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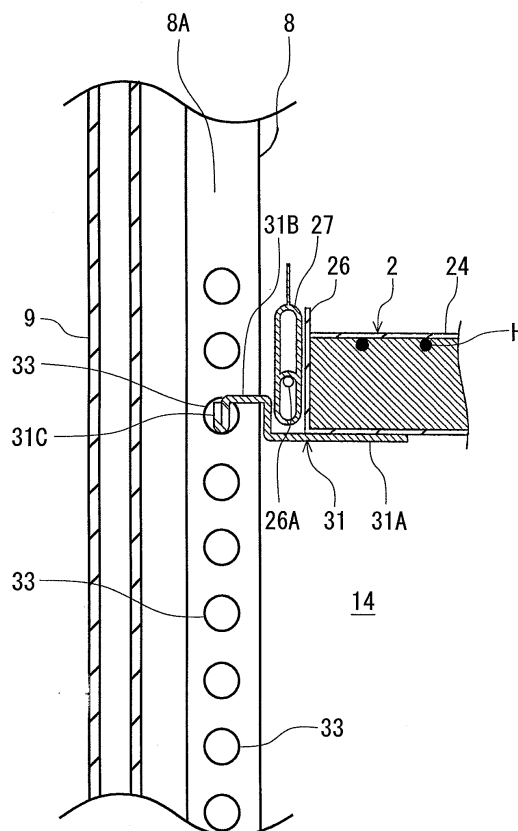
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(54) **Showcase**

(57) There is provided a showcase (1) comprising a display room (14) surrounded with a transparent wall (9). The costs of rack hanging structure in the display room (14) can be reduced. The showcase (1) comprises the display room (14) surrounded with a transparent wall (9) supported by support pillars (7,8) erected at four corners of a main body (3). The rack supporting portion having two or more engaging holes (33,34) is mounted to the pillar (7,8). The rack (2) for displaying commercial goods is hung in the display room (14) by being supported by the rack supporting portion (7A,7B). The rack receiving member (31) receives the rack (2) by engaging with the engaging hole (33,34) of the rack supporting portion (7A, 8A). The rack receiving member (31) is made by bending a metal plate and has an engaging portion (31C) made by contact bending of the metal plate which is inserted into and engaged with the engaging hole (33,34).

FIG. 7



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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a showcase which comprises a display room surrounded with a transparent wall.

[0002] The showcase of such a type has conventionally been constituted in a manner that by mounting a left/right and rear transparent wall and a front transparent door (transparent wall) to support pillars erected at four corners of a main body, the display room surrounded with the transparent walls is constituted on the main body. Then, a structure has been employed in which a rack for displaying goods is hung in the display room, and cold air is discharged from one side of the main body, the cold air is sucked from the other side to circulate in the display room, thereby cooling the display room to a predetermined temperature (e.g., Japanese Patent Application Laid-Open No. 5-203332).

[0003] A hot and cold type showcase has been constituted in a manner that by mounting a heater to the rack and disposing dampers in both sides of the rack. Then, only the part over the rack in the display room can be warmed up by turning on the heater in the state which the cold air circulation over the rack is shut out by the damper.

[0004] In the showcase which comprises the display room surrounded with the transparent walls, usually the rack is made of wires, and the rack is hung in the display room by engaging the tip of the wires which protrude backward from the rack with the engaging holes of the rack supporting portions mounted to the pillars. As other structures, the rack is received by rack receiving members which are made of resin and engaged with the engaging holes.

[0005] However, each structure causes problems of high costs.

SUMMARY OF THE INVENTION

[0006] The present invention has been made to solve the aforementioned conventional technical problems, and it is an object of the invention to provide a showcase comprises a display room surrounded with a transparent wall, and reducing the costs of rack hanging structure in the display room.

[0007] A first aspect of the invention is directed to a showcase comprising a display room surrounded with a transparent wall supported by support pillars erected at four corners of a main body; a rack supporting portion having two or more engaging holes and mounted to the pillar; a rack for displaying commercial goods hung in the display room by being supported by the rack supporting portion; a rack receiving member for receiving the rack by engaging with the engaging hole of the rack supporting portion, wherein the rack receiving member is made by bending a metal plate and has an engaging portion made

by contact bending of the metal plate which is inserted into and engaged with the engaging hole.

[0008] According to the invention, the showcase comprises the display room surrounded with a transparent wall supported by support pillars erected at four corners of a main body, the rack supporting portion having two or more engaging holes and mounted to the pillar, the rack for displaying commercial goods hung in the display room by being supported by the rack supporting portion, and the rack receiving member for receiving the rack by engaging with the engaging hole of the rack supporting portion. The rack receiving member is made by bending a metal plate and has an engaging portion made by contact bending of the metal plate which is inserted into and engaged with the engaging hole.

Thus, the manufacturing cost of the rack receiving member can be reduced remarkably, and the costs for hanging the rack can be reduced. And because of the engaging portion of the rack receiving member is made by contact bending of the metal plate, strength of the rack receiving member can be maintained and the rack can be supported stably.

