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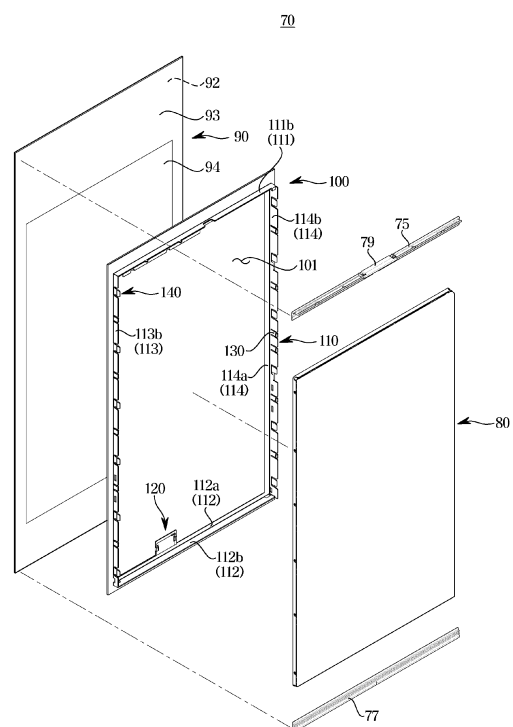
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(54) **REFRIGERATOR**

(57) A refrigerator includes a main body including a storage room, and a door coupled to the main body to open and close the storage room, and including a door body coupled to the main body and a panel detachably coupled to a front surface of the door body to cover the front surface of the door body. The panel includes a display including a screen configured to display an image, and a glass panel provided in front of the display such that trims, allowing the glass panel to be detachably assembled with the front surface of the door body, are fixed to an upper portion and a lower portion of a rear surface of the glass panel. The panel includes a display cover fixed to the rear surface of the glass panel to allow the display to be mounted, such that assembly hooks, allowing the display cover to be detachably assembled with the front surface of the door body, are integrally formed with left and right sides of a rear surface of the display cover.

FIG. 8



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Description

[Technical Field]

[0001] The disclosure relates to a refrigerator including a display on a door.

[Background Art]

[0002] A refrigerator is an appliance including a main body having a storage room and a cool air supply system for supplying cool air to the storage room to keep food fresh. The storage room includes a refrigeration room maintained at temperature of approximately 0 °C to approximately 5 °C to keep food refrigerated, and a freezer maintained at temperature of approximately 0 °C to approximately -30 °C to keep food frozen. On the front side of the main body, doors are provided to open and close the storage room. The doors are rotatably provided on the front side of the main body to open and close the storage room.

[0003] A refrigerator may have a display on the door allowing users to check a state of storage room, execute multiple applications, or perform Internet of Things (IoT) functions without opening the door.

[Disclosure]

[Technical Problem]

[0004] A refrigerator is an appliance including a main body having a storage room and a cool air supply system for supplying cool air to the storage room to keep food fresh. The storage room includes a refrigeration room maintained at temperature of approximately 0 °C to approximately 5 °C to keep food refrigerated, and a freezer maintained at temperature of approximately 0 °C to approximately -30 °C to keep food frozen. On the front side of the main body, doors are provided to open and close the storage room. The doors are rotatably provided on the front side of the main body to open and close the storage room.

[0005] A refrigerator may have a display on the door allowing users to check a state of storage room, execute multiple applications, or perform Internet of Things (IoT) functions without opening the door.

[Technical Solution]

[0006] One aspect of the disclosure provides a refrigerator including a main body including a storage room, and a door coupled to the main body to open and close the storage room, and including a door body coupled to the main body and a panel detachably coupled to a front surface of the door body to cover the front surface of the door body. The panel includes a display including a screen configured to display an image, and a glass panel provided in front of the display such that trims, allowing

the glass panel to be detachably assembled with the front surface of the door body, are fixed to an upper portion and a lower portion of a rear surface of the glass panel. The panel includes a display cover fixed to the rear surface of the glass panel to allow the display to be mounted, such that assembly hooks, allowing the display cover to be detachably assembled with the front surface of the door body, are integrally formed with left and right sides of a rear surface of the display cover.

[0007] The display cover may include an opening having a size corresponding to the screen of the display, and a display mounting portion to which the display is mounted, and the assembly hooks may be integrally formed with the display mounting portion.

[0008] The display mounting portion may be provided to have a square frame shape and extend from the rear surface of the display cover toward a rear side of the display mounting portion.

[0009] The display mounting portion may include a fixing hook to fix the display mounted on the display mounting portion.

[0010] A plurality of fixing hooks may be formed on left and right sides of the display mounting portion, and may be formed toward the display mounted on the display mounting portion to fix the display.

[0011] A plurality of assembly hooks may be formed on the left and right sides of the display mounting portion, and may be formed toward a direction opposite to the fixing hook.

[0012] Each of the plurality of assembly hooks may be formed between each of the plurality of fixing hooks.

[0013] The door body may include an assembly groove into which each of the assembly hooks is assembled.

[0014] The door body may include a door outer case, and a door inner case coupled to a rear surface of the door outer case, and the door outer case may include a heat dissipation plate configured to dissipate heat generated by the display.

[0015] The heat dissipation plate may include a first heat dissipation plate including a display accommodating portion in which the display is accommodated, and a central opening formed in a center of the first heat dissipation plate, and a second heat dissipation plate coupled to the central opening to cover the central opening on a rear surface of the first heat dissipation plate.

[0016] A plurality of assembly grooves may be formed on left and right side edges of the first heat dissipation plate.

[0017] The assembly hooks may be detachably assembled with the front surface of the door body to prevent left and right sides of the panel from being lifted.

[Advantageous Effects]

[0018] According to embodiments of the disclosure, a display provided on a door may be maximized in size.

[0019] Also, while maximizing a size of a display provided on a door, a side of a panel may be prevented from

being lifted when the panel is assembled with a door body.

[0020] Also, components of a door may be simplified, thereby improving ease of assembly and reducing material costs.

[0021] The effects that may achieved by the disclosure are not limited to the above-mentioned effects, and other effects not mentioned will be clearly understood by one of ordinary skill in the technical art to which the disclosure belongs from the following description.

[Description of Drawings]

[0022] These and/or other aspects of the disclosure will become apparent and more readily appreciated from the following description of embodiments, taken in conjunction with the accompanying drawings of which:

FIG. 1 is a view illustrating a front surface of a refrigerator according to an embodiment of the disclosure.

FIG. 2 is a perspective view of the refrigerator in which doors are opened according to an embodiment of the disclosure.

FIG. 3 is a view illustrating a door provided with a display among the doors of the refrigerator according to an embodiment of the disclosure.

FIG. 4 is a view illustrating a state in which a panel is disassembled from the door shown in FIG. 3 according to an embodiment of the disclosure.

FIG. 5 is a view illustrating a state in which a door body shown in FIG. 4 is disassembled according to an embodiment of the disclosure.

FIG. 6 is an enlarged view of a portion A shown in FIG. 5.

FIG. 7 is a view illustrating the panel of FIG. 4, when viewed from a different direction.

FIG. 8 is an exploded view of the panel shown in FIG. 7 according to an embodiment of the disclosure.

FIG. 9 is a view illustrating a display cover shown in FIG. 7.

FIG. 10 is a view illustrating the display cover of FIG. 9, when viewed from a different direction.

FIG. 11 is an enlarged view of a portion B shown in FIG. 9.

FIG. 12 is a view illustrating an operation of coupling a lower portion of the panel shown in FIG. 4 to a door body according to an embodiment of the disclosure.

FIG. 13 is a view illustrating an operation of coupling left and right sides of the panel to the door body, after coupling the lower portion of the panel to the door body, according to an embodiment of the disclosure.

FIG. 14 is a view illustrating a state in which the left and right sides of the panel are coupled to the door body according to an embodiment of the disclosure.

FIG. 15 is a view illustrating the lower portion of the panel and the door body in FIG. 14.

FIG. 16 is a view illustrating a state in which an upper

portion of the panel is coupled to the door body according to an embodiment of the disclosure.

FIG. 17 is a view illustrating a state in which a panel is disassembled according to an embodiment of the disclosure.

[Mode for Invention]

[0023] Configurations illustrated in the embodiments and the drawings described in the present specification are only the preferred embodiments of the disclosure, and thus it is to be understood that various modified examples, which may replace the embodiments and the drawings described in the specification, are possible when filing the present application.

[0024] Also, like reference numerals or symbols denoted in the drawings of the specification represent members or components that perform the substantially same functions.

[0025] Also, the terms used in the specification are merely used to describe embodiments, and are not intended to limit and/or restrict the disclosure. An expression used in the singular encompasses the expression of the plural, unless it has a clearly different meaning in the context. In the specification, it is to be understood that the terms such as "comprising", "including" or "having", etc., are intended to indicate the existence of the features, numbers, steps, operations, components, parts, or combinations thereof disclosed in the specification, and are not intended to preclude the possibility that one or more other features, numbers, steps, operations, components, parts, or combinations thereof may exist or may be added.

[0026] Also, it will be understood that, although the terms including ordinal numbers, such as "first", "second", etc., may be used herein to describe various components, these components should not be limited by these terms. These terms are only used to distinguish one component from another. For example, a first component could be termed a second component, and, similarly, a second component could be termed a first component, without departing from the scope of the disclosure. As used herein, the term "and/or" includes any and all combinations of one or more of associated listed items.

[0027] In the following description, the terms "front end", "rear end", "upper portion", "lower portion", "front surface", "rear surface", "upper end", "lower end", etc. are defined based on the drawings, and the shapes and positions of the corresponding components are not limited by the terms.

[0028] Hereinafter, embodiments of the disclosure will be described in detail with reference to the accompanying drawings.

[0029] FIG. 1 is a view illustrating a front surface of a refrigerator according to an embodiment. FIG. 2 is a perspective view of the refrigerator in which doors are opened according to an embodiment.

[0030] As shown in FIG. 1 and FIG. 2, a refrigerator may include a main body 10, a storage room 20 formed inside the main body 10 and provided in plurality such that front sides of a plurality of storage rooms 20 may be open, a door 30 for opening or closing the front side of the storage room 20, and a cool air supplier (not shown) supplying cool air into the storage room 20.

[0031] The main body 10 may include an inner case 11 forming the storage room 20, and an outer case 13 forming an outer appearance. An insulation (not shown) may be foamed between the inner case 11 and the outer case 13 and inside the door 30 to prevent cool air from leaking out of the storage room 20.

[0032] The main body 10 may include the cool air supplier for supplying cool air to the storage room 20. The cool air supplier may include a compressor, a condenser, an expansion valve, an evaporator, a blower fan, a cool air duct, and the like.

[0033] In a rear, lower portion of the main body 10, a machine room (not shown) in which the compressor for compressing a refrigerant and the condenser for condensing the compressed refrigerant are installed may be provided.

[0034] The evaporator for generating cool air, the blower fan for blowing cool air generated by the evaporator to inside of the storage room 20, and the cool air duct for guiding cool air generated by the evaporator to the storage room 20 may be positioned on a rear wall of the storage room 20. A plurality of evaporators, a plurality of blower fans, and a plurality of cool air ducts may be configured to independently supply cool air to the storage room 20.

[0035] The storage room 20 may be partitioned into a plurality of compartments by a horizontal partition wall 15 and a vertical partition wall 17. The storage room 20 may be partitioned into an upper storage room 21 and a lower storage room 22 by the horizontal partition wall 15. The lower storage room 22 may be partitioned into a left storage room 23 and a right storage room 24 by the vertical partition wall 17.

[0036] The upper storage room 21 and the lower storage room 22, which are partitioned by the horizontal partition wall 15, may be used as a refrigeration room and a freezer, respectively. Furthermore, the left storage room 23 and the right storage room 24, which are partitioned by the vertical partition wall 17, may both be used as a freezer. However, the above division and use of the storage room 20 is only an example, and may not be limited thereto.

[0037] In the storage room 20, a plurality of shelves 25 may be provided to partition the storage room 20 into a plurality of spaces. A plurality of storage containers 26 for storing food, and the like may be provided in the storage room 20.

[0038] The door 30 may be rotatably coupled to the main body 10 to open and close the storage room 20. The door 30 may include a pair of doors 31 and 32 that open and close the upper storage room 21. The pair of doors 31

and 32 may include the first door 31 rotatably coupled to a front left side of the main body 10, and the second door 32 rotatably coupled to a front right side of the main body 10.

