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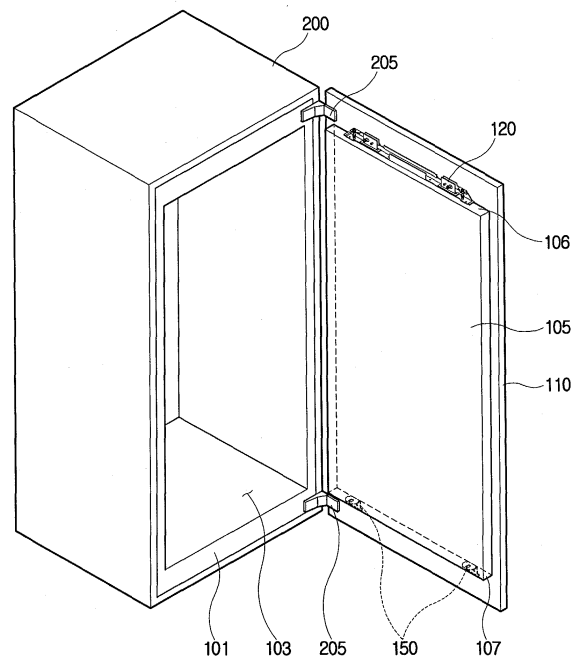
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(54) **Built in storage device installation**

(57) A built-in storage device having a main body (101) accommodated in a cabinet (200), the main body (101) having a storage compartment and a door (105) opening and closing the storage compartment, the built-in storage device also having: a cover part (110) disposed on an exterior of the door (105); a cover bracket (111) combined to the cover part (110); a door bracket (120) having a first door bracket (121) combined to the door (105) and a second door bracket (123) extended from the first door bracket (121) and combined to the cover bracket (111); and a first combining unit combining the cover bracket (111) and the second door bracket (123), to control a distance between the cover bracket (111) and the door bracket (120). With this configuration, the present invention provides a built-in storage device which can control the distance between the door and the cover part to open and close a storage compartment of a main body.

FIG. 3



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Description

[0001] The present invention relates to a storage device installation comprising a refrigerator main body, a door for the refrigerator main body, door cover attached to the door and a structural element adjacent to the refrigerator main body.

[0002] It is known to build storage devices, such as refrigerators and kimchi refrigerators, into fitted kitchens rather than have them free standing. In such installations, the door of the storage device is provided with a cover so that it matches, for example, the surrounding cupboards.

[0003] A known built-in-type storage device, having a door accommodating a cover part, is disclosed in JP-A-1996-2941107.

[0004] Figure 1 shows a refrigerator as disclosed in JP-A-1996-2941107.

[0005] Referring to Figure 1, the known refrigerator includes a main body 11, upper and lower doors 12, 13, frames 14 disposed around the doors 12, 13 and panels 17 inserted into the frames 14 to cover the fronts of the doors 12, 13.

[0006] This structure has the disadvantage that the frames 14 are exposed at all times. Consequently, the panels 17 are only partially effective for making the refrigerator match the surrounding cupboards.

[0007] An installation, according to the present invention, is characterised in that the door is attached to the door cover by adjustable bracket means.

[0008] Preferably, the structural element is comprised in a cabinet in which the storage device main body is installed.

[0009] Preferably, the door cover is hung on the structural element by hinge means and the door can be opened and closed by virtue of being mounted to the cover.

[0010] Preferably, the adjustable bracket means allows for adjustment of the door, relative to the door cover, in three dimensions.

[0011] Preferably, the adjustable bracket means comprises a first member attached to the door and a second member attached to the door cover, a first threaded fastener screwed through one of said members and having its free end butting against the other of said members and a second threaded fastener extending through a hole in one of said members and screwed into the other of said members so as to hold the members with a separation set by the position of the first threaded fastener.

[0012] Preferably, the adjustable bracket means comprises a first member attached to the door and a second member attached to the door cover, a threaded fastener, extending vertically from one of said members through a hole in the other of said members, and first and second nuts on the threaded fastener respectively above and below said hole.

[0013] Additional preferred and optional features are set forth in claims 7 to 43 appended hereto.

[0014] Embodiments of the present invention will now be described, by way of example, with reference to Figures 2 to 13 of the accompanying drawings, in which:

Figure 1 is a perspective view of a known built-in-type refrigerator;

Figure 2 is an exploded perspective view of a built-in storage device according to the present invention;

Figure 3 is a perspective view of the built-in storage device of Figure 2;

Figure 4 is an exploded perspective view of a door bracket of the built-in storage device of Figure 2;

Figure 5 is an exploded perspective view of a supporting bracket of the built-in storage device Figure 2;

Figures. 6 to 8B illustrate details of the door cover mounting in different configurations;

Figure 9 is a perspective view of a door bracket cover covering the door bracket of the built-in storage device of Figure 2;

Figure 10 is an exploded perspective view of the door bracket cover of the built-in storage device in Figure 2;

Figure 11 is a perspective view of the supporting bracket covered by a supporting bracket cover in the built-in storage device of Figure 2;

Figure 12 is an exploded perspective view of the supporting bracket cover of the built-in storage device of Figure 2;

Figure 13 is a combined perspective view of a door and a cover part of a built-in storage device according to a second embodiment of the present invention.

[0015] Referring to Figure 2, a refrigerator 100 according to the present invention is accommodated in a cabinet 200.

[0016] The cabinet 200 comprises a cavity 201 large enough to accommodate the refrigerator 100. The cavity 201 is open at the front 203.

[0017] Referring to Figures 3 to 5, the refrigerator 100 comprises a main body 101, accommodated in the cavity 201, having a storage compartment 103 for food, a storage compartment door 105, a cover 110 disposed in front of the door 105, a cover bracket 111 attached to the cover 110, a door bracket 120 for connecting the door 105 to the cover bracket 111 and a fasteners 130 fixing the cover bracket 111 to the door bracket 120 and adjusting the space between the cover 110 and the door 105.

[0018] The door 105 is connected to the back of the cover 110. If there is a plurality of doors 105. e.g. for freezing and cooling compartments, each door 105 is connected to a respective cover 110.

[0019] The cover 110 is mounted to the cabinet 200, on one side of the opening, by hinges 205. Thus, the door 105 is not itself mounted by hinges directly on the

cabinet 200 and opens and closes with the cover 110.

[0020] The door bracket 120 comprises a transverse strip 121, fixed along the top of the door 105 by screws 126, and a pair of upstanding plates 123, extending upwards from substantially either end of the transverse strip 121. The upstanding plates 123 are coupled to the cover bracket 111 by the fasteners 130.

[0021] Each upstanding plate 123 has first and second holes 124, 125. Screws 131 are screwed through the first holes 123 in respective plates 123 and their free ends butt up against the back face of the cover 110 to set the spacing between plates 123 and the cover bracket 111 and, therefore, also between the cover 110 and the door 105. Bolts 133 extend through the second holes 124 in respective plates 123 and screwed into threaded hole 114 in the cover bracket 111. The second holes 124 are much bigger in diameter than the shanks of the bolts 133 but smaller than the bolts' heads.