[0009] A second aspect of the present invention is directed to the above showcase further comprising a cold air outlet formed on one side of the main body; a cold air inlet formed on the other side of the main body; a heater mounted in the rack; dampers mounted in both sides of the rack to rotate for open and close the cold air passages between the rack and the transparent walls located in both sides of the rack respectively, wherein the damper opens the cold air passage in stood state and closes the cold air passage being rotated to horizontal state, and the damper is supported by the rack receiving member in the horizontal state.

[0010] According to the invention, the showcase further comprises a cold air outlet formed on one side of the main body, a cold air inlet formed on the other side of the main body, a heater mounted in the rack, and dampers mounted in both sides of the rack to rotate for open and close the cold air passages between the rack and the transparent walls located in both sides of the rack respectively. The damper opens the cold air passage in stood state and closes the cold air passage being rotated to horizontal state. Thus, while the part under the rack in the display room is cooled, the part over the rack can be warmed up by rotating the damper to horizontal state and turning on the heater. In this case, because of the damper is supported by the rack receiving member in the horizontal state, the horizontal state of the damper can be maintained stably. And because of particular structure is not necessary to support the damper, the structure can be simple.

[0011] A third aspect of the present invention is directed to the above showcase further comprising two or more racks hung in the display room; an electrical box mounted in machine room formed under the main body; two or more leads that connect the electrical box and the heater of the racks respectively; two or more accommodating

portions formed in the main body that accommodate the rest portion of the leads respectively, wherein the rest portion of the lead from the rack hung in the upper position in the display room is accommodated in the accommodating portion near to the electrical box.

[0012] According to the invention, the showcase further comprises two or more racks hung in the display room, an electrical box mounted in machine room formed under the main body; two or more leads that connect the electrical box and the heater of the racks respectively, and two or more accommodating portions formed in the main body that accommodate the rest portion of the leads respectively. Thus, while the leads have enough length for enabling the rack to move, the appearance can be up by accommodating the rest portion of the leads in the accommodating portions. Especially, the rest portion of the lead from the rack hung in the upper position in the display room is accommodated in the accommodating portion near to the electrical box. Thus, the length of the rest portion of the leads from each rack accommodated in the accommodating portions can be equal by accommodating the rest portion of the lead from the rack far from the electrical box in the accommodating portion near to the electrical box.

[0013] A fourth aspect of the present invention is directed to the above showcase further comprising an openable door which forms at least one of the transparent walls; a magnet gasket mounted around the inner surface of the door; and a metal reinforcing member mounted to the pillar, wherein the reinforcing member is located in the outer surface of the pillar, and the gasket adheres to the reinforcing member when the door is closed.

[0014] According to the invention, the showcase further comprises an openable door which forms at least one of the transparent walls, a magnet gasket mounted around the inner surface of the door, and a metal reinforcing member mounted to the pillar. The reinforcing member is located in the outer surface of the pillar, and the gasket adheres to the reinforcing member when the door is closed. Thus, the surface to which the gasket adheres is made of the reinforcing member, and it is not necessary to provide a particular metal plate to which the gasket adheres, therefore the structure can be simple and the costs can be reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015]

FIG. 1 is a perspective view of a showcase according to an embodiment of the present invention;
FIG. 2 is an expanded horizontal sectional view of the front corner portion of the showcase of FIG. 1;
FIG. 3 is a perspective view of the inner structure of the showcase of FIG. 1;
FIG. 4 is a top view of the rack of the showcase of FIG. 1;
FIG. 5 is a side view of the rack of FIG. 4;

FIG. 6 is a bottom view of the rack of FIG. 4;

FIG. 7 is an elevational view in section of the side part of the rack of FIG. 4 (the damper is in stood state);

FIG. 8 is an elevational view in section of the side part of the rack of FIG. 4 (the damper is in horizontal state);

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0016] Next, the preferred embodiment of the present invention will be described in detail with reference to the accompanying drawings. Showcase 1 of the embodiments is a so-called desktop hot and cold type showcase (showcase which is changeable to cooled or warmed state) which is installed at a store such as a convenience store to sell plastic-bottled or canned drinks such as coffee or green tea in a cooled or warmed state.

[0017] Fig.1 is a perspective view of the showcase 1 according to an embodiment of the present invention, FIG. 2 is an expanded horizontal sectional view of the front corner portion of the showcase 1, FIG. 3 is a perspective view of the inner structure of the showcase 1, FIG. 4 is a top view of the rack 2 of the showcase 1, FIG. 5 is a side view of the rack 2, FIG. 6 is a bottom view of the rack 2, FIG. 7 and Fig. 8 are elevational views in section of the side part of the rack 2. A main body 3 of the showcase 1 of the embodiment comprises an insulated wall (not shown) made of formed polyurethane and a case 6 made of a hard synthetic resin which surrounds the insulated wall. And front support pillars 7, 7 and rear support pillars 8, 8 are erected at four corners of the main body 3, left and right longitudinal transparent walls 9, 9 made of transparent double glass are supported by the support pillars 7, 7, and 8, 8, and a ceiling wall 11 is mounted on top of the support pillars 7, 7 and 8, 8.

