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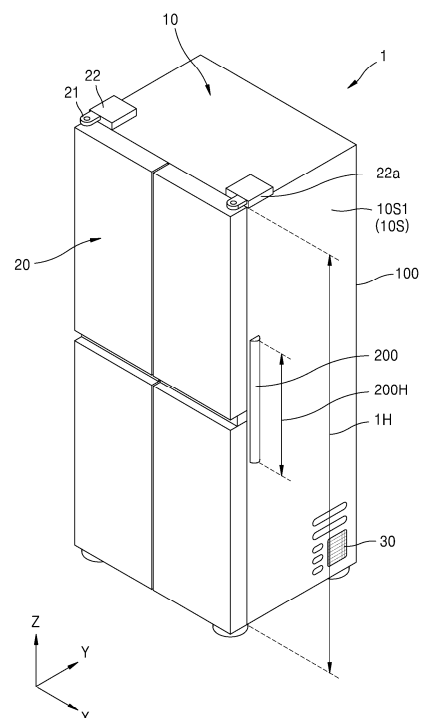
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(54) **REFRIGERATOR HAVING STOPPER BLOCK, AND BUILT-IN REFRIGERATOR SYSTEM EMPLOYING SAME**

(57) This disclosed refrigerator may comprise a body, a door and at least one stopper block. At least one storage chamber can be provided in the body. The door is connected to the body by a hinge so as to open and close the storage chamber. The stopper block can have a mounting surface and a guide surface. The mounting surface is a surface that can be coupled to a side surface in the width direction of the body. The guide surface is a surface opposite to the mounting surface. The stopper block protrudes from the side surface when coupled to the side surface of the body.

FIG. 1



EP 4 818 612 A1

Description**Technical Field**

- 5 **[0001]** The present disclosure relates to a refrigerator having a stopper block and a built-in refrigerator system employing the same.

Background Art

- 10 **[0002]** As an interior design of a modern home, there is a method of defining a space for installing a refrigerator by using a cabinet or the like and installing the refrigerator inside the cabinet. In general, an installation gap is secured between the refrigerator and the cabinet so that the refrigerator can be smoothly inserted into the cabinet and installed in position. Due to long-term use of the refrigerator, the refrigerator may shake during opening and closing of a door of the refrigerator. Due to the shaking, the refrigerator may become displaced. When an offset of the refrigerator reaches a certain level, the refrigerator may detach from the inside of the cabinet, and when the door is opened or closed, the door may collide with the cabinet. Such a collision may damage a door structure of the refrigerator and shorten the life of the refrigerator or the cabinet. In addition, the offset of the refrigerator may negatively affect the overall aesthetics and stability of the interior design including the cabinet and the refrigerator.

Disclosure of Invention**Solution to Problem**

- 25 **[0003]** A refrigerator according to an aspect of the present disclosure may include a main body, a door, and at least one stopper block. At least one storage compartment may be provided in the main body. The door is connected to the main body by a hinge to open and close the storage compartment. The stopper block may have a mounting surface and a guide surface. The mounting surface is a surface that can be coupled to a side surface of the main body in a width direction. The guide surface is opposite to the mounting surface. The stopper block protrudes from the side surface when coupled to the side surface of the main body.
- 30 **[0004]** A built-in refrigerator system according to an aspect of the present disclosure may include a cabinet defining an installation space and the above-described refrigerator installed in the installation space. The stopper block maintains a gap between the side surface of the refrigerator and a side wall of the cabinet.

Brief Description of Drawings

- 35 **[0005]**
- FIG. 1 is a schematic perspective view of a refrigerator according to an embodiment of the present disclosure.
- 40 FIG. 2 is a schematic plan view of the refrigerator shown in FIG. 1 according to an embodiment of the present disclosure.
- FIG. 3 is a schematic front view of a refrigerator system according to an embodiment of the present disclosure.
- FIG. 4 is a cross-sectional view taken along line A-A of FIG. 3.
- FIGS. 5 and 6 are plan views illustrating examples of a position change of a refrigerator in a built-in refrigerator system, according to the related art.
- 45 FIG. 7 is a schematic side view of a refrigerator showing an example of an arrangement position of a stopper block.
- FIG. 8 is a schematic side view of a refrigerator showing an example of an arrangement position of a stopper block.
- FIG. 9 is a schematic side view of a refrigerator showing an example of an arrangement position of a stopper block.
- FIGS. 10 and 11 are partial perspective views illustrating embodiments of a position indicator.
- FIG. 12 is a schematic cross-sectional view of a stopper block according to an embodiment of the present disclosure.
- 50 FIG. 13 illustrates an example of a positional relationship between a stopper block and a side wall of a cabinet.
- FIG. 14 is a schematic cross-sectional view of a stopper block according to an embodiment.
- FIG. 15 is a schematic cross-sectional view of a stopper block according to an embodiment.
- FIG. 16 is a schematic cross-sectional view of a stopper block according to an embodiment.
- FIG. 17 is a schematic configuration diagram of a separation prevention portion according to an embodiment.
- 55 FIG. 18 is a schematic configuration diagram of a separation prevention portion according to an embodiment.
- FIG. 19 illustrates an example of a combination of two stopper pads and one stopper spacer.
- FIG. 20 is a schematic cross-sectional view of a stopper block according to an embodiment.
- FIG. 21 is a schematic cross-sectional view of a stopper block according to an embodiment.

FIG. 22 is a schematic partial perspective view of a refrigerator according to an embodiment.

FIG. 23 is a schematic partial perspective view of a refrigerator according to an embodiment.

Mode for the Invention

[0006] Various embodiments of the disclosure and terms used therein are not intended to limit the disclosure to particular modes of practice, and it is to be appreciated that various modifications, equivalents, and/or alternatives that do not depart from the spirit and technical scope of the disclosure are encompassed in the disclosure.

[0007] In connection with the description of the drawings, like reference numerals may be used to denote like elements or components.

[0008] A singular form of a noun corresponding to an item may include one or a plurality of the items, unless the context clearly indicates otherwise.

[0009] In the present disclosure, each of phrases such as "A or B," "at least one of A and B," "at least one of A or B," "A, B, or C," "at least one of A, B, and C," and "at least one of A, B, or C" may include any one of, or all possible combinations of items enumerated together in a corresponding one of the phrases.

[0010] The term "and/or" includes a combination of a plurality of related described components or any of a plurality of related described components.

[0011] Terms such as "1st" and "2nd", or "first" and "second" may be used to simply distinguish a component from another component, and do not limit the components in another aspect (e.g., importance or order).

[0012] In addition, terms such as "front surface", "rear surface", "upper surface", "lower surface", "side surface", "left side", "right side", "upper portion", and "lower portion" used in the present disclosure are defined based on the drawings, and the shape and position of each component are not limited by these terms.

[0013] Terms such as "include" or "comprise" may be construed to denote a certain characteristic, number, step, operation, component, or a combination thereof, but may not be construed to exclude the existence of or a possibility of addition of one or more other characteristics, numbers, steps, operations, components, or combinations thereof.

[0014] When a component is said to be "connected," "coupled," "supported," or "in contact" with another component, this includes not only cases where the components are directly connected to, coupled to, supported by, or in contact with each other, but also cases where the components are indirectly connected to, coupled to, supported by, or in contact with each other through a third component.

[0015] When a component is referred to as being "on" another component, not only may the component be directly on another component or between two intervening components, but also another component may exist between the two components.

[0016] The present disclosure provides a built-in refrigerator and a built-in refrigerator system, which overcome problems of it being difficult to locate a refrigerator casing during use of a refrigerator, and the refrigerator casing being easily damaged due to collision with a cabinet. However, the technical objectives to be achieved by the present disclosure are not limited to the above-described objectives, and other technical objectives that are not mentioned herein would be clearly understood by a person skilled in the art from the description of the present disclosure.

[0017] Hereinafter, embodiments of a built-in refrigerator and a built-in refrigerator system related to the present disclosure will be described in detail so that those skilled in the art to which the present disclosure pertains can easily implement the embodiments. However, the disclosure may be implemented in various forms and are not limited to the embodiments described below. In addition, in the drawings, parts irrelevant to the description are omitted in order to clearly describe the present disclosure, and similar parts are referenced with similar reference numerals throughout the specification.

[0018] FIG. 1 is a schematic perspective view of a refrigerator 1 according to an embodiment of the present disclosure.

FIG. 2 is a schematic plan view of the refrigerator 1 shown in FIG. 1 according to an embodiment of the present disclosure.

The refrigerator 1 of the present embodiment is a so-called built-in refrigerator installed inside a cabinet 3 (see FIG. 3) defining an installation space. Referring to FIGS. 1 and 2, the refrigerator 1 according to an embodiment may include a main body 10 including at least one storage compartment 11, a door 20 connected to the main body 10 by a hinge 21 to open and close the storage compartment 11, and at least one stopper block 200 configured to be coupled to a side surface 10S of the main body 10.

[0019] The main body 10 may include an inner case, an outer case disposed outside the inner case, and an insulation material provided between the inner case and the outer case. The inner case may include at least one of a case, a plate, a panel, or a liner forming the storage compartment 11. The inner case may be formed as one body, or may be formed by assembling a plurality of plates. The outer case may form the exterior of the main body 10, and may be coupled to the outer side of the inner case such that the insulation material is disposed between the inner case and the outer case.

[0020] The insulation material may insulate the inside of the storage compartment 11 from the outside of the storage compartment 11 so that the internal temperature of the storage compartment 11 may be maintained at a set appropriate temperature without being affected by the external environment of the storage compartment 11. According to an

embodiment, the insulation material may include a foam insulation material. The foam insulation material may be molded by injecting and foaming urethane foam, in which polyurethane and a foaming agent are mixed, between the inner case and the outer case.

[0021] According to an embodiment, the insulation material may include a vacuum insulation material in addition to the foam insulation material, or the insulation material may include only the vacuum insulation material instead of the foam insulation material. The vacuum insulation material may include a core material, and an outer skin material accommodating the core material and sealing the inside thereof with a vacuum or a pressure close to vacuum. However, the insulation material is not limited to the foam insulation material or the vacuum insulation material, and may include various materials that may be used for insulation.

[0022] The storage compartment 11 may include a space defined by the inner case. The storage compartment 11 may further include an inner case defining a space corresponding to the storage compartment 11. Various items such as food, drugs, cosmetics, and the like may be stored in the storage compartment 11, and the storage compartment 11 may be formed such that at least one side thereof is open to store and retrieve the items.

[0023] The refrigerator 1 may include one or more storage compartments 11. When two or more storage compartments 11 are formed in the refrigerator 1, the respective storage compartments 11 may have different uses and may be maintained at different temperatures. To this end, the storage compartments 11 may be partitioned from each other by a partition wall including the insulation material.

[0024] The storage compartment 11 may be provided to be maintained in an appropriate temperature range according to the use, and may include a refrigerating compartment, a freezing compartment, or a variable temperature compartment divided according to the use and/or the temperature range. The refrigerating compartment may be maintained at a temperature suitable for refrigerating and storing the items, and the freezing compartment may be maintained at a temperature suitable for freezing the items. Refrigerating may refer to cooling items to a cold temperature above freezing, and for example, the refrigerating compartment may be maintained in a range of 0 degrees Celsius to 7 degrees Celsius. Freezing may refer to cooling the items so as to be maintained in a frozen state, and for example, the freezing compartment may be maintained in a range of minus 20 degrees Celsius to minus 1 degree Celsius. The variable temperature compartment may be used as any one of the refrigerating compartment or the freezing compartment according to a user's selection or regardless thereof.

[0025] The storage compartment 11 may be referred to using various names, such as a vegetable compartment, a fresh compartment, a cooling compartment, and an ice making compartment, in addition to the names of the refrigerating compartment, the freezing compartment, and the variable temperature compartment, and the terms, such as the refrigerating compartment, the freezing compartment, and the variable temperature compartment, used below should be understood as encompassing the storage compartment 11 having the corresponding use and temperature range.

[0026] According to an embodiment, the refrigerator 1 may include at least one door 20 configured to open and close one open side of the storage compartment 11. The door 20 may be provided to open and close each of the one or more storage compartments 11, or one door 20 may be provided to open and close the plurality of storage compartments 11. The door 20 may be rotatably or slidably installed on a front portion of the main body 10. The door 20 may be configured to seal the storage compartment 11 when the door 20 is closed. Like the main body 10, the door 20 may include an insulation material to insulate the storage compartment 11 when the door 20 is closed.

[0027] According to an embodiment, the door 20 may include a door outer plate forming a front surface of the door 20, a door inner plate forming a rear surface of the door 20 and facing the storage compartment 11, an upper cap, a lower cap, and a door insulation material provided in an inner space defined by the components described above.

[0028] A gasket may be provided at the edge of the door inner plate to seal the storage compartment 11 by being in close contact with the front surface of the main body 10 when the door 20 is closed. The door inner plate may include a dyke protruding rearward so that a door basket capable of storing items may be mounted.

[0029] According to an embodiment, the door 20 may include a door body and a front panel detachably coupled to a front side of the door body and forming the front surface of the door 20. The door body may include a door outer plate forming a front surface of the door body, a door inner plate forming a rear surface of the door body and facing the storage compartment 11, an upper cap, a lower cap, and a door insulation material provided in an inner space defined by the components described above.

[0030] The refrigerator 1 may be classified into a French door type, a side-by-side type, a bottom mounted freezer (BMF), a top mounted freezer (TMF), a one-door refrigerator, or the like according to the arrangement of the door 20 and the storage compartment 11.

[0031] According to an embodiment, the refrigerator 1 may include a cold air supply device provided to supply cold air to the storage compartment 11. The cold air supply device may include a machine, a mechanism, an electronic device, and/or a system combining the same capable of generating cold air and guiding the cold air to cool the storage compartment 11.

[0032] According to an embodiment, the cold air supply device may generate cold air through a refrigeration cycle including compression, condensation, expansion, and evaporation processes of a refrigerant. To this end, the cold air supply device may include a refrigeration cycle device that is capable of driving the refrigeration cycle and includes a

compressor, a condenser, an expansion device, and an evaporator. According to an embodiment, the cold air supply device may include a semiconductor such as a thermoelectric element. The thermoelectric element may cool the storage compartment 11 by a heating and cooling action through the Peltier effect.

[0033] According to an embodiment, the refrigerator 1 may include a machine room in which at least some components included in the cold air supply device are arranged. The machine room may be provided in the main body 10 to be partitioned and insulated from the storage compartment 11 in order to prevent heat generated from the components disposed in the machine room from being transferred to the storage compartment 11. The inside of the machine room may be configured to communicate with the outside of the main body 10 to dissipate heat from the components disposed inside the machine room.

[0034] According to an embodiment, the refrigerator 1 may include a dispenser provided on the door 20 to provide water and/or ice. The dispenser may be provided on the door so that the user can access the door 20 without opening the door.

[0035] According to an embodiment, the refrigerator 1 may include an ice making device provided to make ice. The ice making device may include an ice making tray for storing water, an ice separating device for separating ice from the ice making tray, and an ice bucket for storing ice generated in the ice making tray.

[0036] According to an embodiment, the refrigerator 1 may include a controller for controlling the refrigerator 1. The controller may include memory storing or memorizing programs and/or data for controlling the refrigerator 1, and a processor configured to output a control signal for controlling the cold air supply device according to the programs and/or data stored in the memory.

[0037] The memory stores or records various information, data, instructions, programs, and the like necessary for the operation of the refrigerator 1. The memory may store temporary data generated while a control signal for controlling components included in the refrigerator 1 is being generated. The memory may include at least one of a volatile memory or a non-volatile memory, or a combination thereof.