[0022] The cover bracket 111 has comprises an elongate plate 113, which is fixed to the back of the cover 110 by screws so that it extends across the back of the cover 110, and small horizontal flanges 115 that project towards the door 105 from the top of the elongate plate 113 at substantially opposite ends.

[0023] A relative height setting means 140 comprises a stud 141 projecting upwards at one end of the transverse strip 121, first and second nuts 143, 145 and a transverse slot 117 in one of the flanges 115. The shank of the stud 141 extends loosely through the slot 117 in the flange 115, with the second nut 145 threaded onto the stud 141 below the flange 115 to set the vertical separation between the brackets 120, 111 and the first nut 145 threaded onto the stud 141 above the flange 115 to hold the brackets 120, 111 together. A similar relative height setting means 140 is provided at the other end of the door bracket 120.

[0024] A pair of supporting brackets 150 are attached to the bottom edge 107 of the door 105 and the lower margin of the back of the cover 110.

[0025] In another embodiment the supporting brackets 150 are at the top of the door 105 and the door and cover brackets 120, 111 are at the bottom of the door 105.

[0026] Referring to Figures 3 and 5, each supporting bracket 150 comprises first and second plates 151, 153 at right angles to each other. The first plate 151 has a pair of hole and pair of screws 154 are screwed into the cover through the holes. The second plate 153 has a slot 155. A screw 161 is screwed into the bottom edge of the door 105 through the slot 105. The slot 155 allows the spacing of the door 105 and the cover 110 to be adjusted.

[0027] The installation of the refrigerator will now be described with reference to Figures 2 to 8B.

[0028] The main body 101 of the refrigerator 100 is installed in the cavity 201 of the cabinet 200. Then, the cover bracket 111 is screwed to the back of the cover 110 and the supporting brackets 150 are screwed to the

cover 110.

[0029] The door bracket 120 is fixed to the top edge 106 of the door by screws 126. The door and cover brackets 120, 111 are then coupled together.

[0030] The cover bracket 111 is coupled to the door bracket 120 by first screwing the screws 131 through the smaller holes 124 in the upstanding plates 123. The second nuts 145 are threaded onto the studs 141 and the cover 110 hung on the door 105 by positioning the cover 110 so that the studs 141 pass through the slots 117 in the flanges 115 and the flanges rest on the second nuts 145. The first nuts 143 are then threaded onto the studs 141.

[0031] With the cover 110 mounted to the door 105, the bolts 133 are inserted through the larger holes 125 in the upstanding plates 123 and screwed into respective threaded holes 114 in the elongate plate 113.

[0032] The screws 161 are inserted through the slots 155 in the supporting brackets 150 and screwed into the bottom edge of the door 105.

[0033] The relative heights of the door 105 and the cover 110 can now be set by moving the second nuts 145 on the studs 141 to the desired position and then tightening the first nuts 143 (see Figures 7A and 7B). The separation between the upper parts of the door 105 and the cover 110 can then be set by adjusting the screws 131 to give the correct separation and then tightening the bolts 133 so that the screws 131 butt against the cover bracket 113.

[0034] Once the relative positions of the tops of the door 105 and the cover 110 have been set, the relative positions of the bottoms of the door 105 and the cover 110 can be positioned and the screws 161 done up.

[0035] Thus, the door 105 can be moved up and down relative to the cover 110 so that it properly closes the main body 101.

[0036] The slots 117 and the holes 125 give some leeway for side-to-side adjustment of the cover 110 relative to the door 105 so that the door 105 opens properly.

[0037] Referring to Figures 9 and 10, the built-in refrigerator 100 further comprises a door bracket cover 170 covering the cover bracket 111 and the door bracket 120.

[0038] The door bracket cover 170 is supported by the cover bracket 111 on one side and by the door bracket 120 on the other side to allow the door bracket 120 to be movable within a predetermined distance relative to the cover bracket 111. The door bracket cover 170 has a first supporting part 171 supported by a flanges 118, extending from the elongate plate 113, and a second supporting part 173 supported by raised tabs 127 disposed at either end of the transverse strip 121.

[0039] Thus, the door bracket cover 170 covers the door bracket 121 and the cover bracket 111 to protect them from the ingress of unwanted matter and improve the appearance of the refrigerator 100.

[0040] Referring to Figures 11 and 12, the built-in refrigerator 100 further comprises supporting bracket cov-

ers 180 attached to the supporting brackets 150.

[0041] The supporting bracket covers 180 each include a cover base 181, disposed between the supporting bracket 150 and the cover 110, and a pivoting cover body 183 pivotably attached to the cover base 181 and covering the supporting bracket 150.

[0042] A strap hinge 187 connects the pivoting cover body 183 and the cover base 181. A hook 185, disposed on the pivoting cover body 183, and a catch 182, disposed on the cover base 181, which is engaged by the hook 185 to hold the supporting bracket cover 180 closed. A through hole 184 is provided so that the thread of the screw 161 can pass through the through hole 184 after the supporting bracket cover 180 is closed.

[0043] Thus, the supporting bracket covers 180 cover the supporting brackets 150, thereby preventing the supporting bracket 150 from being exposed and improving the appearance. Also, the screw 161 can pass through the through hole 184 with ease, without separating the rotating cover body 183 from the cover base 181.

[0044] Figure 13 is a perspective view of the door 105 and the cover 110 of the built-in refrigerator 100 according to a second embodiment of the present invention.

[0045] As Figure 13 illustrates, a door bracket 120 is disposed on the top edge 106 and the bottom edge 107 of the door 105. That is, rather than the supporting bracket 150 of the first embodiment, a door bracket 120 is disposed on the bottom edge 107 of the door 105 instead.

[0046] Though the door bracket 120 and the supporting bracket 150 are combined to the top edge 106 of the door 105 and the bottom edge 107 of the door 105 respectively in the above-described embodiments, the door bracket 120 and the supporting bracket 150 may be attached to side edges of the door 105.

[0047] As is described above, the distance between the door 105 and the cover part 100 can be adjusted to ensure that the door 105 properly closes the refrigerator's main body 101.

[0048] In addition, the door 105 can be moved up and down by the second combining unit 140 and right and left by the first and the second through holes 125 and 117, relative to the cover 110.

[0049] Also, the door bracket cover 170 and the supporting bracket covers 180 provide a fine appearance.

Claims

1. A storage device installation comprising:

a storage device main body (101),
a door (105) for the storage device main body (101),
door cover (110) attached to the door (105), and
a structural element (203) adjacent to the storage device main body (101),

characterised in that the door (105) is attached to the door cover (110) by adjustable bracket means (111, 120).