[0018] A longitudinal front and rear doors 12 (front door is shown, rear door is not shown) as a transparent wall in which transparent double glass 12B is fitted into a surrounding sash 12A is pivotally supported by the right front support pillar 7 and the left rear support pillar 8 to rotate. On the main body 3, a display room 14 is constituted by being surrounded with the transparent walls 9, 9, the doors 12, 12 and the ceiling wall 11. The doors 12, 12 close front and rear openings of the display room 14 to be freely opened.

[0019] A reference numeral 15 is a grip mounted to a center front in an up-and down direction (longitudinal direction) of a non-pivotal supporting side (front left side) of the sash 12A. A reference numeral 16 is a magnet gasket mounted around the inner surface (pillar 7 or 8 side surface) of the door 12, and bonded to the door 12 to seal it when the door 12 is closed.

[0020] A machine chamber 18 around which grilles 17.. are mounted is constituted below the main body 3 (around the main body 3 is covered with the panel 13 too). A compressor and a condenser (not shown) are

installed to constitute a refrigerant circuit of a cooling device in the machine chamber 18. A cooling chamber (not shown) whose upper surface is open is constituted in the insulated wall of the main body 3. An evaporator and a blower (not shown) which constitute the refrigerant circuit are installed in the cooling chamber. And a cold air outlet 21 is integrally formed from the front to the deep side on the right of the main body 3. A cold air inlet 22 is integrally formed from the front to the deep side on the left of the main body 3. The cold air inlet 22 is communicated with a cold air suction side of the evaporator in the cooling chamber, and the cold air outlet 21 is communicated with a cold air discharge side of the evaporator in the cooling chamber.

[0021] Angles (not shown) are erected from the four corners of a base 19 which constitutes the bottom of the machine chamber 18. On the other hand, metal (steel plate) reinforcing members 23 is mounted on the front support pillars 7, 7 and the rear support pillars 8, 8 respectively, each reinforcing member 23 reinforces the support pillars 7, 8. Each reinforcing member 23 is formed about a gate shape, and integrally mounted to the front surface (outer surface) of the front support pillar 7, 7 and the front surface (outer surface) of the ceiling wall 11, or the rear surface (outer surface) of the rear support pillar 8, 8 and the rear surface (outer surface) of the ceiling wall 11. The bottom ends of each reinforcing member 23 are fixed to the angles (the rear side reinforcing member is not shown). The magnet gasket 16 adheres to the reinforcing member 23 when the door 12 is closed. Namely the reinforcing member 23 also serves as a surface to which the magnet gasket 16 adheres, therefore it is not necessary to mount a particular metal plate to which the gasket 16 adheres on the outer surface of the support pillars 7, 8.

[0022] On the other hand, the rack 2 comprises a metal upper plate 24, an insulated wall (not shown) inserted in the upper plate 24, a frame member 26 made of resins and mounted around the upper plate 24 and the insulated wall. An electric heater H is mounted to an inner surface of the upper plate 24. The both sides of the frame member 26 caved in to form a cold air passage between the rack 2 and the transparent walls 9, 9 located in outside of it respectively. In the concave portion of the highest rack 2 and the rack 2 under the highest rack 2, a damper 27 is mounted respectively (not shown in Fig. 2). The damper 27 is mounted by being engaged with front and rear pivots 26A, 26A of the frame member 26 to rotate and move up and down at predetermined range. The cold air passages are disposed over the cold air outlet 21 and the cold air inlet 22, and the damper 27 is rotated to open and close the cold air passage.

[0023] Reference numerals 31, 31 are rack receiving members of the present invention for supporting the rack 2. This rack receiving member 31 is made by bending a metal plate (steel plate). The rack receiving member 31 comprises a receiving portion 31A fixed to the lower surface of the rack 2, an elevated portion 31B which is ele-

vated in a staircase pattern at the out side of the receiving portion 31A, and an engaging portion 31C protrudes backward at the out side of the elevated portion 31B. The engaging portion 31C is made by contact bending of the metal plate, and the contact face is in the vertical direction.

[0024] The receiving portion 31A is fixed to the rear corners of the lower surface of the rack 2 by screw for mounting the rack receiving member 31, 31 on the rear both sides of the lower surface of the rack 2. In this state, the elevated portion 31B is disposed in the outside far from the concave portion of the rack 2, and the damper 27 is positioned between the elevated portion 31B and the rack 2.