[0038] The processor controls the overall operation of the refrigerator 1. The processor may control the components of the refrigerator 1 by executing a program stored in the memory. The processor may include a separate NPU that performs the operation of the AI model. In addition, the processor may include a central processing unit, a graphics processing unit (GPU), and the like. The processor may generate a control signal for controlling an operation of the cold air supply device. For example, the processor may receive temperature information of the storage compartment 11 from a temperature sensor, and generate a cooling control signal for controlling the operation of the cold air supply device based on the temperature information of the storage compartment 11.

[0039] In addition, the processor may process a user input of a user interface according to the program and/or data memorized/stored in the memory, and control an operation of the user interface. The user interface may be provided using an input interface and an output interface. The processor may receive a user input from the user interface. In addition, the processor may transmit, to the user interface, a display control signal and image data for displaying an image on the user interface in response to a user input.

[0040] The processor and the memory may be provided integrally or separately. The processor may include one or more processors. For example, the processor may include a main processor and at least one sub-processor. The memory may include one or more memories.

[0041] According to an embodiment, the refrigerator 1 may include a processor and memory for controlling all components included in the refrigerator 1, and may include a plurality of processors and a plurality of memories for individually controlling the components of the refrigerator 1. For example, the refrigerator 1 may include a processor and memory that control the operation of the cold air supply device according to the output of the temperature sensor. In addition, the refrigerator 1 may separately include a processor and memory for controlling the operation of the user interface according to the user input.

[0042] A communication module may communicate with an external device, such as a server, a mobile device, other home appliances, and the like, through an access point (AP). The AP may connect a local area network (LAN), to which the refrigerator 1 or a user equipment is connected, to a wide area network (WAN) to which the server is connected. The refrigerator 1 or the user equipment may be connected to the server through the wide area network (WAN).

[0043] The input interface may include a key, a touch screen, a microphone, and the like. The input interface may receive a user input and transmit the user input to the processor.

[0044] The output interface may include a display, a speaker, and the like. The output interface may output various notifications, messages, information, and the like generated by the processor.

[0045] Referring to FIGS. 1 and 2, the refrigerator 1 may have an overall rectangular parallelepiped shape. In FIG. 1, when the refrigerator 1 is viewed from the front, that is, from the door 20 side, an X direction indicates a left-right direction (or a width direction), a Y direction indicates a front-rear direction (or a depth direction), and a Z direction indicates an up-down direction. The main body 10 may have a rectangular parallelepiped shape with an open front portion, and one or more doors 20, for example, four doors 20, may be supported on the main body 10 to open and close the front portion of the main body 10. The front portion of the refrigerator 1 may be defined by the door 20. An upper surface, a lower surface, a rear surface, and side surfaces 10S1 and 10S2 of the refrigerator 1 may be defined by an outer case 100 of the main body 10.

The upper surface, the lower surface, the rear surface, and the side surfaces 10S1 and 10S2 of the refrigerator 1 may be referred to as an upper surface, a lower surface, a rear surface, and side surfaces 10S1 and 10S2 of the main body 10. A ventilation portion 30 may be provided on at least one of the side surfaces 10S1 and 10S2 of the main body 10. The ventilation portion 30 is for communicating the above-described machine room provided in the main body 10 with the outside. The ventilation portion 30 may be implemented in various forms. For example, the ventilation portion 30 may be implemented by one or more ventilation holes, one or more ventilation slots, and/or a combination thereof.

[0046] The door 20 may be rotatably connected to the main body 10 by, for example, a hinge 21. Although not shown in the drawings, the hinge 21 may have a one-axis hinge structure, and may have a multi-axis hinge structure of two or more axes in order to reduce the rotation radius of the door 20. For example, in the embodiment shown in FIG. 1 in which four doors 20 are arranged in a 2×2 form in the up-down direction Z and the left-right direction X, each door 20 is rotatably supported on the main body 10 by two upper and lower hinges 21. Accordingly, four hinges 21 are arranged in the up-down direction at positions adjacent to the side surface 10S1, and four hinges 21 are arranged in the up-down direction at positions adjacent to the side surface 10S2.

[0047] FIG. 3 is a schematic front view of the refrigerator system 2 according to an embodiment of the present disclosure. FIG. 4 is a cross-sectional view taken along line A-A of FIG. 3. In FIG. 4, only the outline of the refrigerator 1 is briefly shown. Referring to FIGS. 3 and 4, a refrigerator system 2 may include a cabinet 3 defining an installation space S, and a refrigerator 1 installed in the installation space S inside the cabinet 3.

[0048] The cabinet 3 may be implemented in various forms. In an embodiment, the cabinet 3 may be implemented by a wall or the like defining an indoor space. As an embodiment, the cabinet 3 may be installed in the indoor space as a separate structure implemented by wood and/or steel panels. In an embodiment, the cabinet 3 may be a separate structure implemented by wood and/or steel panels and may form an installation space of the refrigerator 1 together with a wall defining the indoor space.

[0049] As an embodiment, the cabinet 3 may have a rectangular parallelepiped shape with an open front portion. For example, the cabinet 3 may include a pair of side walls 310S1 and 310S2, a top wall 320, and a rear wall 330. The rear wall 330 may connect the pair of side walls 310S1 and 310S2 to the top wall 320. Although not shown, the cabinet 3 may include the pair of side walls 310S1 and 310S2 and the top wall 320 connecting the same. In this case, a wall defining the indoor space may function as a rear wall. Although not shown in the drawings, the cabinet 3 may include the pair of side walls 310S1 and 310S2 and the rear wall 330 connecting the same. Any one of the pair of side walls 310S1 and 310S2 may be implemented by a wall defining the indoor space.

[0050] The refrigerator 1 may be installed in the installation space S inside the cabinet 3 by pushing the refrigerator 1 into the inside of the cabinet 3, that is, the installation space S, in the front-rear direction Y through the open front portion of the cabinet 3. The side surface 10S1 of the main body 10 faces the side wall 310S1 of the cabinet 3, and the side surface 10S2 of the main body 10 faces the side wall 310S2 of the cabinet 3. With such a configuration, the so-called built-in refrigerator system 2 may be implemented. The built-in refrigerator system 2 may prevent the exterior of the refrigerator 1 except for the front portion of the refrigerator 1, for example, the front portion of the door 20, from being exposed to the outside of the cabinet 3, so that the refrigerator 1 and the cabinet 3 may harmonize with the interior design, thereby improving the quality of the interior design as a whole.

[0051] In order to easily insert the refrigerator 1 into the installation space S through the open front portion of the cabinet 3, a width W3 of the front portion of the cabinet 3, that is, an inner distance between the pair of side walls 310S1 and 310S2 is greater than the width W1 of the front portion of the refrigerator 1. Accordingly, after the refrigerator 1 is installed inside the cabinet 3, a gap SG is formed between the side surface 10S1 of the main body 10 and the side wall 310S1 of the cabinet 3 facing the same, and between the side surface 10S2 of the main body 10 and the side wall 310S2 of the cabinet 3 facing the same. In terms of ease of installation of the refrigerator 1, the larger the gap SG, the better. From the perspective of interior design quality, the smaller the gap SG, the better. Meanwhile, the components of the cold air supply device installed in the above-described machine room need to exchange heat with air, and the gap SG may be determined to secure a flow space of air for heat exchange. In addition, the gap SG may be determined so as not to interfere with the side walls 310S1 and 310S2 of the cabinet 3 when the door 20 pivots about the hinge 21. In addition, some of the components of the refrigerator 1 may partially protrude from the side surfaces 10S1 and 10S2 of the main body 10, and the gap SG may be determined in consideration of the amount of protrusion of these protruding components. As described above, the gap GS may be determined in consideration of the ease of installation of the refrigerator 1, securing a flow space of air for heat exchange, preventing interference with the door 20, protrusion amounts of protruding parts, interior design quality, and the like.

[0052] The refrigerator 1 may move within the installation space S while the refrigerator 1 is used. For example, in the process of opening and closing the door 20, a force may be applied to the refrigerator 1 in the front-rear direction Y and the left-right direction X, and accordingly, the refrigerator 1 may be slightly moved in the front-rear direction Y and the left-right direction X. FIGS. 5 and 6 are plan views illustrating examples of a position change of a refrigerator 1' in a built-in refrigerator system 2' according to the related art.

[0053] Referring to FIG. 5, the refrigerator 1' may be offset toward, for example, a side wall 310S1' of the cabinet 3'. Then,

in the process of using the refrigerator 1', such as opening and closing the door 20', the refrigerator 1' may be shaken, and thus a side surface 10S1' of the refrigerator 1' may interfere with the side wall 310S1' of the cabinet 3', thereby damaging the side surface 10S1' of the refrigerator 1' and/or the side wall 310S1' of the cabinet 3'. In addition, a component protruding from the side surface 10S1' of the refrigerator 1' may interfere with the side wall 310S1' of the cabinet 3', and thus the protruding component may be damaged. In addition, as indicated by reference numeral 22', when the door 20' adjacent to the side wall 310S1' of the cabinet 3' is opened, the door 20' interferes with the side wall 310S1' of the cabinet 3', so that the door 20' may not be properly opened or the door 20' and/or the side wall 310S1' of the cabinet 3' may be damaged.

[0054] Referring to FIG. 6, the refrigerator 1' may be rotated. For example, the refrigerator 1' may be rotated such that the right portion of a front portion of the refrigerator 1' is close to the side wall 310S1' of the cabinet 3' and the left portion of a rear portion of the refrigerator 1' is close to a side wall 310S2' of the cabinet 3'. Then, in the process of using the refrigerator 1', such as opening and closing the door 20', the refrigerator 1' may be shaken, and thus, the side surfaces 10S1' and 10S2' of the refrigerator 1' and the side walls 310S1' and 310S2' of the cabinet 3' may interfere with each other, thereby damaging the side surfaces 10S1' and 10S2' of the refrigerator 1' and/or the side walls 310S1' and 310S2' of the cabinet 3'. Components protruding from the side surfaces 10S1' and 10S2' of the refrigerator 1' may come into contact with the side walls 310S1' and 310S2' of the cabinet 3', and the protruding components may be damaged. In addition, as indicated by reference numeral 23', when the door 20' adjacent to the side wall 310S1' of the cabinet 3' is opened, the door 20' interferes with the side wall 310S1' of the cabinet 3', so that the door 20' may not be properly opened or the door 20' and/or the side wall 310S1' of the cabinet 3' may be damaged.

[0055] In addition, although not shown in the drawings, the side surfaces 10S1' and 10S2' of the refrigerator 1' and the side walls 310S1' and 310S2' of the cabinet 3' may interfere with each other in the process of pushing the refrigerator 1' backward to install the same in the installation space S' of the cabinet 3'.

[0056] The above-described problems may also occur due to deformation of the cabinet 3' over time.

[0057] In consideration of this point, referring to FIGS. 1 to 4, the refrigerator 1 according to the present embodiment includes one or more stopper blocks 200. The stopper block 200 may be installed on at least one of the side surfaces 10S of the main body 10. The stopper block 200 may be provided together with the refrigerator 1 so as to be installed on at least one of the side surfaces 10S of the main body 10.

[0058] In the present embodiment, the stopper block 200 is installed on each of the side surfaces 10S1 and 10S2 of the main body 10. The stopper block 200 may be installed on each of the side surfaces 10S1 and 10S2 of the main body 10 by various methods. In the present embodiment, the stopper block 200 is attached to each of the side surfaces 10S1 and 10S2 of the main body 10. However, the present disclosure is not limited thereto. For example, the stopper block 200 may be installed on each of the side surfaces 10S1 and 10S2 of the main body 10 by various methods such as fastening and snap-fit coupling.

[0059] The material of the stopper block 200 is not particularly limited. For example, the stopper block 200 may be formed of a plastic material. For example, at least a portion of the stopper block 200 may have elasticity. For example, installation positions of two stopper blocks 200 respectively installed on the side surfaces 10S1 and 10S2 of the main body 10 may be symmetrical in the left-right direction X.

[0060] When the stopper block 200 is installed on each of the side surfaces 10S1 and 10S2 of the main body 10, the stopper block 200 may have a thickness sufficient to secure the gap SG between the side surface 10S of the main body 10 and the side wall 310S of the cabinet 3.

[0061] The position and number of the stopper blocks 200 are not particularly limited. For example, as shown in FIGS. 1 and 2, the stopper block 200 may be installed near the hinge 21 of the door 20. The stopper block 200 may be installed in the vicinity of a central portion of the main body 10 in the up-down direction Z. For example, in the embodiment shown in FIG. 1 in which four doors 20 are arranged in a 2×2 form in the up-down direction Z and the left-right direction X, the stopper block 200 may be installed at the central portion of the two doors 20 arranged up and down. In other words, among the four hinges 21 disposed in the up-down direction Z at positions adjacent to the side surface 10S1, the two hinges 21 in the middle may be disposed adjacent to each other, and the stopper block 200 may be installed on the side surface 10S1 adjacent to the two hinges 21 in the middle. In addition, among the four hinges 21 disposed in the up-down direction Z at positions adjacent to the side surface 10S2, the two hinges 21 in the middle may be disposed adjacent to each other, and the stopper block 200 may be installed on the side surface 10S2 adjacent to the two hinges 21 in the middle. The length 200H of the stopper block 200, that is, the length in the up-down direction Z, may be about 30% to 40% of the height 1H of the main body 10. However, the number and installation positions of the stopper blocks 200 installed on each of the side surfaces 10S1 and 10S2 of the main body 10 are not limited thereto. Various installation examples of the stopper block 200 will be described later.

[0062] The stopper block 200 may be pre-installed on the side surface 10S of the main body 10. The stopper block 200 may be provided together with the refrigerator 1 and installed on the side surface 10S of the main body 10 before the refrigerator 1 is installed in the installation space S of the cabinet 3. In a state in which the one or more stopper blocks 200 are installed on the side surface 10S of the main body 10, the refrigerator 1 may be pushed in the front-rear direction and inserted into the installation space S of the cabinet 3. As the stopper block 200 serves as a guide, interference between the

refrigerator 1 and the cabinet 3 may be reduced in the process of inserting the refrigerator 1 into the installation space S, and the refrigerator 1 may be easily inserted into the installation space S. When the refrigerator 1 is installed in the installation space S, the stopper block 200 is interposed between the side surface 10S of the main body 10 and the side wall 310S of the cabinet 3. Accordingly, the gap SG may be secured and maintained uniform between the side surface 10S of the main body 10 and the side wall 310S of the cabinet 3, thereby maintaining the quality of the interior design. A flow space of air for heat exchange with the components of the cold air supply device installed in the machine room of the refrigerator 1 may be secured by the gap SG, thereby reducing the dispersion of energy consumption according to the installation posture of the refrigerator 1. In addition, even when a force is applied to the refrigerator 1 in the left-right direction X or the front-rear direction Y in the process of opening and closing the door 20, as the position change of the refrigerator 1 is limited by the stopper block 200, the refrigerator 1 may be maintained in the installation position and the gap SG may be stably secured. Accordingly, the door 20 may be stably opened and closed without interference with the cabinet 3, and the risk of damage to the protruding components due to interference with the cabinet 3 may be reduced. In addition, as position stability of the refrigerator 1 in the installation space S is secured, the quality of the interior design may be maintained.

[0063] As described above, according to the refrigerator 1 and the built-in refrigerator system 2 according to the present disclosure, by employing the stopper block 200 having a simple structure and low cost, the stable installation position maintenance and usability of the built-in refrigerator 1 may be secured.

[0064] Hereinafter, in describing various embodiments of the refrigerator 1, the side surfaces 10S1 and 10S2 of the main body 10 are collectively referred to as the side surface 10S, and the side walls 310S1 and 310S2 of the cabinet 3 are collectively referred to as the side wall 310S.