2. A storage device installation according to claim 1, wherein the structural element (203) is comprised in a cabinet (200) in which the storage device main body (101) is installed.
3. A storage device installation according to claim 1 or 2, wherein the door cover (110) is hung on the structural element (203) by hinge means (205) and the door (105) can be opened and closed by virtue of being mounted to the cover (110).
4. A storage device installation according to claim 1, 2 or 3, wherein the adjustable bracket means (111, 120) allows for adjustment of the door (105), relative to the door cover (110), in three dimensions.
5. A storage device installation according to any preceding claim, wherein the adjustable bracket means (111, 120) comprises a first member (120) attached to the door (105) and a second member (111) attached to the door cover (110), a first threaded fastener (131) screwed through one of said members (111, 120) and having its free end butting against the other of said members (111, 120) and a second threaded fastener (133) extending through a hole in one of said members (111, 120) and screwed into the other of said members (111, 120) so as to hold the members (111, 120) with a separation set by the position of the first threaded fastener.
6. A storage device installation according to any one of claims 1 to 4, wherein the adjustable bracket means (111, 120) comprises a first member (120) attached to the door (105) and a second member (111) attached to the door cover (110), a threaded fastener (131), extending vertically from one of said members (111, 120) through a hole (117) in the other of said members (111, 120), and first and second nuts (143, 145) on the threaded fastener (131) respectively above and below said hole (117).
7. A built-in storage device having a main body accommodated in a cabinet, the main body having a storage compartment and a door opening and closing the storage compartment, the built-in storage device comprising:

a cover part disposed on an exterior of the door;
a cover bracket combined to the cover part;
a door bracket having a first door bracket combined to the door and a second door bracket extended from the first door bracket and combined to the cover bracket; and

a first combining unit combining the cover bracket and the second door bracket, to control a distance between the cover bracket and the second door bracket.

8. The built-in storage device according to claim 7, wherein:

the first combining unit comprises, a first control screw engaged with the second door bracket, and having an edge in contact with the cover bracket, to control the distance between the cover bracket and the second door bracket; and a second control screw penetrating a first through hole positioned in the second door bracket, and combining the second door bracket to the cover bracket.

9. The built-in storage device according to claim 8, wherein:

the first through hole of the second door bracket is larger than a thread part of the second control screw.

10. The built-in storage device according to claim 8, wherein:

the first door bracket is disposed on an edge of the door; and
the second door bracket is extended plurally from the first door bracket in parallel with a plane of the cover bracket.

11. The built-in storage device according to claim 7, wherein:

the cover bracket comprises a first cover bracket combined to the cover part and a second cover bracket extended from the first cover bracket toward the door; and
the built-in storage device further comprises a second combining unit combining the first door bracket and the second cover bracket, to control a distance between the first door bracket and the second cover bracket.

12. The built-in storage device according to claim 11, wherein the second combining unit comprises:

a control screw combined to the first door bracket and penetrating a through hole positioned in the second cover bracket; and
a nut combined with the control screw passing through the through hole.

13. The built-in storage device according to claim 12, wherein:

the through hole of the second cover bracket is larger than a thread part of the control screw.

14. The built-in storage device according to claim 13, wherein:

the second combining unit further comprises an auxiliary nut engaged with the combining unit opposite to the nut, interposing the second cover bracket in between.

15. The built-in storage device according to claim 7, further comprising:

a door bracket cover combined to the cover bracket and the door bracket.

16. The built-in storage device according to claim 15, wherein:

the door bracket cover has a first side supported by the cover bracket and a second side supported by the door bracket, to move the door bracket relative to the cover bracket.

17. The built-in storage device according to claim 11, wherein the door bracket is combined with a first edge of the door and further comprises at least one supporting bracket combining a second edge, opposite to the first edge of the door, and the cover part.

18. The built-in storage device according to claim 17, wherein the supporting bracket comprises:

a first supporting bracket combined to the covering part; and a second supporting bracket extended from the first supporting bracket and combined to the second edge of the door.

19. The built-in storage device according to claim 18, further comprising:

a third combining unit combining the door and the second supporting bracket, to control a distance between the door and the second supporting bracket.

20. The built-in storage device according to claim 19, wherein the third combining unit comprises:

a control screw engaged with the door, and passing through a first through hole positioned in the second supporting bracket.

21. The built-in storage device according to claim 20, wherein:

the first through hole of the second supporting bracket is larger than a thread of the control screw.

- 22.** The built-in storage device according to claim 20, further comprising:

a supporting bracket cover combined with the supporting bracket.

- 23.** The built-in storage device according to claim 22, wherein the supporting bracket cover comprises:

a cover base disposed between the supporting bracket and the cover part; and
a rotating cover body rotatably connected to the cover base and covering an outer surface of the supporting bracket.

- 24.** The built-in storage device according to claim 23, wherein the supporting bracket cover further comprises:

a film hinge rotatably connecting the cover base and the rotating cover body.

- 25.** The built-in storage device according to claim 23, wherein the rotating cover body has a second through hole, through which the third combining unit passes.

- 26.** A storage device, comprising:

a cabinet having a containing part and an opening;

a refrigerator, having a main body with a storage compartment therein, installed in the containing part;

a door, opening and closing the storage compartment a cover part, opening and closing the opening of the cabinet;

a hinge part, movably connecting one of the door to the main body and the cover part to the cabinet; and

a mounting device, adjustably connecting the door and the cover part to be movable relative to each other, to adjust the opening and closing of one of the storage compartment and the opening of the cabinet.

- 27.** The storage device according to claim 26, wherein the mounting device comprises:

a cover bracket connected to the cover part; and

a door bracket connected to the door,

wherein the cover bracket and the door bracket

are adjustably connected.

- 28.** The storage device according to claim 27, wherein:

the door bracket comprises

a first door bracket connected to the door, and

a second door bracket, extending approximately perpendicularly from the first door bracket;

the cover bracket comprises

a first cover bracket connected to the cover part, and

a second cover bracket, extending approximately perpendicularly from the first cover bracket; and

the storage device further comprises

a first combining unit adjustably connecting the second door bracket and the first cover bracket, and

a second combining unit adjustably connecting the first door bracket and the second cover bracket.

- 29.** The storage device according to claim 28, wherein:

the second door bracket has a first through hole and a first screwing hole;

the first cover bracket has a second screwing hole;

the first combining unit comprises

a first control screw, with threads passing through and engaging the first screwing hole, and a first end contacting the first cover bracket,

a second control screw, with threads passing through the first through hole and engaging the second screwing hole, and a first end contacting the second door bracket;

the second cover bracket has a second through hole; and

the second combining unit comprises

a third control screw, extending from the first door bracket and passing through the second through hole,

a nut engaging the third control screw on a first side of the second cover bracket, and an auxiliary nut engaging the third control screw on a second side of the second cover bracket.

er bracket.

30. The storage device according to claim 29, wherein:

the first end of the second control screw is larger than the first through hole; and
the nut and the auxiliary nut are larger than the second through hole.

31. The storage device according to claim 27, wherein the mounting device further comprises:

a supporting bracket, provided at an edge of the door opposite to the door bracket, connected to the cover part, and adjustably connected to the door.

32. The storage device according to claim 31, wherein the supporting bracket comprises:

a first supporting bracket connected to the cover part; and
a second supporting bracket, extending approximately perpendicularly from the first supporting bracket and having a first through hole, through which threads of a control screw pass and adjustably connect to the door.

33. The storage device according to claim 32, wherein:

adjustment of the control screw adjusts a distance between the door and the second supporting bracket.

34. The storage device according to claim 32, wherein:

the supporting bracket forms a pair.