[0025] On the other hand, rack supporting portions 8A are formed in the front surface (surface of the display room 14 side) of the rear support pillars 8, 8. The rack supporting portion 8A has two or more engaging holes 33.. formed up and down at predetermined intervals. Rack supporting portions 7A are formed in the surfaces of the front support pillars 7, 7 facing each other. The rack supporting portion 7A has two or more engaging holes 34.. formed up and down in a predetermined interval. The engaging portions 31C of the rear both sides rack receiving members 31 are inserted into and engaged with any engaging holes 33, and engaging projections 32 protrude from the both sides of the front end of the rack 2 are inserted into and engaged with the engaging holes 34. In this state, the rack 2 is hung in a state of being inclined low obliquely to the front.

[0026] As described, the rack receiving member 31 is made by bending a metal plate. Thus, the manufacturing cost of the rack receiving member 31 can be reduced remarkably, and the costs for hanging the rack 2 can be reduced. The rack receiving member 31 has an engaging portion 31C made by contact bending of the metal plate which is inserted into and engaged with the engaging hole, and the contact face of the engaging portion 31C is in the vertical direction. Thus, strength of the rack receiving member 31 against the load of the rack 2 can be maintained and the rack 2 can be supported stably.

[0027] In the embodiment described above, three vertical stages of racks 2 are hung in the display room 14, however, the lowest rack 2 constitutes a deck pan. The rack 2 is hung in a state of being inclined low obliquely to the front by being fixed to the front support pillar 7, 7 and the rear support pillar 8, 8 not by above described supporting manner.

[0028] On the other hand, an accommodating groove 36 having a front opening is made in front of the engaging holes 34 of the front support pillar 7, 7. The leads 37 from the electric heaters H of the racks 2 are accommodated downwardly in the accommodating groove 36. The leads 37 are connected to the electrical box 38 mounted on the rear right corner of the machine chamber 18 for connecting the heaters H of the racks 2 and the electrical box 38 respectively. In this case, the lead 37 from the highest rack 2 is accommodated in the accommodating groove

36 of the right front support pillar 7, and the lead 37 from the rack 2 under the highest rack 2 is accommodated in the accommodating groove 36 of the left front support pillar 7. At the front part of the case 6 of the main body 3, accommodating portions 41, 41 are integrally formed having upper openings. The rest portion of the lead 37 from the highest rack 2 is accommodated in the right side accommodating portion 41, and the rest portion of the lead 37 from the rack 2 under the highest rack 2 is accommodated in the left side accommodating portion 41 (see Fig. 3). The entire rest portion was accommodated in the rack, therefore the area of validity of the rack is reduced. By making the accommodating portions 41 in the main body 3, such problem can be resolved.

[0029] The highest rack 2 and the rack 2 under the highest rack 2 are movable up and down by changing the engaging holes 33, 34 with which the engaging portion 31C and the engaging projection 32 are engaged. Thus, while the leads 37, 37 have enough length for enabling the highest rack 2 and the rack 2 under the highest rack 2 to move, the rest portion of the leads 37 do not appear in the display room 14 by accommodating the rest portion of the leads 37 in the accommodating portions 41 as described above, therefore the appearance can be up. Especially, the rest portion of the lead 37 from the rack 2 hung in the upper position in the display room (the highest rack 2) is accommodated in the right side accommodating portion 41 near to the electrical box 38. Thus, the length of the rest portion of the leads 37 from each rack 2 accommodated in the accommodating portions 41 can be equal by accommodating the rest portion of the lead 37 from the rack 2 (the highest rack 2) far from the electrical box 38 in the accommodating portion 41 near to the electrical box 38 (About the lead 37 from the highest rack 2, the distance between the rack 2 and the accommodating portion 41 becomes long. About the lead 37 from the rack 2 under the highest rack 2, the distance between the accommodating portion 41 and the electrical box 38 becomes long).

[0030] According to the foregoing constitution, when the whole area in the display room 14 is used in the cooled state, the dampers 27, 27 both sides of the highest rack 2 and the rack 2 under the highest rack 2 are rotated to stood state (see Fig. 5, Fig. 6 and Fig. 7). In this state, the damper 27 is positioned between the elevated portion 31B and the rack 2, and the damper 27 opens the cold air passages between the rack 2 and the transparent walls 9, 9 located in both sides of the rack 2. The cold air discharged upward from the cold air outlet 21 goes up in the right side cold air passage of the rack 2, and goes down in the left side cold air passage to be sucked in the cold air inlet 22. Thus, the whole area in the display room 14 is cooled to a refrigerating temperature.

[0031] When only the area over the highest rack 2 in the display room 14 is used in the warmed state and the other area under the highest rack 2 in the display room 14 is used in the cooled state, only the dampers 27, 27 both sides of the highest rack 2 are rotated to horizontal

state for closing the cold air passages between the highest rack 2 and the transparent walls 9, 9 located in both sides of the highest rack 2 (see Fig. 4 and Fig. 8). In this state, the cold air is not supplied over the highest rack 2. Thus, the area over the highest rack 2 in the display room is warmed to a predetermined temperature by executing the electric heater H of the highest rack 2.