[0065] The installation position, number, shape, and the like of the stopper block are not limited to the example shown in FIG. 1. FIG. 7 is a schematic side view of the refrigerator 1 showing an example of an installation position of the stopper block. Referring to FIG. 7, a plurality of stopper blocks, for example, two stopper blocks 200a and 200b, may be installed on the side surface 10S of the main body 10. The stopper block 200a is installed near the hinge 21. The installation form of the stopper block 200a is the same as the installation form of the stopper block 200 shown in FIG. 1. Accordingly, the gap SG is secured between the side surface 10S of the main body 10 and the side wall 310S of the cabinet 3 in the vicinity of the door 20, and thus stable operation of the door 20 is possible. The ventilation portion 30 for communicating the above-described machine room with the outside is provided on the side surface 10S of the refrigerator 1. The stopper block 200b may be installed adjacent to the ventilation portion 30. Accordingly, an air flow path may be secured between the ventilation portion 30 and the side wall 310S of the cabinet 3.

[0066] FIG. 8 is a schematic side view of the refrigerator 1 showing an example of an installation position of the stopper block. FIG. 8 is different from FIG. 7 in that a stopper block 200c is further installed, and while a redundant description will be omitted, differences will be mainly described. Referring to FIG. 8, the stopper block 200c is further installed adjacent to a rear edge 10ER of the side surface 10S. The stopper block 200c may be installed on the rear edge 10ER of the side surface 10S at a position adjacent to an upper edge 10EU. Accordingly, in a process in which the refrigerator 1 is installed in the installation space S of the cabinet 3, the rear edge 10ER of the side surface 10S may not interfere with the side wall 310S of the cabinet 3. In addition, after the refrigerator 1 is installed in the installation space S of the cabinet 3, a position offset due to shaking of the refrigerator 1 may be reduced. In addition, the gap SG may be secured and maintained uniform over the front-rear direction Y between the side surface 10S of the main body 10 and the side wall 310S of the cabinet 3.

[0067] FIG. 9 is a schematic side view of the refrigerator 1 showing an example of an installation position of the stopper block. FIG. 9 is different from FIG. 8 in that the stopper block 200a is divided into three stopper blocks 200d, 200e, and 200f, and while a redundant description will be omitted, differences will be mainly described. Referring to FIG. 9, the three stopper blocks 200d, 200e, and 200f are installed at the side surface 10S of the main body 10 near a front edge 10EF, that is, near the hinge 21 of the door 20. For example, when four doors 20 are arranged in a 2×2 form in the up-down direction Z and the left-right direction X, four hinges 21 are installed adjacent to the front edge 10EF of the side surface 10S in the up-down direction. Accordingly, the three stopper blocks 200d, 200e, and 200f may be disposed adjacent to the front edge 10EF of the side surface 10S to be arranged in the up-down direction Z. That is, the stopper block 200d may be installed near the uppermost hinge 21, the stopper block 200e may be installed near the central hinge (not shown), and the stopper block 200f may be installed near the lowermost hinge (not shown). Accordingly, the gap SG is secured between the side surface 10S of the main body 10 and the side wall 310S of the cabinet 3 in the vicinity of the door 20, and thus the door 20 may stably operate. As the stopper blocks 200d, 200e, and 200f have a length smaller than that of the stopper block 200a shown in FIGS. 7 and 8, it is possible to reduce material costs. In addition, as the stopper blocks have a wider protective area in the vertical direction than the stopper block 200a shown in FIGS. 7 and 8, it may be more effective in terms of positional stability and collision prevention effect of the refrigerator 1.

[0068] The two stopper blocks 200b and 200c may be installed adjacent to the rear edge 10ER of the side surface 10S. Accordingly, in the process in which the refrigerator 1 is installed in the installation space S of the cabinet 3, the rear edge 10ER of the side surface 10S may not interfere with the side wall 310S of the cabinet 3. In addition, after the refrigerator 1 is installed in the installation space S of the cabinet 3, a position offset due to shaking of the refrigerator 1 may be reduced. For example, the two stopper blocks 200b and 200c may be installed to be arranged adjacent to the rear edge 10ER in the up-

down direction Z. The stopper block 200b may be installed adjacent to the rear edge 10ER and a lower edge 10EB of the side surface 10S, and the stopper block 200c may be installed adjacent to the rear edge 10ER and the upper edge 10EU of the side surface 10S. The stopper block 200b is disposed adjacent to the ventilation portion 30.

[0069] The refrigerator 1 may include a protruding member having a protrusion partially protruding from the side surface 10S. Examples of the protruding member may vary. For example, referring to FIGS. 1 and 2, the hinge cover 22 covering the uppermost hinge 21 may include a protrusion 22a partially protruding from the side surface 10S of the main body 10. The hinge cover 22 is an example of the protruding member. Referring to FIG. 9, the stopper block 200d may be installed near the protrusion 22a of the hinge cover 22 on the side surface 10S of the main body 10. Accordingly, damage to the hinge cover 22 due to interference with the cabinet 3 may be prevented in the process of installing the refrigerator 1 in the installation space S.

[0070] The number, installation positions, and the like of stopper blocks are not limited to the above-described exemplary embodiments. An appropriate number of stopper blocks may be installed at an appropriate position of the side surface 10S of the main body 10 to prevent an offset of the refrigerator 1 and secure positional stability of the refrigerator 1 by evenly distributing a force acting on the refrigerator 1 during use of the refrigerator 1.

[0071] The refrigerator 1 may be provided with a position indicator that indicates an installation position of the stopper block 200. Accordingly, the stopper block 200 may be installed at a suitable position, and the installation time may be shortened. The position indicator may be provided, for example, on the side surface 10S of the main body 10. The position indicator may be implemented in various forms. FIGS. 10 and 11 are partial perspective views illustrating embodiments of the position indicator.

[0072] Referring to FIG. 10, a position indicator 250 may be implemented by a concaveconvex shape provided on the side surface 10S of the main body 10 according to the shape of the stopper block 200. For example, the position indicator 250 may be concavely formed on the side surface 10S of the main body 10 as shown in FIG. 10, or may be convexly formed on the side surface 10S of the main body 10 although not shown.

[0073] Referring to FIG. 11, the position indicator 250 may be implemented by a marking provided on the side surface 10S of the main body 10 according to the shape of the stopper block 200. The marking may be implemented by, for example, printing, engraving, a sticker, or the like.

[0074] FIG. 12 is a schematic cross-sectional view of the stopper block 200 according to an embodiment of the present disclosure. Referring to FIG. 12, the stopper block 200 may include a mounting surface 201 coupled to the side surface 10S of the main body 10 and a guide surface 202 opposite to the mounting surface 201. The stopper block 200 is installed on the side surface 10S of the main body 10. For example, the mounting surface 201 of the stopper block 200 may be coupled to the side surface 10S of the main body 10 by various methods such as adhesion, fastening, snap-fitting, and the like. In the present embodiment, the stopper block 200 is attached to the side surface 10S of the main body 10. For example, the mounting surface 201 of the stopper block 200 may be adhered to the side surface 10S of the main body 10 by an adhesive member 230. The guide surface 202 may include an inclined surface 202a having a decreasing distance from the mounting surface 201 in the front-rear direction Y of the refrigerator 1, that is, an installation direction Y1. Accordingly, the refrigerator 1 may be easily pushed into the installation space S of the cabinet 3. The guide surface 202 may further include an inclined surface 202b having a decreasing distance from the mounting surface 201 in a direction Y2 opposite to the installation direction Y1 of the refrigerator 1. Accordingly, the refrigerator 1 may be easily pushed into the installation space S of the cabinet 3 or pulled out from the installation space S. The inclined surfaces 202a and 202b may be flat surfaces or curved surfaces. The stopper block 200 may have a thickness 200T such that the gap SG is maintained between the side surface 10S of the main body 10 and the side wall 310S of the cabinet 3 when the stopper block 200 is installed on the side surface 10S of the main body 10. The thickness 200T of the stopper block 200 may be determined to secure the gap SG in consideration of the thickness of the adhesive member 230, for example, a double-sided tape, for adhering the stopper block 200 to the side surface 10S of the main body 10. The adhesive member 230 may be provided separately from the stopper block 200. In an embodiment, the adhesive member 230 may be provided in a state of being attached to the mounting surface 201 of the stopper block 200. In this case, the stopper block 200 may include the adhesive member 230. The thickness 200T of the stopper block 200 may be determined according to the width of the installation space S. As a non-limiting example, the thickness 200T of the stopper block 200 may be, for example, 2 mm to 6 mm.

[0075] The material of the stopper block 200 is not particularly limited. In an embodiment, the stopper block 200 may be formed of plastic. For example, the stopper block 200 may be formed of a polymer compound, such as PE, PS, PC, ABS, PP, or PVC, an aluminum extruded material, or the like. In an embodiment, at least a portion of the stopper block 200 may have elasticity. For example, the stopper block 200 may be formed of an elastic material such as rubber. In the process of inserting the refrigerator 1 into the installation space S of the cabinet 3, the stopper block 200 may come into contact with the side wall 310S of the cabinet 3. In this case, the stopper block 200 having elasticity may be elastically deformed to reduce or prevent damage to the cabinet 300.

[0076] In a state in which the refrigerator 1 is inserted into the installation space S of the cabinet 3, the guide surface 202 of the stopper block 200 may be spaced apart from the side wall 310S of the cabinet 3. However, the disclosure is not limited thereto. For example, when the stopper block 200 has elasticity, the guide surface 202 of the stopper block 200 may be in

contact with the side wall 310S of the cabinet 3 in a state in which the refrigerator 1 is inserted into the installation space S of the cabinet 3, and as shown in FIG. 13, the stopper block 200 may be partially compressed by being pressed by the side wall 310S of the cabinet 3.

[0077] FIG. 14 is a schematic cross-sectional view of a stopper block 200-1 according to an embodiment. The stopper block 200-1 shown in FIG. 14 has a guide surface 202-1 different in shape from the stopper block 200 shown in FIG. 12. Therefore, the same elements are denoted by the same reference numerals, and redundant descriptions thereof are omitted. Referring to FIG. 14, the stopper block 200-1 includes the guide surface 202-1. The guide surface 202-1 may include an inclined surface 202a having a decreasing distance from the mounting surface 201 in the installation direction Y1 of the refrigerator 1, and a flat surface 202c having a constant distance from the mounting surface 201. The inclined surface 202a may be a flat surface or a curved surface. When the stopper block 200-1 is installed on the side surface 10S of the main body 10, the stopper block 200-1 may have the thickness 200T to secure the gap SG between the side surface 10S of the main body 10 and the side wall 310S of the cabinet 3.

[0078] FIG. 15 is a schematic cross-sectional view of a stopper block 200-2 according to an embodiment. The stopper block 200-2 shown in FIG. 15 has a guide surface 202-2 which is different from the stopper block 200 shown in FIG. 12 in shape. Therefore, the same elements are denoted by the same reference numerals, and redundant descriptions thereof are omitted. Referring to FIG. 15, the stopper block 200-2 includes the guide surface 202-2. The guide surface 202-2 is an inclined surface having a decreasing distance from the coupling surface 201 in the installation direction Y1 of the refrigerator 1 as a whole. The guide surface 202-2 may be a flat surface or a curved surface. When the stopper block 200-2 is installed on the side surface 10S of the main body 10, the stopper block 200-2 may have the thickness 200T to secure the gap SG between the side surface 10S of the main body 10 and the side wall 310S of the cabinet 3.

[0079] Stopper blocks having various thicknesses may be employed according to the width of the refrigerator 1, the width of the cabinet 3, and the like. To this end, the stopper block may include a stopper pad installed on the side surface 10S of the main body 10 and a stopper spacer coupled to the stopper pad and protruding from the stopper pad in a direction opposite to the side surface 10S.

[0080] FIG. 16 is a schematic cross-sectional view of a stopper block 200-3 according to an embodiment. Referring to FIG. 16, the stopper block 200-3 may include a stopper pad 210 installed on the side surface 10S of the main body 10, and a stopper spacer 220 coupled to the stopper pad 210 to protrude in a direction opposite to the side surface 10S of the main body 10. The stopper pad 210 may include a mounting surface 211 provided on the side surface 10S of the main body 10. The stopper spacer 220 may have a guide surface 222. The stopper spacer 220 may be coupled to the stopper pad 210 such that the guide surface 222 is opposite to the mounting surface 211. In an embodiment, the stopper pad 210 may include a first coupling surface 212 opposite to the mounting surface 211. The stopper spacer 220 may have a second coupling surface 221 coupled to the first coupling surface 212 of the stopper pad 210. The guide surface 222 is a surface opposite to the second coupling surface 221.

[0081] The stopper pad 210 is coupled to the side surface 10S of the main body 10. For example, the stopper pad 210 may be coupled to the side surface 10S of the main body 10 by various methods such as adhesion, fastening, snap-fitting, and the like. In the present embodiment, the stopper pad 210 is adhered to the side surface 10S of the main body 10 by the adhesive member 230. The adhesive member 230 may be provided separately from the stopper block 200-3. In an embodiment, the adhesive member 230 may be provided in a state of being attached to the mounting surface 211 of the stopper block 200-3. In this case, the stopper block 200-3 may include the adhesive member 230. The material of the stopper pad 210 is not particularly limited. For example, the stopper pad 210 may be formed of an elastic material such as plastic or rubber. The stopper pad 210 reinforces rigidity of the adhesive member 230 so that the stopper block 200-3 may be in close contact with the side surface 10S of the main body 10.

[0082] The stopper spacer 220 may be coupled to the first coupling surface 212 of the stopper pad 210. The stopper spacer 220 may have the second coupling surface 221 coupled to the first coupling surface 212 of the stopper pad 210, and the guide surface 222 opposite to the second coupling surface 221. For example, the stopper spacer 220 may be coupled to the stopper pad 210 by various methods such as adhesion, fastening, snap-fitting, and the like. In the present embodiment, the stopper spacer 220 is adhered to the stopper pad 210. To this end, although not shown in the drawings, an adhesive layer may be provided on one of the first coupling surface 212 of the stopper pad 210 or the second coupling surface 221 of the stopper spacer 220. The guide surface 222 may include an inclined surface 222a having a decreasing distance from the second coupling surface 221 in the direction Y1 in which the refrigerator 1 is installed. Accordingly, the refrigerator 1 may be easily pushed into the installation space S of the cabinet 3. The guide surface 222 may further include an inclined surface 222b having a decreasing distance from the second coupling surface 221 in the direction Y2 opposite to the installation direction Y1 of the refrigerator 1. Accordingly, the refrigerator 1 may be easily pushed into the installation space S of the cabinet 3 or pulled out from the installation space S. The inclined surfaces 222a and 222b may be flat surfaces or curved surfaces. When the stopper block 200 is installed on the side surface 10S of the main body 10, the stopper block 200 may have the thickness 200T such that the gap SG may be secured between the side surface 10S of the main body 10 and the side wall 310S of the cabinet 3.

[0083] A material of the stopper spacer 220 is not particularly limited. For example, the stopper spacer 220 may be

formed of various plastic materials. For example, the stopper block 200 may be formed of a polymer compound, such as PE, PS, PC, ABS, PP, or PVC, an aluminum extruded material, or the like. In an embodiment, at least a portion of the stopper spacer 220 may have elasticity. For example, the stopper spacer 220 may be formed of an elastic material such as rubber.

[0084] According to this configuration, the thickness 200T of the stopper block 200-3 is the sum of a first thickness 210T of the stopper pad 210 and a second thickness 220T of the stopper spacer 220. At least one of the stopper pad 210 and the stopper spacer 220 may be provided in plural. For example, one stopper pad 210 and a plurality of stopper spacers 220, or a plurality of stopper pads 210 and one stopper spacer 220, or a plurality of stopper pads 210 and a plurality of stopper spacers 220 may be provided. By combining appropriate numbers of stopper pads 210 and stopper spacers 220, it is possible to implement the stopper block 200-3 having an appropriate thickness 200T according to the width of the refrigerator 1, the width of the cabinet 3, and the like. The refrigerator 1 may include appropriate numbers of stopper pads 210 and stopper spacers 220 according to the number of stopper blocks 200-3 to be applied.