35. The storage device according to claim 28, further comprising:

a door bracket cover, connected to the cover bracket and the door bracket, and covering the cover bracket and the door bracket.

36. The storage device according to claim 35, wherein:

a first side of the door bracket cover is connected to the door bracket, and a second side of the door bracket cover is connected to the cover bracket, thereby allowing the door bracket to move with respect to the cover bracket.

37. The storage device according to claim 27, further comprising:

a door bracket cover, with first and second supporting parts, covering the cover bracket and

the door bracket, wherein

a first supporting plate extends from the first cover bracket,
a second supporting plate is disposed at an end of the first door bracket, and
the first supporting plate supports the first supporting part, and the second supporting plate supports the second supporting part, thereby allowing the door bracket to move with respect to the cover bracket.

38. The storage device according to claim 31, further comprising:

a supporting bracket cover covering the supporting bracket.

39. The storage device according to claim 32, further comprising:

a supporting bracket cover covering the supporting bracket.

40. The storage device according to claim 39, wherein the supporting bracket cover comprises:

a cover base, disposed between the supporting bracket and the cover part;
a rotating cover body, covering the supporting bracket and having a second through hole, through which the threads of the control screw pass and adjustably connect to the door, and;
a film hinge rotatably connecting the cover base and the rotating cover body.

41. The storage device according to claim 40, wherein:

a hook is disposed on one of the cover base and the rotating cover body; and
a hook holder, to which the hook combines to close the supporting bracket cover, is disposed on the remaining one of the cover base and the rotating cover body.

42. A mounting device, adjustably connecting a door and a door cover, comprising:

a cover bracket, connected to the cover; and
a door bracket connected to the door, and adjustably connected to the cover bracket, to move the cover bracket in three orthogonal directions relative to the door bracket.

43. A storage device installation comprising:

a storage device main body (101),
a door (105) for the storage device main body (101),

door cover (110) attached to the door (105), and
a structural element (203) adjacent to the stor-
age device main body (101),

characterised in that the door cover (110) is
hung on the structural element (203) by hinge
means (205) and the door (105) can be opened and
closed by virtue of being mounted to the cover
(110).

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FIG. 1
(PRIOR ART)