[0032] In this case, because of the rear end of the damper 27 is put on the elevated portion 31B and supported by the rack receiving member 31 in the horizontal state (see Fig. 8). Thus, the horizontal state of the damper 27 can be maintained stably. And because of particular structure is not necessary to support the damper 27, the structure can be simple.

Claims

1. A showcase comprising:

a display room surrounded with a transparent wall supported by support pillars erected at four corners of a main body,
a rack supporting portion having two or more engaging holes and mounted to the pillar,
a rack for displaying commercial goods hung in the display room by being supported by the rack supporting portion,
a rack receiving member for receiving the rack by engaging with the engaging hole of the rack supporting portion,
wherein the rack receiving member is made by bending a metal plate and has an engaging portion made by contact bending of the metal plate which is inserted into and engaged with the engaging hole.

2. The showcase according to claim 1, further comprising:

a cold air outlet formed on one side of the main body,
a cold air inlet formed on the other side of the main body,
a heater mounted in the rack,
dampers mounted in both sides of the rack to rotate for open and close the cold air passages between the rack and the transparent walls located in both sides of the rack respectively,
wherein the damper opens the cold air passage in stood state and closes the cold air passage being rotated to horizontal state, and the damper is supported by the rack receiving member in the horizontal state.

3. The showcase according to claim 2, further comprising:

two or more racks hung in the display room,
 an electrical box mounted in machine room
 formed under the main body,
 two or more leads that connect the electrical box
 and the heater of the racks respectively,
 two or more accommodating portions formed in
 the main body that accommodate the rest por-
 tion of the leads respectively,
 wherein the rest portion of the lead from the rack
 hung in the upper position in the display room
 is accommodated in the accommodating portion
 near to the electrical box.

4. The showcase according to claim 1 to 3, further comprising:

an openable door which forms at least one of
 the transparent walls,
 a magnet gasket mounted around the inner sur-
 face of the door,
 a metal reinforcing member mounted to the pil-
 lar,
 wherein the reinforcing member is located in the
 outer surface of the pillar, and the gasket ad-
 heres to the reinforcing member when the door
 is closed.

5. A display case comprising a rack for displaying mer-
 chandise placed on the rack and support members
 for supporting the rack within the case, the rack in-
 cluding cooperating elements releasably engagea-
 ble with corresponding apertures in the support
 members to attach the rack to the case, **character-**
ised in that the cooperating elements on the rack
 each comprise a metal plate having a folded portion
 of double-thickness, said folded portion being re-
 ceived in a respective aperture in a support member
 to attach the rack thereto.

6. A display case comprising a pair of side walls and a
 rack for displaying merchandise placed on the rack
 and support members for supporting the rack within
 the case between said side walls, the rack having a
 heater for heating a space above the rack and co-
 operating elements that releasably engage with cor-
 responding apertures in the support members to at-
 tach the rack to the case, the case further comprising
 a damper on each side of the rack movable between
 a first raised position in which a gap is formed be-
 tween each side wall and the rack for the flow of cold
 air into and out of the space above the rack to cool
 the space above the rack when the heater is not be-
 ing used and, a second lowered position in which
 the damper closes the gap between each side wall
 and the rack to prevent the flow of cold air into the
 space above the rack when said space is being heat-
 ed by the heater, **characterised in that** the dampers
 are supported by the cooperating elements in their

lowered position.

7. A display case comprising a rack for displaying mer-
 chandise placed on the rack within the case and sup-
 port members for supporting the rack within the case,
 the rack having a heater for heating a space above
 the rack and cooperating elements that releasably
 engage with corresponding apertures in the support
 members to attach the rack to the case at selected
 one of a number of different positions within the case,
 the heater having a lead extending from the rack to
 an electrical housing beneath the rack, **character-**
ised in that the display case includes a chamber
 adjacent to the electrical housing to contain any ex-
 cess lead extending from the heater in the rack to
 the electrical housing, the excess length of lead be-
 ing dependent on the selected position of the rack
 within the case.

