawn, the rib 130 may be elastically deformed as the second protrusion 87 is received within the damping portion 131 of the rib 130 as shown in FIG. 27. At this time, the user may perceive such a condition.

**[0141]** In response to the rib 130 being elastically deformed by the second protrusion 87 and the second protrusion 87 being received within the damping portion 131, the stopper 111 may be caught by contact with the second catch portion 83. In response to the stopper 111 being caught by the second catch portion 83, the drawer 100 may no longer be withdrawn and may be stopped. This may be the maximum withdrawal position of the drawer 100.

**[0142]** As described above, when the drawer 100 is withdrawn from the interior of the storage compartment 20, the rib 130 may be dampened by being elastically deformed by the second protrusion 87 just before the stopper 111 of the drawer 100 is caught by the second catch portion 83, so that the user may perceive such a condition.

**[0143]** Although the drawings only show the movement of the drawer 100 being withdrawn from the state of being inserted into the interior of the storage compartment 20, it should be understood that the movement of the drawer 100 being inserted from the state of being withdrawn from the interior of the storage compartment 20 may be the opposite to the movement of the drawer 100 being withdrawn from the state of being inserted into the interior of the storage compartment 20.

**[0144]** In other words, when the drawer 100 is in a state of being maximally withdrawn from the interior of the storage compartment 20 as shown in FIG. 27, the second protrusion 87 may be in a state of being received within the damping portion 131 of the rib 130.

**[0145]** In a state in which the drawer 100 is maximally withdrawn from the interior of the storage compartment 20, as the drawer 100 is partially inserted as shown in FIG. 26, the second protrusion 87 may be released from the inside of the damping portion 131 of the rib 130. In response to the second protrusion 87 being released from the inside of the damping portion 131, the rib 130 may be elastically deformed by the second protrusion 87. At this time, the user may perceive such a condition.

**[0146]** In a state in which the rib 130 is elastically deformed by the second protrusion 87 and the second protrusion 87 is released from the inside of the damping portion 131, as the drawer 100 is continued to be inserted as shown in FIG. 25, the rib 130 may contact the first protrusion 85.

**[0147]** After the rib 130 contacts the first protrusion 85, as the drawer 100 is continued to be inserted, the rib 130 may be elastically deformed as the first protrusion 85 is received within the damping portion 131 of the rib 130 as shown in FIG. 24. At this time, the user may perceive such a condition.

**[0148]** In response to the rib 130 being elastically deformed by the first protrusion 85 and the first protrusion 85 being received within the damping portion 131, the stopper 111 may be caught by contact with the first catch portion 81. In response to the stopper 111 being caught by the first catch portion 81, the drawer 100 may no longer be inserted and may be stopped. This may be the maximum insertion position of the drawer 100.

**[0149]** As described above, when the drawer 100 is inserted into the storage compartment 20, the rib 130 may be dampened by being elastically deformed by the first protrusion 85 just before the stopper 111 of the drawer 100 is caught by the first catch portion 81, so the user may perceive such a condition.

**[0150]** FIG. 28 is a perspective view illustrating the drawer inserted into the storage compartment, according to an embodiment. FIG. 29 is a perspective view illustrating the drawing and the guide rails shown in FIG. 28 separated from the inner case.

**[0151]** As shown in FIGS. 28 and 29, a guide rail 90 configured to guide the insertion and withdrawal of the drawer 100 may be coupled to both side walls of the storage compartment 20. In other words, the guide rail 90 may be coupled to the inner case 11. The drawer 100 may include the guide portion 110 that allows the drawer 100 to be moved along the guide rail 90 coupled to both side walls of the storage compartment 20. The guide portion 110 may be formed on both side walls of the drawer 100. The guide portion 110 may be formed at a position corresponding to the guide rail 90 coupled to both side walls of the storage compartment 20.

**[0152]** The stopper 111 may be formed at the rear end of the guide portion 110. The stopper 111 may be caught by a catch portions 91 and 93 formed on the guide rail 90 to limit the insertion and withdrawal range of the drawer 100. In other words, when the drawer 100 is inserted into or withdrawn from the interior of the storage compartment 20, the position at which the stopper 111 is caught by the catch portions 91 and 93 may be the maximum insertion and withdrawal position of the drawer 100.

**[0153]** The catch portions 91 and 93 may include a first catch portion 91 formed on a rear side of the guide rail 90 and configured to allow the stopper 111 to be caught when the drawer 100 is inserted, thereby limiting the insertion range of the drawer 100. In other words, when the drawer 100 is inserted, the position at which the stopper 111 is caught by the first catch portion 91 to limit the insertion may be the maximum insertion position of the drawer 100.

**[0154]** The catch portions 91 and 93 may include a second catch portion 93 formed on a front side of the guide rail 90 and configured to allow the drawer 100 to be caught when the drawer 100 is withdrawn, thereby limiting the withdrawal range of the drawer 100. In other words, when the drawer 100 is withdrawn, the position at which the stopper 111 is caught by the second catch portion 93 to limit the withdrawal may be the maximum withdrawal position of the drawer 100.

**[0155]** A protrusion 95 may be formed on the front side of the guide rail 90. The protrusion 95 may be formed to

protrude upwardly from the guide rail 90. In response to the drawer 100 being moved for insertion and withdrawal, the protrusion 95 may come into contact with a lower portion of the guide portion 110.

**[0156]** A plurality of catches 115 and 117 may be formed on the lower portion of the guide portion 110 of the drawer 100. The plurality of catches 115 and 117 may be formed to protrude downwardly from the lower portion of the guide portion 110. In response to the drawer 100 being moved for insertion and withdrawal, the plurality of catches 115 and 117 may come into contact with the protrusion 95 formed on the guide rail 90. As a result, the user may perceive when the protrusion 95 passes over the plurality of catches 115 and 117.

**[0157]** The plurality of catches 115 and 117 may include a first catch 115 formed at the front with respect to the center of the guide portion 110. The plurality of catches 115 and 117 may include a second catch 117 formed at the rear with respect to the center of the guide portion 110.

**[0158]** In response to the drawer 100 being withdrawn from the inserted state, the protrusion 95 may pass over the first catch 115 and then the protrusion 95 may pass over the second catch 117. After the protrusion 95 passes over the second catch 117, the stopper 111 may be caught by the second catch portion 93 to stop the drawer 100. In other words, just before the stopper 111 is caught by the second catch portion 93 to stop the drawer 100, the protrusion 95 may pass over the second catch 117, thereby allowing the user to perceive such a condition.

**[0159]** In response to the drawer 100 being inserted from the withdrawn state, the protrusion 95 may pass over the second catch 117 and then the protrusion 95 may pass over the first catch 115. After the protrusion 95 passes over the first catch 115, the stopper 111 may be caught by the first catch portion 91 to stop the drawer 100. In other words, just before the stopper 111 is caught by the first catch portion 91 to stop the drawer 100, the protrusion 95 may pass over the first catch 115, thereby allowing the user to perceive such a condition.

**[0160]** In the above, it is expressed for convenience that the protrusion 95 passes over the first catch 115 and the second catch 117, but in practice, because the drawer 100 in which the guide portion 110 is formed is moved and the guide rail 90 is fixed, the first catch 115 and the second catch 117 may pass over the protrusion 95.

**[0161]** As described above, before the drawer 100 is stopped, the user may perceive that the drawer 100 is about to stop, thereby improving the emotional quality. In addition, because the user may perceive such a condition before the drawer 100 is maximally inserted and withdrawn, the user may avoid using excessive force to ensure that the drawer 100 settles into the correct position when the drawer 100 is maximally inserted and withdrawn.

**[0162]** FIG. 30 is a view illustrating the drawer maximally inserted into the storage compartment, according to an embodiment. FIG. 31 is a view of the drawer partially withdrawn from the state in in FIG. 30, showing the first catch passed over the protrusion. FIG. 32 is a view of the drawer further withdrawn from the state in FIG. 31, showing just before the second catch passing over the protrusion. FIG. 33 is a view of the drawer maximally withdrawn from the state in FIG. 32, showing the second catch passed over the protrusion.

**[0163]** As shown in FIG. 30, when the drawer 100 is fully inserted into the storage compartment 20, the stopper 111 may be caught by the first catch portion 91 to prevent the drawer 100 from moving rearwardly.

**[0164]** In a state the drawer 100 is fully inserted into the storage compartment 20, as the drawer 100 is partially withdrawn as shown in FIG. 31, the first catch 115 may pass over the protrusion 95. At this time, the user may perceive such a condition.

**[0165]** In response to the drawer 100 being continued to be withdrawn while the first catch 115 has passed over the protrusion 95, the second catch 117 may approach the protrusion 95 as shown in FIG. 32.

**[0166]** In response to the drawer 100 being further withdrawn while the second catch 117 approaches the protrusion 95, the second catch 117 may pass over the protrusion 95 as shown in FIG. 33. In response to the second catch 117 passing over the protrusion 95, the stopper 111 may be caught by contact with the second catch portion 93. In response to the stopper 111 being caught by the second catch portion 93, the drawer 100 may no longer be withdrawn and may be stopped. This may be the maximum withdrawal position of the drawer 100.

**[0167]** As described above, when the drawer 100 is withdrawn from the interior of the storage compartment 20, the user may perceive such a condition because the second catch 117 passes over the protrusion 95 just before the stopper 111 of the drawer 100 is caught by the second catch portion 93.

**[0168]** Although the drawings only show the movement of the drawer 100 being withdrawn from the state of being inserted into the interior of the storage compartment 20, it should be understood that the movement of the drawer 100 being inserted from the state of being withdrawn from the interior of the storage compartment 20 may be the opposite to the movement of the drawer 100 being withdrawn from the state of being inserted into the interior of the storage compartment 20.

**[0169]** In other words, when the drawer 100 is fully withdrawn from the interior of the storage compartment 20 as shown in FIG. 33, the stopper 111 may be caught by the second catch portion 93 to prevent the drawer 100 from moving forwardly.

**[0170]** In a state in which the drawer 100 is fully withdrawn from the interior of the storage compartment 20, as the drawer 100 is partially inserted as shown in FIG. 32, the second catch 117 may pass over the protrusion 95. At this time, the user may perceive such a condition.

**[0171]** In response to the drawer 100 being continued to be inserted while the second catch 117 has passed

over the protrusion 95 as shown in FIG. 32, the first catch 115 may approach the protrusion 95 as shown in FIG. 31.

**[0172]** In response to the drawer 100 being further inserted while the first catch 115 approaches the protrusion 95, the first catch 115 may pass over the protrusion 95 as shown in FIG. 30. In response to the first catch 115 passing over the protrusion 95, the stopper 111 may be caught by contact with the first catch portion 91. In response to the stopper 111 being caught by the first catch portion 91, the drawer 100 may no longer be inserted and may be stopped. This may be the maximum insertion position of the drawer 100.

**[0173]** As described above, when the drawer 100 is inserted into the interior of the storage compartment 20, the user may perceive such a condition because the first catch 115 passes over the protrusion 95 just before the stopper 111 of the drawer 100 is caught by the first catch portion 91.

**[0174]** While the refrigerator has been described above with reference to the accompanying drawings with emphasis on particular shapes and orientations, various modifications and variations may be made by those skilled in the art and such modifications and variations should be construed as being within the scope of the disclosure.

## Claims

**1.** A refrigerator comprising:

a main body;
a storage compartment configured such that a front thereof is open inside the main body;
a drawer configured to be insertable and withdrawable within the storage compartment; and
a guide rail configured to guide the insertion and withdrawal of the drawer and including a catch portion configured to limit an insertion and withdrawal range of the drawer;
wherein the drawer comprises:

a stopper formed on both side walls of the drawer and caught by the catch portion to limit the insertion and withdrawal range of the drawer, and
a rib formed to be elastic on at least one of both sides of the drawer and configured to dampen the drawer by contacting a plurality of protrusions formed on the guide rail before the stopper contacts the catch portion.

**2.** The refrigerator of claim 1, wherein
the guide rail is formed integrally with a shelf arranged on a lower portion of the drawer, and the plurality of protrusions are formed such that, in response to the drawer being inserted and withdrawn, the plurality of protrusions contact the rib to cause the rib to be elastically deformed, thereby allowing the drawer to be movable.

**3.** The refrigerator of claim 1, wherein
the guide rail is formed integrally with both side walls of the storage compartment, and the plurality of protrusions are formed such that, in response to the drawer being inserted and withdrawn, the plurality of protrusions contact the rib to cause the rib to be elastically deformed, thereby allowing the drawer to be movable.

**4.** The refrigerator of claim 1, wherein
the rib is formed on a rear side of both side walls of the drawer, and comprises a damping portion formed in a grooved shape that is recessed downwardly, and a reinforcing rib formed to protrude upwardly from a center of the damping portion to increase a strength of the rib.