[0085] The stopper pad 210 and the stopper spacer 220 may be coupled to each other by, for example, an adhesive layer. The stopper block 200-3 may include a separation preventing portion having a shape in which the stopper pad 210 and the stopper spacer 220 are complementarily engaged with each other so as to prevent the stopper pad 210 and the stopper spacer 220 from being separated from each other.

[0086] FIG. 17 is a schematic configuration diagram of a separation prevention portion according to an embodiment. Referring to FIG. 17, a separation prevention portion 240 may include a first shape portion 241 and a second shape portion 242 that are provided on the stopper pad 210 and the stopper spacer 220, respectively, and have complementary shapes that engage with each other. For example, the first shape portion 241 may be a concave portion and the second shape portion 242 may be a convex portion inserted into the concave portion, or vice versa. As the first shape part 241 and the second shape part 242 are coupled to each other, the stopper pad 210 and the stopper spacer 220 are not separated in the process of installing the refrigerator 1.

[0087] FIG. 17 illustrates the separation prevention portion 240 including a pair of first and second shape portions 241 and 242, but is not limited thereto. For example, the separation prevention portion 240 may be implemented by two or more pairs of first and second shape portions 241 and 242. FIG. 18 is a schematic configuration diagram of the separation prevention portion 240 according to an embodiment. As shown in FIG. 18, each of the stopper pad 210 and the stopper spacer 220 may be provided with first and second shape portions 241 and 242, for example, one of each.

[0088] FIG. 19 illustrates an example of a combination of two stopper pads 210a and 210b and one stopper spacer 220. Referring to FIG. 19, each of the two stopper pads 210a and 210b includes the first shape portion 241 and the second shape portion 242. The stopper spacer 220 includes a first shape portion 241 and a second shape portion 242. The two stopper pads 210a and 210b may have substantially the same shape. That is, the stopper pad 210b may have a shape obtained by flipping or rotating the stopper pad 210a. The two stopper pads 210a and 210b are coupled to each other so that the second shape portion 242 and the first shape portion 241 are engaged with each other. For example, the two stopper pads 210a and 210b may be adhered to each other by an adhesive layer (not shown). The second shape portion 242 of the stopper pad 210a and the first shape portion 241 of the stopper pad 210b are engaged with each other, which may function as a second separation prevention portion 240a that prevents the stopper pads 210a and 210b from being separated from each other. Next, the stopper pad 210b and the stopper spacer 220 are coupled to each other so that the first shape portion 241 and the second shape portion 242 are engaged with each other. For example, the stopper pad 210b and the stopper spacer 220 may be adhered to each other by an adhesive layer (not shown). Accordingly, the separation prevention portion 240 may be implemented to prevent the stopper pad 210b and the stopper spacer 220 from being separated from each other. The stopper pads 210a and 210b may have the same thickness or different thicknesses. Although the two stopper pads 210a and 210b are stacked in FIG. 19, three or more stopper pads may be stacked.

[0089] Table 1 shows examples of the thicknesses of the stopper block 200-3 that can be combined when there are two stopper pads 210 each having a thickness 210T of 0.5 mm, two stopper pads 210 each having a thickness 210T of 0.7 mm, one stopper spacer 220 having a thickness 220T of 2.25 mm, and a double-sided tape having a thickness of 0.4 mm used as the adhesive member 230.

[Table 1]

Stopper Pad	Thickness of Implementable Stopper Block (mm)	Including Thickness of Double-Sided Tape (mm)
Unused	2.25	2.65
1×0.5 mm	2.75	3.15
1×0.7 mm	2.95	3.35
2×0.5 mm	3.25	3.65

(continued)

Stopper Pad	Thickness of Implementable Stopper Block (mm)	Including Thickness of Double-Sided Tape (mm)
1×0.5 mm + 1×0.7 mm	3.45	3.85
2×0.7 mm	3.65	4.05

[0090] The shape of the stopper spacer is not limited to the example shown in FIG. 16. FIG. 20 is a schematic cross-sectional view of a stopper block 200-4 according to an embodiment. The stopper block 200-4 shown in FIG. 20 is different from the stopper block 200-3 shown in FIG. 16 in shape. Therefore, the same elements are denoted by the same reference numerals, and redundant descriptions thereof are omitted. Referring to FIG. 20, the stopper spacer 220-4 includes a guide surface 222-4. The guide surface 222-4 may include an inclined surface 222a having a decreasing distance from the second coupling surface 221 in the installation direction Y1 of the refrigerator 1, and a flat surface 222c having a constant distance from the second coupling surface 221. The inclined surface 222a may be a flat surface or a curved surface. When the stopper block 200-4 is installed on the side surface 10S of the main body 10, the stopper block 200-4 may have the thickness 200T to secure the gap SG between the side surface 10S of the main body 10 and the side wall 310S of the cabinet 3.

[0091] FIG. 21 is a schematic cross-sectional view of a stopper block 200-5 according to an embodiment. The stopper block 200-5 shown in FIG. 21 has a guide surface 222-5 which is different from the stopper block 200-3 shown in FIG. 16 in shape. Therefore, the same elements are denoted by the same reference numerals, and redundant descriptions thereof are omitted. Referring to FIG. 21, the stopper block 200-5 includes the guide surface 222-5. The guide surface 222-5 is an inclined surface having a decreasing distance from the mounting surface 211 in the installation direction Y1 of the refrigerator 1 as a whole. The guide surface 222-5 may be a flat surface or a curved surface. When the stopper block 200-5 is installed on the side surface 10S of the main body 10, the stopper block 200-5 may have the thickness 200T to secure the gap SG between the side surface 10S of the main body 10 and the side wall 310S of the cabinet 3.

[0092] In the above-described embodiments, the side surface 10S of the refrigerator 1 is described as the side surface of the outer case 100 forming the exterior of the main body 10, but the side surface 10S of the refrigerator 1 is not limited thereto. FIG. 22 is a schematic partial perspective view of the refrigerator 1 according to an embodiment. FIG. 22 is a partial perspective view of a lower right end of the refrigerator 1 as an example. Referring to FIG. 22, a bracket 40 may include a protrusion 41 extending from the lower portion of the main body 10 of the refrigerator 1 to partially cover the side surface 10S and protruding from the side surface 10S. The side surface 10S of the refrigerator 1 may be understood as including the surface of the protrusion 41. The stopper block 200-6 may be installed, for example, adhered to the surface of the protrusion 41 of the bracket 40. In this case, the thickness of the stopper block 200-6 may be determined such that an appropriate gap SG may be secured between the side surface 10S of the refrigerator 1 and the side wall 310S of the cabinet 3 in consideration of the thickness of the protrusion 41.

[0093] FIG. 23 is a schematic partial perspective view of the refrigerator 1 according to an embodiment. FIG. 23 is a partial perspective view of the lower right end of the refrigerator 1 as an example. Referring to FIG. 23, the bracket 40 may include the protrusion 41 extending from the lower portion of the main body 10 of the refrigerator 1 to partially cover the side surface 10S and protruding from the side surface 10S. A stopper block 200-7 may extend from the protrusion 41 and may be integrally formed with the bracket 40.

[0094] The bracket 40 illustrated in FIGS. 22 and 23 is an example of the protruding member having the above-described protrusion.

[0095] In the above-described embodiments, the number and arrangement of stopper blocks on both of the side surfaces 10S1 and 10S2 of the main body 10 are the same, but are not limited thereto. In both of the side surfaces 10S1 and 10S2 of the main body 10, at least one of the number and arrangement of stopper blocks may be different.

[0096] A refrigerator according to an aspect of the present disclosure includes a main body including at least one storage compartment, at least one door connected to the main body by a hinge to open and close the storage compartment, and at least one stopper block having a mounting surface configured to be coupled to a side surface of the main body in a width direction, and a guide surface opposite to the mounting surface, the at least one stopper block protruding from the side surface when coupled to the side surface of the main body.

[0097] In an embodiment, the guide surface may have an inclined surface having a decreasing distance from the mounting surface in the front-rear direction of the main body.

[0098] In an embodiment, at least a portion of the stopper block may have elasticity.

[0099] In an embodiment, the stopper block may be installed near the hinge.

[0100] In an embodiment, the stopper block may be installed at a central portion of the main body in a vertical direction near the hinge, and the length of the stopper block may be 30% to 40% of the height of the main body.

[0101] In an embodiment, the refrigerator may include a protruding member having a protrusion protruding from the side surface of the main body, and the stopper block may be installed near the protrusion.

[0102] In an embodiment, the stopper block may be integrally formed with the protruding member.

[0103] In an embodiment, a ventilation portion may be provided on the side surface of the main body, and the stopper block may be installed near the ventilation portion.

[0104] In an embodiment, the stopper block may be installed near each of a front edge and a rear edge of the side surface.

[0105] In an embodiment, a position indicator indicating an installation position of the stopper block may be provided on the side surface of the main body.

[0106] In an embodiment, the stopper block may include a stopper pad having the mounting surface, and a stopper spacer having the guide surface and coupled to the stopper pad such that the guide surface is a surface opposite to the mounting surface.

[0107] In an embodiment, the stopper spacer may have elasticity.

[0108] The stopper pad may have a first thickness, and the stopper spacer may have a second thickness greater than the first thickness.

[0109] In an embodiment, the stopper block may include a separation prevention portion having a shape in which the stopper pad and the stopper spacer are complementarily engaged with each other so as to prevent the stopper pad and the stopper spacer from being separated from each other.

[0110] According to an aspect of the present disclosure, a built-in refrigerator system includes a cabinet defining an installation space, and a refrigerator according to any one of claims 1 to 14 installed in the installation space, wherein the stopper block maintains a gap between the side surface of the refrigerator and a side wall of the cabinet.

[0111] According to the above-described refrigerator and the built-in refrigerator system employing the same, a stable and uniform gap between the cabinet and the refrigerator may be secured by employing a stopper block. In addition, it is possible to reduce or prevent damage to the refrigerator and the cabinet by reducing or preventing the offset and/or rotation of the refrigerator due to the force applied to the refrigerator during the use of the refrigerator.

[0112] The technical effects to be achieved in the present disclosure are not limited to the above-described technical effects, and other technical effects that are not mentioned herein would be clearly understood by those skilled in the art from the description of the present disclosure.

[0113] As described above, although the built-in refrigerator of the present disclosure and the built-in refrigerator system employing the same have been described by limited embodiments and drawings, the present disclosure is not limited to the above embodiments, and various modifications are possible without departing from the spirit thereof.

Claims

1. A refrigerator comprising: a main body (10) including at least one storage compartment (11);

at least one door (20) connected to the main body by a hinge (21) to open and close the storage compartment; and at least one stopper block (200) having a mounting surface (201) configured to be coupled to a side surface (10S) of the main body in a width direction, and a guide surface (202) opposite to the mounting surface, the at least one stopper block protruding from the side surface when coupled to the side surface of the main body.

2. The refrigerator of claim 1, wherein

the guide surface (202) has an inclined surface (202a) that decreases in distance from the mounting surface in a front-rear direction of the main body.

3. The refrigerator of claim 1 or 2, wherein

at least a portion of the stopper block has elasticity.

4. The refrigerator of any one of claims 1 to 3, wherein

the stopper block is installed near the hinge.

5. The refrigerator of claim 4, wherein

the stopper block is installed at a central portion of the main body in a vertical direction near the hinge, and a length (200H) of the stopper block is 30% to 40% of a height 1H of the main body.

6. The refrigerator of any one of claims 1 to 5, further comprising

a protruding member (22) having a protrusion (22a) protruding from the side surface of the main body, wherein the stopper block is installed near the protrusion.

7. The refrigerator of claim 6, wherein
the stopper block is integrally formed with the protruding member.

8. The refrigerator of any one of claims 1 to 7, wherein

a ventilation portion (30) is provided on the side surface of the main body, and
the stopper block is installed near the ventilation portion.

9. The refrigerator of any one of claims 1 to 8, wherein
the stopper block is installed near each of a front edge (10EF) and a rear edge (10ER) of the side surface.

10. The refrigerator of any one of claims 1 to 9, wherein
a position indicator (250) indicating an installation position of the stopper block is provided on the side surface of the main body.

11. The refrigerator of any one of claims 1 to 10, wherein
the stopper block (200-3) comprises:

a stopper pad (210) having the mounting surface; and
a stopper spacer (220) having the guide surface and coupled to the stopper pad such that the guide surface is
opposite to the mounting surface.

12. The refrigerator of claim 11, wherein
the stopper spacer has elasticity.

13. The refrigerator of claim 11 or 12, wherein

the stopper pad has a first thickness (210T), and
the stopper spacer has a second thickness (220T) greater than the first thickness.

14. The refrigerator of any one of claims 11 to 13, wherein
the stopper block comprises a separation prevention portion (240) having a shape in which the stopper pad and the stopper spacer are complementarily engaged with each other so as to prevent the stopper pad and the stopper spacer from being separated from each other.

15. A built-in refrigerator system comprising: a cabinet (3) defining an

installation space (S); and
a refrigerator (1) according to any one of claims 1 to 14 installed in the installation space,
wherein the stopper block is configured to maintain a gap between a side surface of the refrigerator and a side wall of the cabinet.