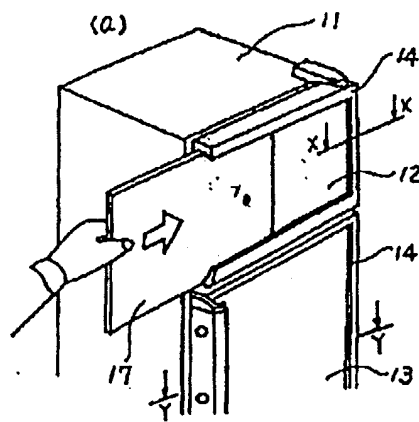


FIG. 2

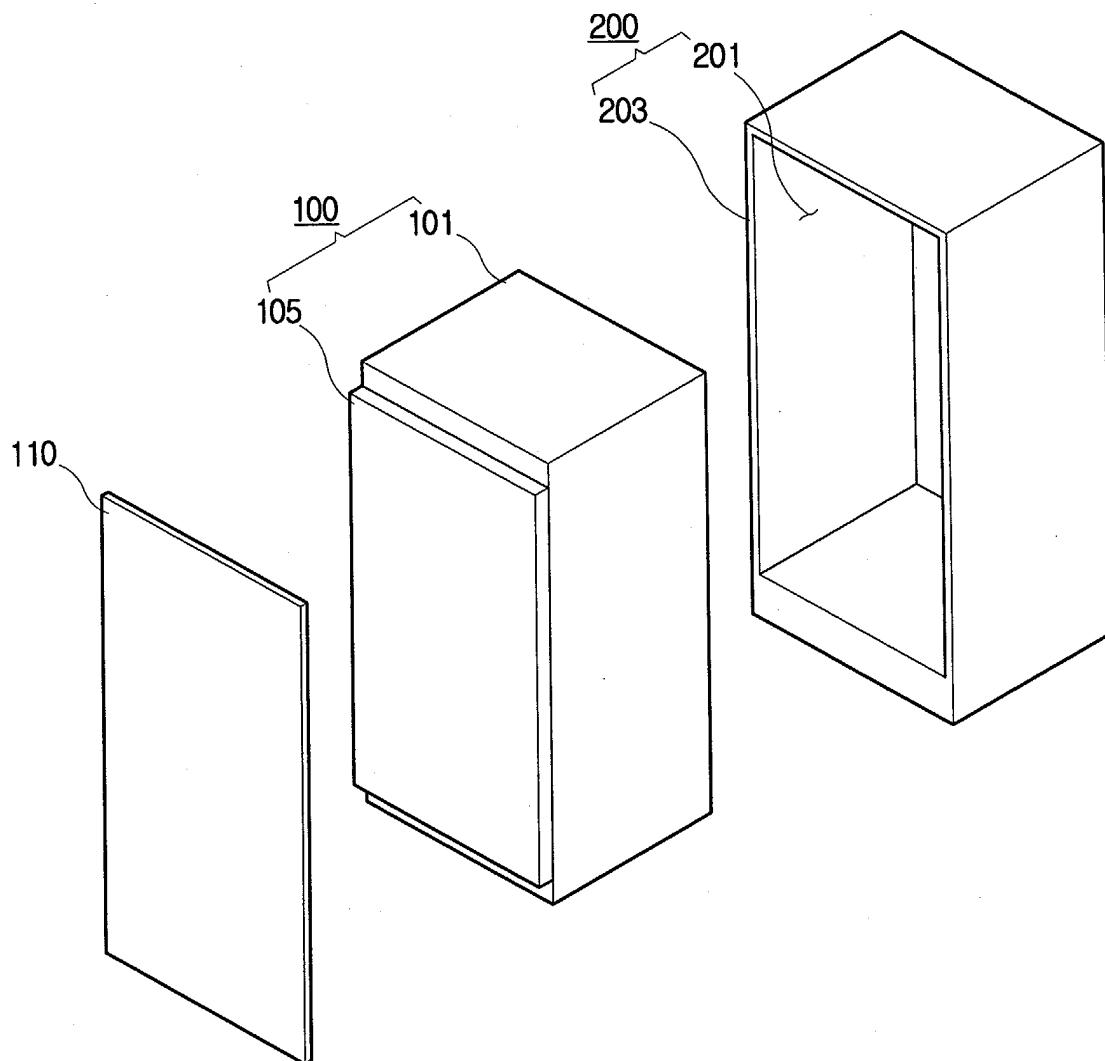


FIG. 4

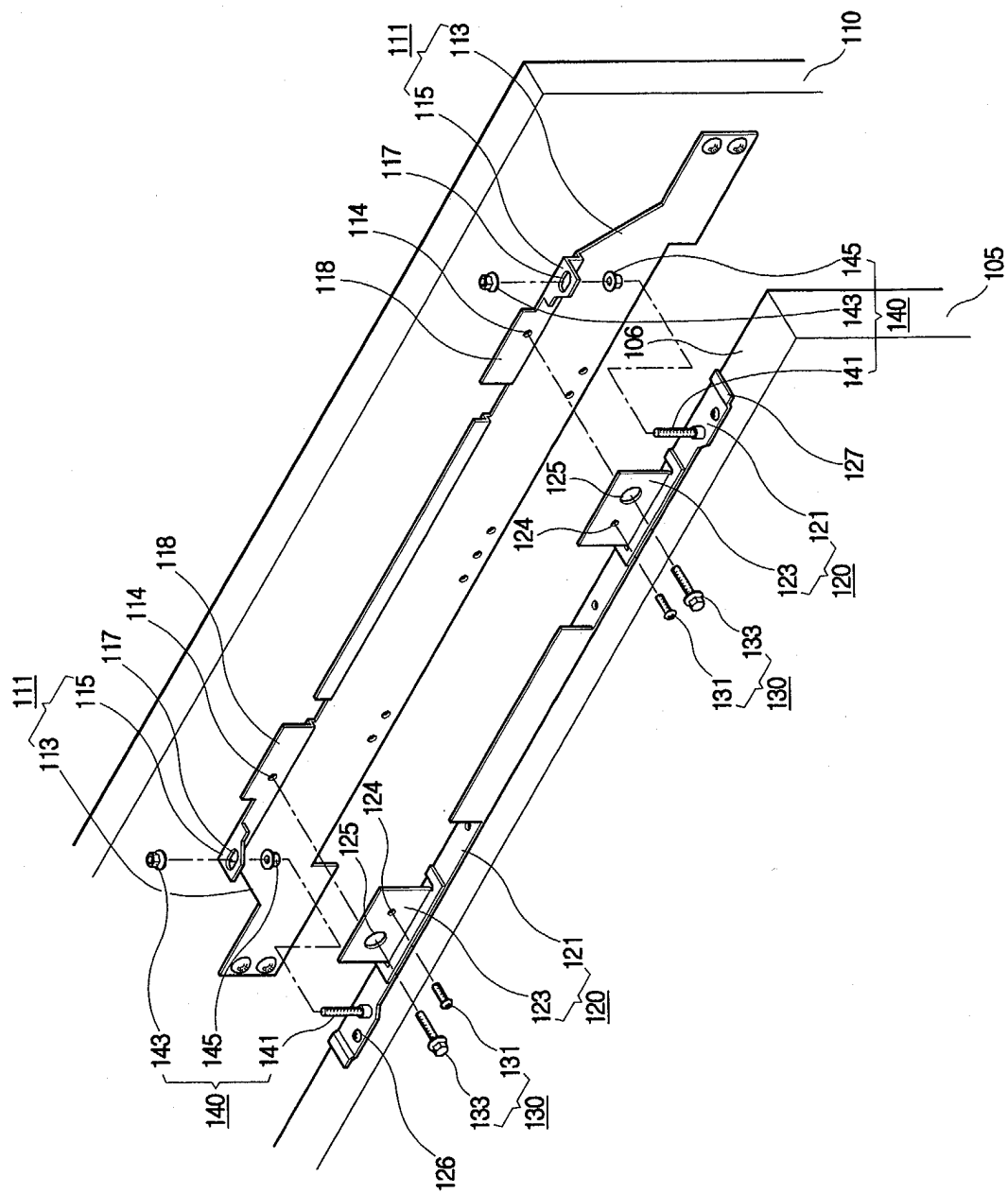


FIG. 5

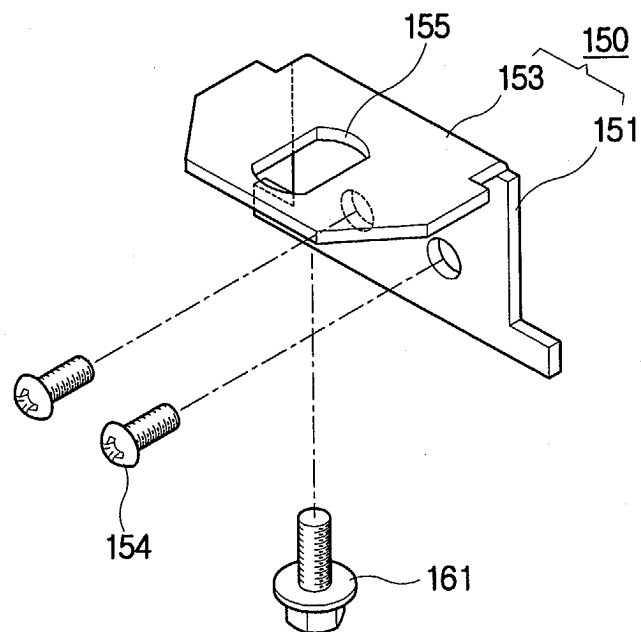


FIG. 6