[0039] The door 30 may include a pair of doors 33 and 34 that open and close the lower storage room 22. The pair of doors 33 and 34 may include the third door 33 opening and closing the left storage room 23, and the fourth door 34 opening and closing the right storage room 24.

[0040] The main body 10 may be provided with hinges 35, 36 and 37 to rotatably couple the door 30 to the main body 10. The hinges 35, 36 and 37 may include the upper hinge 35 provided at an upper portion of the main body 10 to rotatably couple the door 30 to the main body 10. The hinges 35, 36 and 37 may include a middle hinge 36 provided at the horizontal partition wall 15, which is a middle portion of the main body 10, to allow the door 30 to be rotatably coupled to the main body 10. The hinges 35, 36 and 37 may include the lower hinge 37 provided at a lower portion of the main body 10 to rotatably couple the door 30 to the main body 10.

[0041] A plurality of door guards 38 for accommodating food, and the like may be installed on a rear surface of the door 30. On the rear surface of the door 30, a gasket 39 that, when the door 30 is closed, is in close contact with a front surface of the main body 10 may be provided to seal the storage room 20.

[0042] The door 30 may be provided with a display 80. The display 80 may display various information related to a state, an operation, and the like of the refrigerator, or may display various applications (apps) for user convenience. Although the display 80 is shown as being provided on the second door 32 of the doors 30, the display 80 is not limited thereto. That is, the display 80 may be provided on the other doors 31, 33 and 34.

[0043] FIG. 3 is a view illustrating a door provided with a display among the doors of the refrigerator according to an embodiment. FIG. 4 is a view illustrating a state in which a panel is disassembled from the door shown in FIG. 3. FIG. 5 is a view illustrating a state in which a door body shown in FIG. 4 is disassembled. FIG. 6 is an enlarged view of a portion A shown in FIG. 5. FIG. 7 is a view illustrating the panel of FIG. 4, when viewed from a different direction. FIG. 8 is an exploded view of the panel shown in FIG. 7. FIG. 9 is a view illustrating a display cover shown in FIG. 7. FIG. 10 is a view illustrating the display cover of FIG. 9, when viewed from a different direction. FIG. 11 is an enlarged view of a portion B shown in FIG. 9.

[0044] Hereinafter, the second door 32 on which the display 80 is installed is referred to as the door 30 for convenience of description.

[0045] As shown in FIG. 3 to FIG. 11, the door 30 may include a door body 40 coupled to the main body 10. The door body 40 may be rotatably coupled to the main body 10. The door body 40 may include a door outer case 41, a door inner case 42, an upper cap 50, and a lower cap 60. The door outer case 41, the door inner case 42, the upper

cap 50, and the lower cap 60 may be coupled to each other to form an interior space, and an insulation 48 may be provided in the interior space (see FIG. 12).

[0046] The door outer case 41 may include heat dissipation plates 43 and 44 to dissipate heat generated by the display 80. The heat dissipation plates 43 and 44 may include the first heat dissipation plate 43. The first heat dissipation plate 43 may include a display accommodating portion 45 that is concavely formed to accommodate the display 80. The display accommodating portion 45 may be wider than a space occupied by the display 80, such that an air insulation layer is formed to prevent heat generated by the display 80 from being transferred.

[0047] The first heat dissipation plate 43 may include a central opening 46 formed at a rear of the display accommodating portion 45. The second heat dissipation plate 44 may be coupled to the central opening 46. The second heat dissipation plate 44 may be formed of a material having a higher thermal conductivity than the first heat dissipation plate 43. For example, the second heat dissipation plate 44 may be formed of a metal material, while the first heat dissipation plate 43 may be formed of a plastic material.

[0048] Accordingly, heat emitted from the display 80 may be guided through the second heat dissipation plate 44 to the first heat dissipation plate 43, provided at a boundary of the second heat dissipation plate 44, thereby preventing heat from being transferred to the storage room 20. Although the heat dissipation plates 43 and 44 are shown as being formed separately as the first heat dissipation plate 43 and the second heat dissipation plate 44, the heat dissipation plates 43 and 44 are not limited thereto. That is, the heat dissipation plates 43 and 44 may be formed integrally.

[0049] The first heat dissipation plate 43 may be provided with an assembly groove 47 into which left and right surfaces of the panel 70 are detachably assembled. A plurality of assembly grooves 47 may be formed on the left and right sides of the first heat dissipation plate 43, respectively. The plurality of assembly grooves 47 may be detachably assembled with a plurality of assembly hooks 140 formed on a display cover 100 to be described below.

[0050] Side plates 49 may be coupled to both sides of the heat dissipation plates 43 and 44.

[0051] The door inner case 42 may be coupled to a rear surface of the door outer case 41. The plurality of door guards 38 may be provided on a rear surface of the door inner case 42.

[0052] The upper cap 50 may include an upper cap body 51, an insertion groove 53, and an upper cap hole 55. The insertion groove 53 may be formed such that an upper trim projection 76a of an upper trim 75 is inserted. When the upper trim projection 76a is inserted into the insertion groove 53, a fixing member 57 may be coupled to the upper cap hole 55 of the upper cap 50 and an upper trim hole 76b of the upper trim projection 76a so as to couple the panel 70 to the door body 40. (see FIG. 16)

[0053] The lower cap 60 may include a lower cap body 61, a lower cap projection 63, a lower cap rib 65, and a lower cap mounting space 67. The lower cap projection 63 may protrude upwardly from the lower cap body 61.

The lower cap projection 63 may be formed to be insertable into a lower trim groove 78b of a lower trim 77. (see FIG. 15)

[0054] The lower cap rib 65 may protrude upwardly from the lower cap body 61. The lower cap rib 65 may be formed to be spaced apart from the lower cap projection 63 by a predetermined distance. The lower cap rib 65 may guide the lower trim 77 of the panel 70 to an installation position, when the panel 70 is installed on the door body 40. (see FIG. 15)

[0055] The door 30 may include the panel 70 detachably coupled to a front surface of the door body 40. The panel 70 may be provided with the display 80. The panel 70 may be provided to cover the entire area of the front surface of the door body 40. That is, the panel 70 may be formed to have a size corresponding to a size of the front surface of the door body 40. Accordingly, the door body 40 may be covered with the panel 70. The panel 70 may be provided to be detachably coupled to the door body 40.

[0056] The panel 70 may include the display 80 having a screen 81 configured to display an image. The panel 70 may include a glass panel 90 provided in front of the display 80. The panel 70 may include the display cover 100 coupled to a rear surface of the glass panel 90 and to which the display 80 is mounted.

[0057] The glass panel 90 may include a glass member 91 and a decorative layer 92 formed on a rear surface of the glass member 91.

[0058] The glass member 91 may include glass or plastic made of a transparent material such as glass. The glass member 91 may be formed to have a size corresponding to the size of the front surface of the door body 40 to cover the entire area of the front surface of the door body 40.

[0059] The glass member 91 may have a transparent area TA and a non-transparent area NA by the decorative layer 92 formed on the rear surface of the glass member 91. The transparent area TA is an area in which the decorative layer 92 is not formed, and the screen 81 of the display 80 disposed behind the glass panel 90 may be exposed through the transparent area TA. The non-transparent area NA is an area in which the decorative layer 92 is formed, and patterns and colors of the decorative layer 92 may be visible through the non-transparent area NA.

[0060] The glass panel 90 may further include a shatterproof film 93 that prevents the glass member 91 from shattering when the glass member 91 is broken. The shatterproof film 93 may be provided on a rear surface of the non-transparent area NA where the decorative layer 92 is formed.

[0061] The glass panel 90 may further include a touch film 94 for inputting a signal to the display 80. The touch film 94 may be provided on the transparent area TA on the

rear surface of the glass member 91 to correspond to the screen 81 of the display 80. A thickness of the touch film 94 may be formed to correspond to a sum of a thickness of the decorative layer 92 and a thickness of the shatter-proof film 93.

[0062] The trims 75 and 77 may be attached and fixed to the rear surface of the glass panel 90 using adhesive. The upper trim 75 and the lower trim 77 may be fixed to an upper portion and a lower portion of the rear surface of the glass panel 90, respectively. The panel 70 may be detachably assembled with the front surface of the door body 40 by the upper trim 75 and the lower trim 77. The panel 70 may be detachably coupled to an upper portion and a lower portion of the front surface of the door body 40 by the upper trim 75 and the lower trim 77.

[0063] The upper trim 75 may include an upper trim body 76, the upper trim projection 76a, and the upper trim hole 76b. The upper trim projection 76a may protrude from the upper trim body 76. The upper trim hole 76b may be formed in the upper trim projection 76a. (see FIG. 16)

[0064] The lower trim 77 may include a lower trim body 78, a lower trim projection 78a, and the lower trim groove 78b. The lower trim projection 78a may protrude from the lower trim body 78. The lower trim projection 78a may have a shape extending rearwardly from the lower trim body 78 by a predetermined length and approximately extending in a vertical direction, in order to form the lower trim groove 78b. The lower trim groove 78b may be formed between the lower trim body 78 and the lower trim projection 78a. (see FIG. 15)

[0065] The panel 70 may be provided with a microphone 79 for receiving voice. The microphone 79 may be disposed on the upper trim 75 coupled to an upper portion of the rear surface of the glass panel 90.

[0066] The panel 70 may include the display cover 100 to which the display 80 is mounted. The display cover 100 may be formed to have a smaller size than the glass panel 90 such that the display cover 100 is covered with the glass panel 90. The display cover 100 may be fixed to the rear surface of the glass panel 90 using an adhesive 95 such as silicone, hot melt, and the like.

[0067] The display 80 may be mounted on a display mounting portion 110 of the display cover 100 after the display cover 100 is fixed to the rear surface of the glass panel 90. That is, the display 80 may be mounted on the display mounting portion 110 in a direction from a rear to a front. With the structure described above, not only the display 80 may be easily mounted, but also the display 80 may be separated and replaced, without detaching the display cover 100 from the glass panel 90 after assembly of the panel 70 is completed.

[0068] The display cover 100 is positioned between the glass panel 90 and the display 80, and thus the display cover 100 may include an opening 101 having a size corresponding to the screen 81 of the display 80 such that the screen 81 of the display 80 is not covered by the display cover 100. With the above structure, the entire front surface of the panel 70 may be formed from the

glass panel 90, and the display 80 may be integrated with the glass panel 90 through the display cover 100. Accordingly, no gap is formed in the panel 70, and no seam caused by the gap is visible, thereby improving aesthetics.

[0069] The display cover 100 may include the display mounting portion 110 on which the display 80 is mounted. The display mounting portion 110 may have a quadrilateral frame shape. The display mounting portion 110 may include an upper support portion 111, a lower support portion 112, a left support portion 113, and a right support portion 114 that support a top, a bottom, a left end, and a right end of the display 80, respectively. The upper support portion 111, the lower support portion 112, the left support portion 113, and the right support portion 114 may each include first support portions 111a, 112a, 113a and 114a preventing the display 80 from moving towards the glass panel 90. The first support portions 111a, 112a, 113a and 114a may support edges of a front surface of the display 80.

[0070] Furthermore, the upper support portion 111, the lower support portion 112, the left support portion 113, and the right support portion 114 may each include second support portions 111b, 112b, 113b and 114b preventing the display 80 from moving up, down, left and right. The second support portions 111b, 112b, 113b and 114b may support top, bottom, left and right sides of the display 80, respectively.

[0071] The display cover 100 may include a guide rib 120 that guides the display 80 to the display mounting portion 110. The guide rib 120 may be formed on a lower portion of the display mounting portion 110. The guide rib 120 may be formed to protrude upwardly from an end of the second support portion 112b of the lower support portion 112. Although the guide rib 120 is shown as being formed on the lower portion of the display mounting portion 110, the guide rib 120 is not limited thereto. That is, the guide rib 120 may be formed on a side and an upper portion of the display mounting portion 110.

[0072] The guide rib 120 may form a guide groove (not shown) together with the lower support portion 112. The guide groove may be formed between the guide rib 120 and the lower support portion 112. The guide rib 120 may guide the display 80 to be inserted into the guide groove.

[0073] The display cover 100 may include an elastically deformable fixing hook 130 for fixing the display 80 mounted on the display mounting portion 110. The fixing hook 130 may be formed on the left support portion 113 and the right support portion 114 of the display mounting portion 110. That is, the display mounting portion 110 may include the fixing hook 130. A plurality of fixing hooks 130 may be provided along a longitudinal direction of the left support portion 113 and the right support portion 114. However, the fixing hook 130 may also be formed on the upper support portion 111 and the lower support portion 112.