FIG. 1

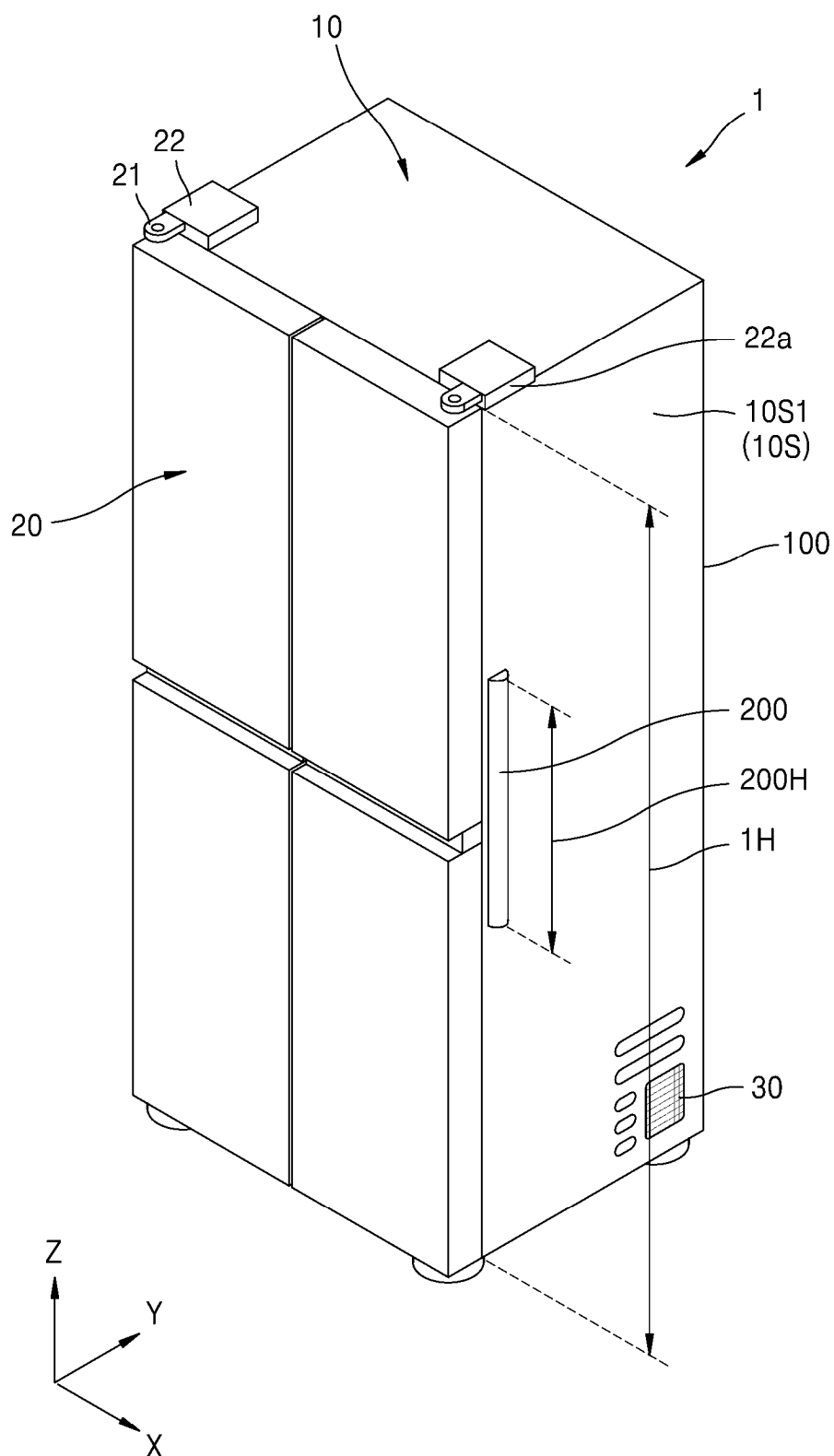


FIG. 2

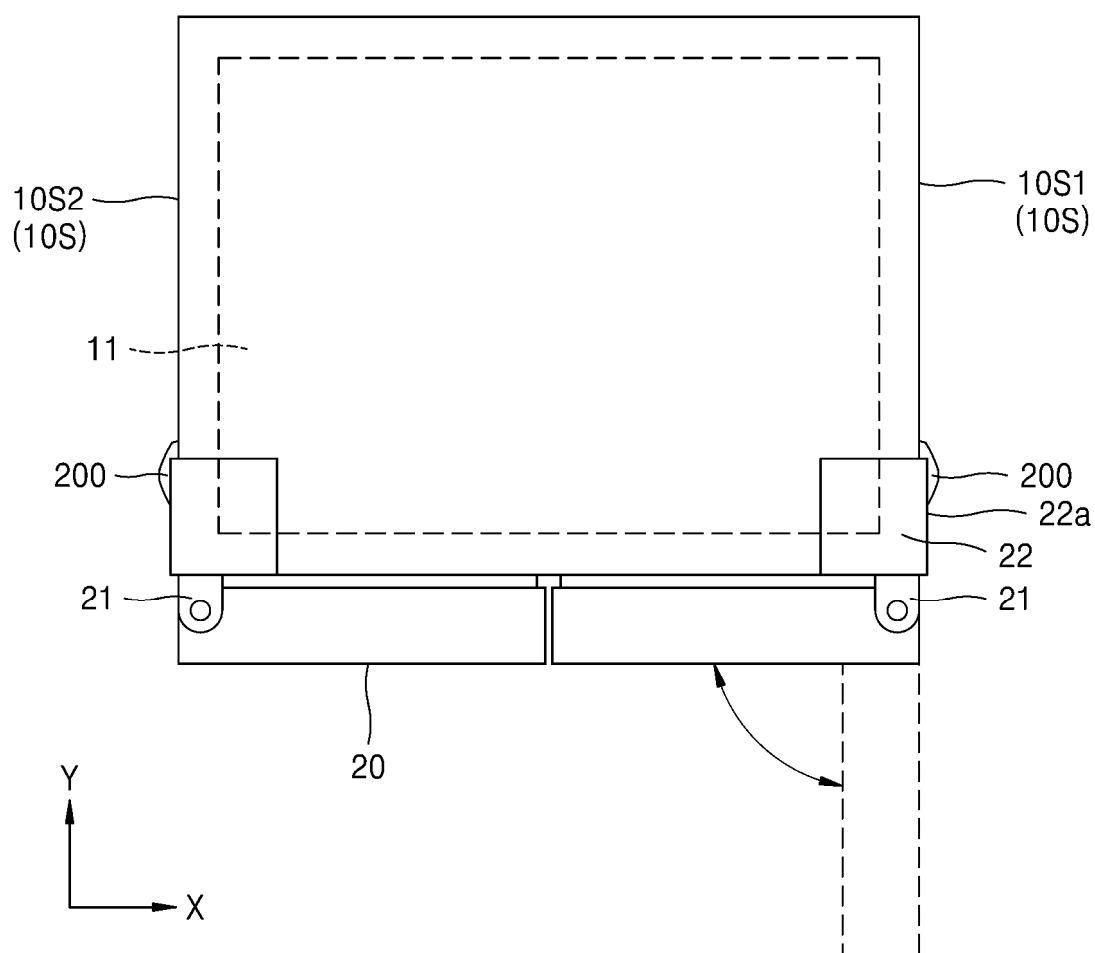


FIG. 3

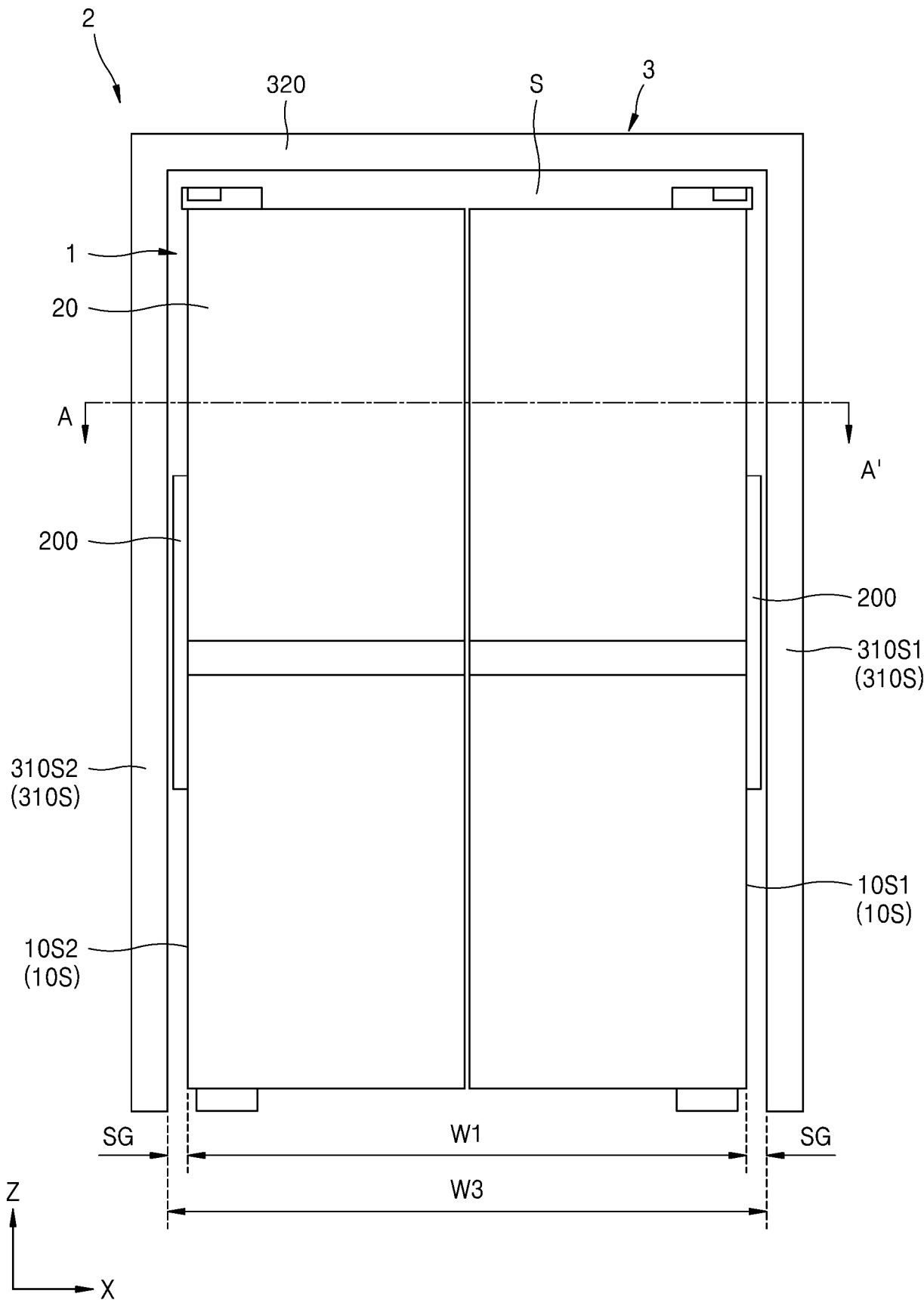


FIG. 4

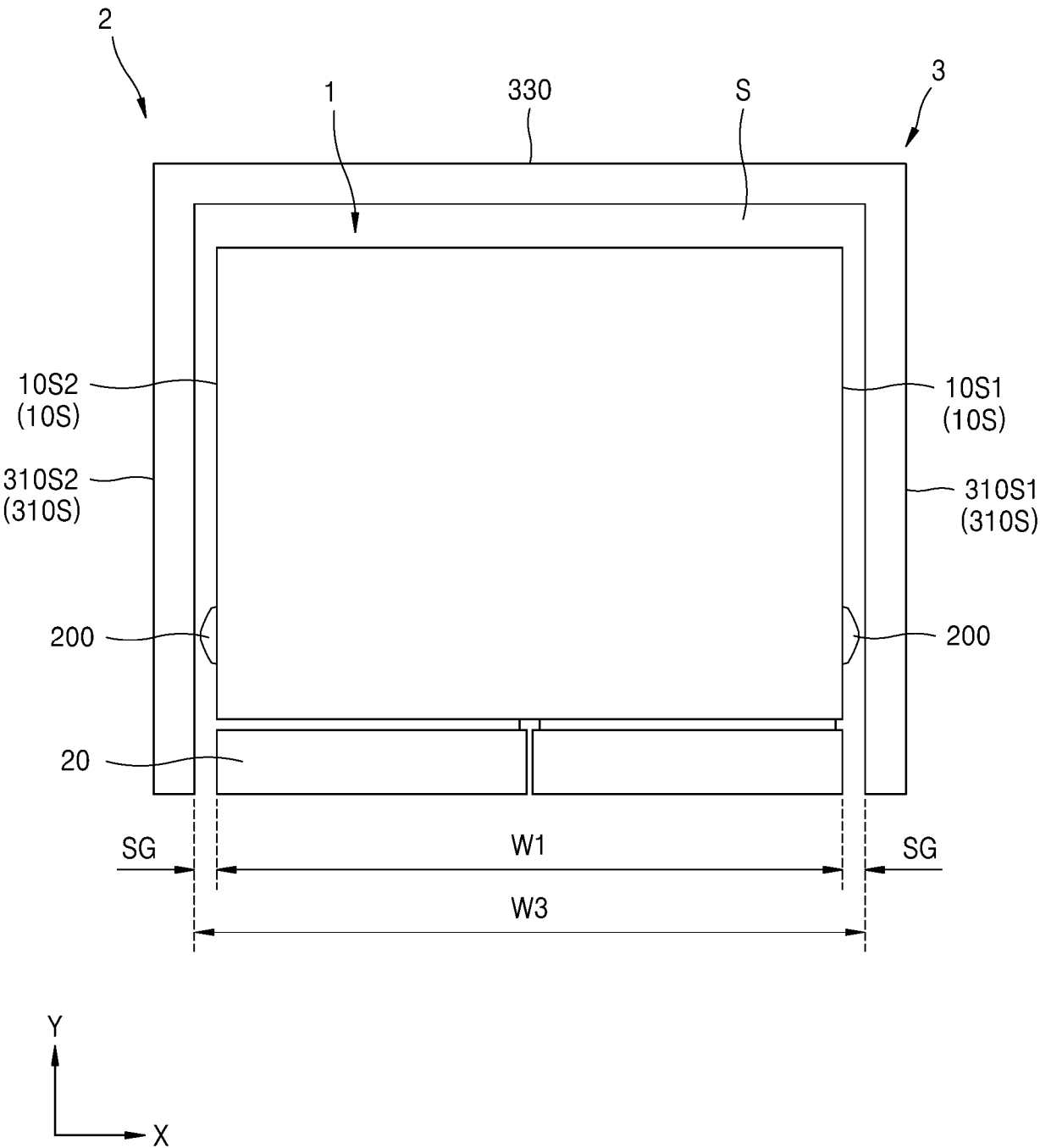


FIG. 5

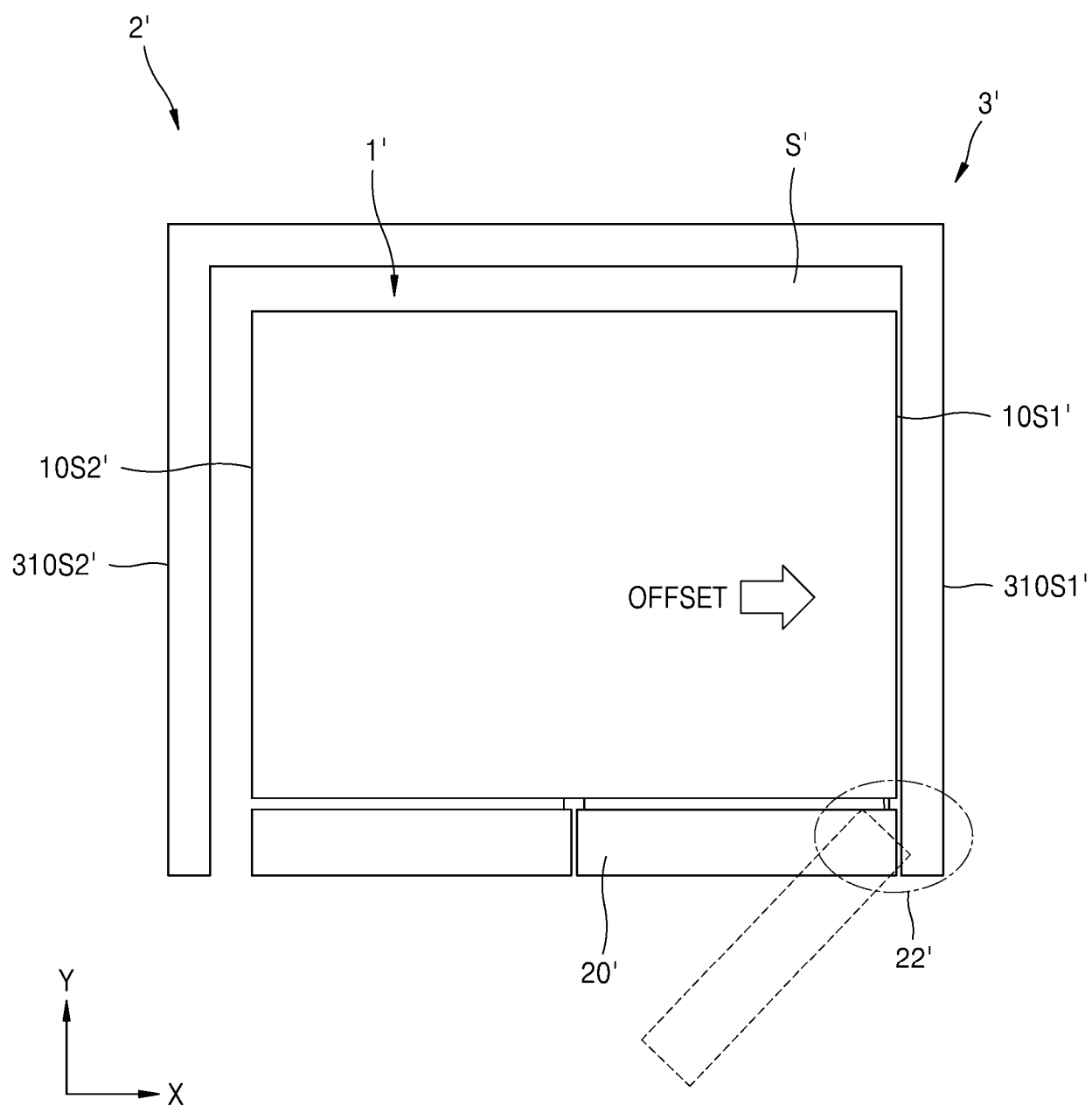


FIG. 6

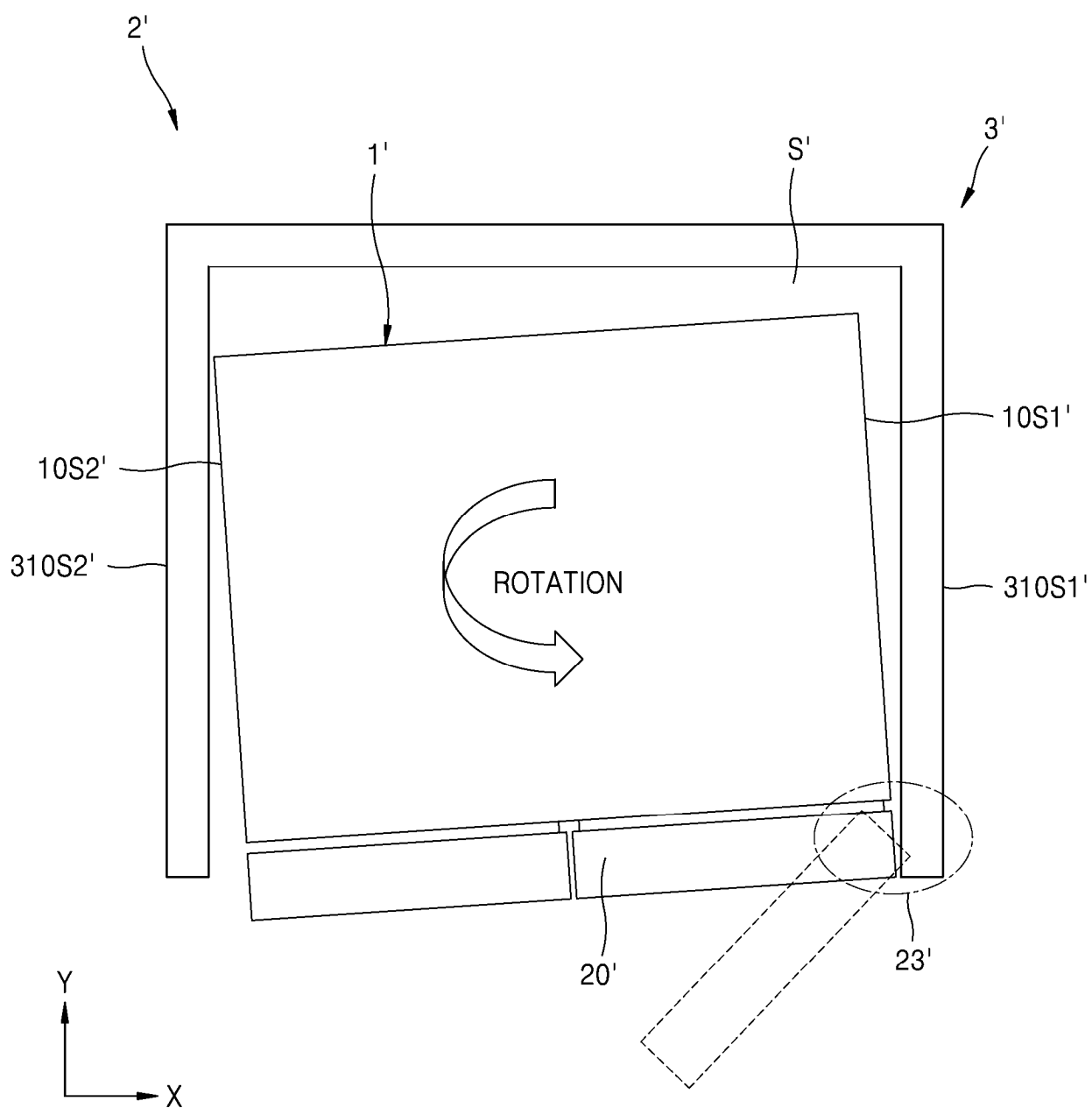


FIG. 7

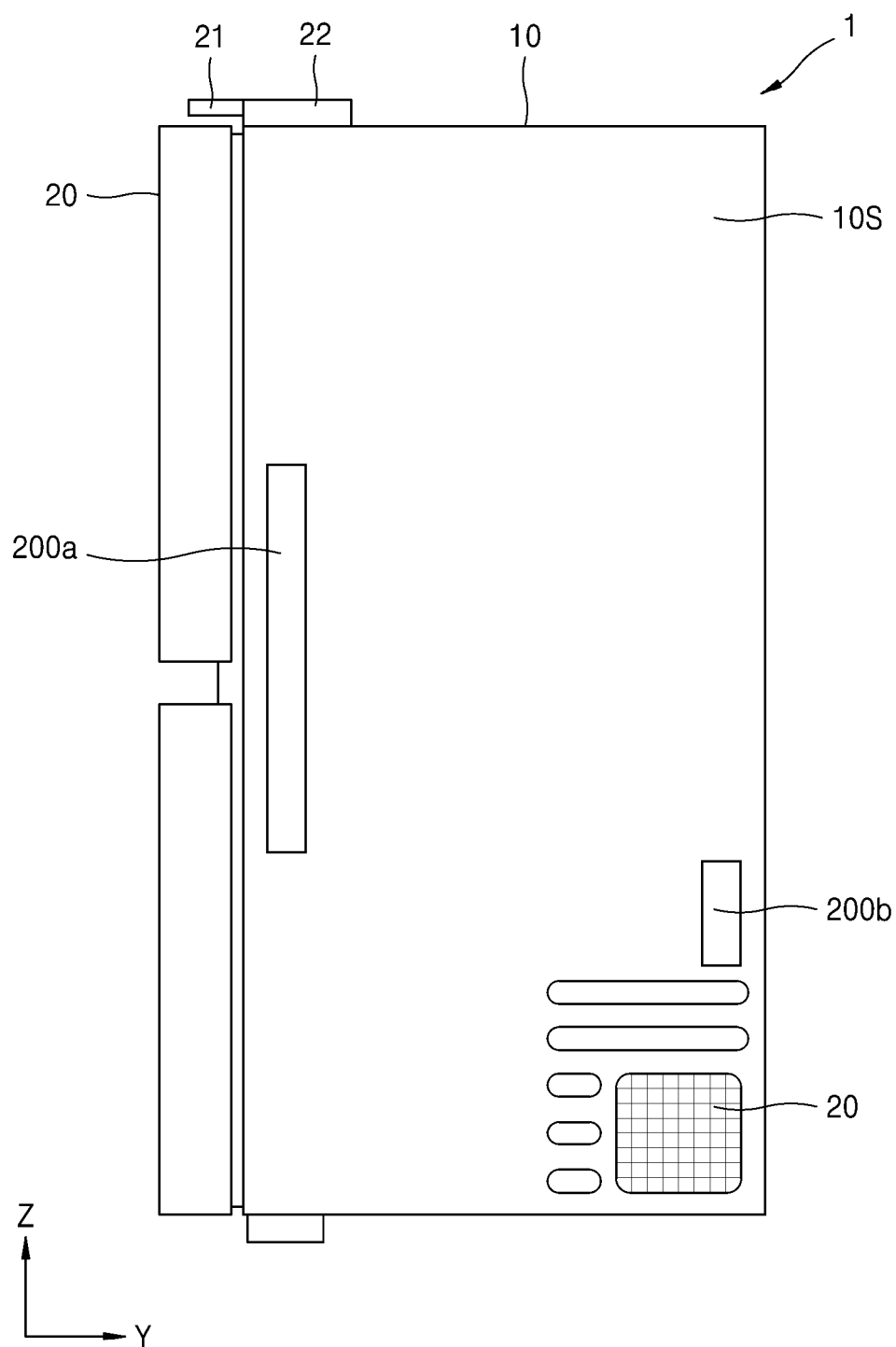


FIG. 8

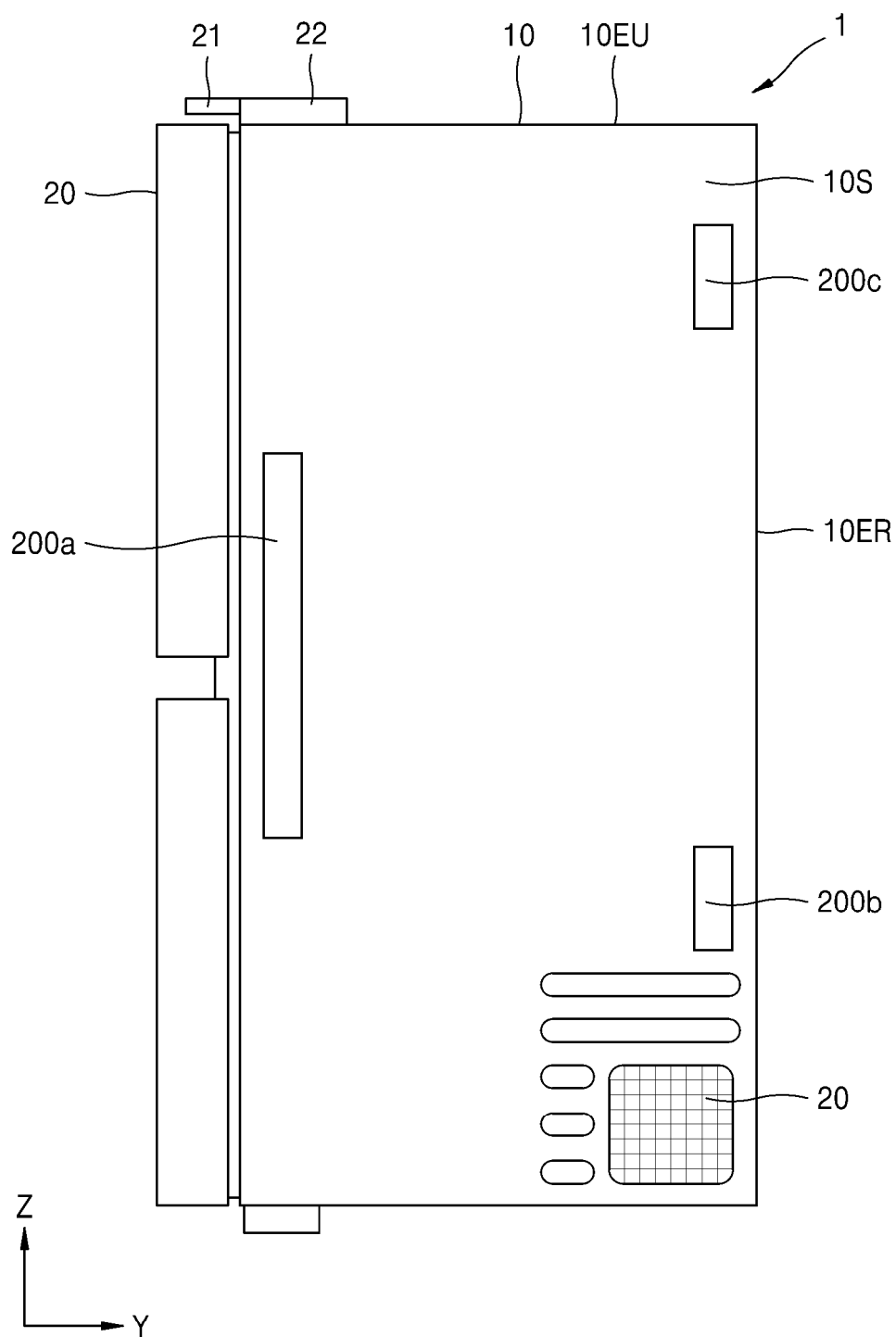


FIG. 9

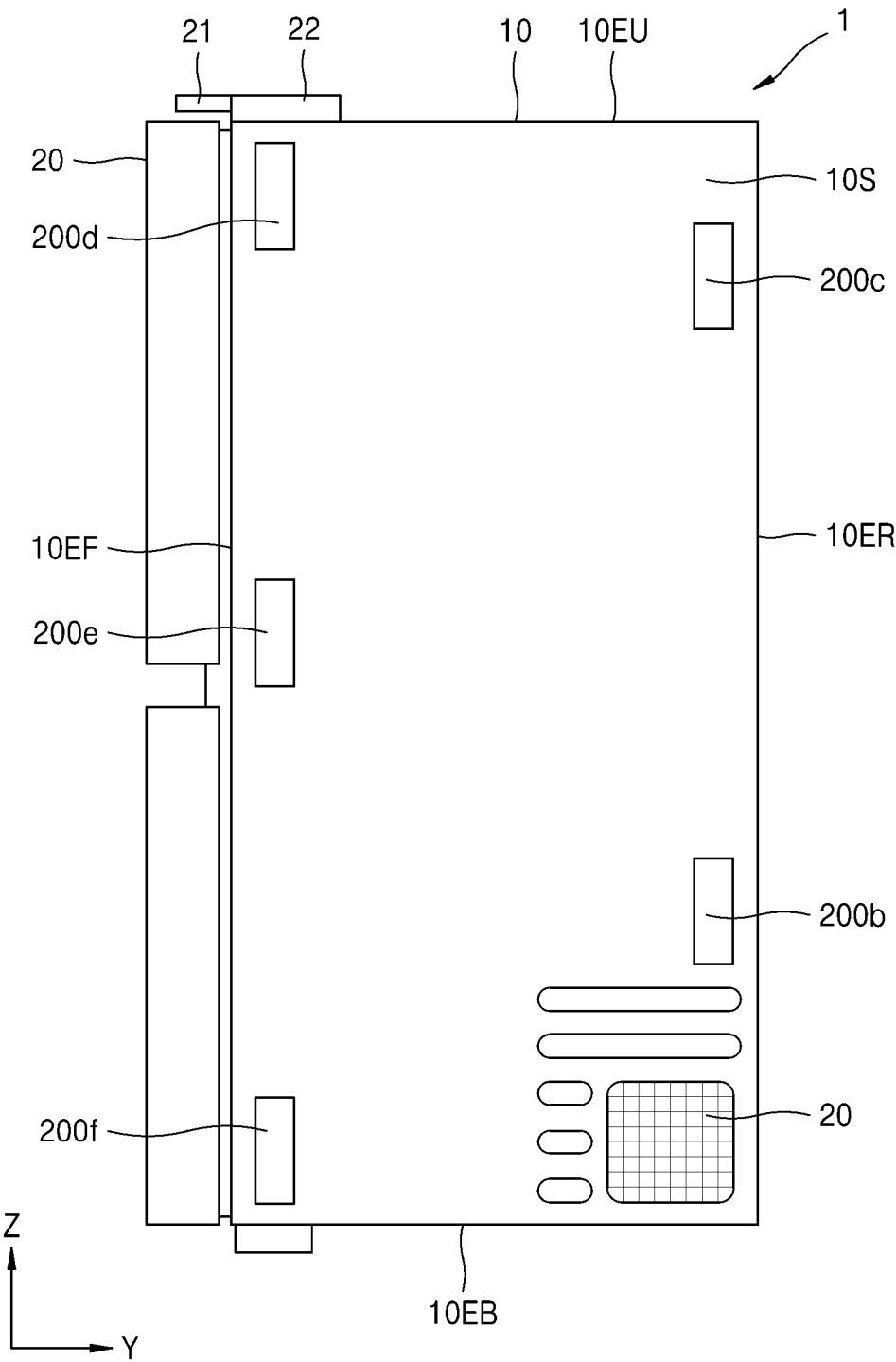


FIG. 10

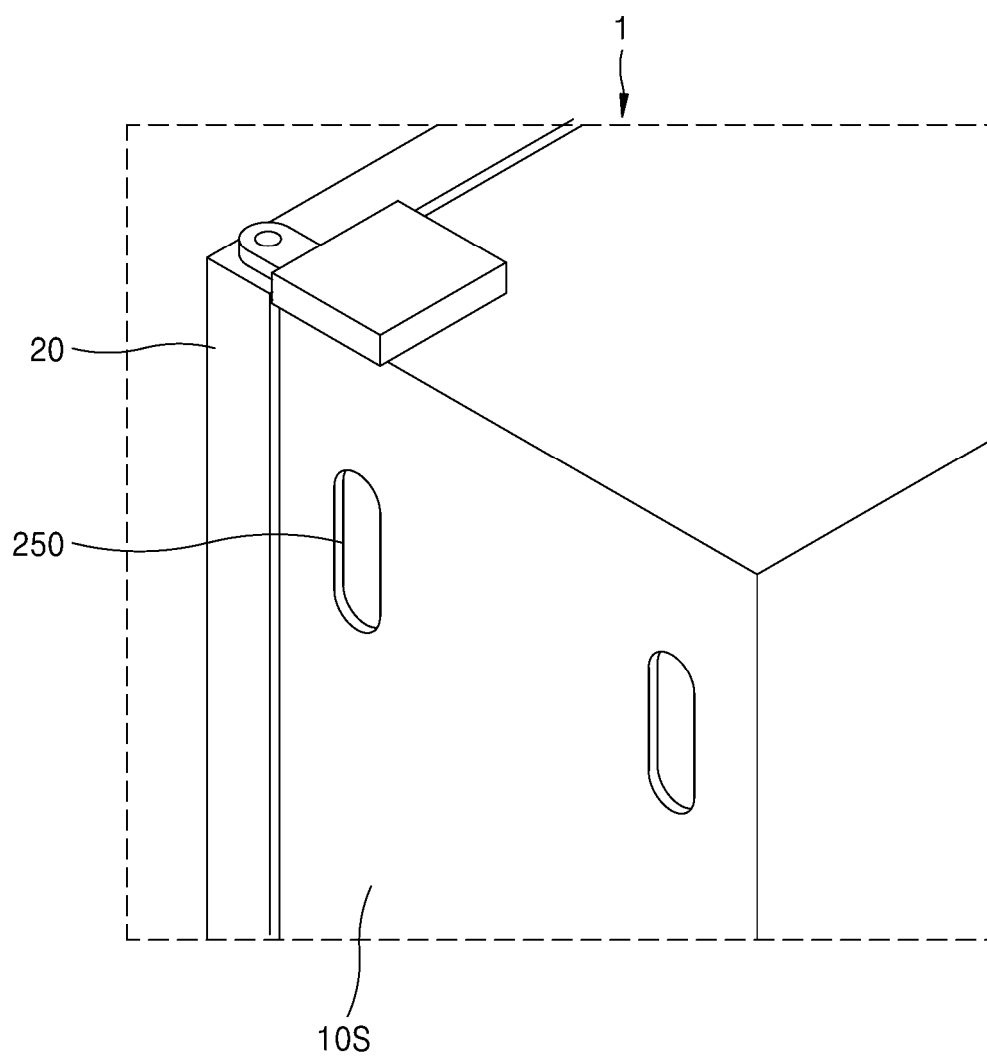


FIG. 11

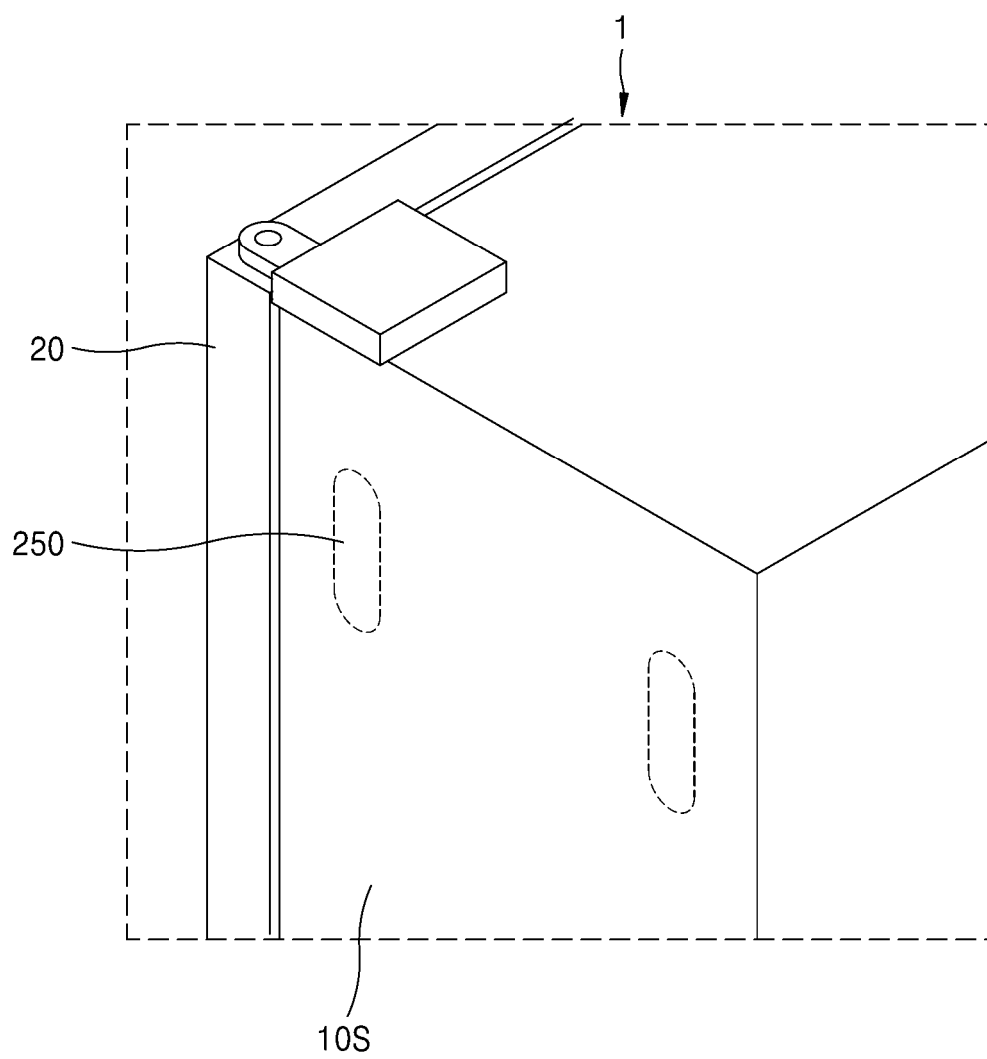


FIG. 12

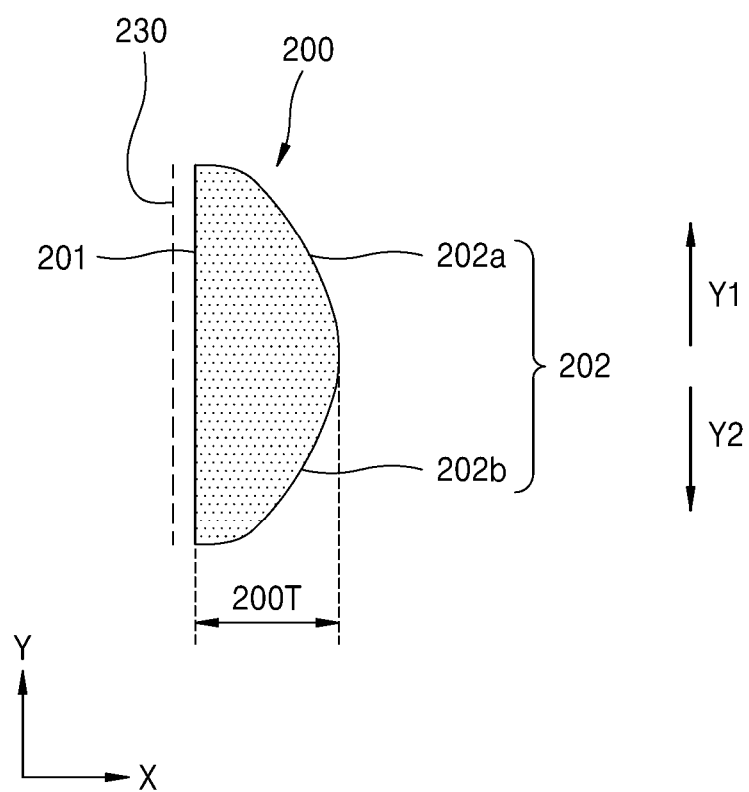


FIG. 13

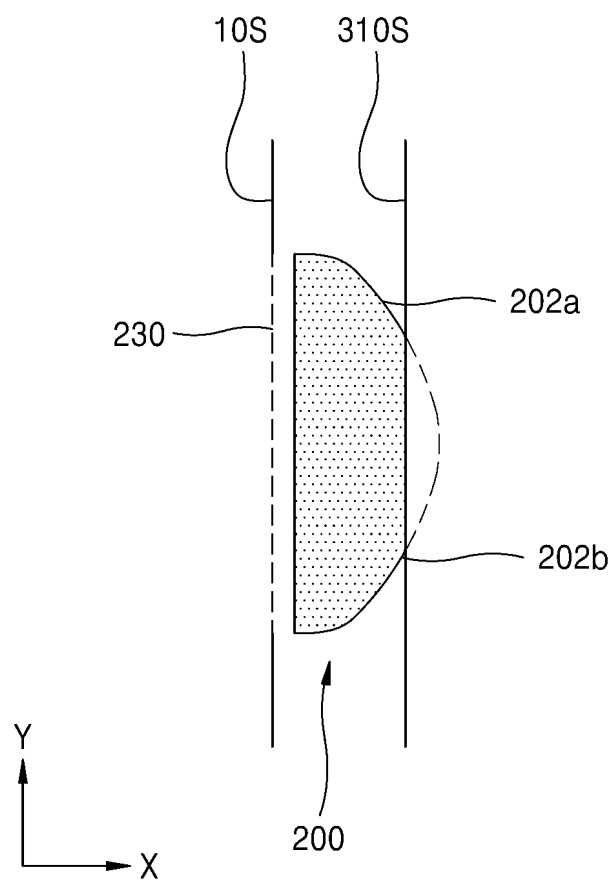


FIG. 14

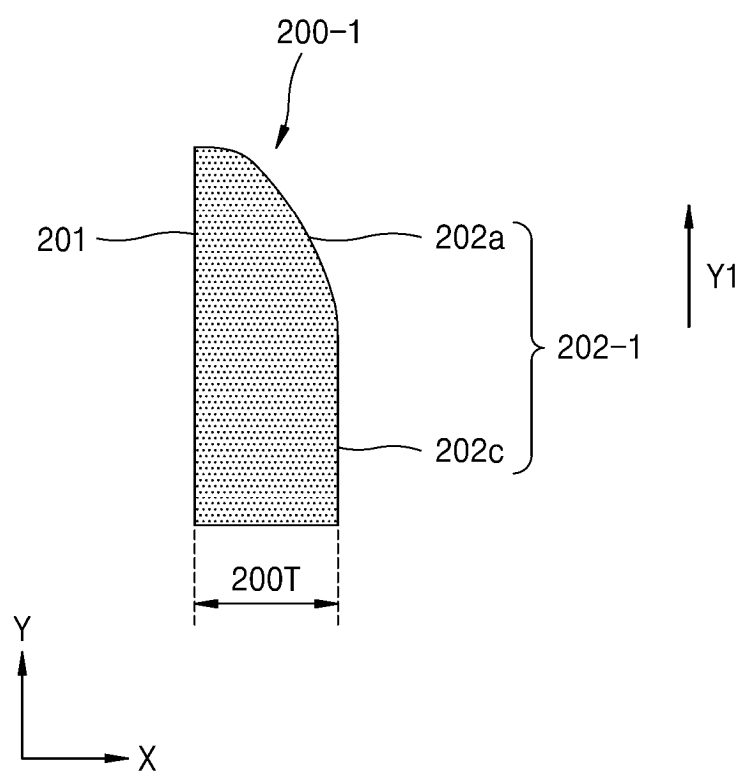


FIG. 15