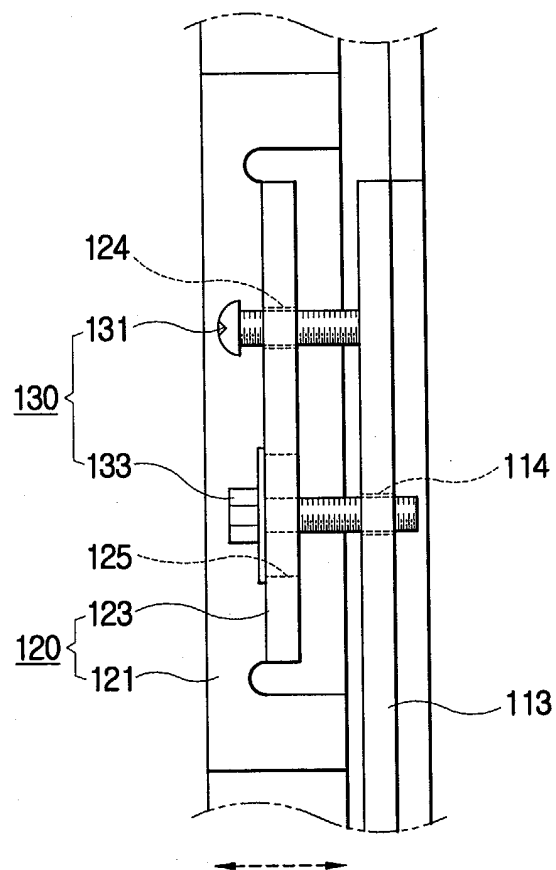


FIG. 7A

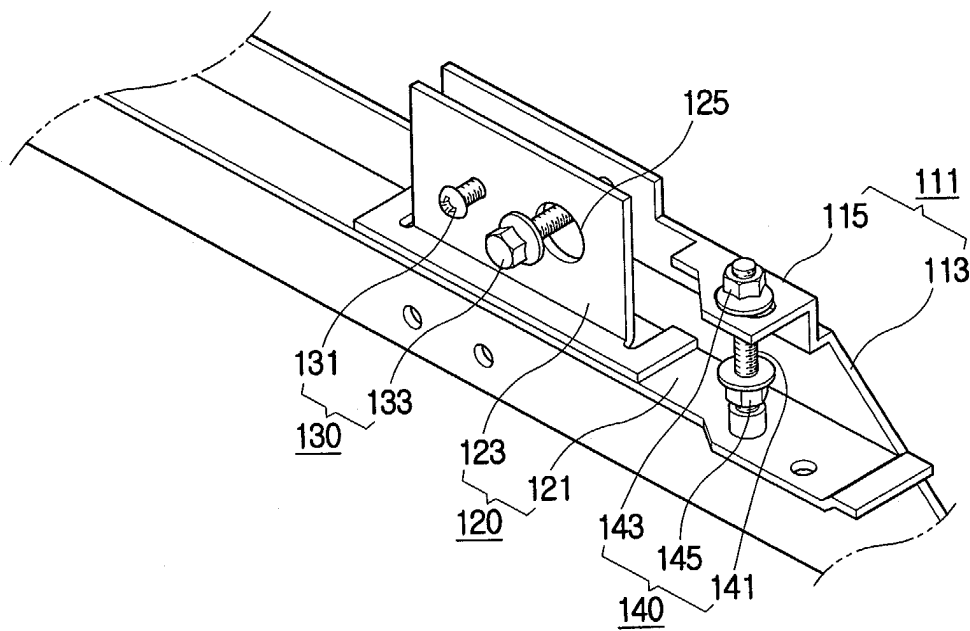


FIG. 7B

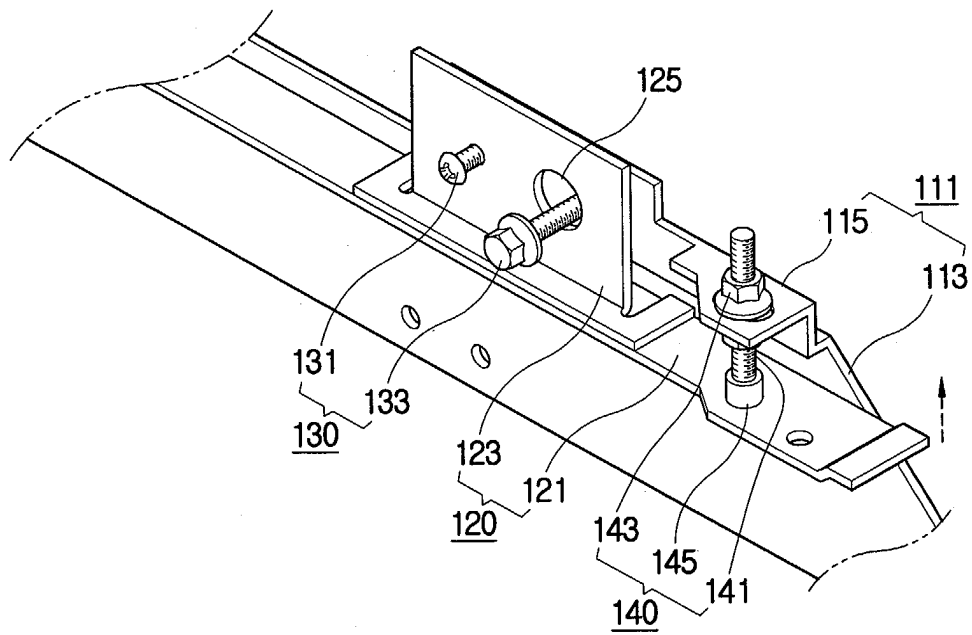


FIG. 8A

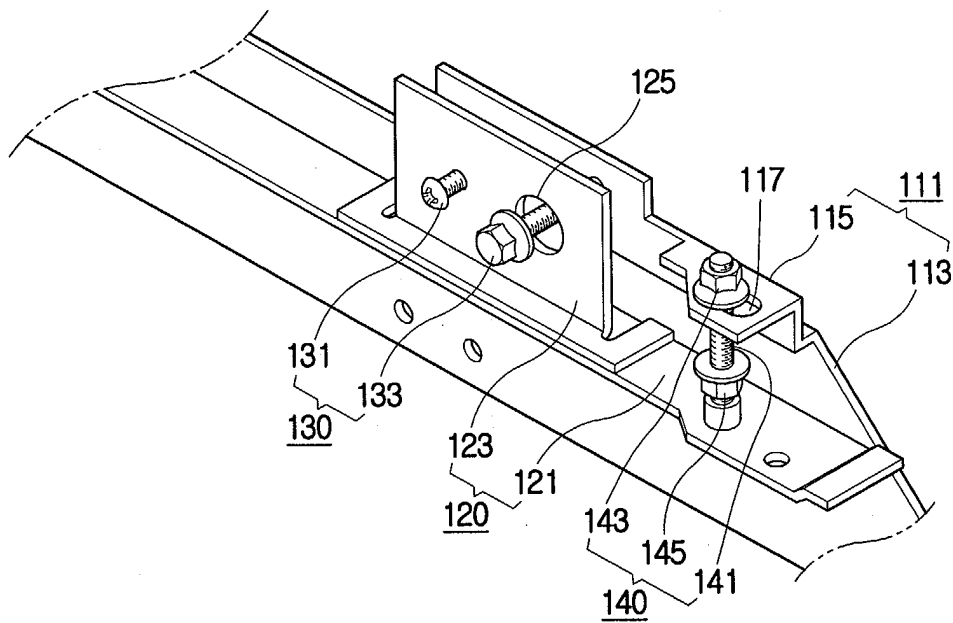


FIG. 8B

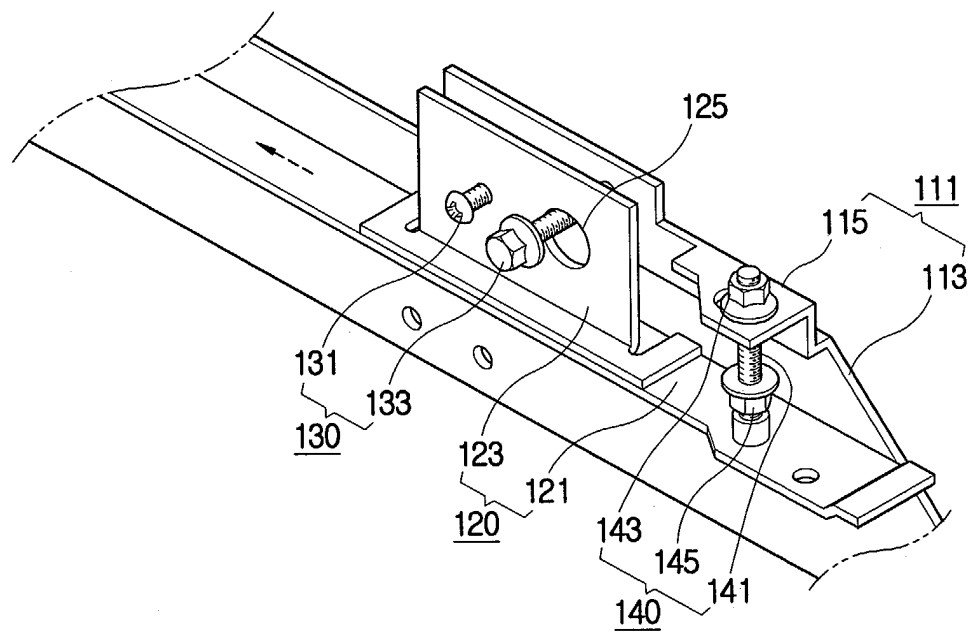