[0074] The fixing hook 130 may be formed toward the display 80 mounted on the display mounting portion 110

for fixing the display 80. Because the fixing hook 130 is formed toward the display 80 mounted on the display mounting portion 110, while the display 80 is being mounted on the display mounting portion 110, the fixing hook 130 may be elastically deformed to spread outwardly, and when the display 80 is completely mounted on the display mounting portion 110, the fixing hook 130 may return to its original shape.

[0075] The fixing hook 130 may be provided to hook onto a rear surface of the display 80 to prevent the display 80 from being displaced from the display mounting portion 110 unless the display 80 is pulled by a predetermined external force.

[0076] The display cover 100 may include an assembly hook 140 detachably assembled with the front surface of the door body 40. The assembly hook 140 may be elastically deformable. A plurality of assembly hooks 140 may be formed on each of the left and right sides of the rear surface of the display cover 100. The assembly hooks 140 may be formed on the left support portion 113 and the right support portion 114 of the display mounting portion 110. That is, the display mounting portion 110 may include the assembly hooks 140. The plurality of assembly hooks 140 may be provided along a longitudinal direction of the left support portion 113 and the right support portion 114.

[0077] The plurality of assembly hooks 140 may be integrally formed with the left support portion 113 and the right support portion 114 of the display mounting portion 110. The plurality of assembly hooks 140 may be detachably assembled into a plurality of assembly grooves 47 formed in the first heat dissipation plate 43 of the door body 40. When the panel 70 is detachably assembled to the front surface of the door body 40 by the plurality of assembly hooks 140, the left and right sides of the panel 70 may be prevented from being lifted.

[0078] In addition, the plurality of assembly hooks 140 may be integrally formed with the display mounting portion 110, and thus a separate trim to prevent the left and right sides of the panel 70 from being lifted may not require to be coupled to the left and right sides of the rear surface of the glass panel 90. Because separate trims are not required to be coupled to the left and right sides of the rear surface of the glass panel 90, a space for coupling the separate trims to the left and right sides of the rear surface of the glass panel 90 is not required. Accordingly, a size of the display 80 may be maximized as large as the space.

[0079] Furthermore, because the plurality of assembly hooks 140 are integrally formed with the display mounting portion 110, separate trims are not required to be coupled to the left and right sides of the rear surface of the glass panel 90, thereby simplifying components. Accordingly, the ease of assembly of the door 30 may be improved and material costs may be reduced.

[0080] The assembly hooks 140 may be formed in an opposite direction to the fixing hooks 130. That is, the assembly hooks 140 may be formed in a direction oppo-

site to a direction toward the display 80 mounted on the display mounting portion 110.

[0081] Each of the plurality of assembly hooks 140 may be formed between the plurality of fixing hooks 130. However, each of the plurality of assembly hooks 140 may not be formed between all of the plurality of fixing hooks 130.

[0082] Next, an operation in which the panel 70 is detachably assembled with the front surface of the door body 40 is described with reference to FIG. 12 to FIG. 16.

[0083] FIG. 12 is a view illustrating an operation of coupling a lower portion of the panel shown in FIG. 4 to a door body. FIG. 13 is a view illustrating an operation of coupling left and right sides of the panel to the door body, after coupling the lower portion of the panel to the door body. FIG. 14 is a view illustrating a state in which the left and right sides of the panel are coupled to the door body. FIG. 15 is a view illustrating the lower portion of the panel and the door body in FIG. 14. FIG. 16 is a view illustrating a state in which an upper portion of the panel is coupled to the door body.

[0084] As shown in FIG. 12, to detachably assemble the panel 70 to the front surface of the door body 40, the lower cap projection 63 may first be entered to the lower trim groove 78b by tilting the panel 70. That is, a lower portion of the panel 70 may be coupled to the door body 40 such that the lower cap projection 63 is inserted into the lower trim groove 78b.

[0085] After coupling the lower portion of the panel 70 to the door body 40 such that the lower cap projection 63 is inserted into the lower trim groove 78b, as shown in FIG. 13, the panel 70 may be rotated such that the left and right sides of the panel 70 are detachably coupled to the door body 40. That is, as shown in FIG. 14, by rotating the panel 70, the plurality of assembly hooks 140 integrally formed with the display cover 100 may be detachably assembled into the plurality of assembly grooves 47 formed on the door body 40. Once the plurality of assembly hooks 140 integrally formed with the display cover 100 are assembled into the plurality of assembly grooves 47 formed on the door body 40, the lower cap projection 63 is fully inserted into the lower trim groove 78b, as shown in FIG. 15. Accordingly, a lower portion and left and right sides of the panel 70 may be coupled to the front surface of the door body 40.

[0086] Once the lower portion and the left and right sides of the panel 70 are coupled to the front surface of the door body 40, the upper trim projection 76a may be inserted into the insertion groove 53 of the upper cap 50, as shown in FIG. 16. A fixing member 69 may be coupled to the upper cap hole 55 of the upper cap 50 and the upper trim hole 76b of the upper trim projection 76a in a top-to-bottom direction. With the above structure, the panel 70 may be easily detachably coupled to the door body 40 and, in the reverse order of the above, the panel 70 may be easily detached from the door body 40.

[0087] FIG. 17 is a view illustrating a state in which a panel is disassembled according to an embodiment.

[0088] As shown in FIG. 17, the panel 70 may include the display 80, the glass panel 90 provided in front of the display 80, and a display cover 200 attached to a rear surface of the glass panel 90 such that the display 80 is mounted. Except for the display cover 200, the remaining configurations may be the same as those illustrated in FIG. 8.

[0089] Trims 250 and 260 may be integrally formed with an upper portion and a lower portion of a rear surface of the display cover 200. The trims 250 and 260 may include the upper trim 250 integrally formed with the upper portion of the rear surface of the display cover 200 and the lower trim 260 integrally formed with the lower portion of the rear surface of the display cover 200. That is, the upper trim 75 and the lower trim 77, attached and fixed to the upper and lower portions of the glass panel 90 in FIG. 8, may be integrally formed with the upper and lower portions of the rear surface of the display cover 200 in the panel 70 shown in FIG. 17. Except for the configuration in which the upper and lower portions of the display cover 200 extend upwardly and downwardly, respectively, from the display mounting portion 110 such that the upper trim 250 and the lower trim 260 are integrally formed with the upper and lower portions of the rear surface of the display cover 200, the remaining configurations may be the same as those of the display cover 100 shown in FIG. 8. Accordingly, descriptions of the same configurations with only different reference numerals are omitted.

[0090] While the disclosure has been particularly described with reference to exemplary embodiments, it should be understood by those skilled in the art that various changes in form and detail may be made without departing from the spirit and scope of the disclosure.

Claims

1. A refrigerator, comprising:

a main body including a storage room; and
a door coupled to the main body to open and close the storage room, and including a door body coupled to the main body and a panel detachably coupled to a front surface of the door body to cover the front surface of the door body, wherein the panel includes:

a display including a screen configured to display an image;
a glass panel provided in front of the display such that trims, allowing the glass panel to be detachably assembled with the front surface of the door body, are fixed to an upper portion and a lower portion of a rear surface of the glass panel; and
a display cover fixed to the rear surface of the glass panel to allow the display to be

mounted, such that assembly hooks, allowing the display cover to be detachably assembled with the front surface of the door body, are integrally formed with left and right sides of a rear surface of the display cover.

2. The refrigerator of claim 1, wherein the display cover includes:

an opening having a size corresponding to the screen of the display; and
a display mounting portion on which the display is mounted, wherein the assembly hooks are integrally formed with the display mounting portion.

3. The refrigerator of claim 2, wherein the display mounting portion is provided to have a square frame shape and extend from the rear surface of the display cover toward a rear side of the display mounting portion.

4. The refrigerator of claim 3, wherein the display mounting portion includes a fixing hook to fix the display mounted on the display mounting portion.

5. The refrigerator of claim 4, wherein a plurality of fixing hooks are formed on left and right sides of the display mounting portion, and are formed toward the display mounted on the display mounting portion to fix the display.

6. The refrigerator of claim 5, wherein a plurality of assembly hooks are formed on the left and right sides of the display mounting portion, and are formed toward a direction opposite to the fixing hook.

7. The refrigerator of claim 6, wherein each of the plurality of assembly hooks is formed between each of the plurality of fixing hooks.

8. The refrigerator of claim 1, wherein the door body includes an assembly groove into which each of the assembly hooks is assembled.

9. The refrigerator of claim 8, wherein the door body includes:

a door outer case; and
a door inner case coupled to a rear surface of the door outer case, wherein the door outer case includes a heat dissipation plate configured to dissipate heat generated by the display.

10. The refrigerator of claim 9, wherein the heat dissipation plate includes:

a first heat dissipation plate including a display accommodating portion in which the display is accommodated, and a central opening formed in a center of the first heat dissipation plate; and a second heat dissipation plate coupled to the central opening to cover the central opening on a rear surface of the first heat dissipation plate. 5

11. The refrigerator of claim 10, wherein a plurality of assembly grooves are formed on left and right side edges of the first heat dissipation plate. 10

12. The refrigerator of claim 1, wherein the assembly hooks are detachably assembled with the front surface of the door body to prevent left and right sides of the panel from being lifted. 15