FIG. 1

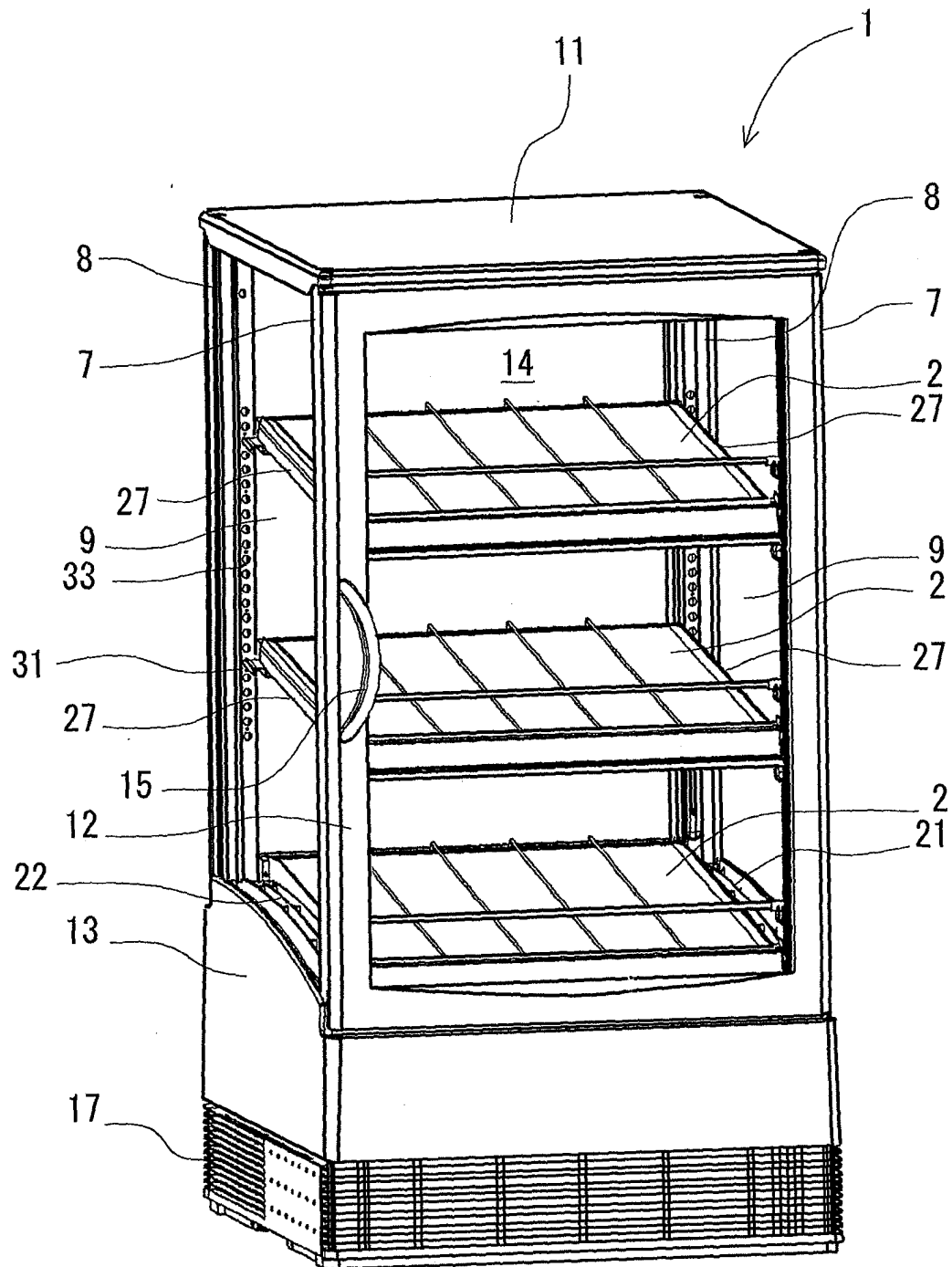


FIG. 2

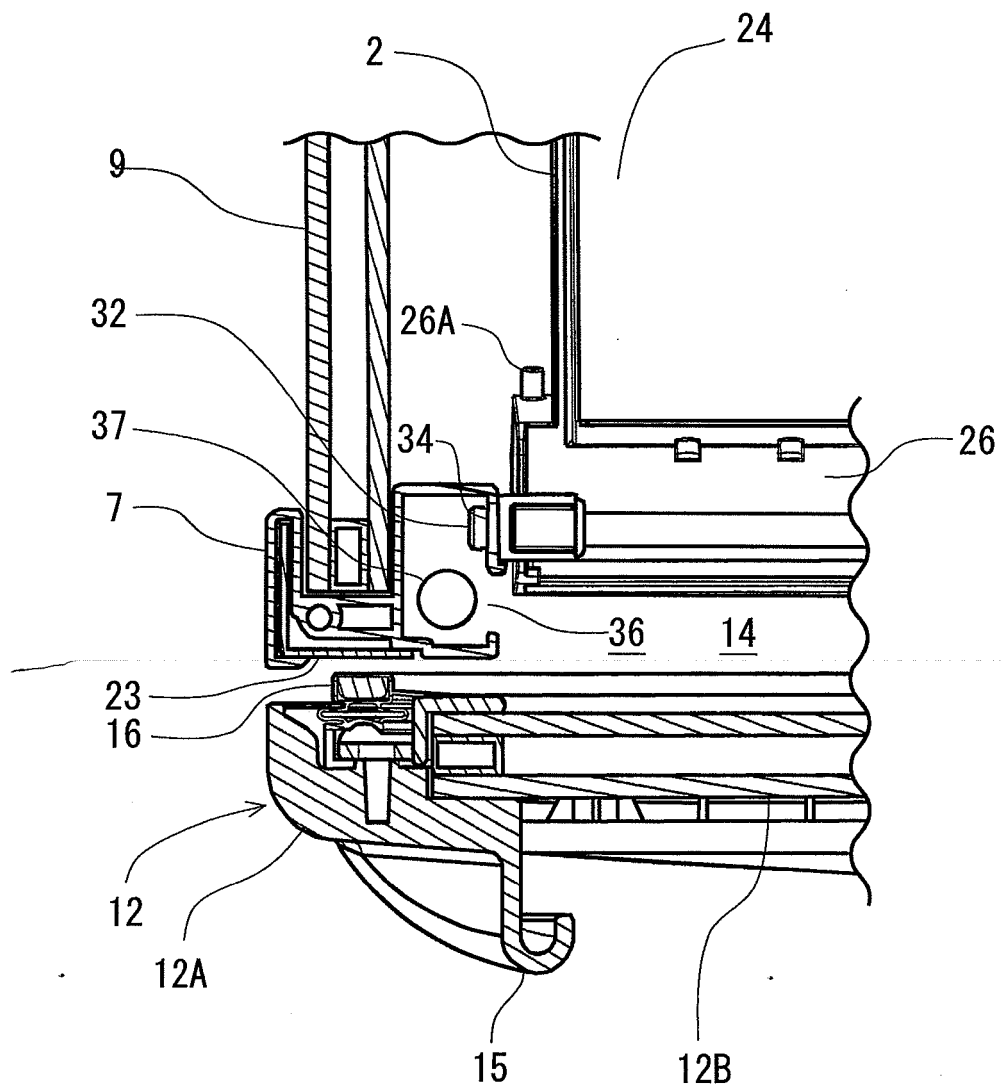