FIG. 9

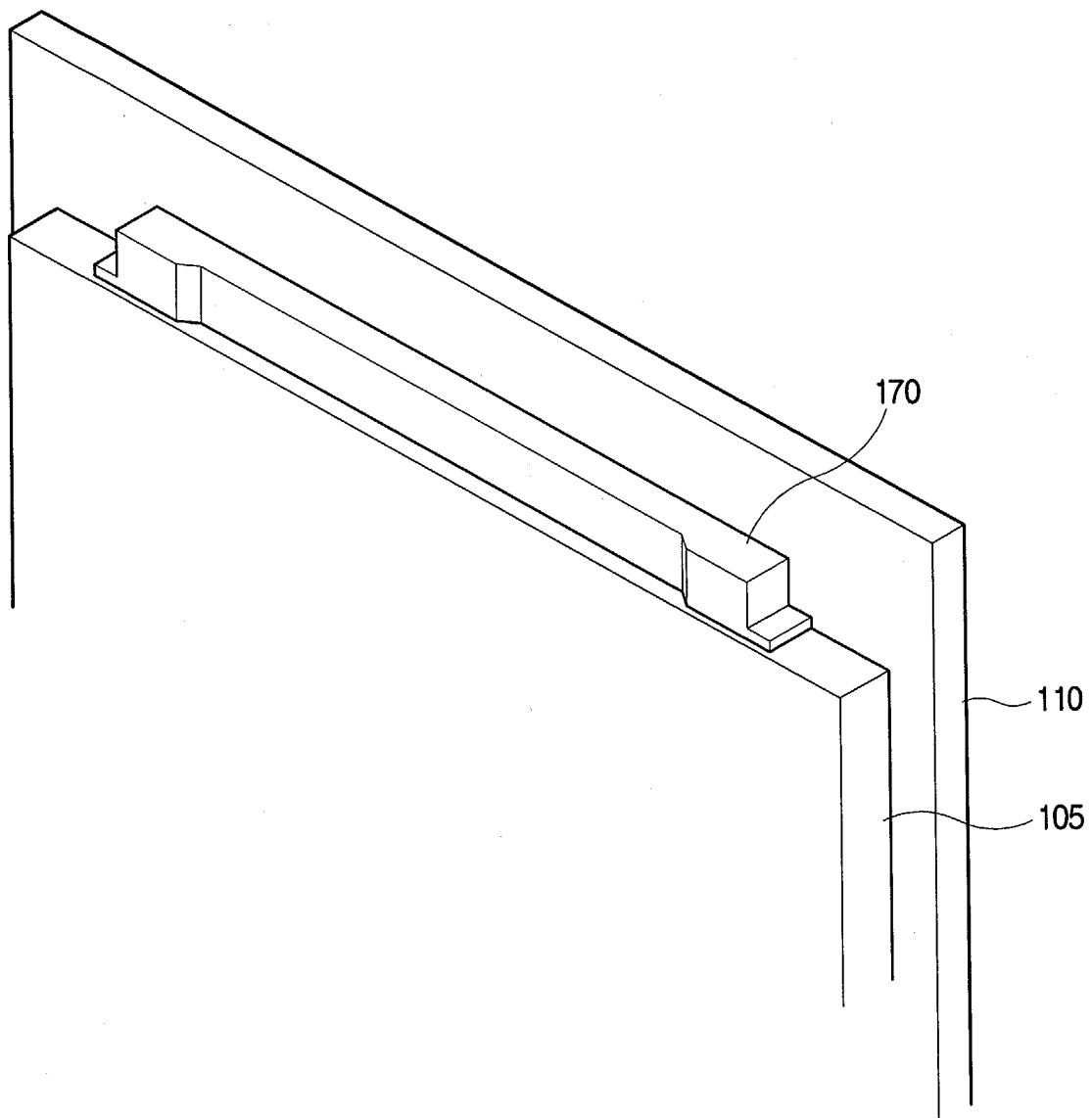


FIG. 10

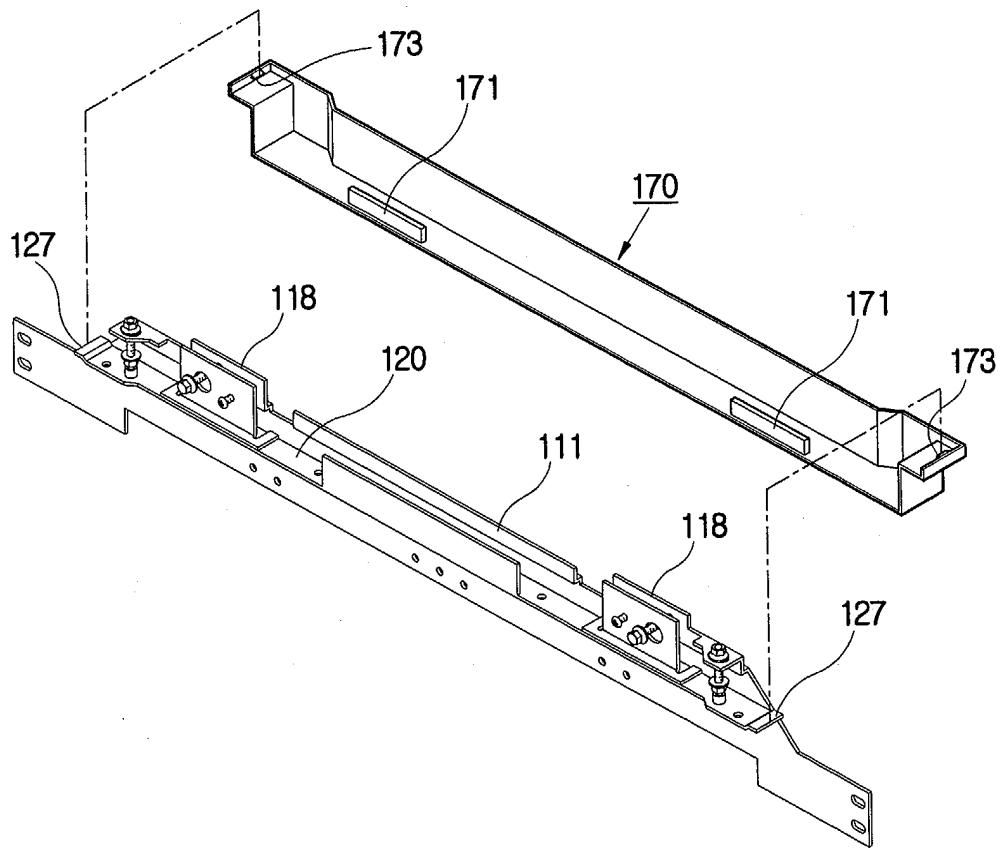


FIG. 11

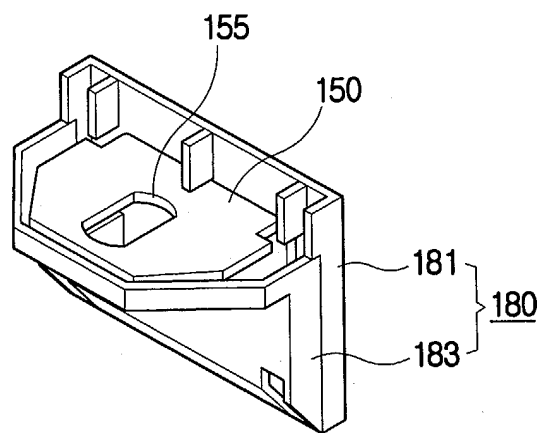


FIG. 12

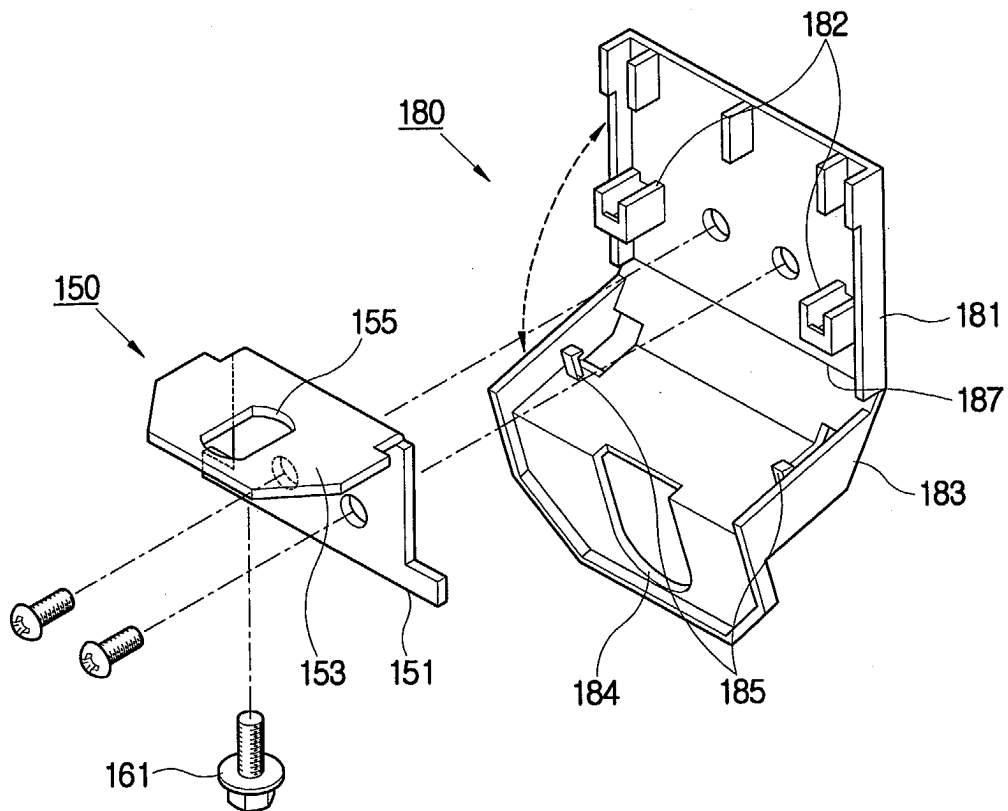