**5.** The refrigerator of claim 4, wherein
the plurality of protrusions are formed to protrude upwardly from the guide rail and to contact a lower portion of the damping portion in response to movement of the drawer, thereby elastically deforming the damping portion upwardly, the plurality of protrusions including a first protrusion formed at a rear with respect to the center of the guide rail and a second protrusion formed at a front with respect to the center of the guide rail.

**6.** The refrigerator of claim 5, wherein
the drawer further comprises a guide portion formed on both side walls of the drawer to allow the drawer to be moved along the guide rail, and the stopper is formed at a rear end of the guide portion.

**7.** The refrigerator of claim 6, wherein
the catch portion comprises a first catch portion formed on a rear side of the guide rail and configured to allow the stopper to be caught to limit the insertion range of the drawer when the drawer is inserted, and a second catch portion formed on a front side of the guide rail and configured to allow the stopper to be caught to limit the withdrawal range of the drawer when the drawer is withdrawn.

**8.** The refrigerator of claim 7, wherein
in response to the drawer being withdrawn from a state of being inserted into the storage compartment, the rib is elastically deformed by the first protrusion, and before the stopper is caught by the second catch portion, the damping portion is elastically deformed by the second protrusion, and then the stopper is caught by the second catch portion, thereby completing the withdrawal.

**9.** The refrigerator of claim 8, wherein

in response to the drawer being inserted from a state of being withdrawn from the storage compartment, the rib is elastically deformed by the second protrusion, and before the stopper is caught by the first catch portion, the damping portion is elastically deformed by the first protrusion, and then the stopper is caught by the first catch portion, thereby completing the insertion.

**10.** The refrigerator of claim 1, wherein
the rib is formed on a rear side of both sides of a lower surface of the drawer, and includes a damping portion including a grooved shape that is recessed along a left-to-right direction toward the drawer and is formed by cutting a central portion, and a reinforcing rib to increase a strength of the rib.

**11.** The refrigerator of claim 10, wherein
the plurality of protrusions are formed to protrude along the left-to-right direction from the guide rail toward the drawer, and configured to elastically deform the damping portion in response to movement of the drawer by being received in an inside of the damping portion and then released from, or by being received in the inside of the damping portion, the plurality of protrusions including a first protrusion formed at a rear with respect to a center of the guide rail and a second protrusion formed at a front with respect to the center of the guide rail.

**12.** The refrigerator of claim 11, wherein
the drawer further comprises a guide portion formed on both side walls of the drawer to allow the drawer to be moved along the guide rail, and the stopper is formed at a rear end of the guide portion.

**13.** The refrigerator of claim 12, wherein
the catch portion comprises a first catch portion formed on a rear side of the guide rail and configured to allow the stopper to be caught to limit the insertion range of the drawer when the drawer is inserted, and a second catch portion formed on a front side of the guide rail and configured to allow the stopper to be caught to limit the withdrawal range of the drawer when the drawer is withdrawn.

**14.** The refrigerator of claim 13, wherein
in response to the drawer being withdrawn from a state of being inserted into the storage compartment, the rib is elastically deformed while the first protrusion is released from a state of being received in the inside of the damping portion, and before the stopper is caught by the second catch portion, the damping portion is elastically deformed by the second protrusion to allow the second protrusion to be received in the inside of the damping portion, and then the stopper is caught by the second catch portion, thereby completing the withdrawal.

**15.** The refrigerator of claim 14, wherein
in response to the drawer being inserted from a state of being withdrawn from the storage compartment, the rib is elastically deformed while the second protrusion is released from the state of being received in the inside of the damping portion, and before the stopper is caught by the first catch portion, the damping portion is elastically deformed by the first protrusion to allow the first protrusion to be received in the inside of the damping portion, and then the stopper is caught by the first catch portion, thereby completing the insertion.

FIG. 1

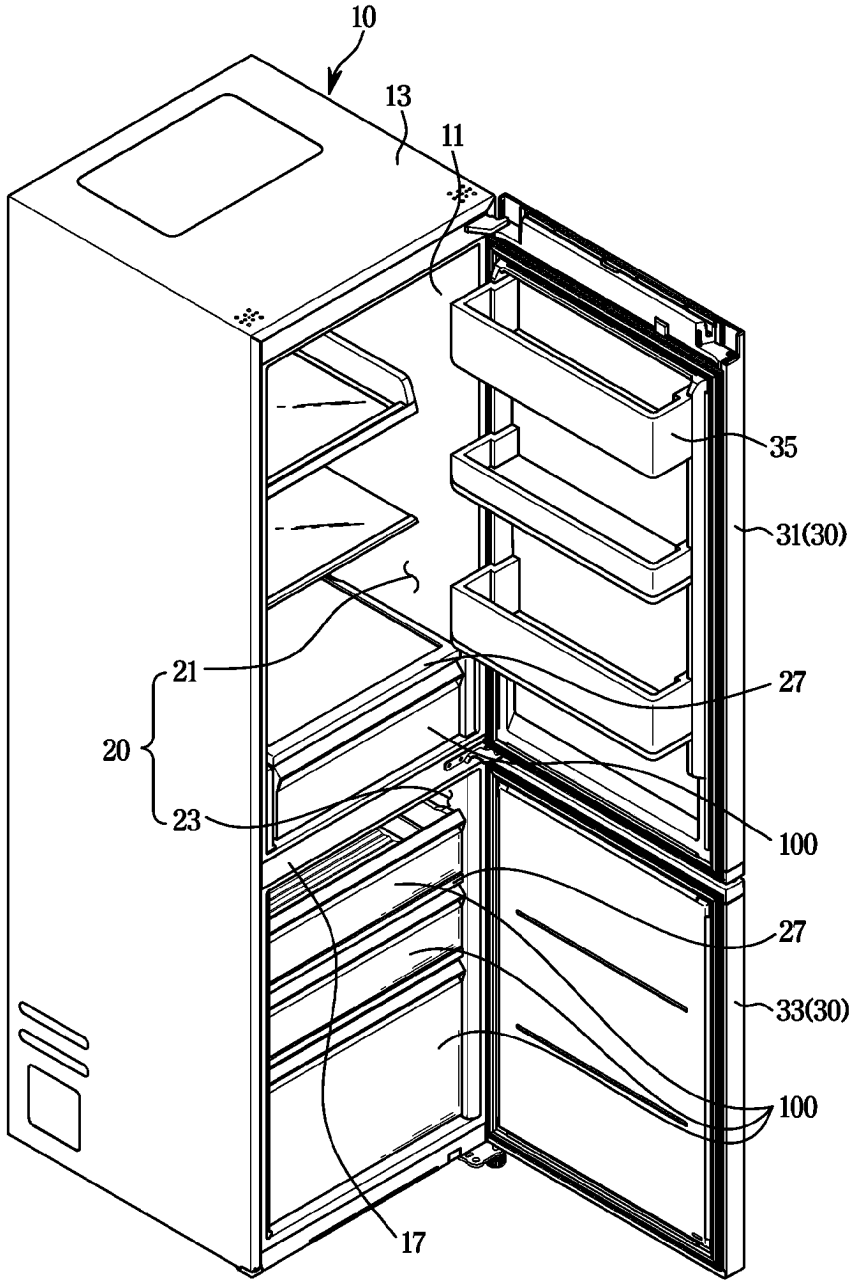


FIG. 2

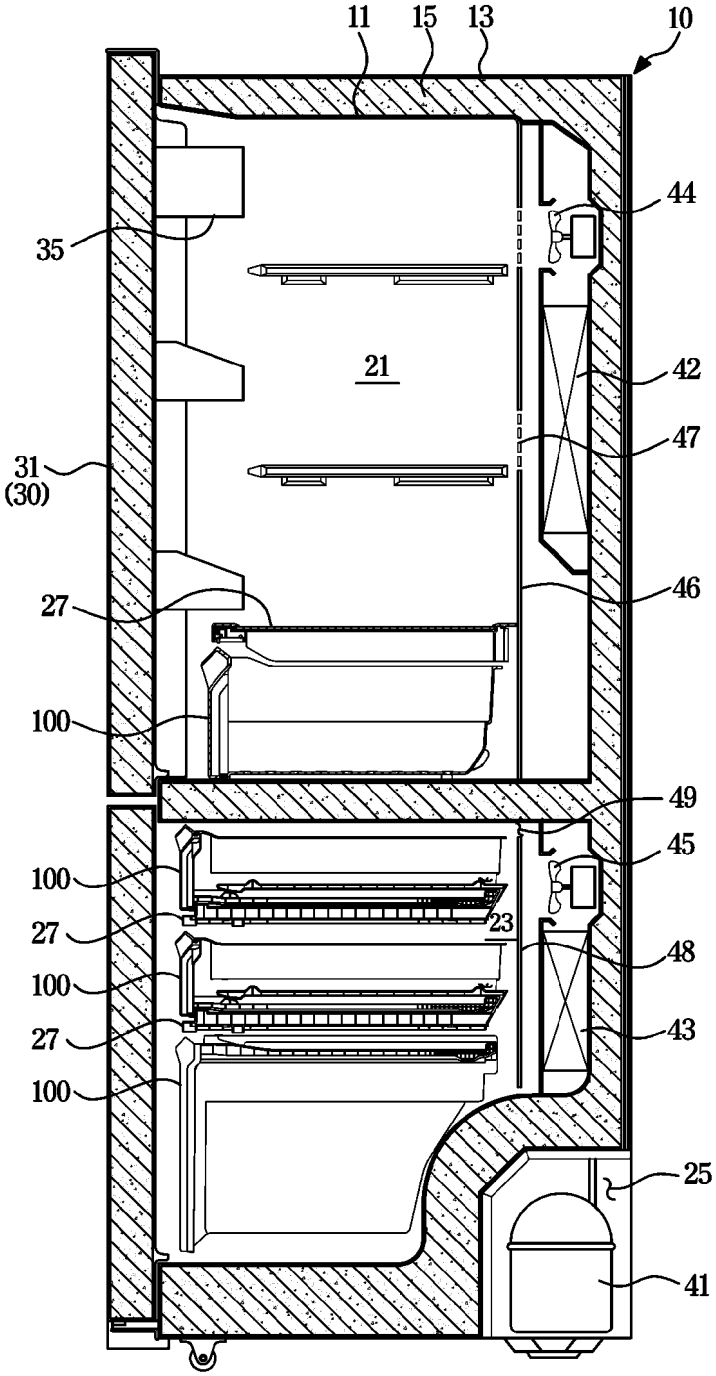

11
15
13
10
44
35
21
42
47
31
(30)
46
27
100
49
45
100
23
27
48
100
43
27
100
25
41