FIG. 3

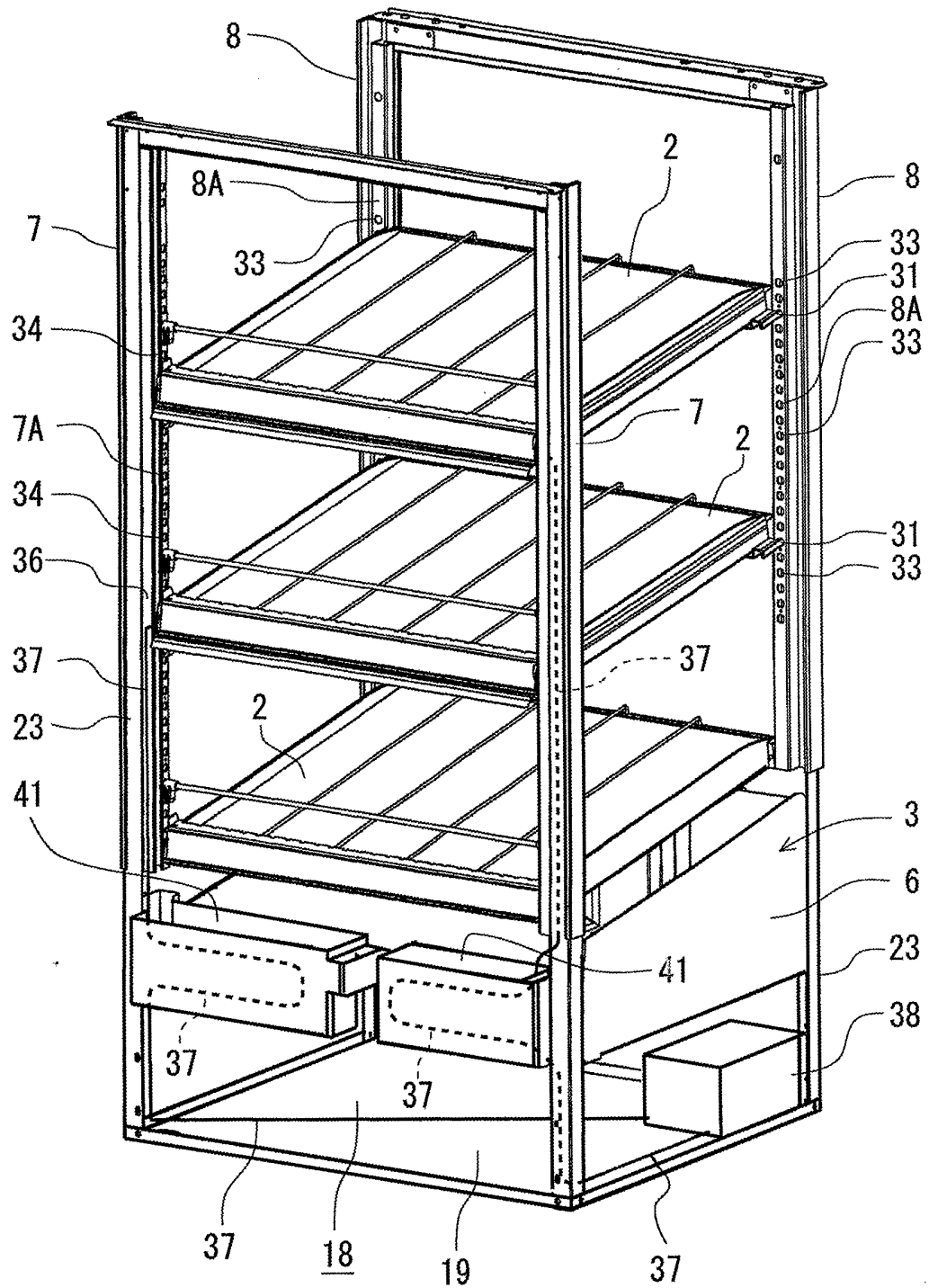


FIG. 4