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FIG. 1

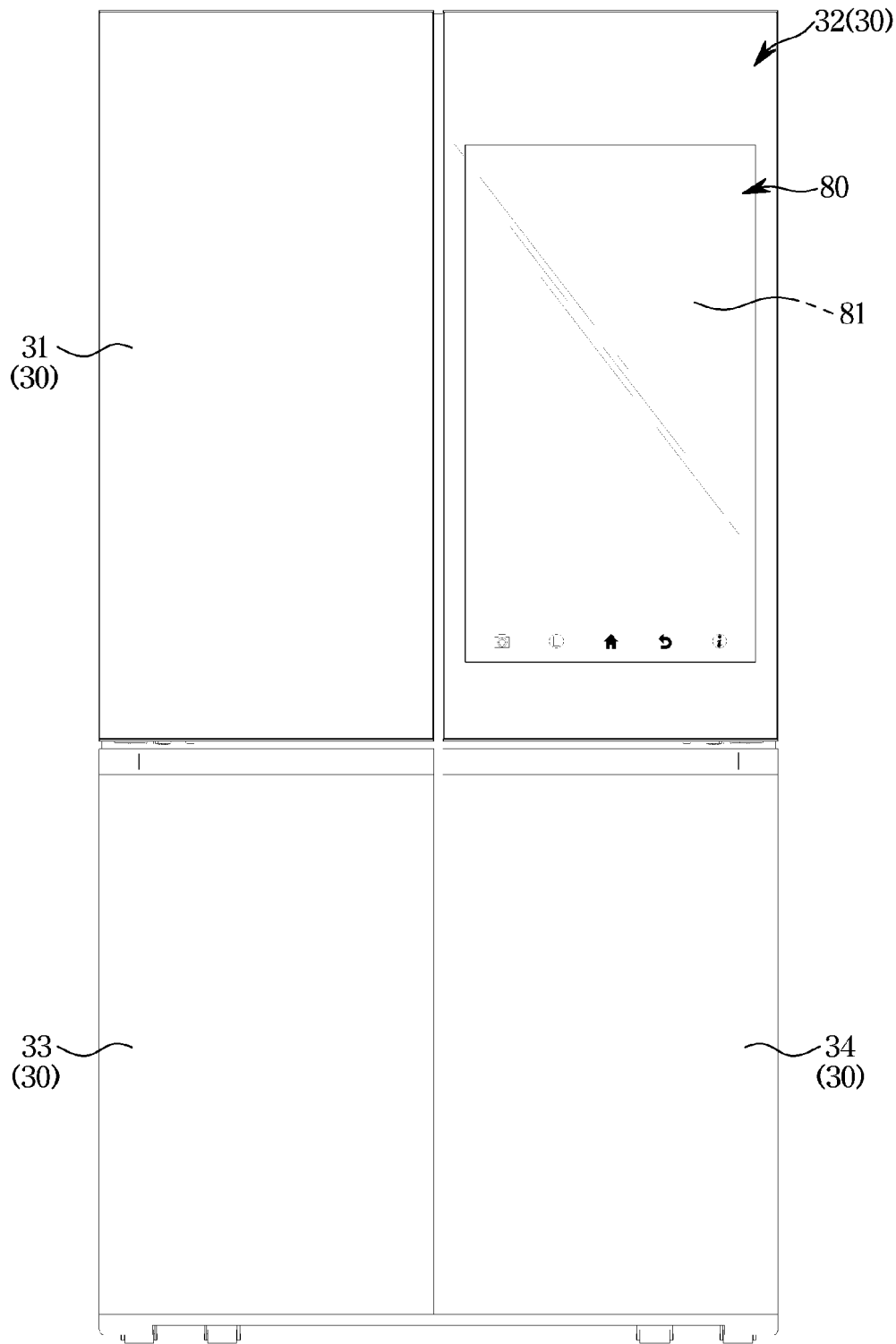


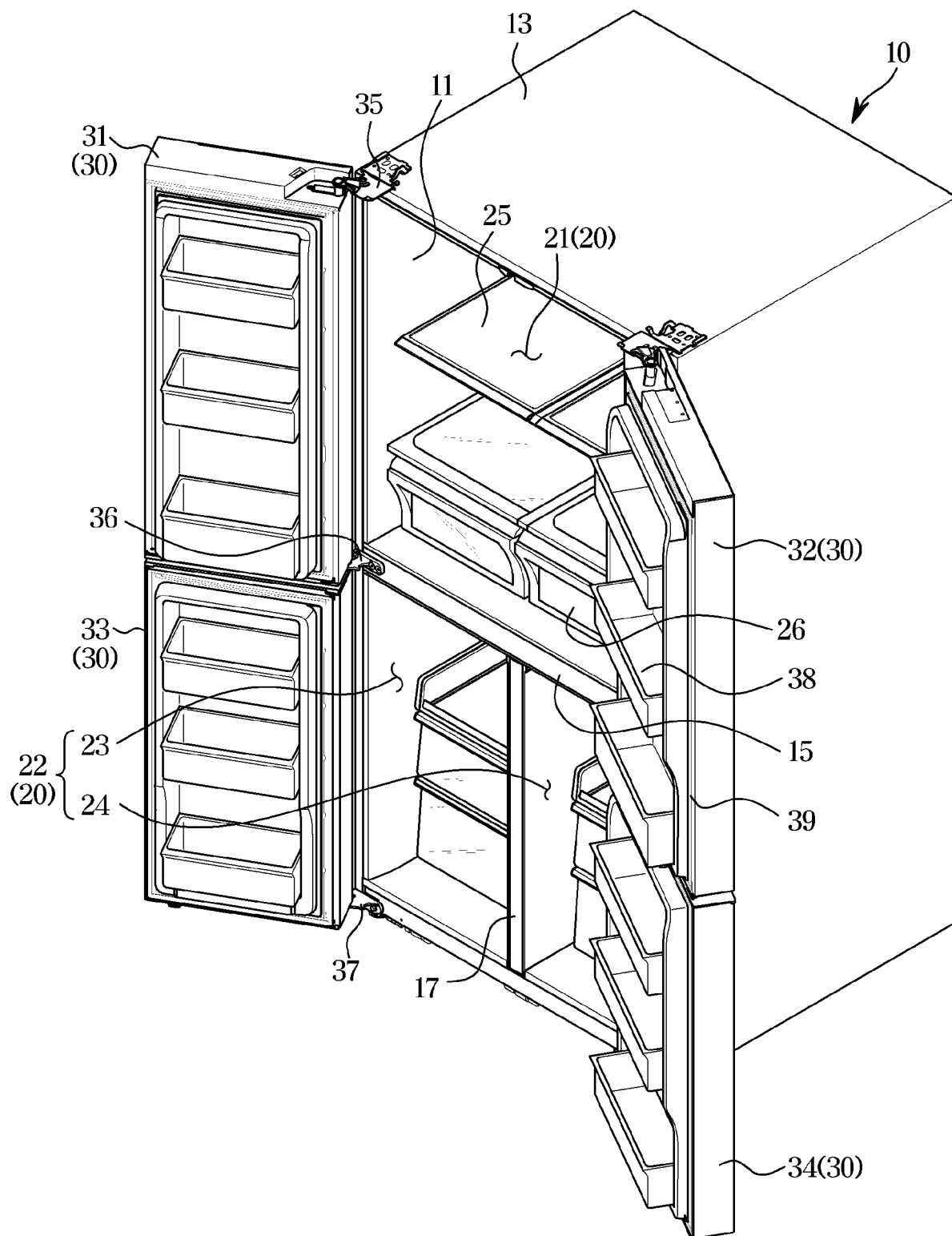
FIG. 2

FIG. 3

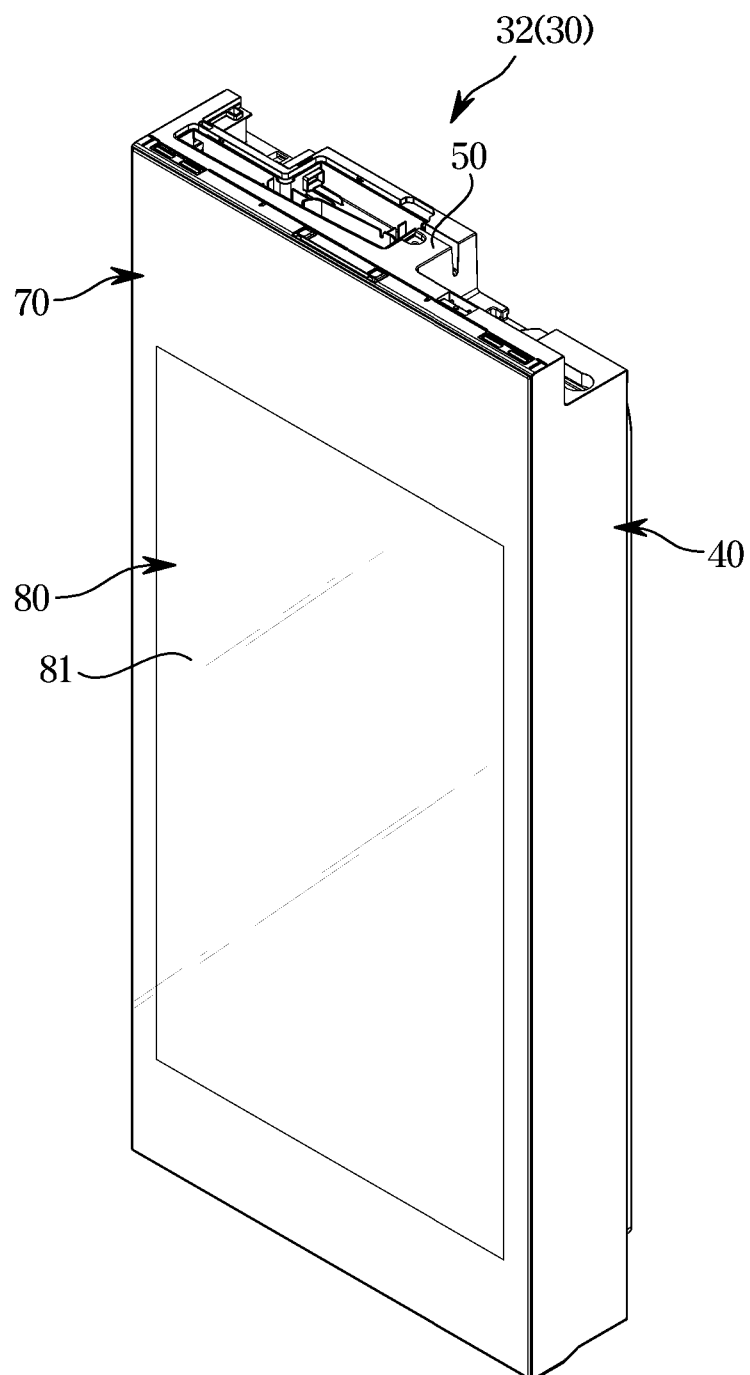


FIG. 4

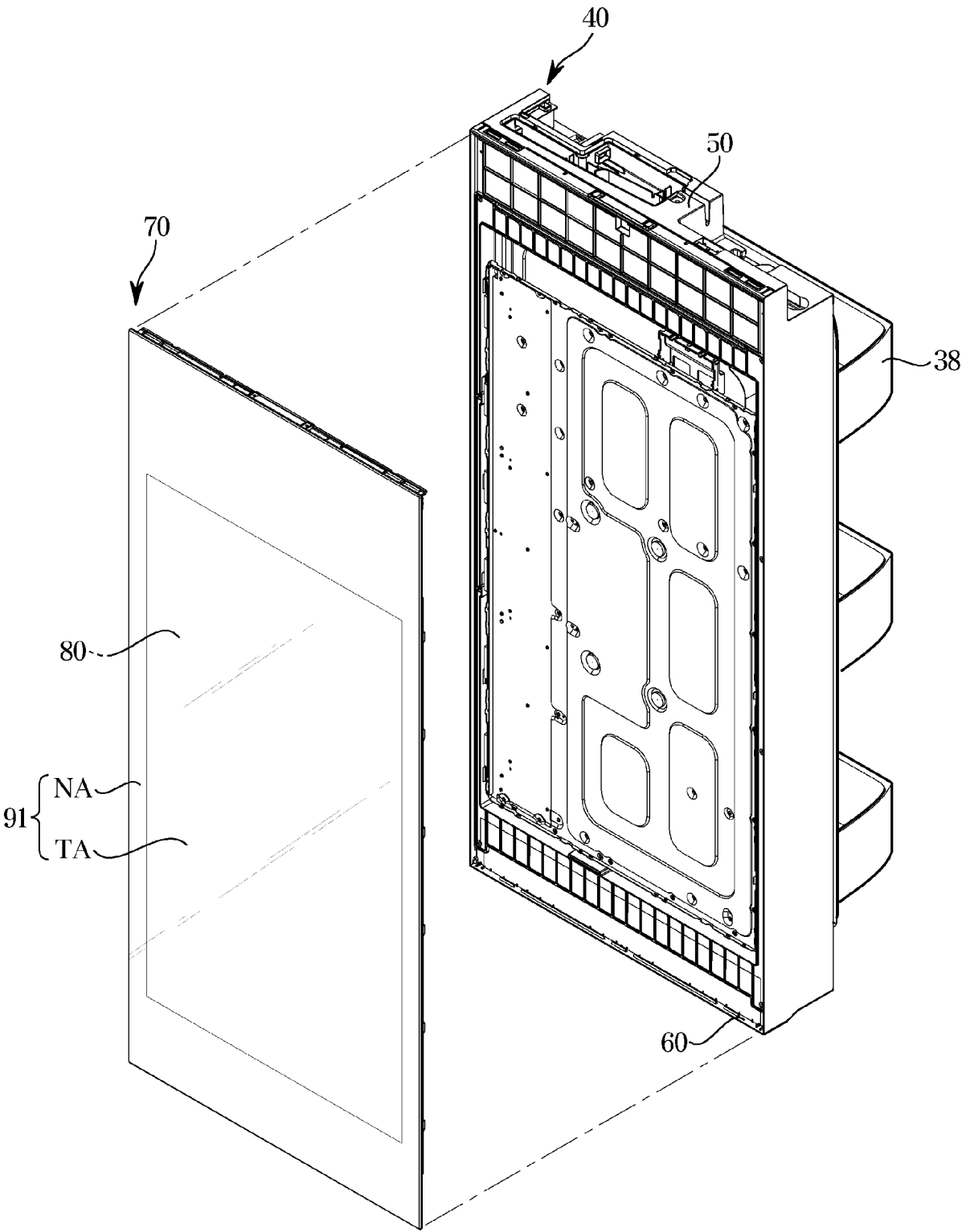


FIG. 5

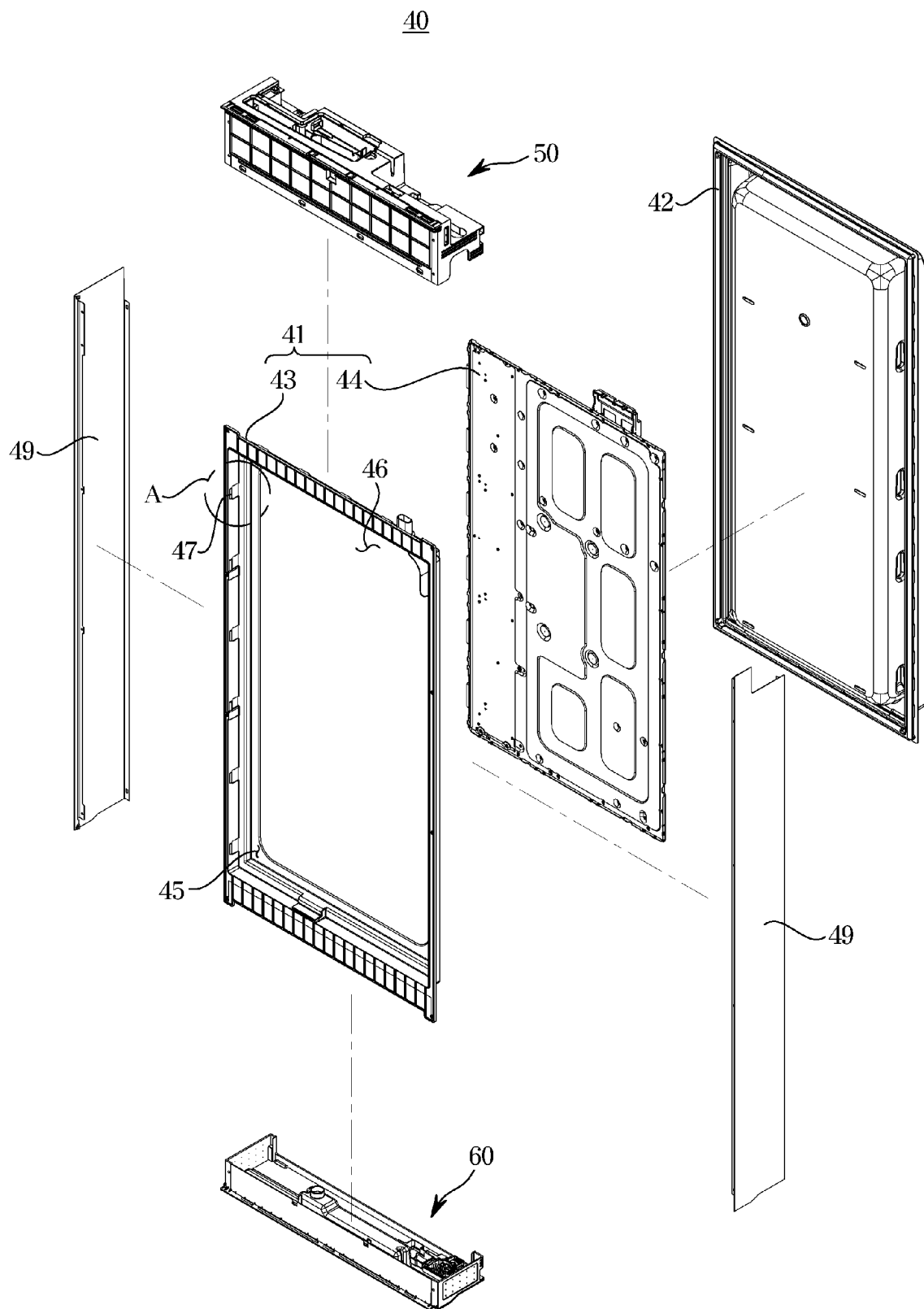


FIG. 6

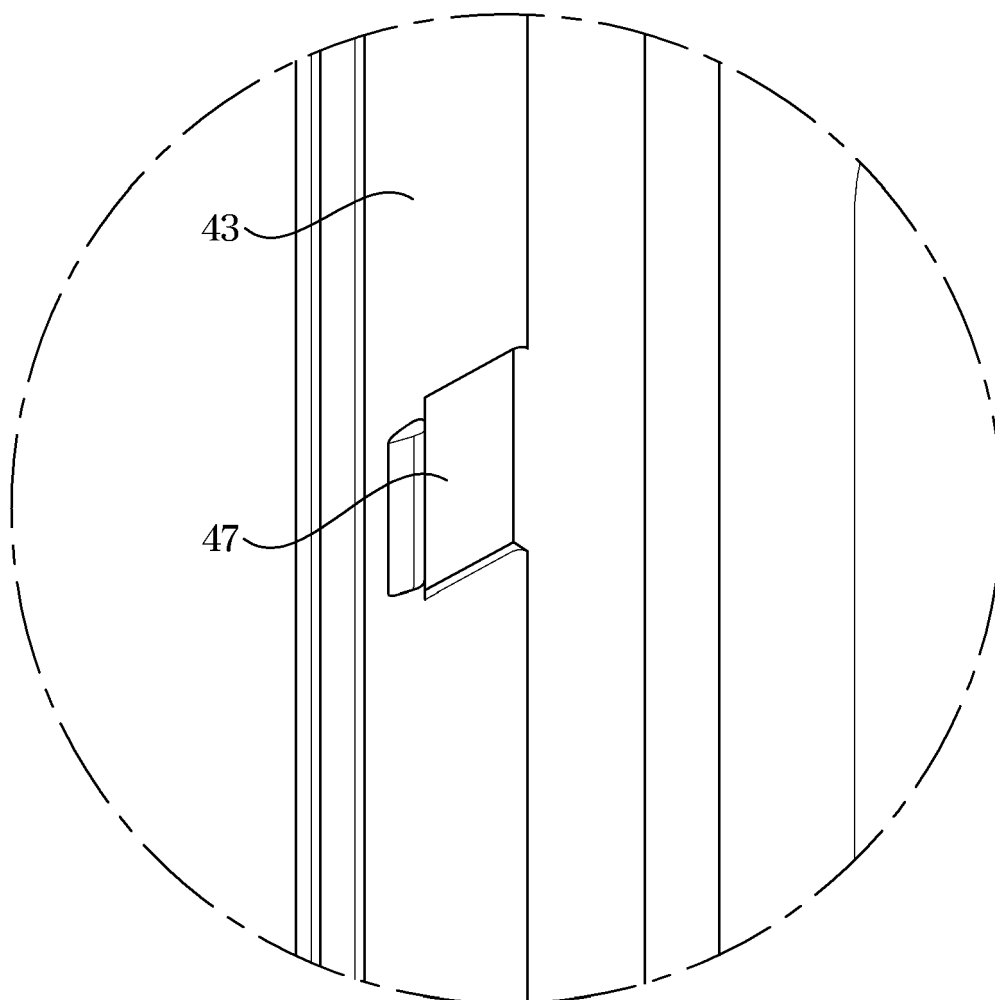


FIG. 7

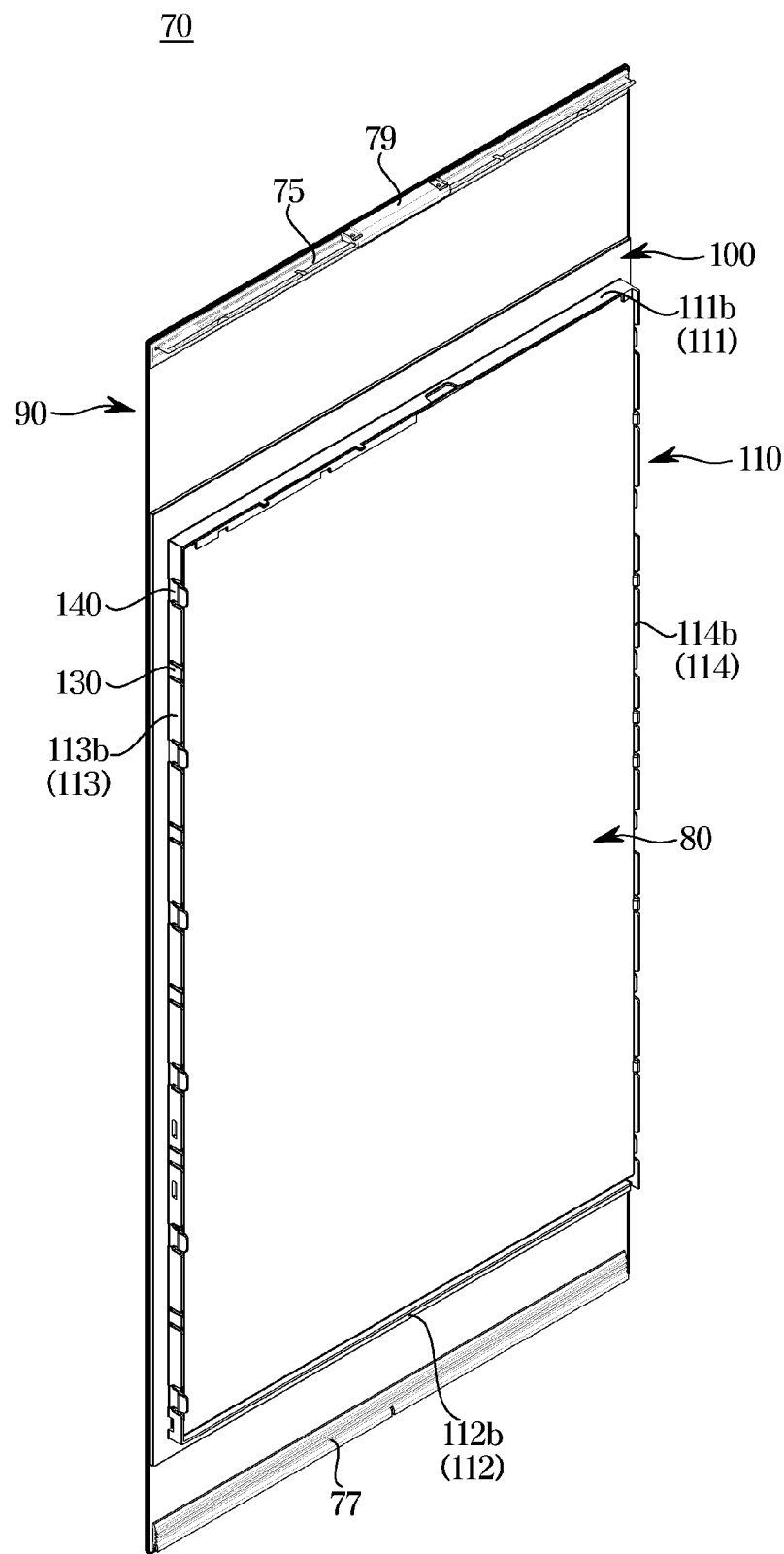


FIG. 8

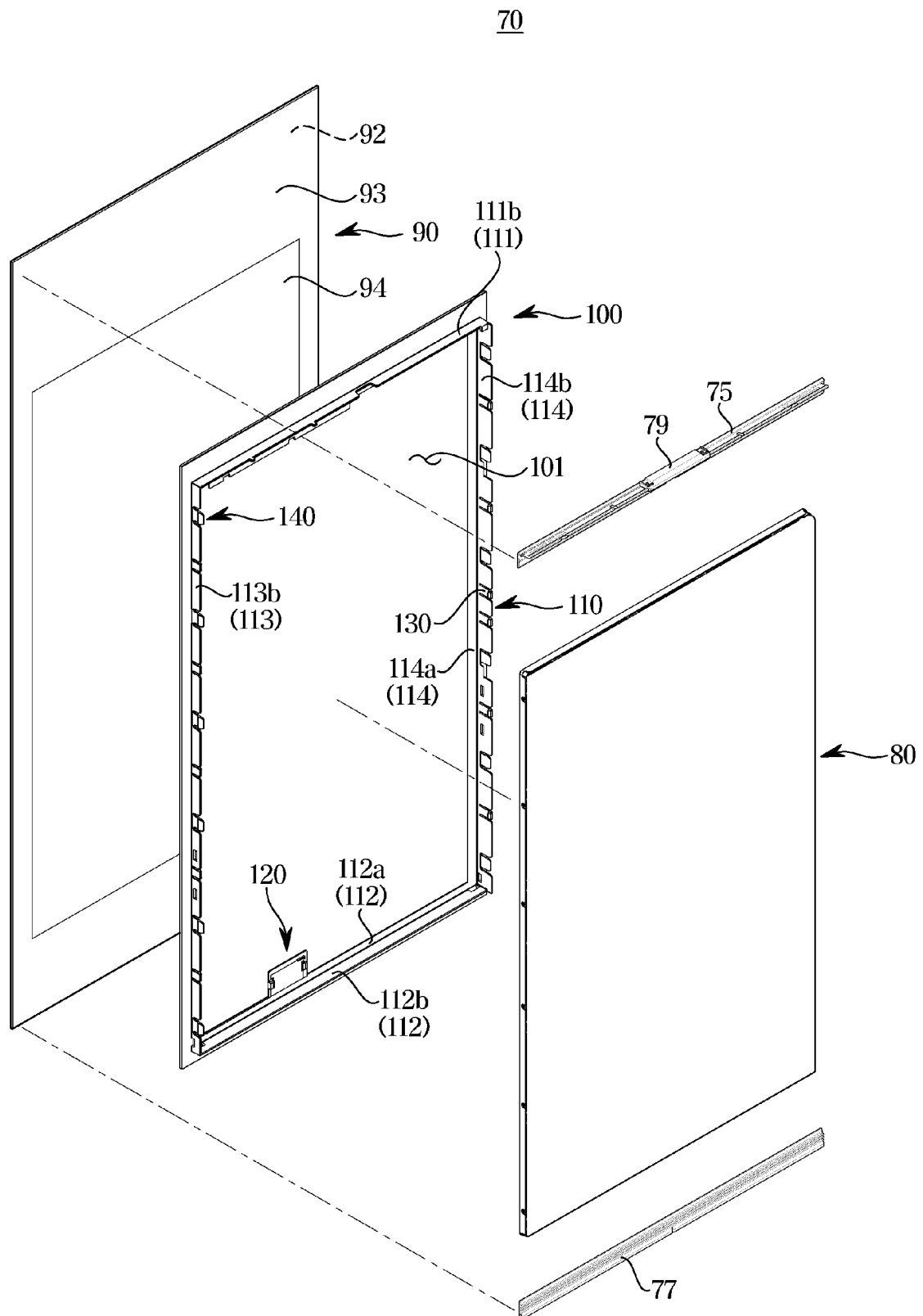


FIG. 9

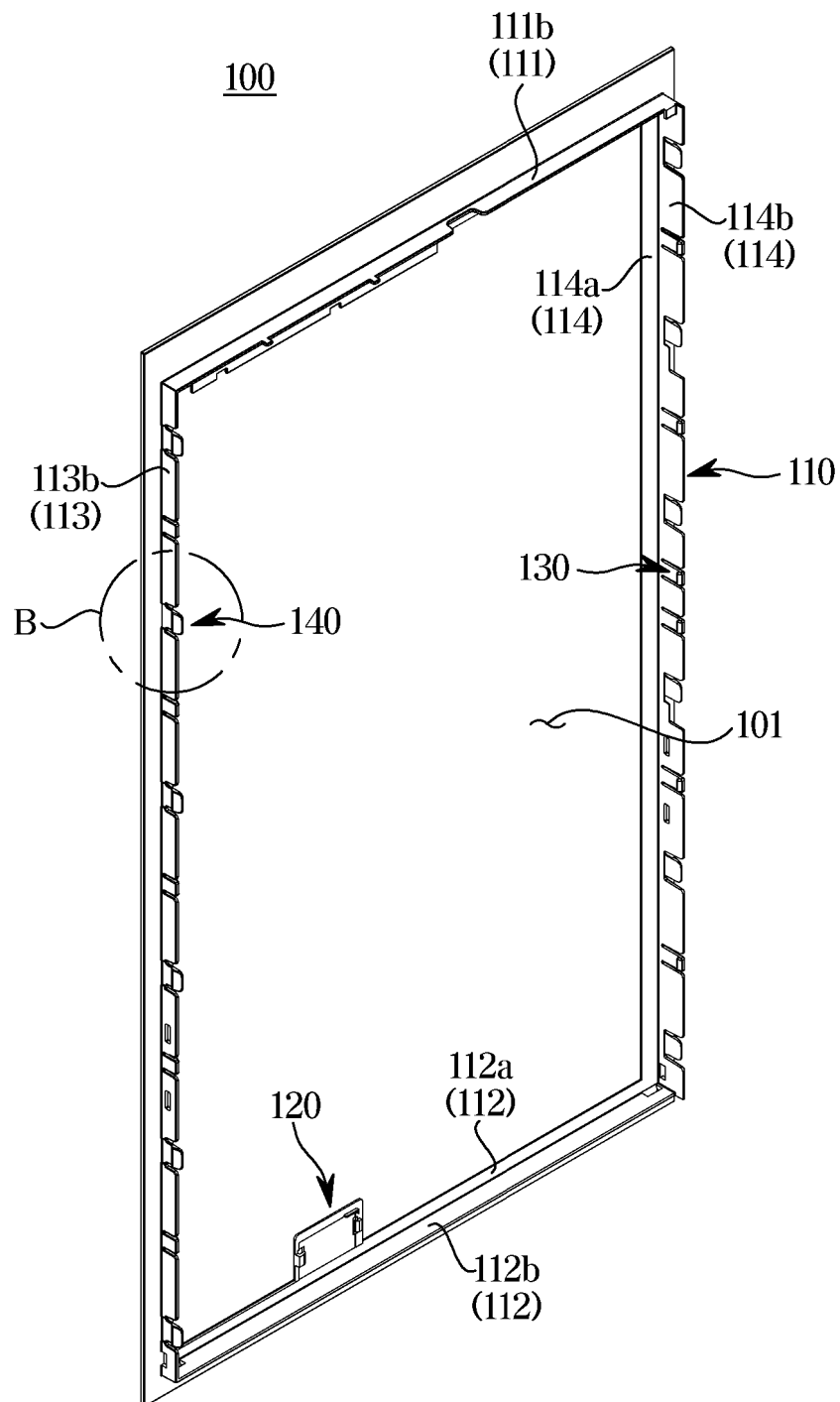


FIG. 10