FIG. 3

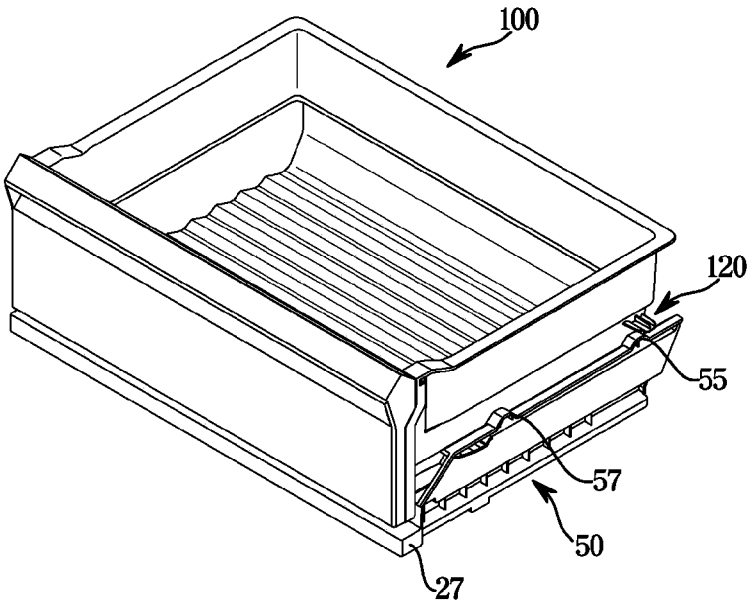


FIG. 4

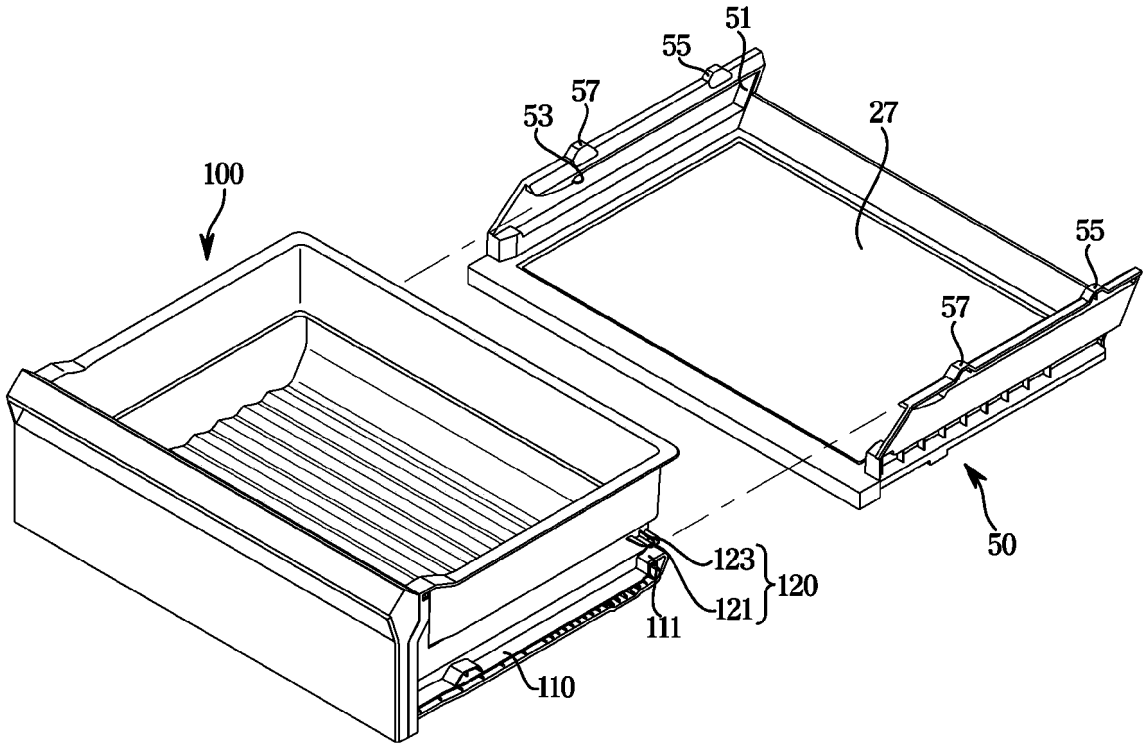


FIG. 5

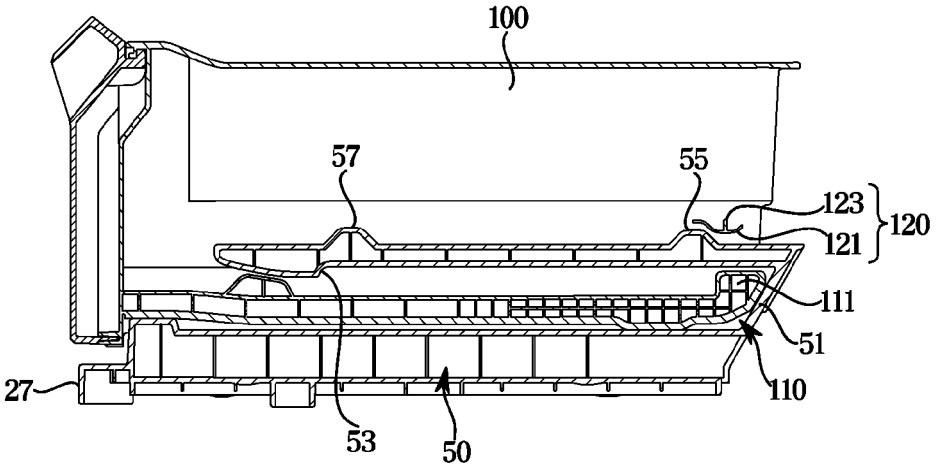


FIG. 6

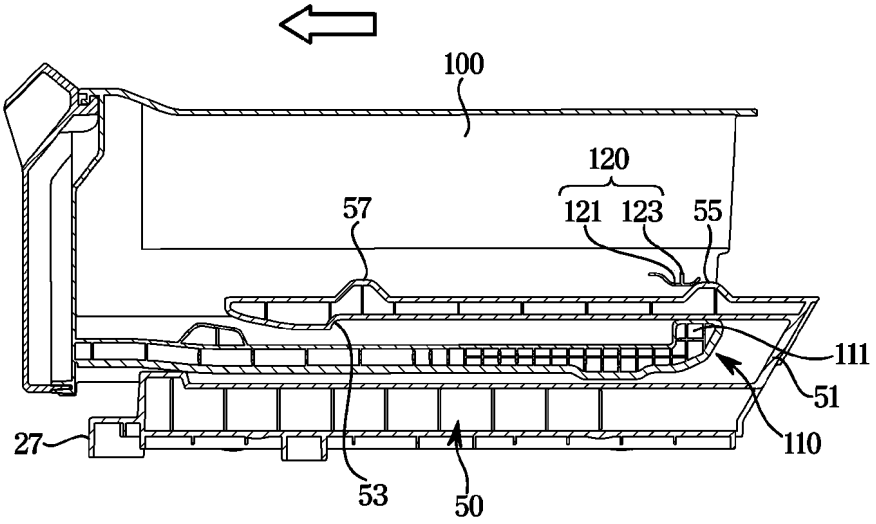


FIG. 7

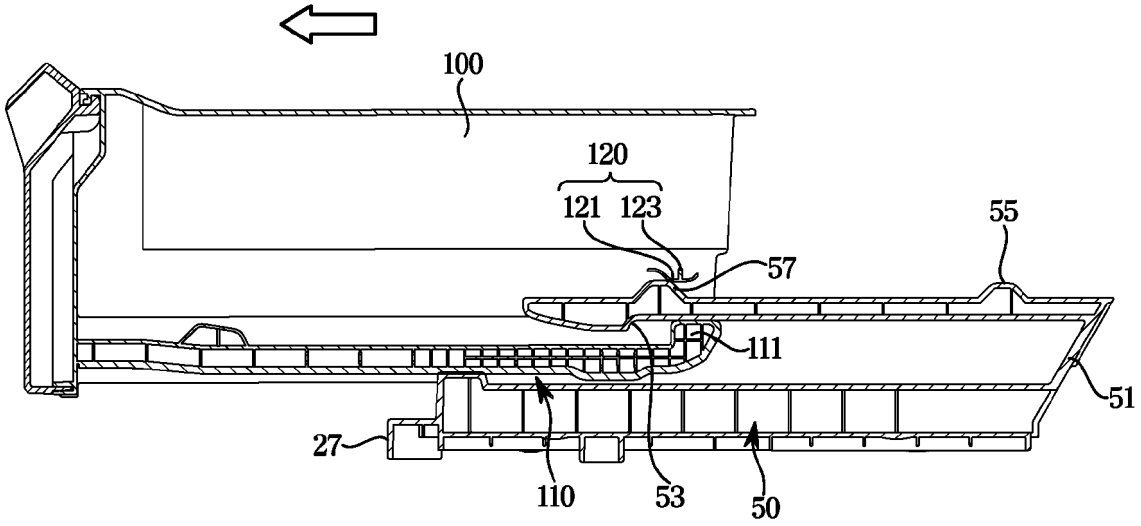


FIG. 8

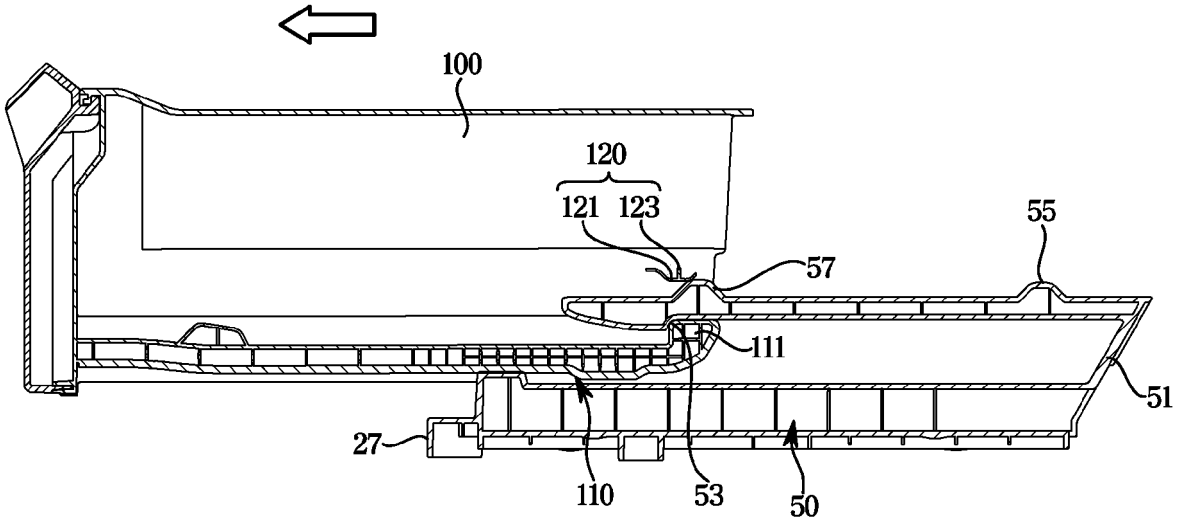


FIG. 9

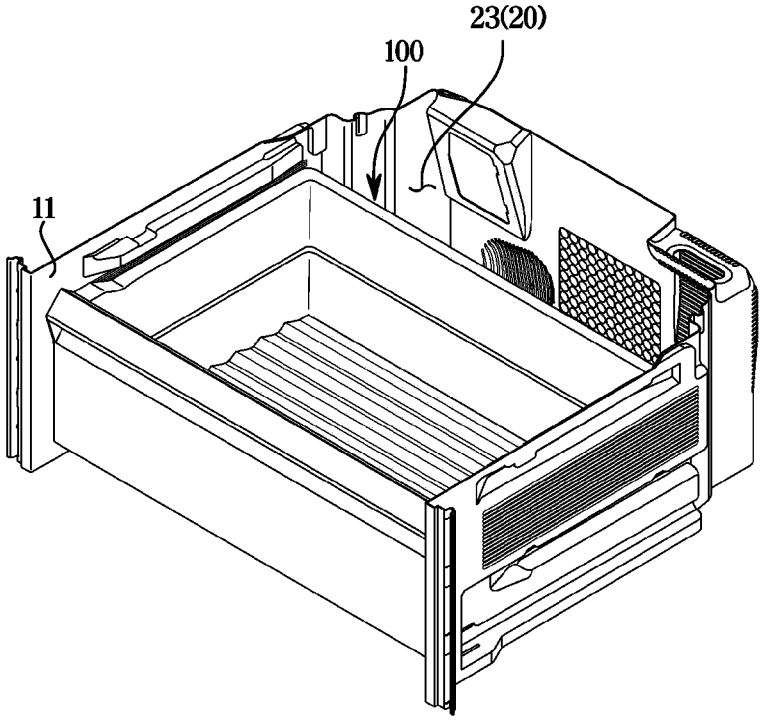


FIG. 10

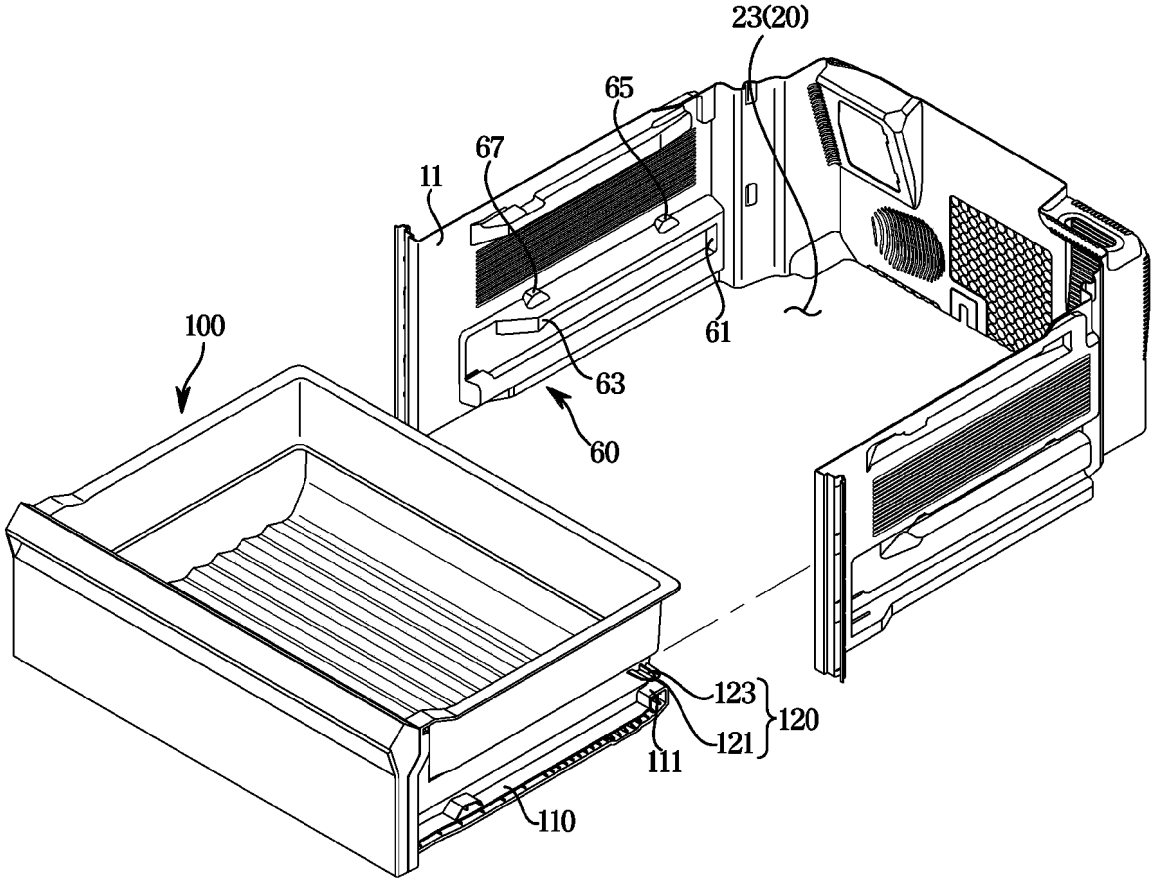


FIG. 11

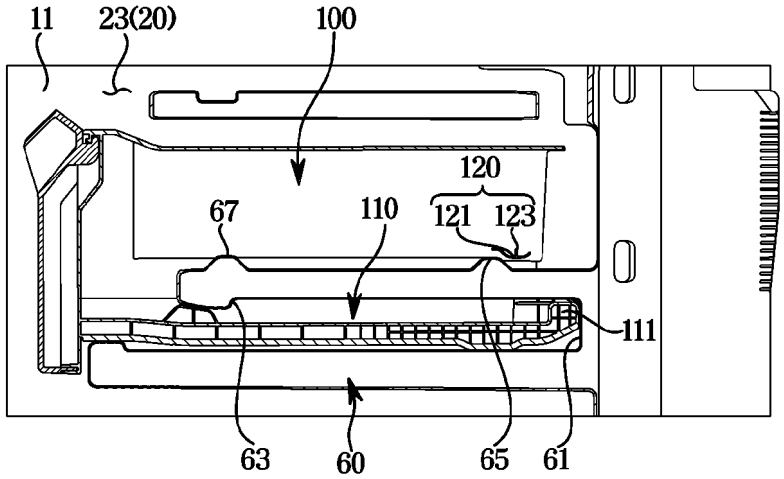


FIG. 12

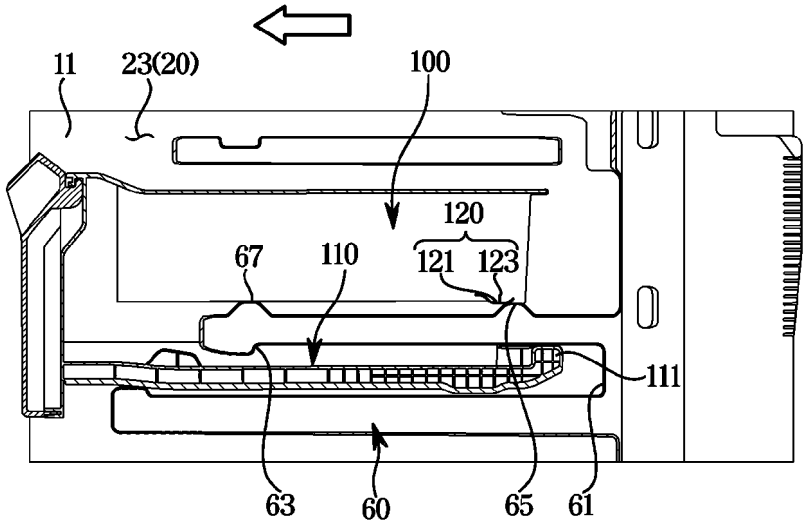


FIG. 13

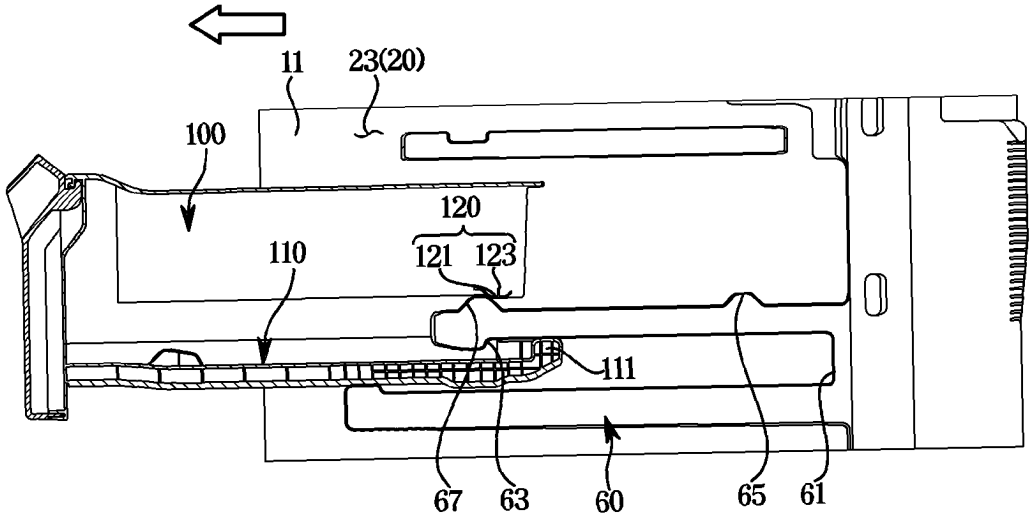


FIG. 14

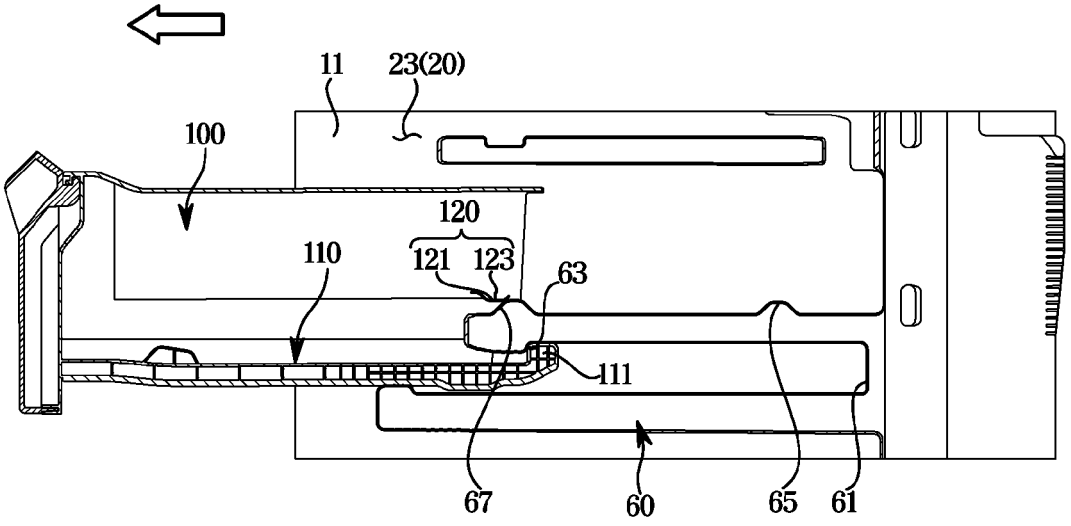


FIG. 15

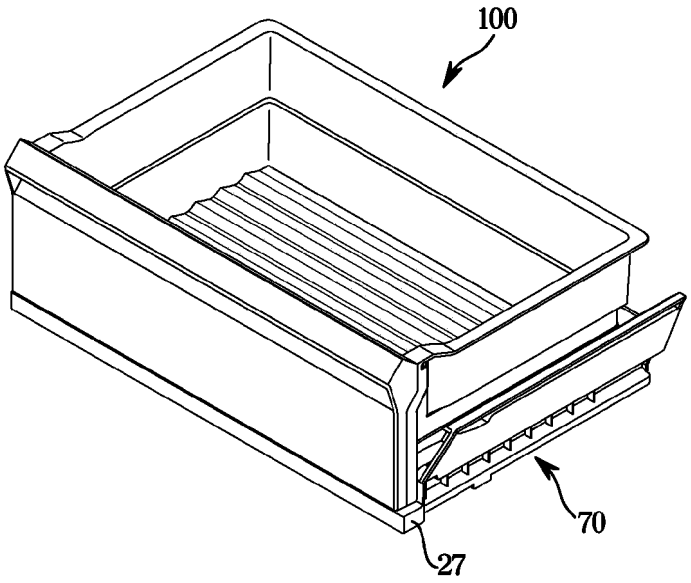


FIG. 16