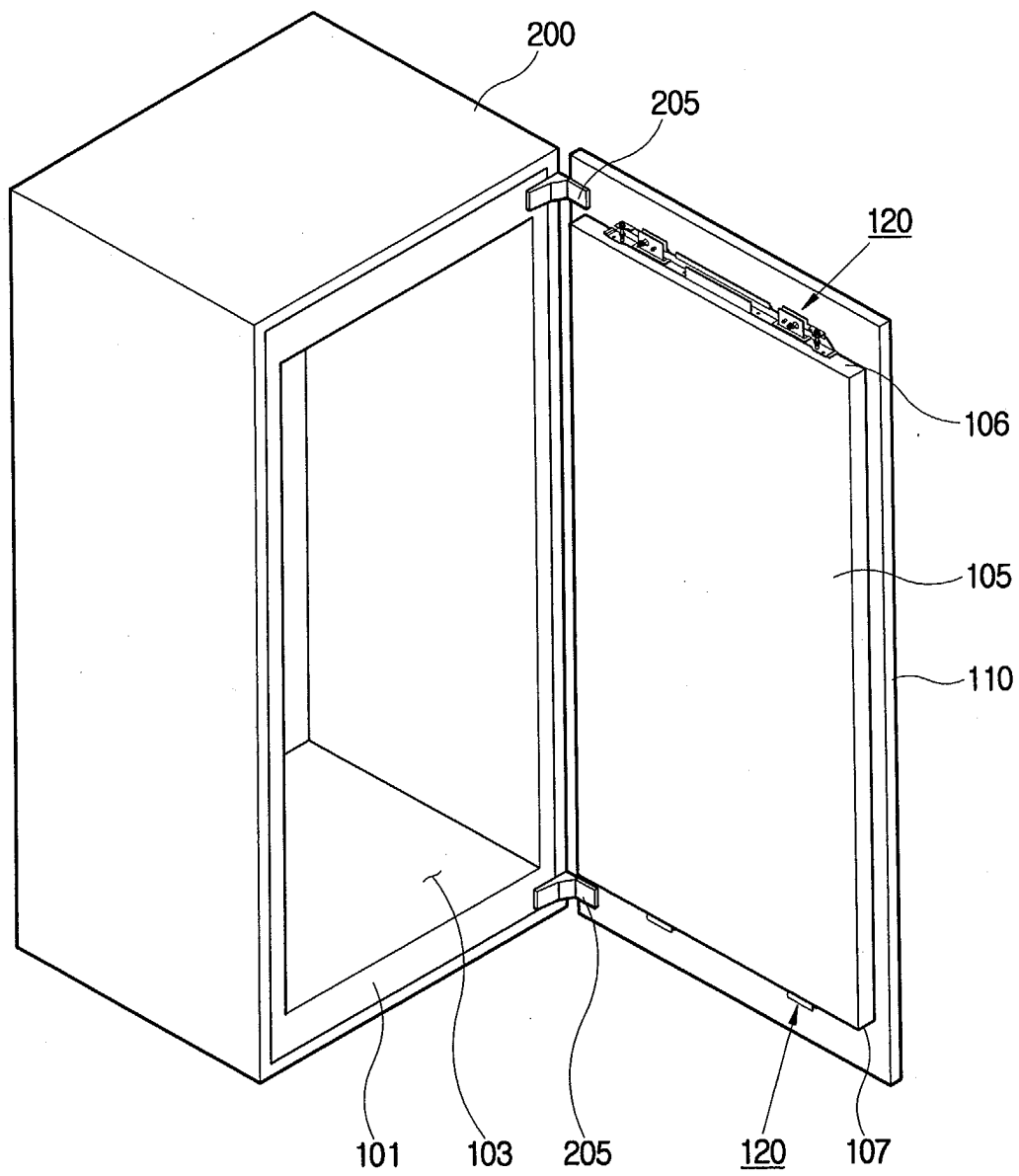


FIG. 13





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 25 1591

DOCUMENTS CONSIDERED TO BE RELEVANT			
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