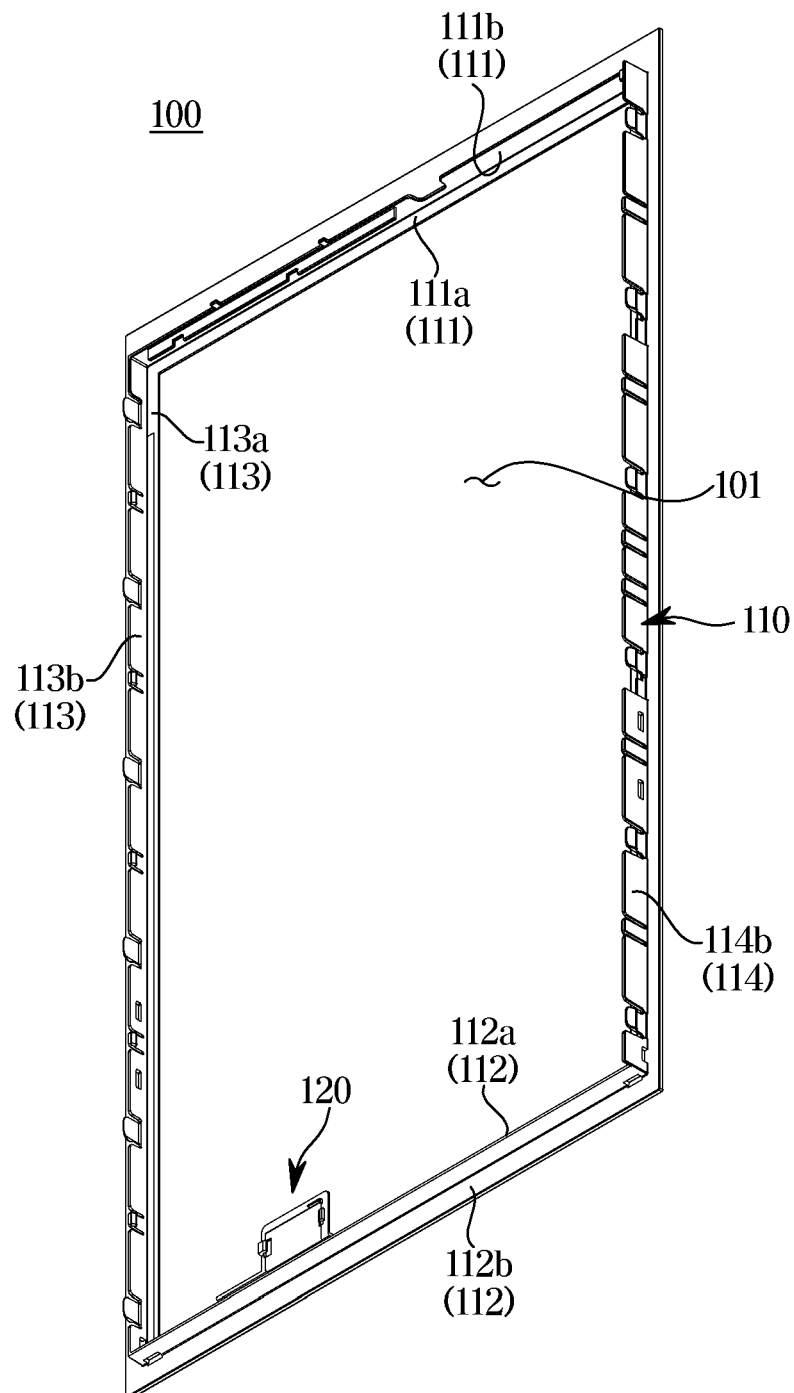


FIG. 11

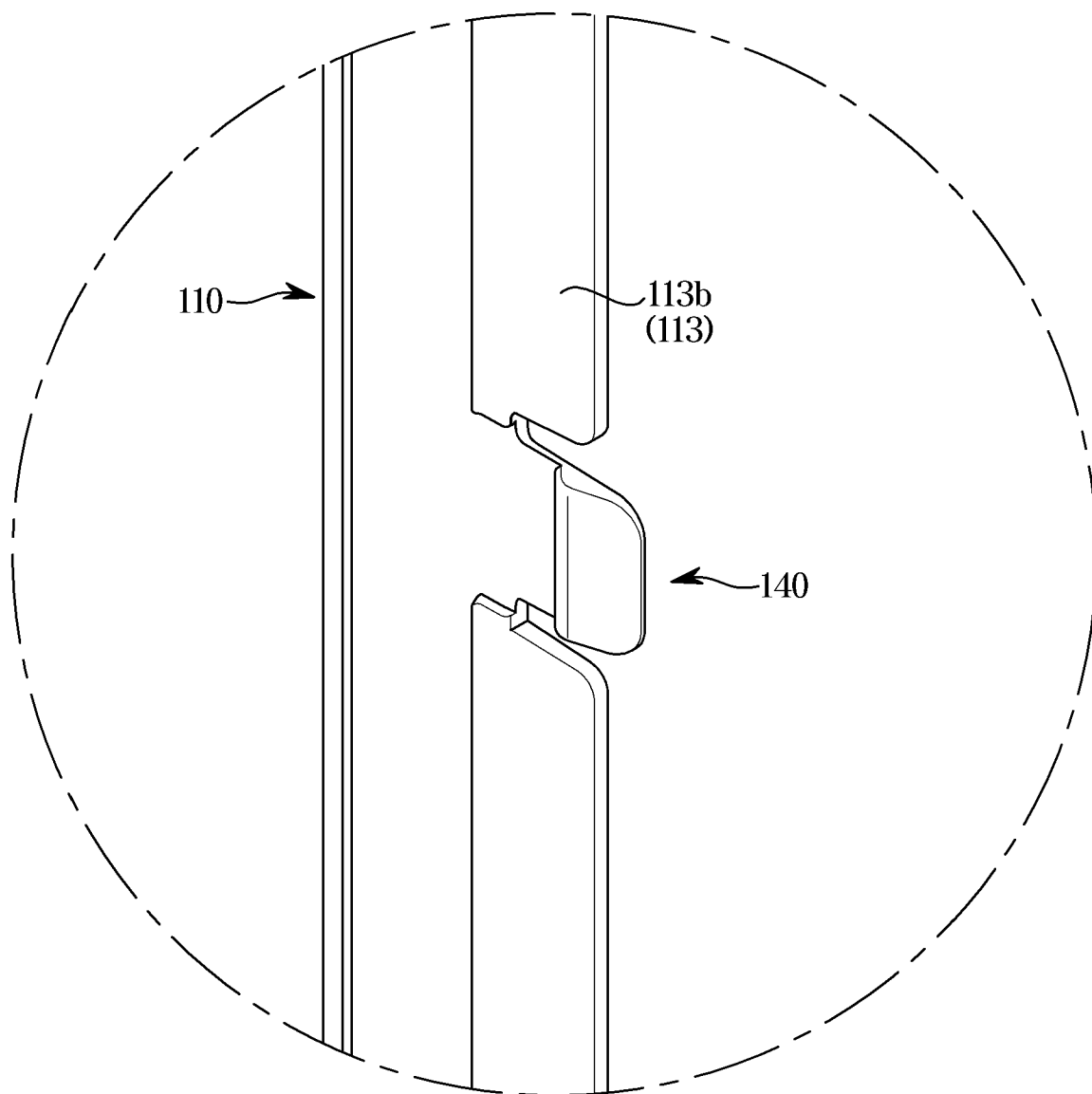


FIG. 12

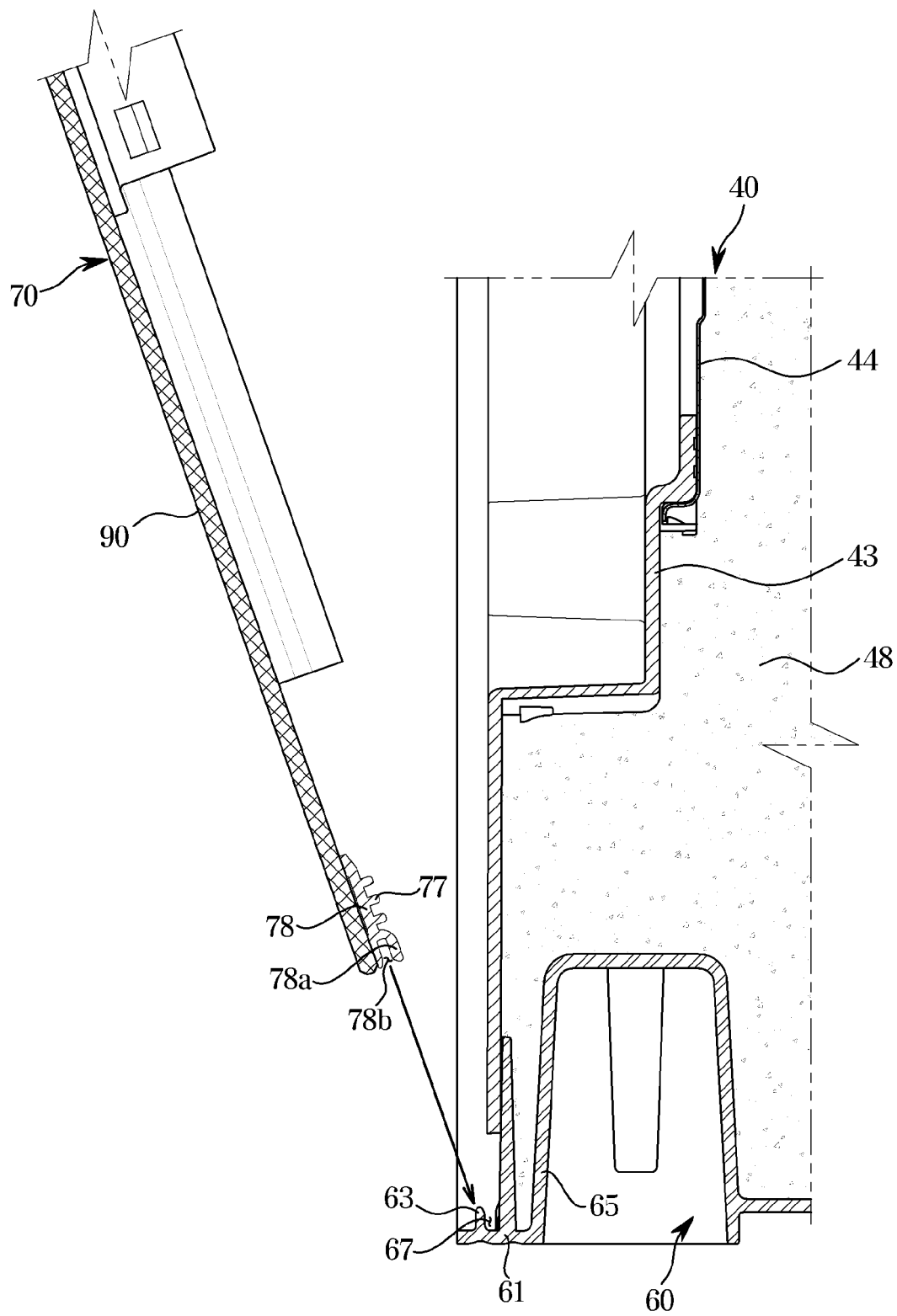


FIG. 13

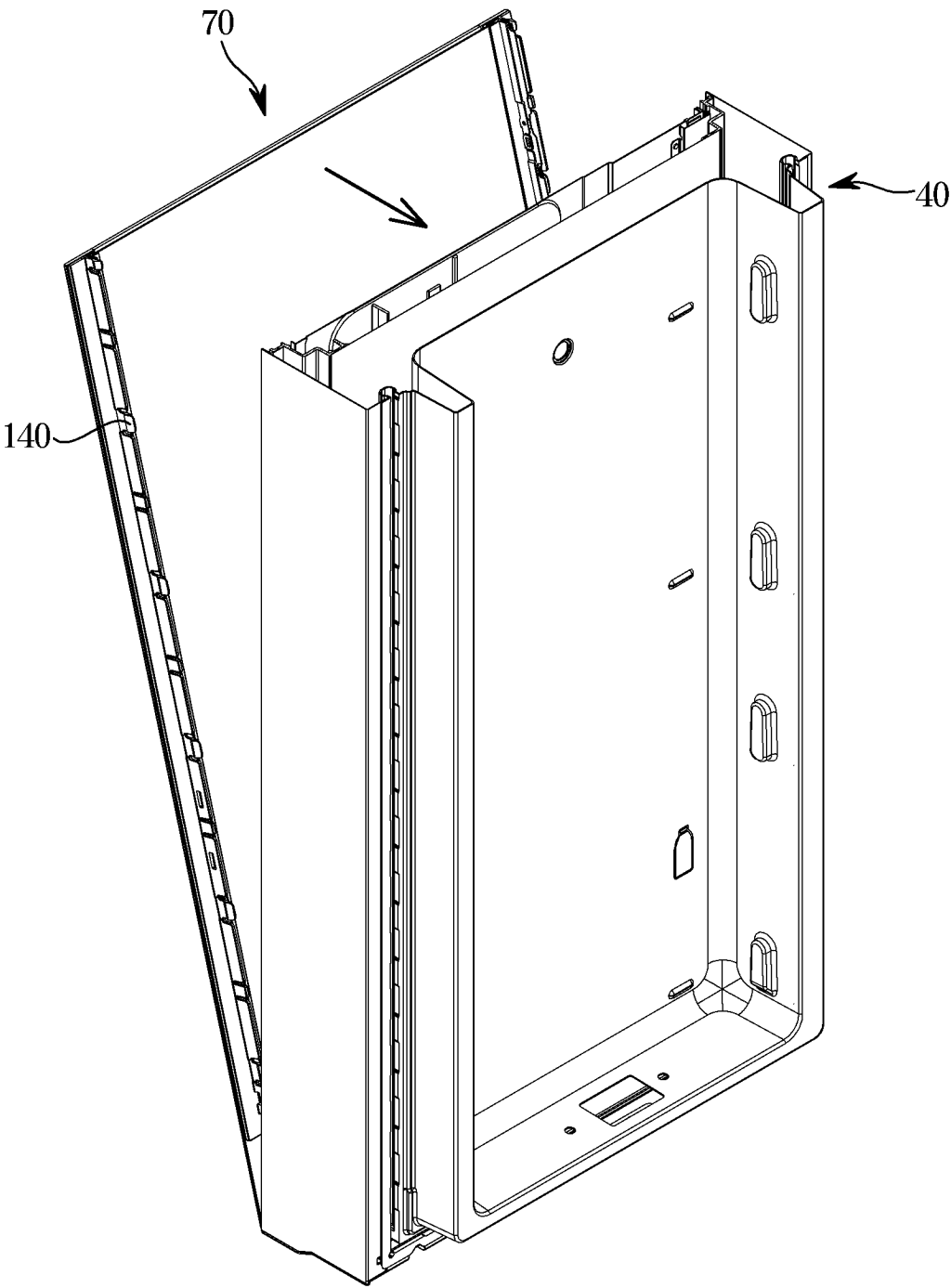


FIG. 14

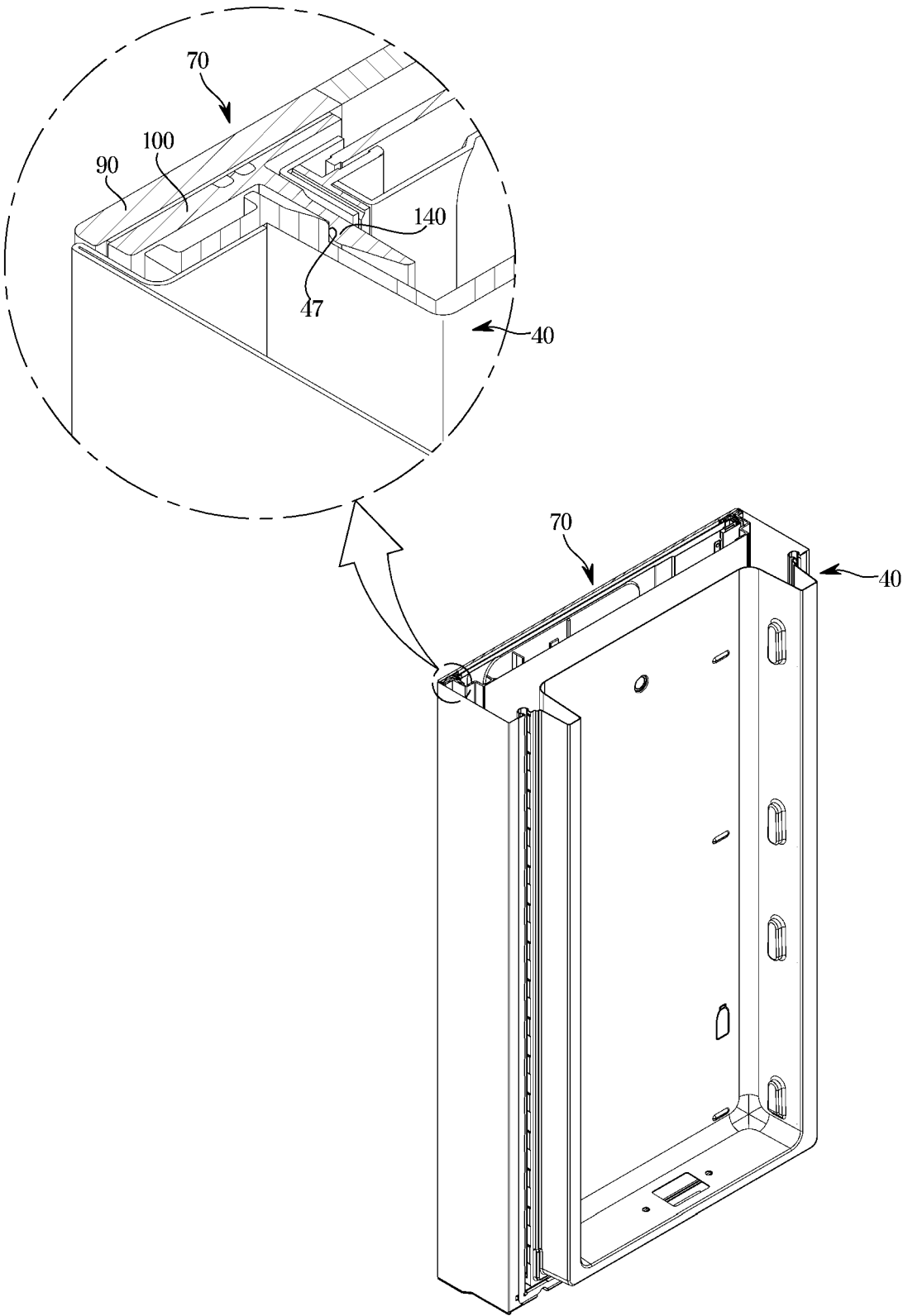


FIG. 15

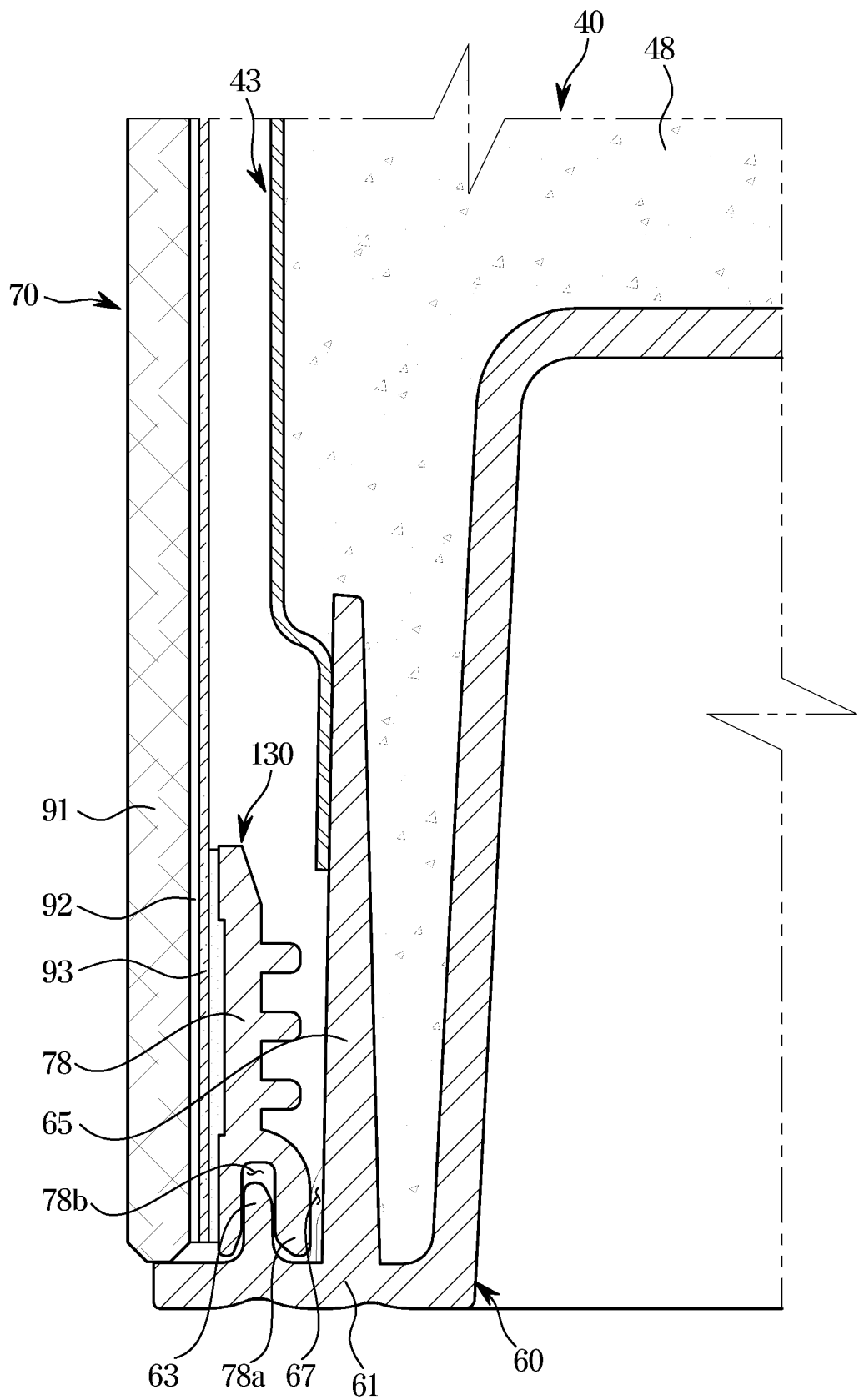


FIG. 16

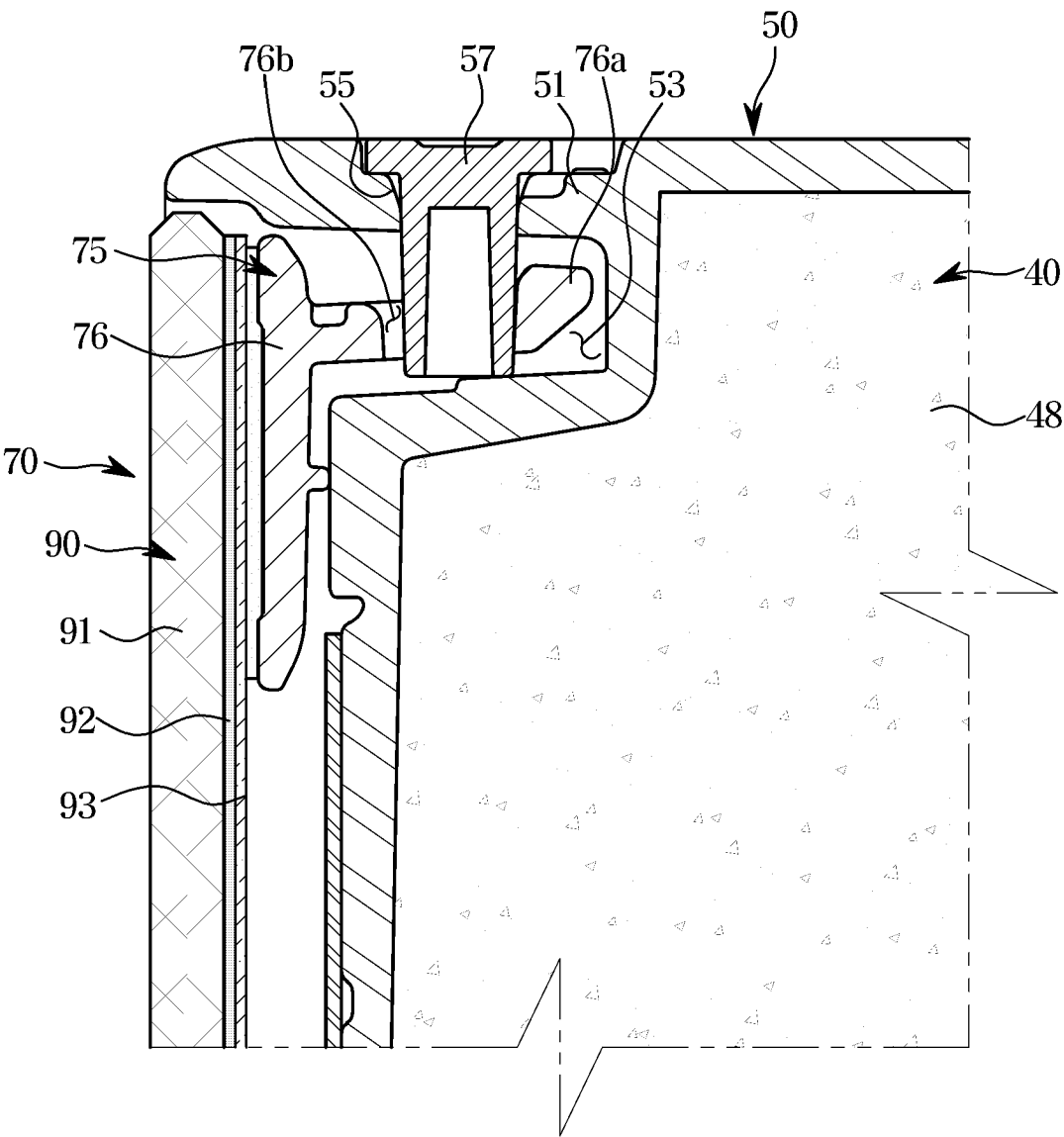
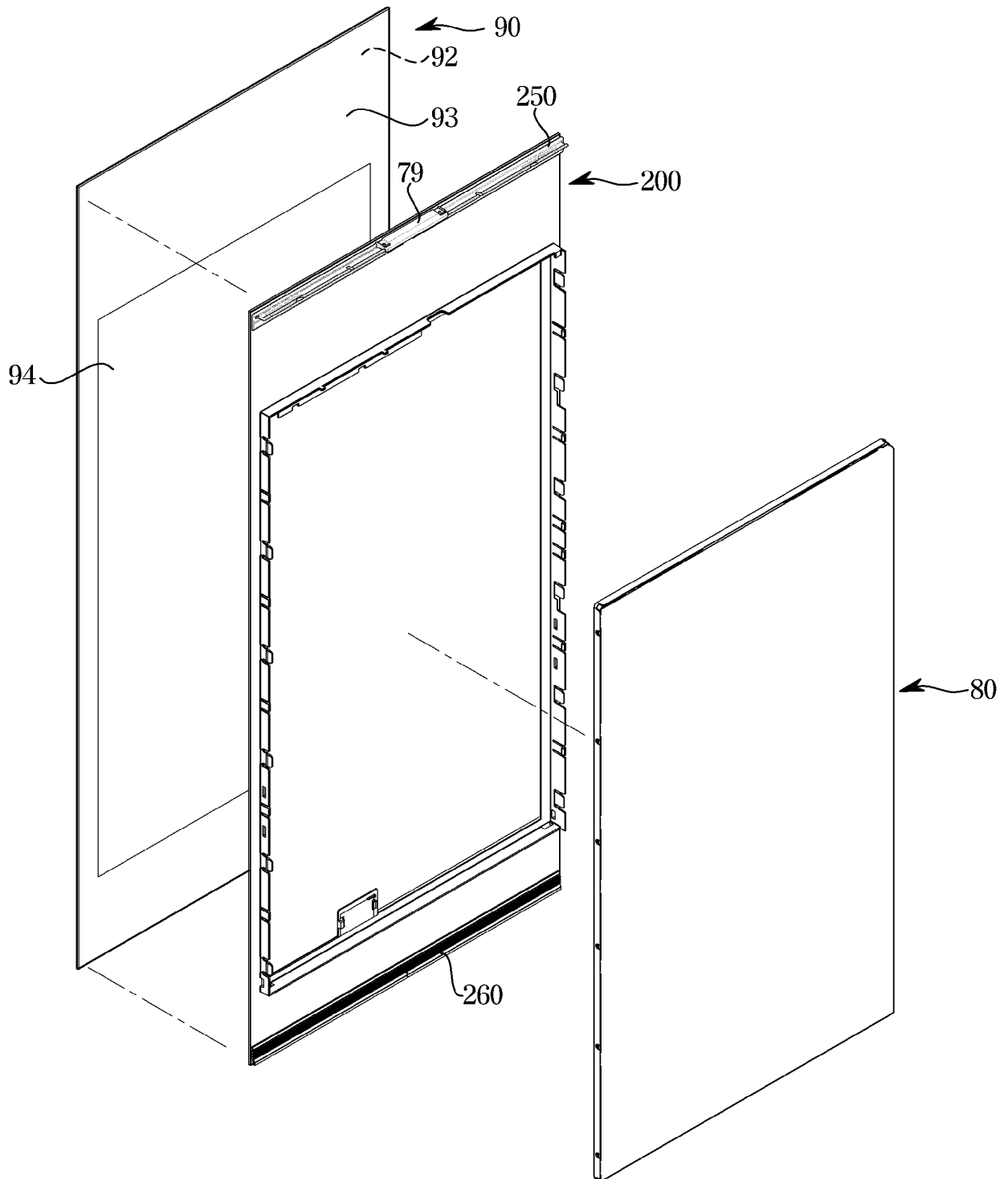


FIG. 17



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2023/014746