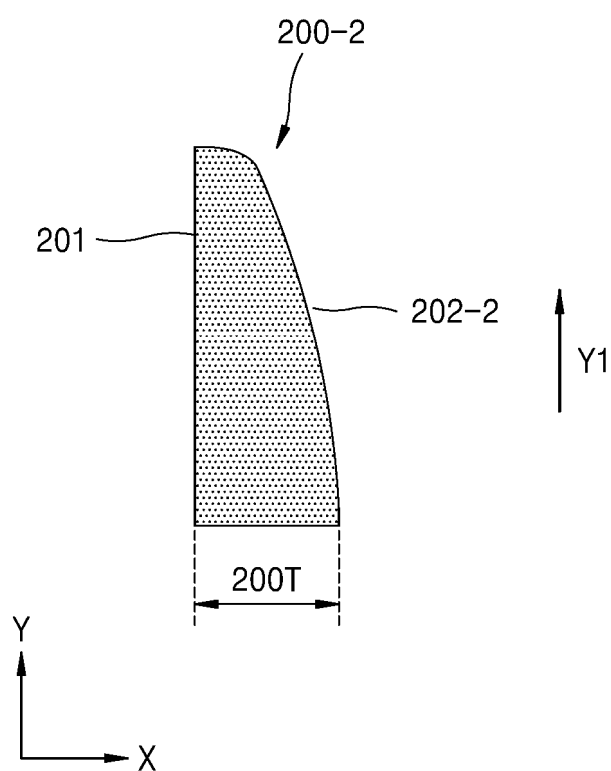


FIG. 16

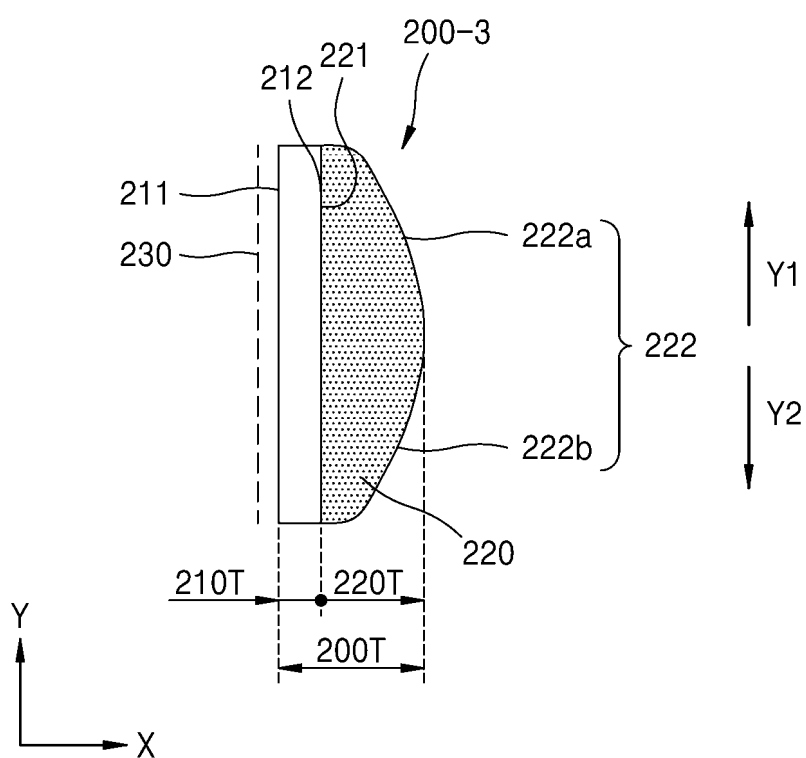


FIG. 17

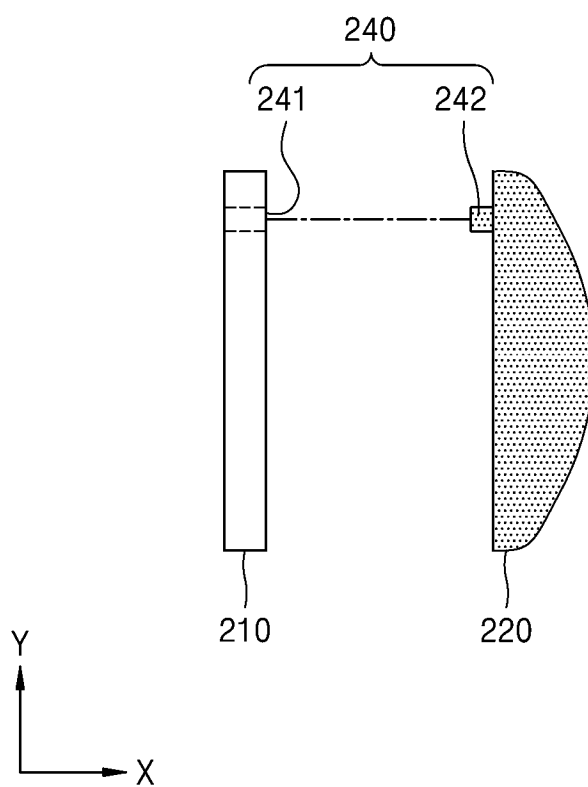


FIG. 18

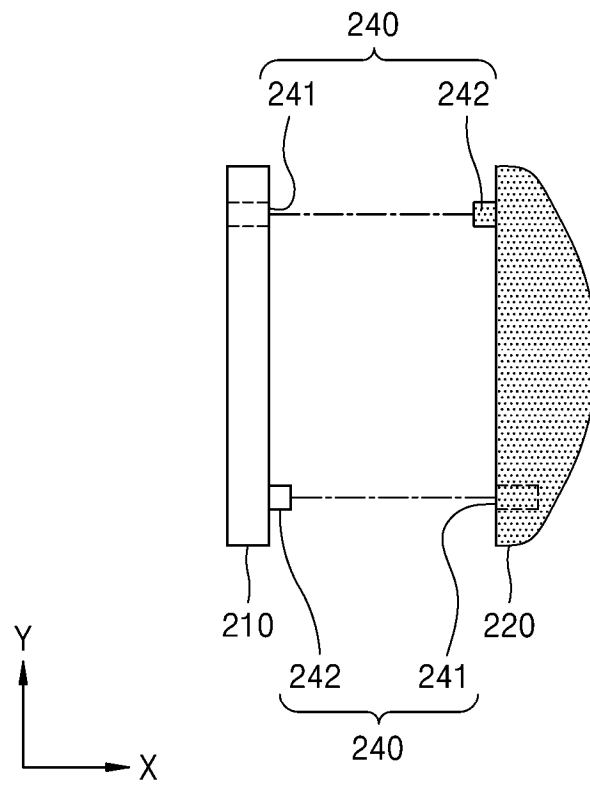


FIG. 19

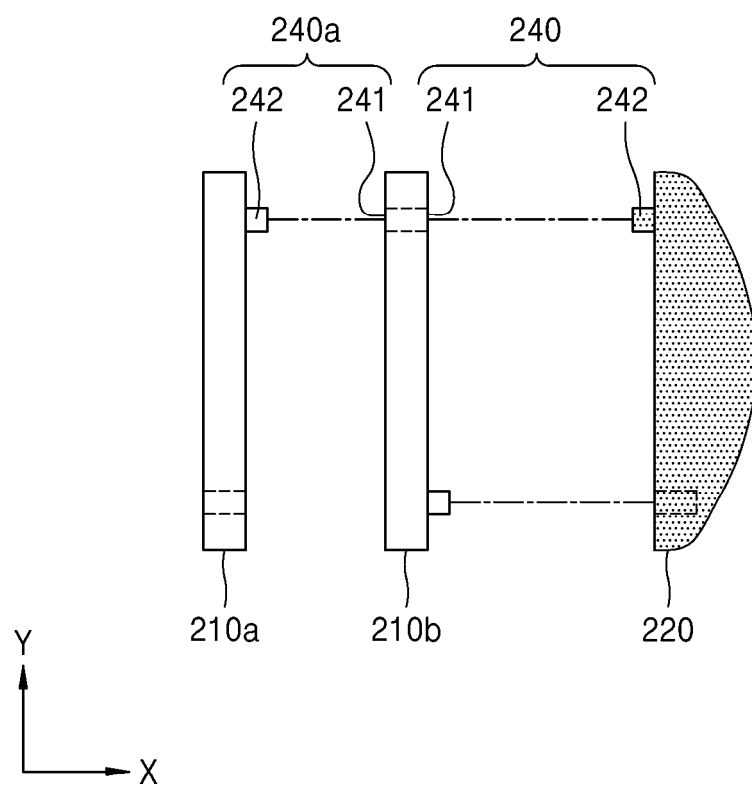


FIG. 20

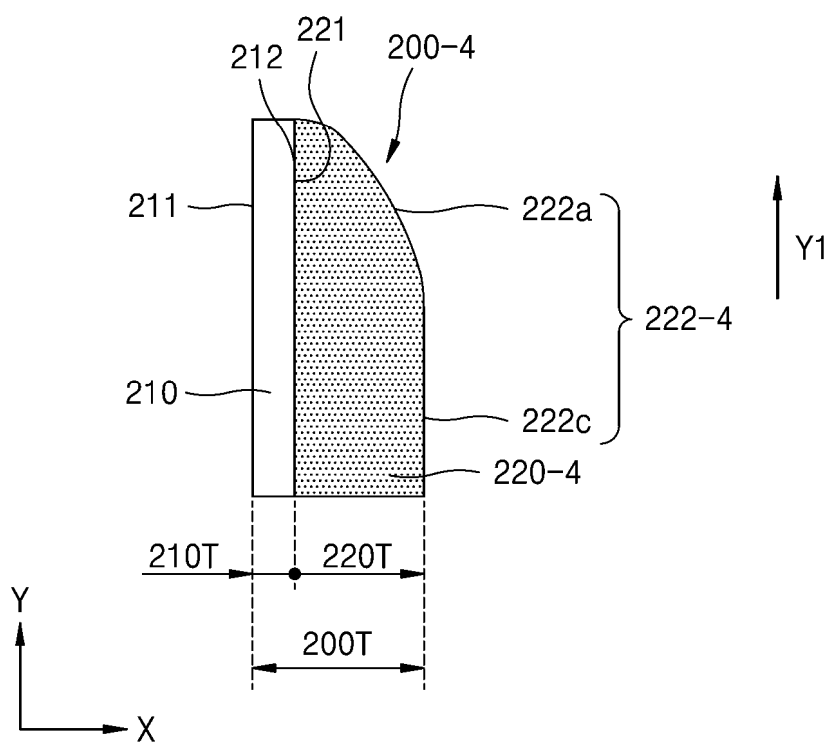


FIG. 21

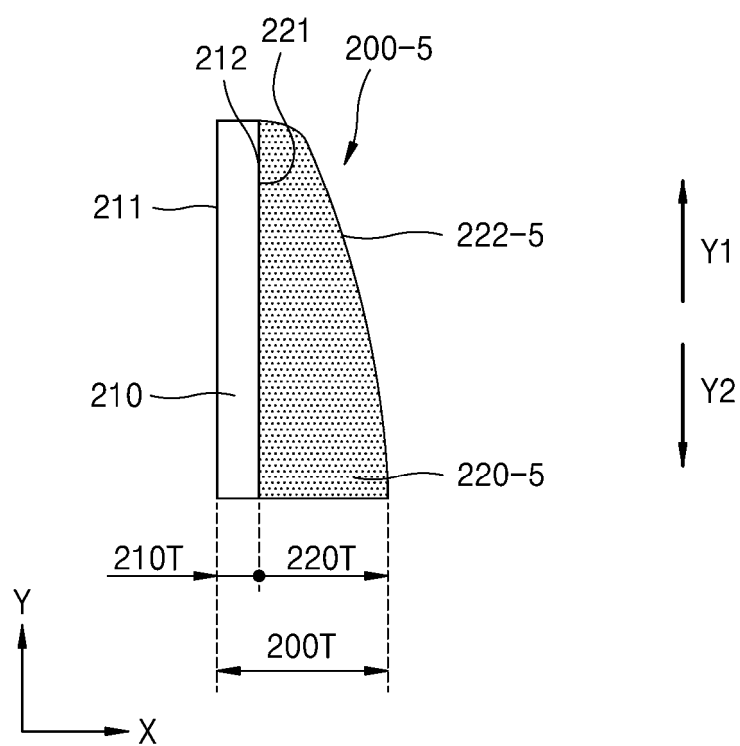


FIG. 22

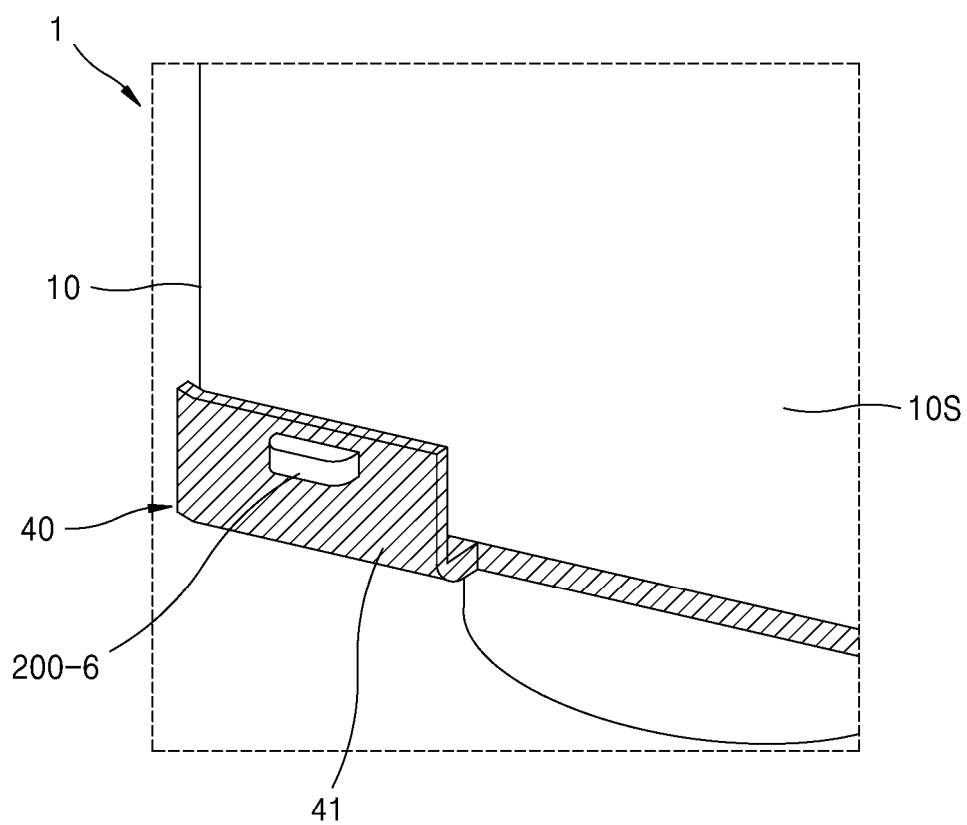
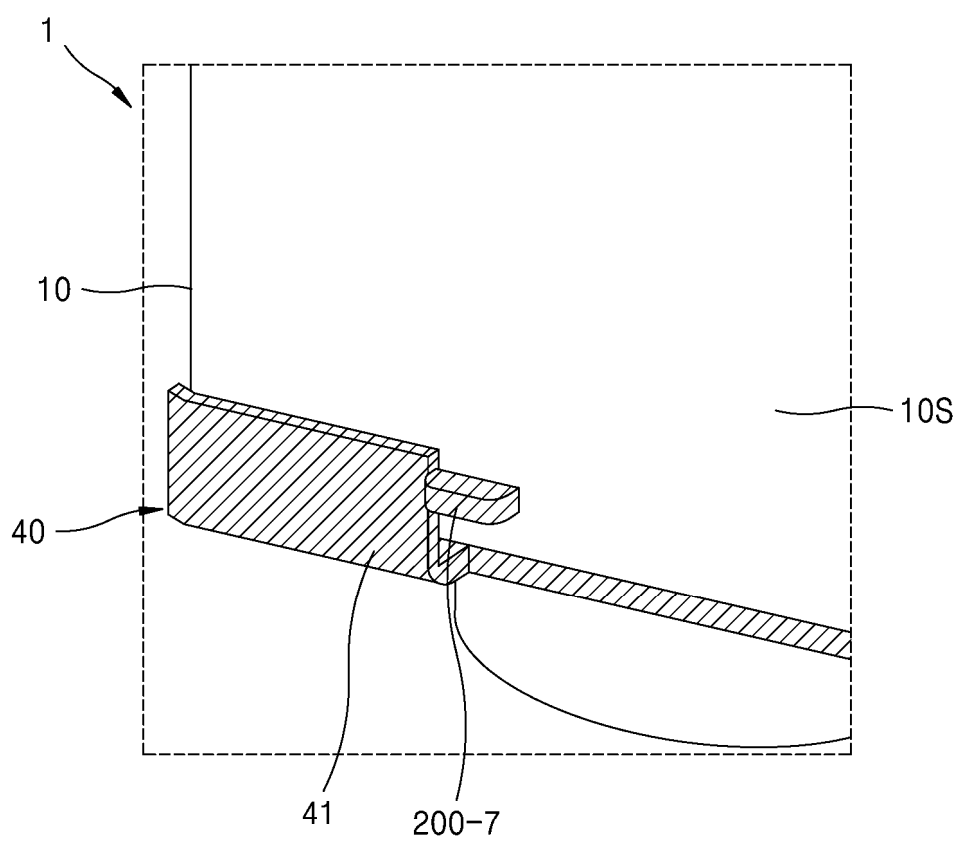


FIG. 23



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2025/001335

A. CLASSIFICATION OF SUBJECT MATTER

F25D 23/10(2006.01)i; F25D 23/06(2006.01)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 23/10(2006.01); F25D 23/00(2006.01); F25D 23/02(2006.01); F25D 23/06(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: 