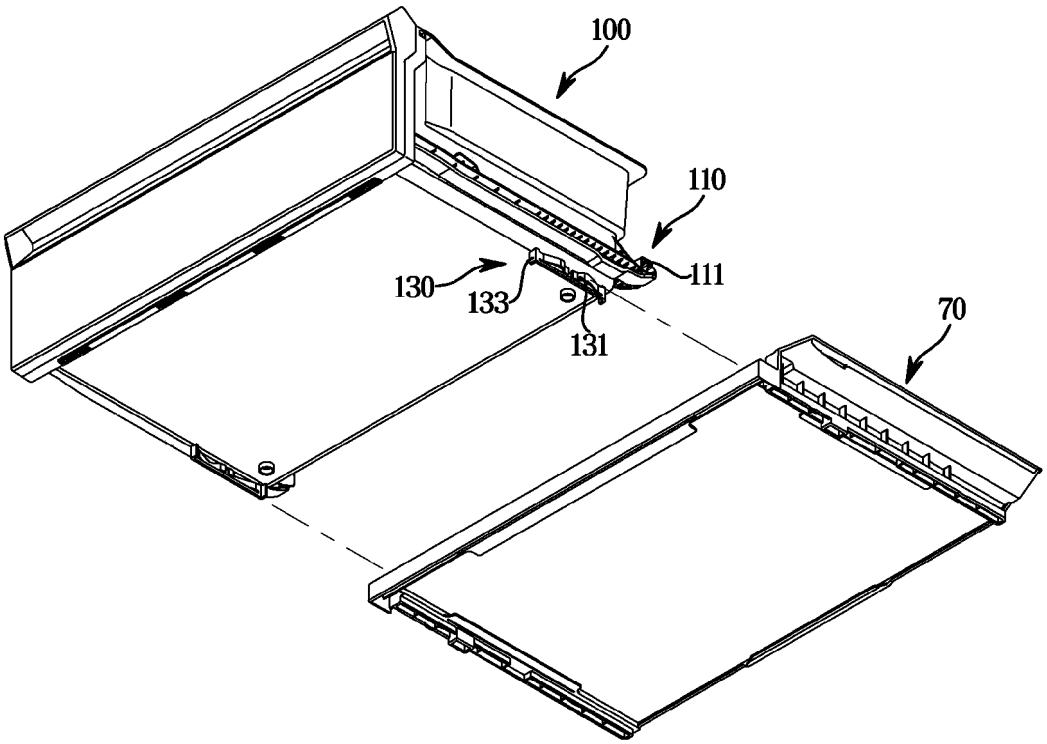


FIG. 17

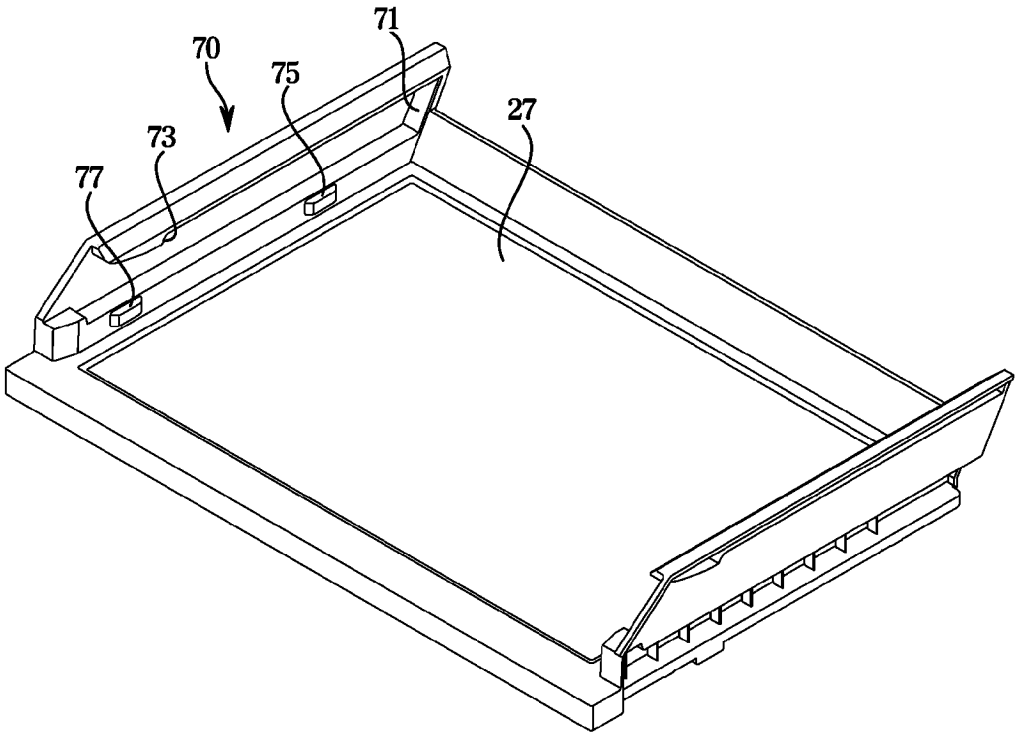


FIG. 18

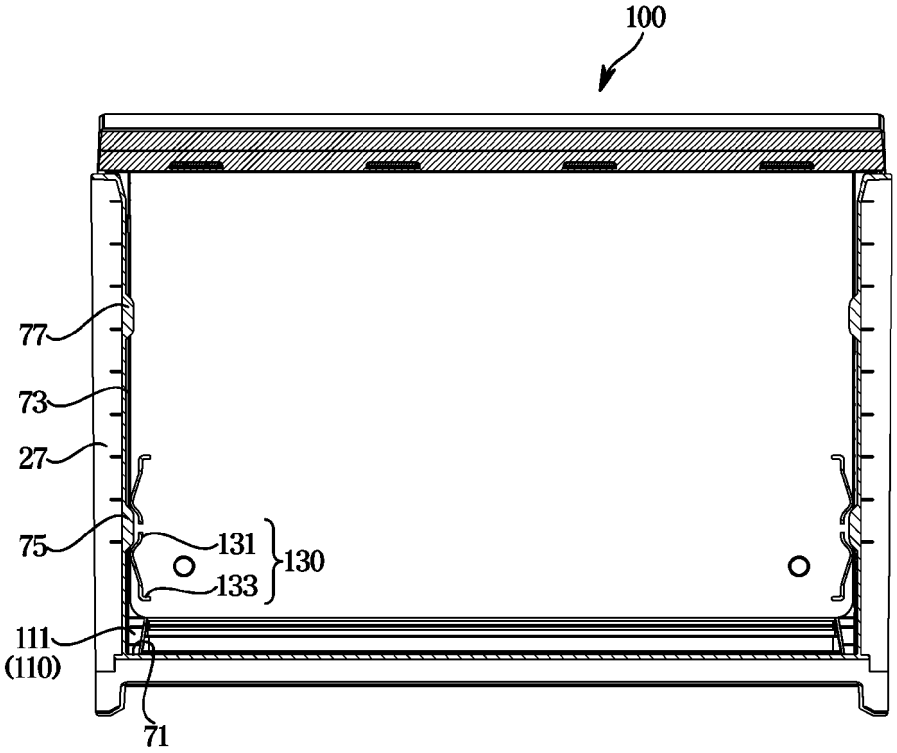


FIG. 19

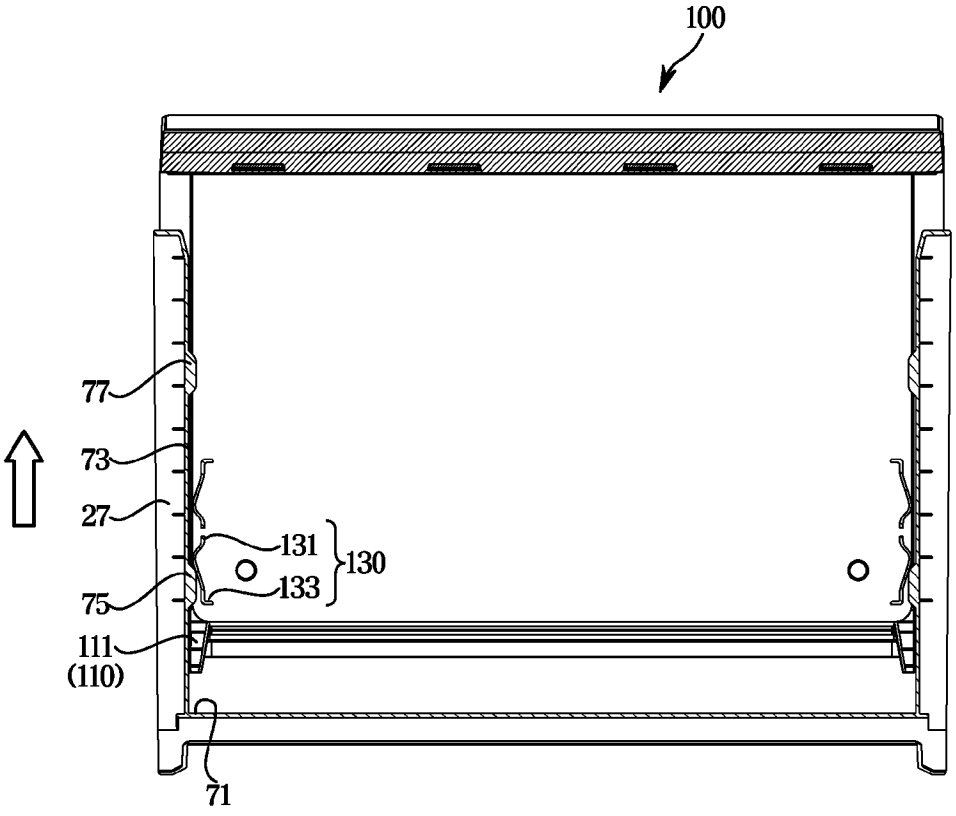


FIG. 20

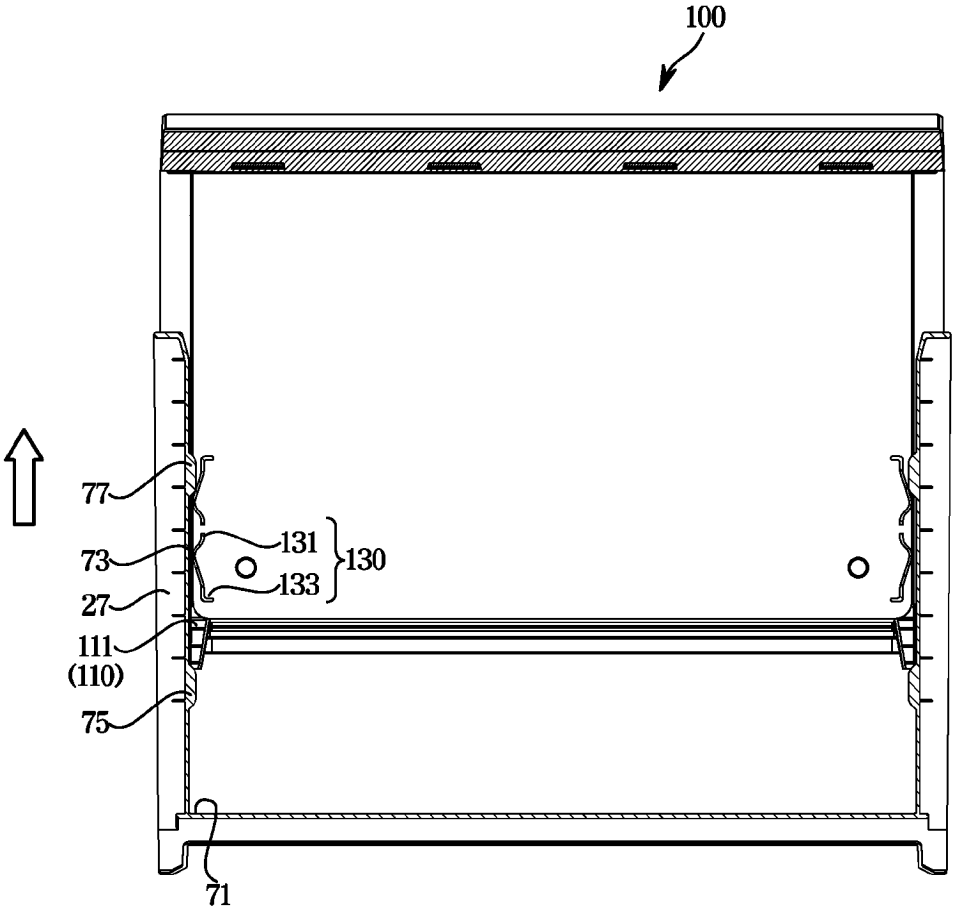


FIG. 21

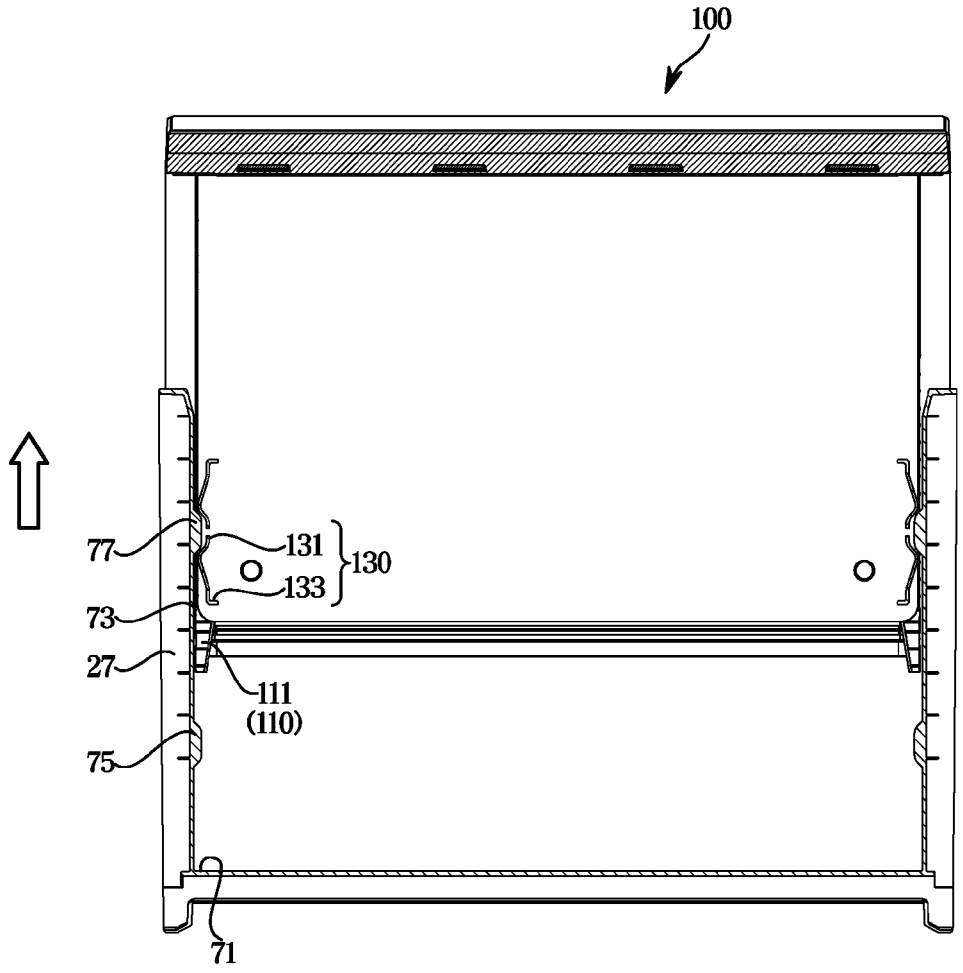


FIG. 22

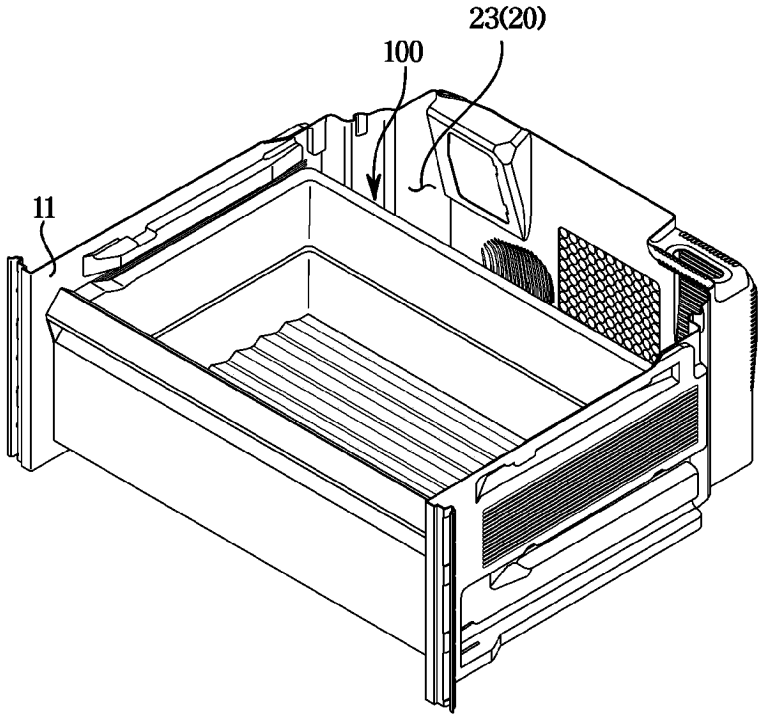


FIG. 23

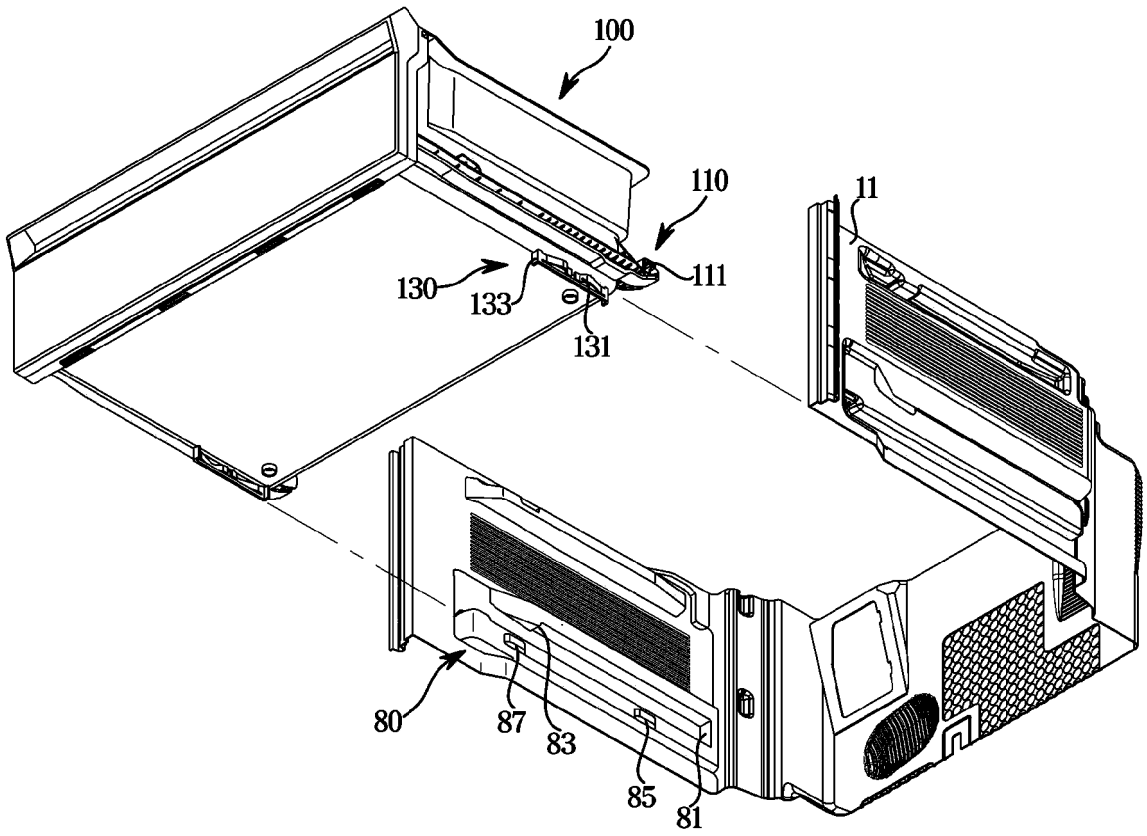


FIG. 24

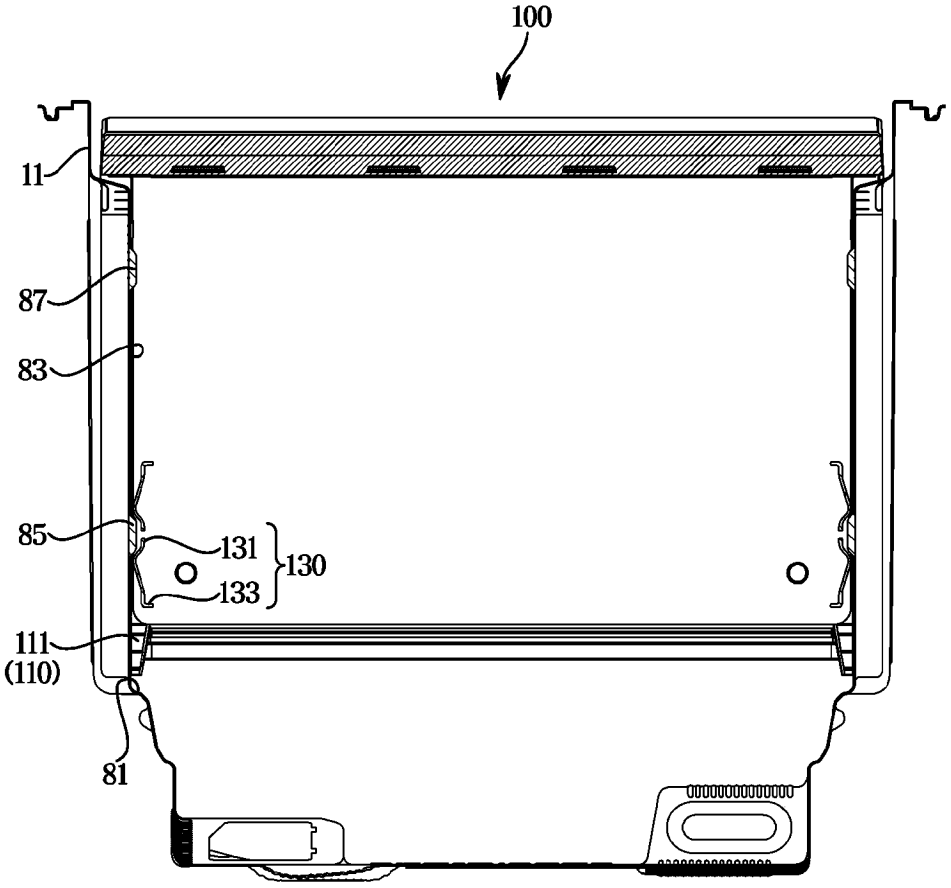


FIG. 25

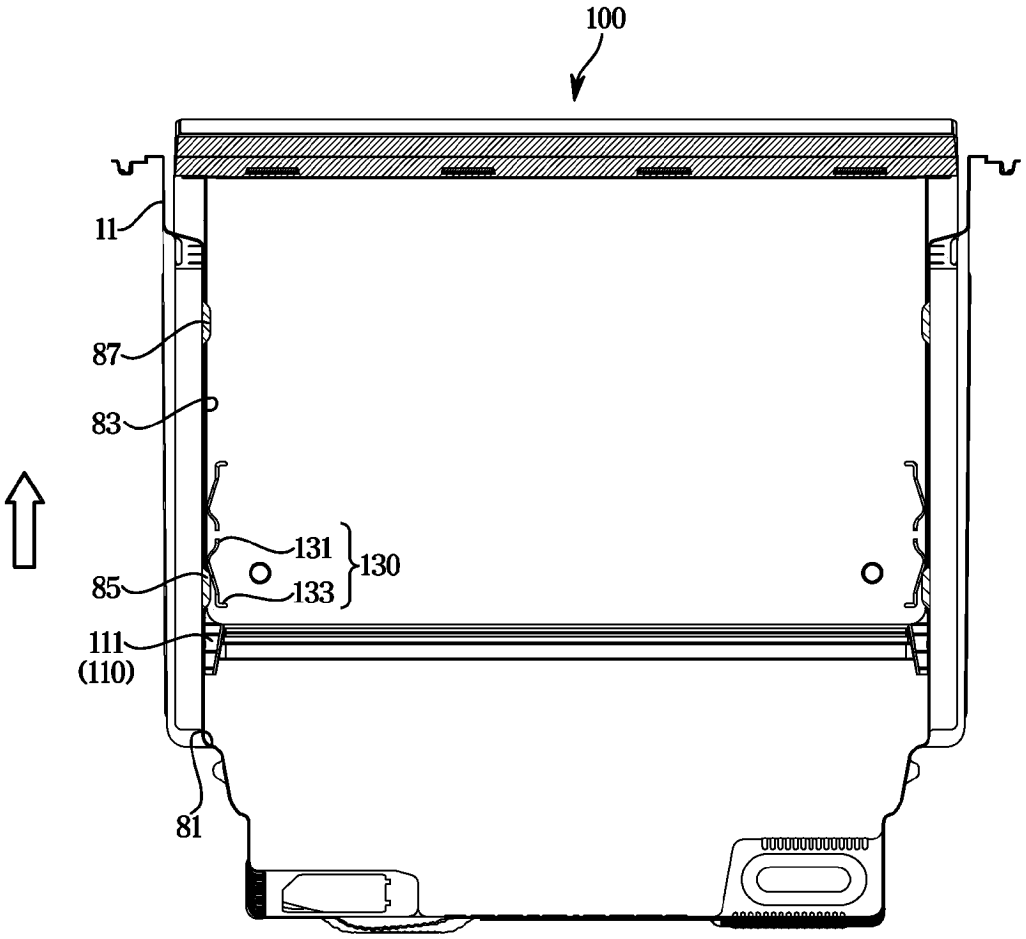


FIG. 26

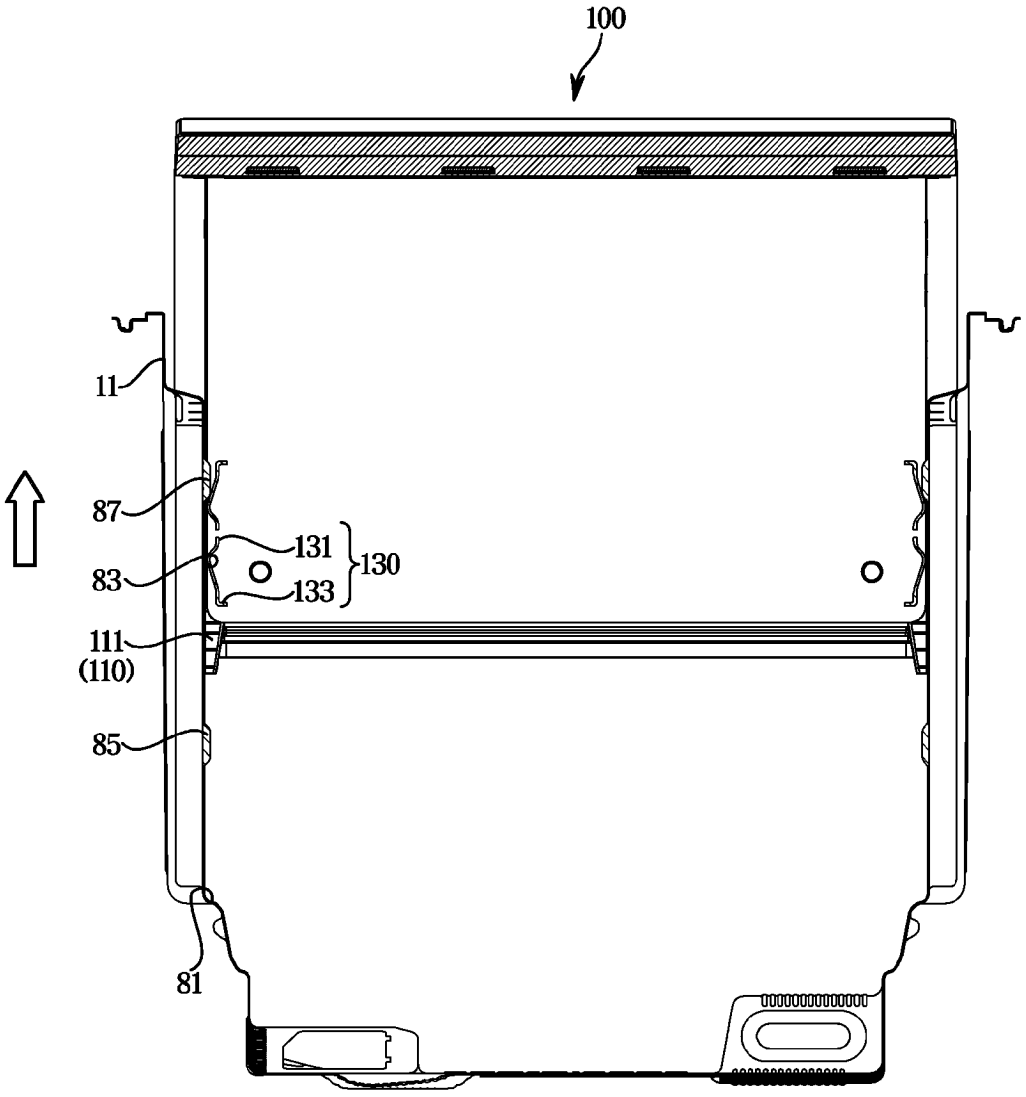


FIG. 27

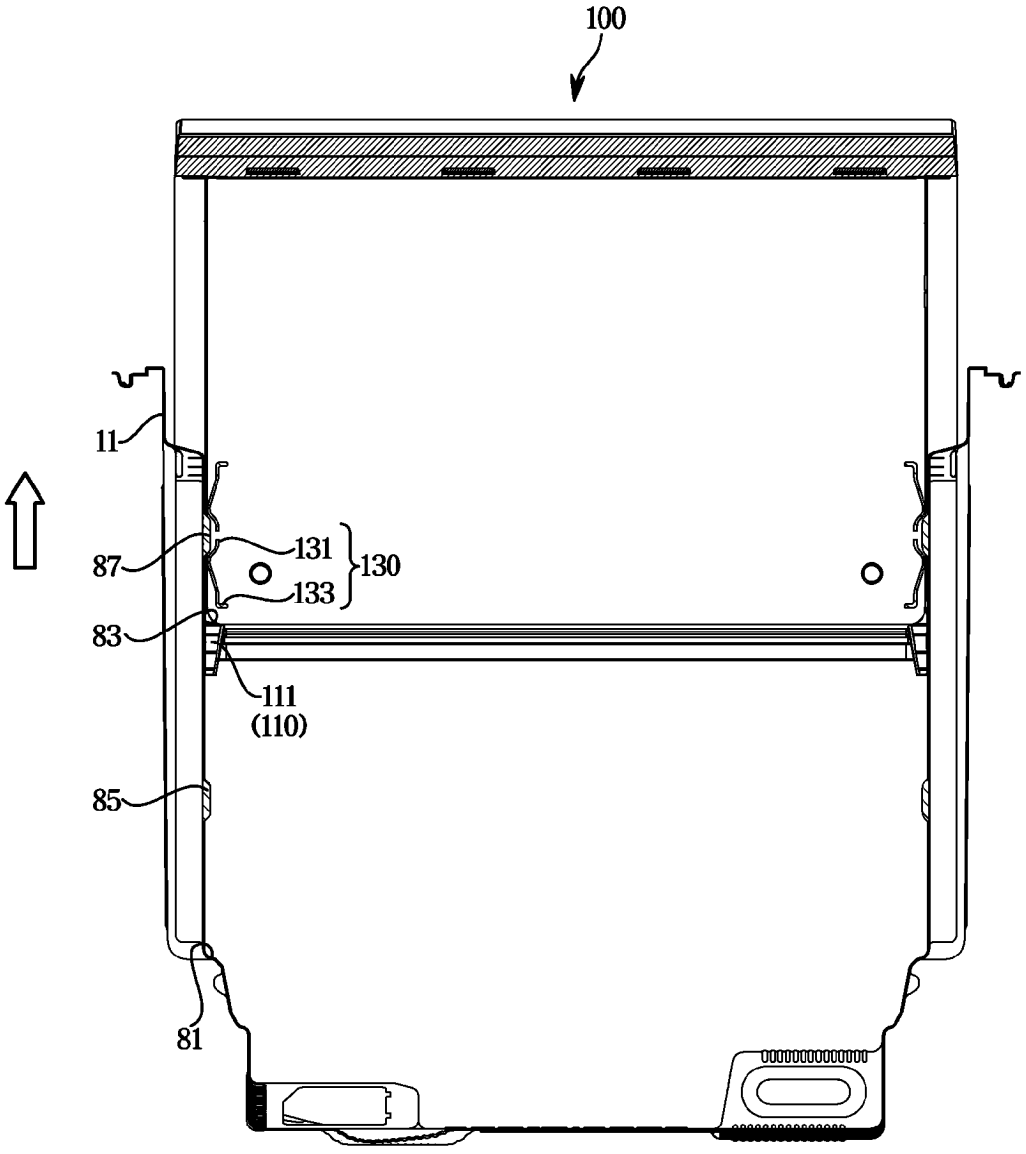


FIG. 28

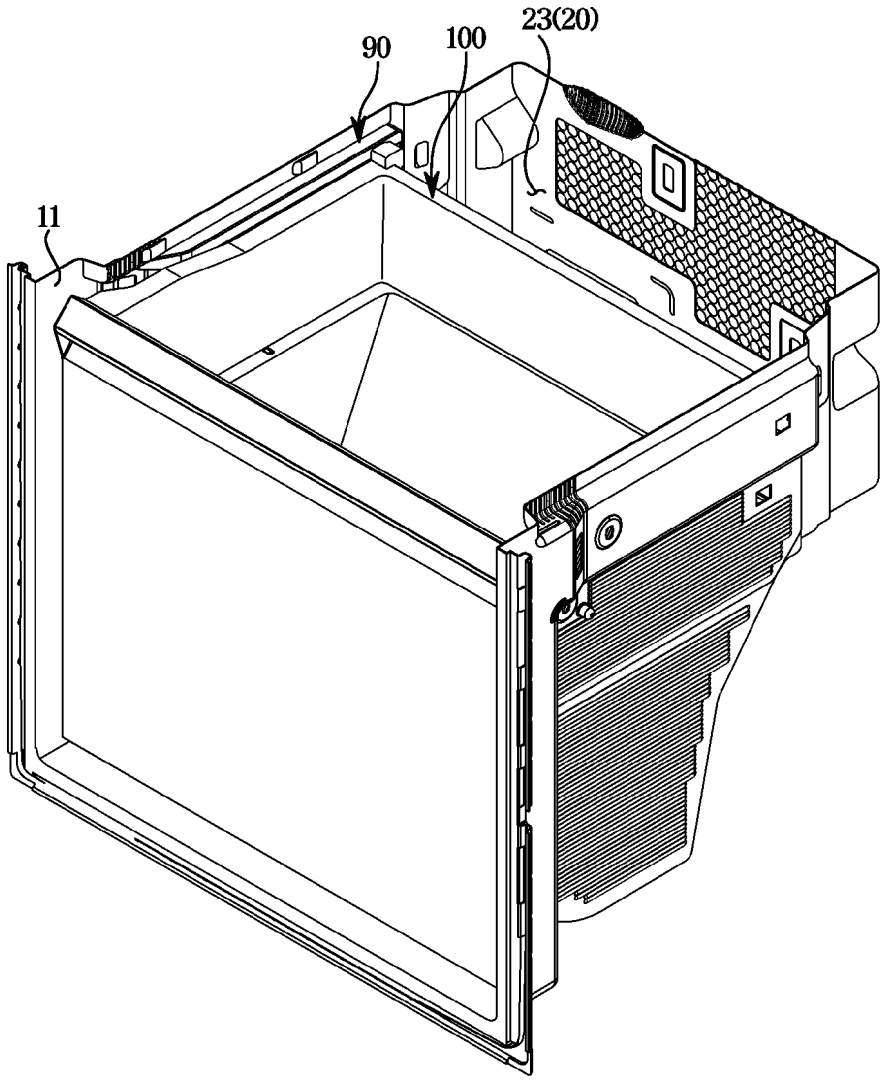


FIG. 29

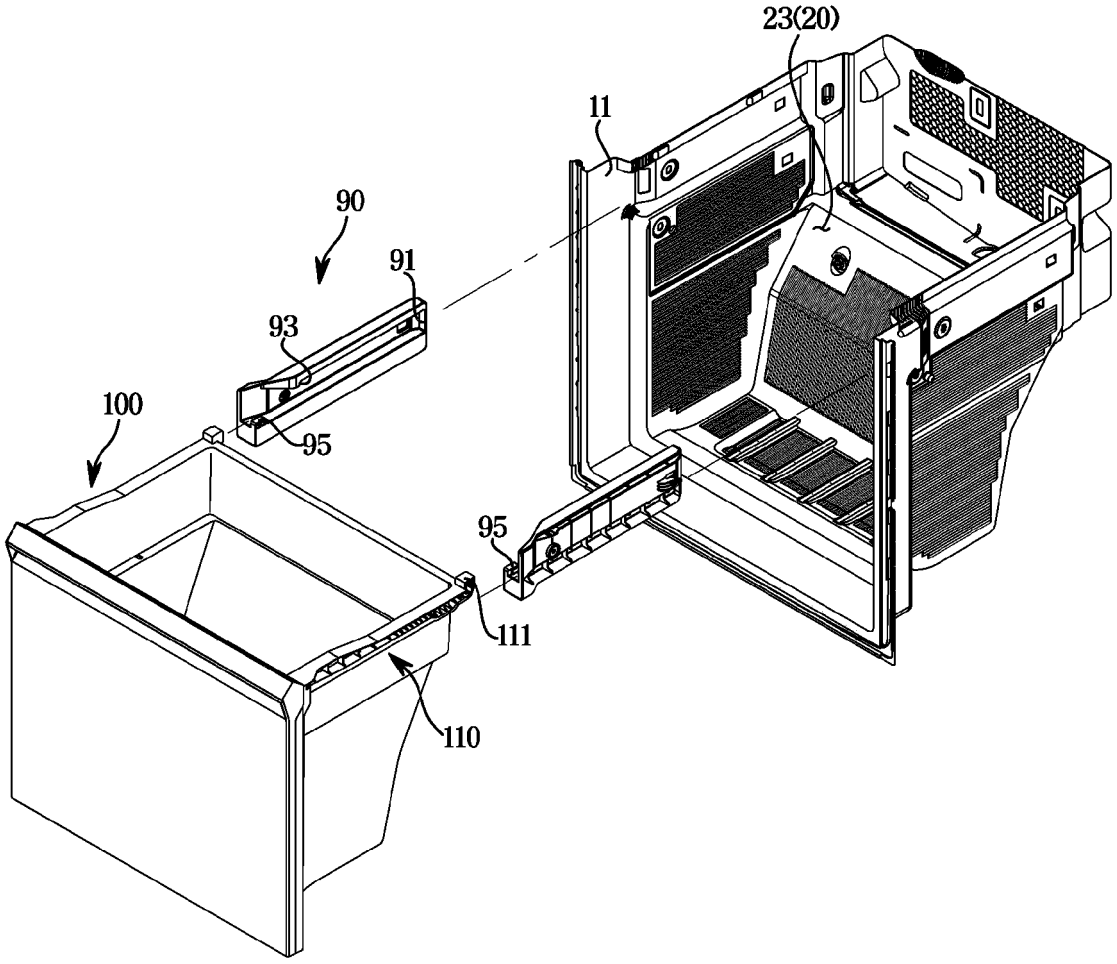