A. CLASSIFICATION OF SUBJECT MATTER**F25D 23/02**(2006.01)i; **F25D 29/00**(2006.01)i; **F25D 11/02**(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 23/02(2006.01); A47B 96/00(2006.01); E06B 3/70(2006.01); F25D 27/00(2006.01); F25D 29/00(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: 냉장고(refrigerator), 도어(door), 패널(panel), 디스플레이(display), 트림(trim), 글래스(glass), 커버(cover), 후크(hook), 홈(groove), 방열 플레이트(heat dissipation plate)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	KR 10-2021-0125376 A (SAMSUNG ELECTRONICS CO., LTD.) 18 October 2021 (2021-10-18) See paragraphs [0047]-[0056] and [0067]-[0081] and figures 2-12.	1-12
Y	KR 10-1815383 B1 (LG ELECTRONICS INC.) 30 January 2018 (2018-01-30) See paragraphs [0056] and [0078]-[0079] and figures 3-5.	1-12
A	WO 2022-050714 A1 (LG ELECTRONICS INC.) 10 March 2022 (2022-03-10) See paragraphs [0085]-[0109] and figure 6.	1-12
A	US 2019-0249919 A1 (SAMSUNG ELECTRONICS CO., LTD.) 15 August 2019 (2019-08-15) See paragraphs [0080]-[0093] and figures 4-5.	1-12
A	US 8382220 B2 (KIM, Ung-Su) 26 February 2013 (2013-02-26) See column 3, lines 36-43 and figures 2-5.	1-12

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

* Special categories of cited documents:

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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

18 January 2024

Date of mailing of the international search report

18 January 2024

Name and mailing address of the ISA/KR

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Authorized officer

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2023/014746

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