냉장고(refrigerator), 빌트인(built-in), 도어(door), 스톱퍼 블록(stopper block), 힌지(hinge), 스페이서(spacer), 틈새(gap)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-0700616 B1 (LG ELECTRONICS INC.) 28 March 2007 (2007-03-28) See paragraphs [0016]-[0021] and figures 4-5.	1-2,4-7,15
Y		3,8-14
Y	KR 10-0766108 B1 (LG ELECTRONICS INC.) 11 October 2007 (2007-10-11) See paragraphs [0022] and [0032]-[0038] and figures 2-4.	3,11-14
Y	JP 07-260330 A (MATSUSHITA REFRIG. CO., LTD.) 13 October 1995 (1995-10-13) See paragraphs [0014], [0023]-[0025] and [0033] and figures 8 and 13-14.	8-9
Y	KR 10-2005-0111372 A (LG ELECTRONICS INC.) 24 November 2005 (2005-11-24) See paragraphs [0018]-[0024] and figures 2-4b.	10
A	JP 58-085186 U (SANYO ELECTRIC CO., LTD. et al.) 09 June 1983 (1983-06-09) See figures 1-5.	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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“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

29 April 2025

Date of mailing of the international search report

30 April 2025

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon Building 4, 189 Cheongsaro, Seo-gu, Daejeon 35208

Facsimile No. +82-42-481-8578

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2025/001335

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KR	10-0766108	B1	11 October 2007	KR 10-2005-0111373 A	24 November 2005
JP	07-260330	A	13 October 1995	None	
KR	10-2005-0111372	A	24 November 2005	None	
JP	58-085186	U	09 June 1983	None	