FIG. 30

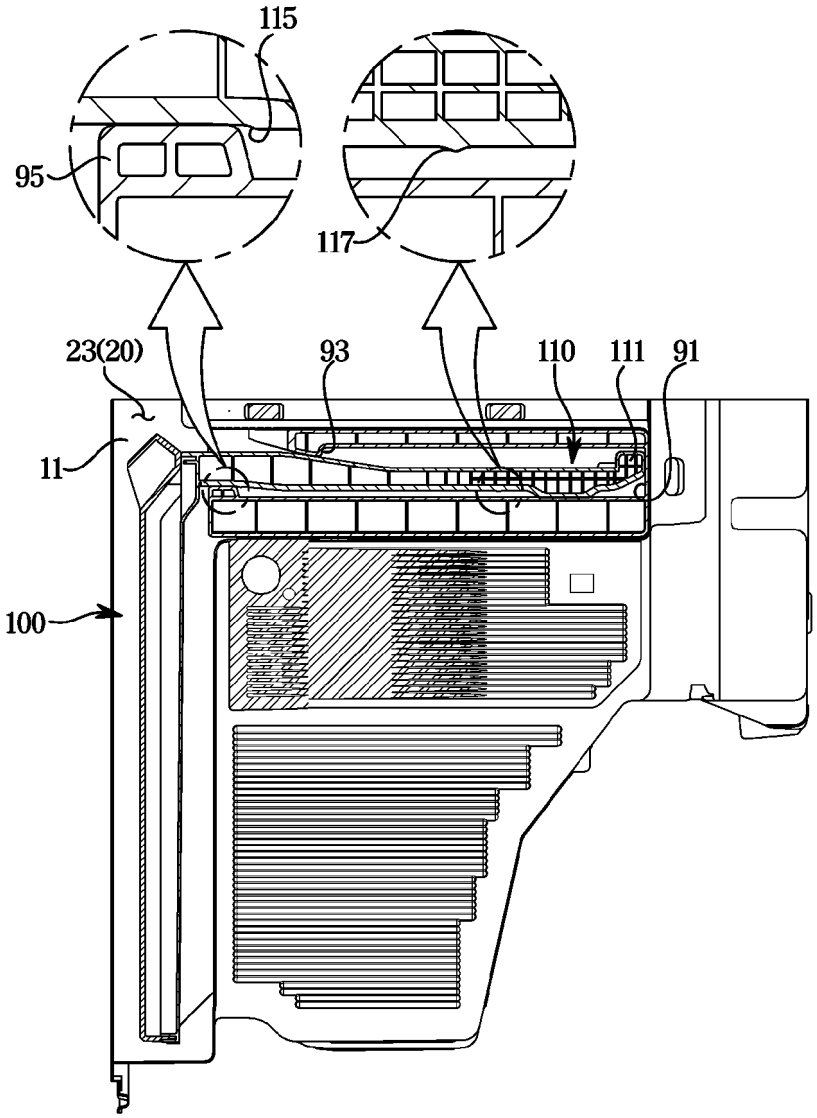


FIG. 31

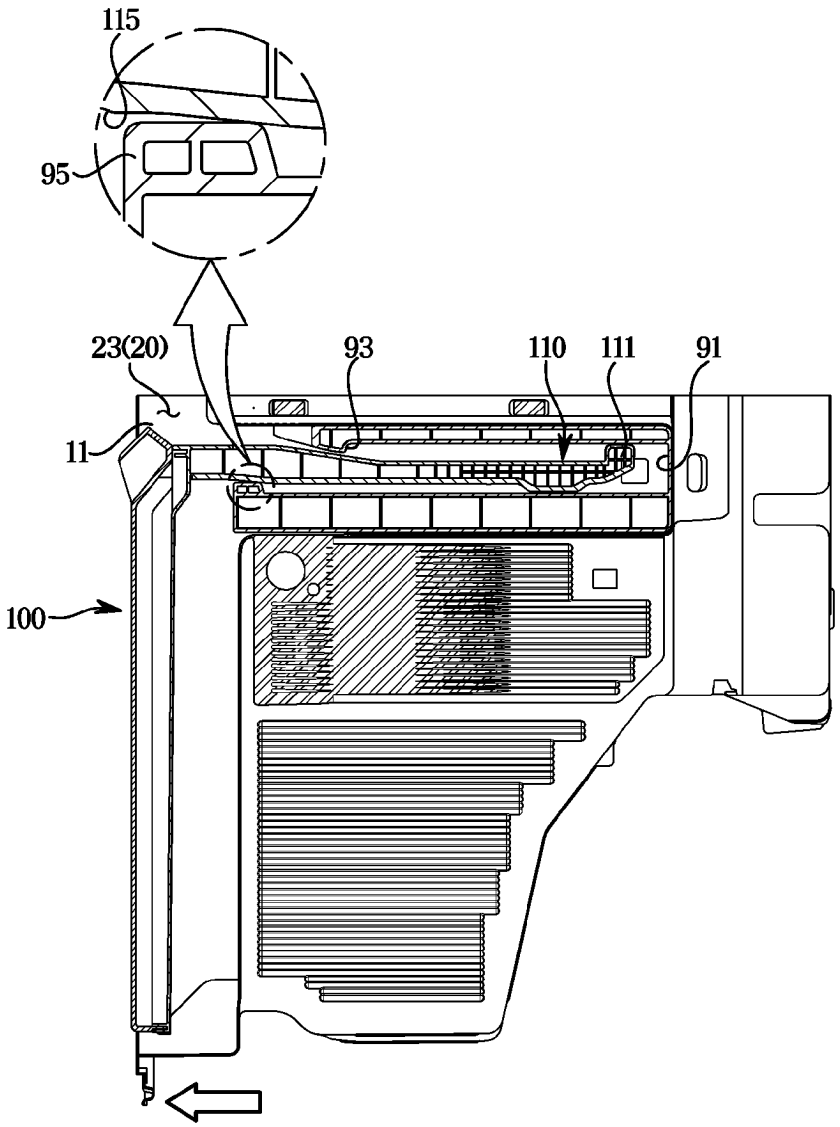


FIG. 32

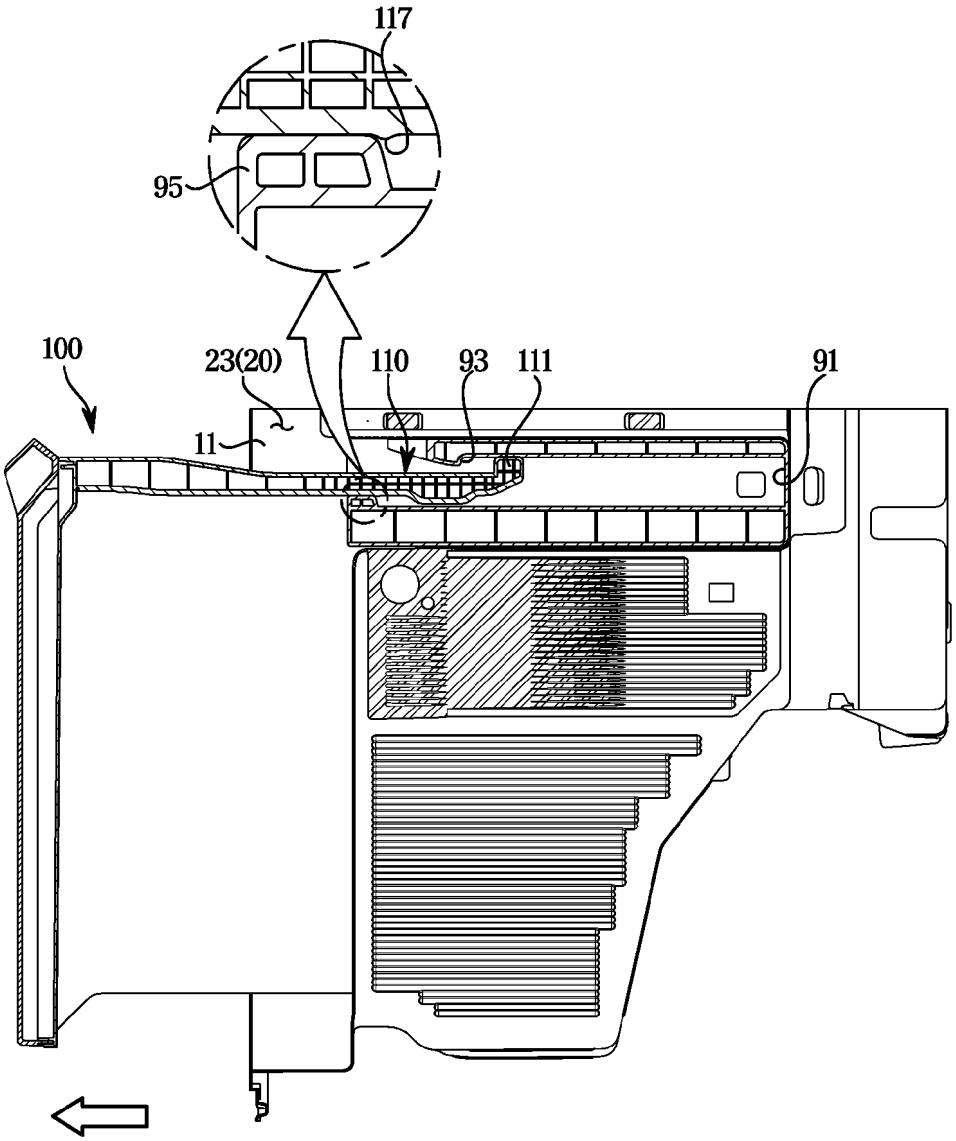
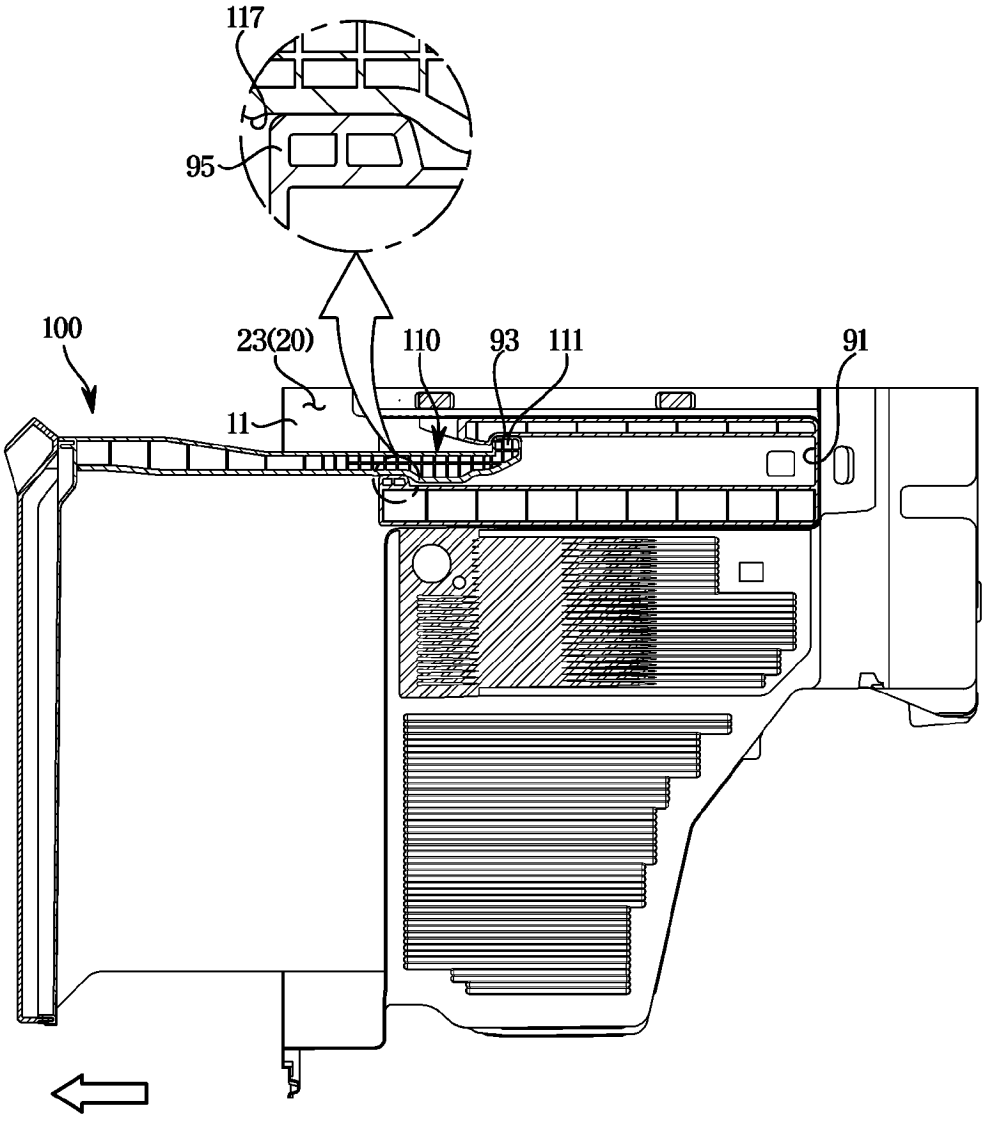


FIG. 33



# INTERNATIONAL SEARCH REPORT

International application No.
**PCT/KR2023/011584**

## A. CLASSIFICATION OF SUBJECT MATTER

**F25D 25/02**(2006.01)i; **F25D 23/06**(2006.01)i; **F25D 11/02**(2006.01)i; **A47B 88/477**(2017.01)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)

F25D 25/02(2006.01); A47B 88/00(2006.01); A47B 88/04(2006.01); F25D 17/04(2006.01); F25D 17/08(2006.01); F25D 23/02(2006.01); F25D 23/12(2006.01); F25D 25/00(2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models: IPC as above
Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & keywords: 서랍(drawer), 돌기(projection), 스토퍼(stopper), 댐퍼(damper), 냉장고(refrigerator)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| Y | KR 10-2006-0022428 A (LG ELECTRONICS INC.) 10 March 2006 (2006-03-10)<br>See paragraphs [0033], [0039], [0062], [0063], [0065], [0066] and [0070], claim 1 and figures 3 and 7. | 1-3 |
| A | | 4-15 |
| Y | KR 10-2005-0025233 A (TENMA CORPORATION) 14 March 2005 (2005-03-14)<br>See paragraphs [0023], [0025] and [0027] and figures 2-4. | 1-3 |
| A | JP 2007-003063 A (SHARP K.K.) 11 January 2007 (2007-01-11)<br>See paragraphs [0023] and [0027] and figures 6, 9 and 10. | 1-15 |
| A | KR 10-1861279 B1 (LG ELECTRONICS INC.) 25 May 2018 (2018-05-25)<br>See paragraphs [0072], [0073] and [0080] and figure 3. | 1-15 |
| A | WO 2017-163295 A1 (MITSUBISHI ELECTRIC CORP.) 28 September 2017 (2017-09-28)<br>See paragraphs [0030]-[0032] and figure 5. | 1-15 |

☐ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
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"D" document cited by the applicant in the international application
"E" earlier application or patent but published on or after the international filing date
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"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 | Date of mailing of the international search report |
|---|---|
| **28 November 2023** | **28 November 2023** |
| Name and mailing address of the ISA/KR<br>**Korean Intellectual Property Office**<br>**Government Complex-Daejeon Building 4, 189 Cheongsa-ro, Seo-gu, Daejeon 35208**<br>Facsimile No. **+82-42-481-8578** | Authorized officer<br><br>Telephone No. |

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**INTERNATIONAL SEARCH REPORT**
**Information on patent family members**

International application No.
**PCT/KR2023/011584**

| Patent document cited in search report | Publication date (day/month/year) | Patent family member(s) | Publication date (day/month/year) |
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