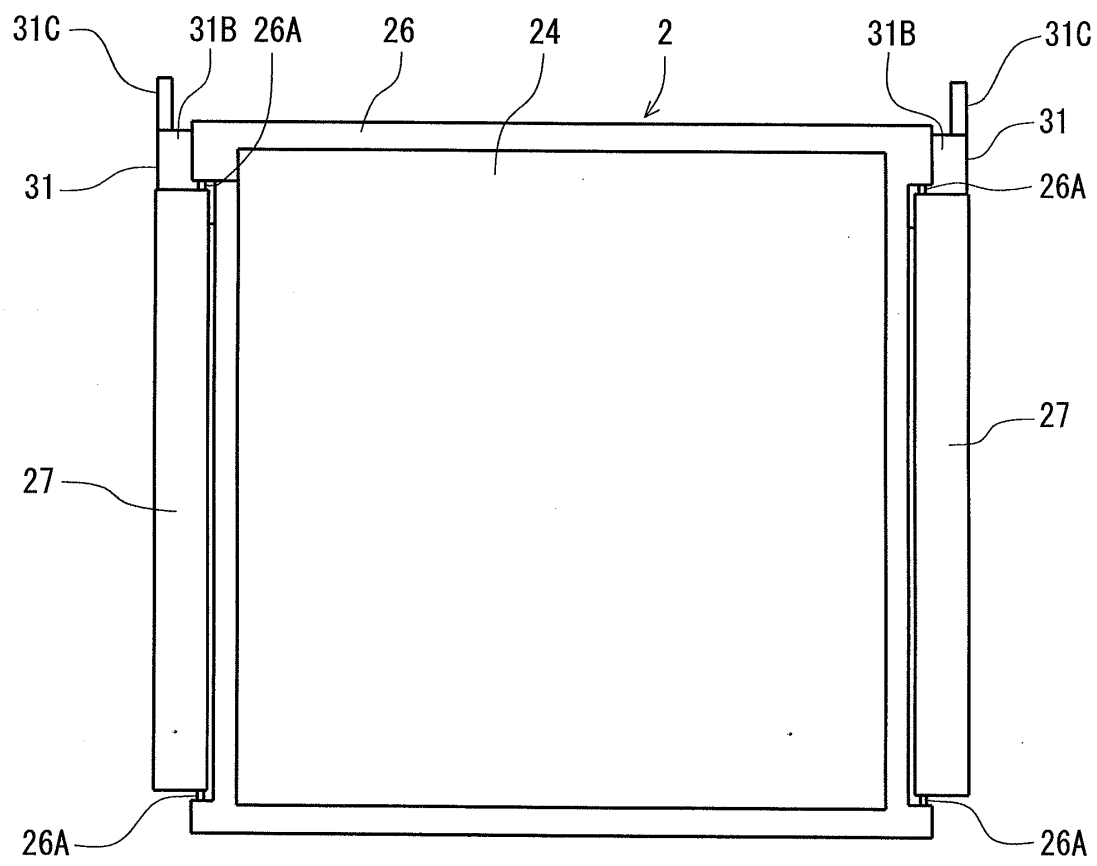


FIG. 5

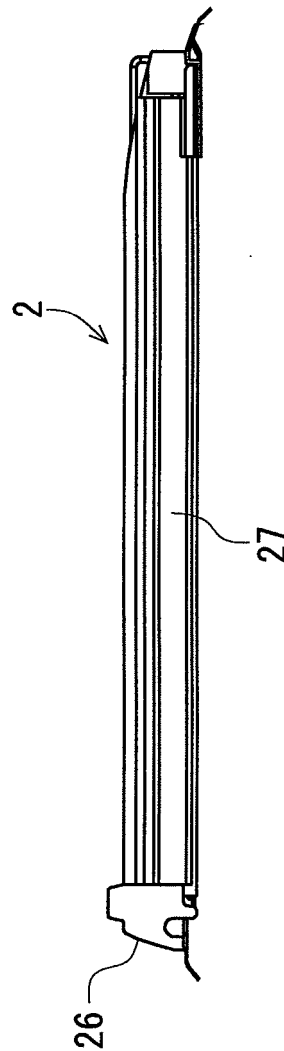


FIG. 6

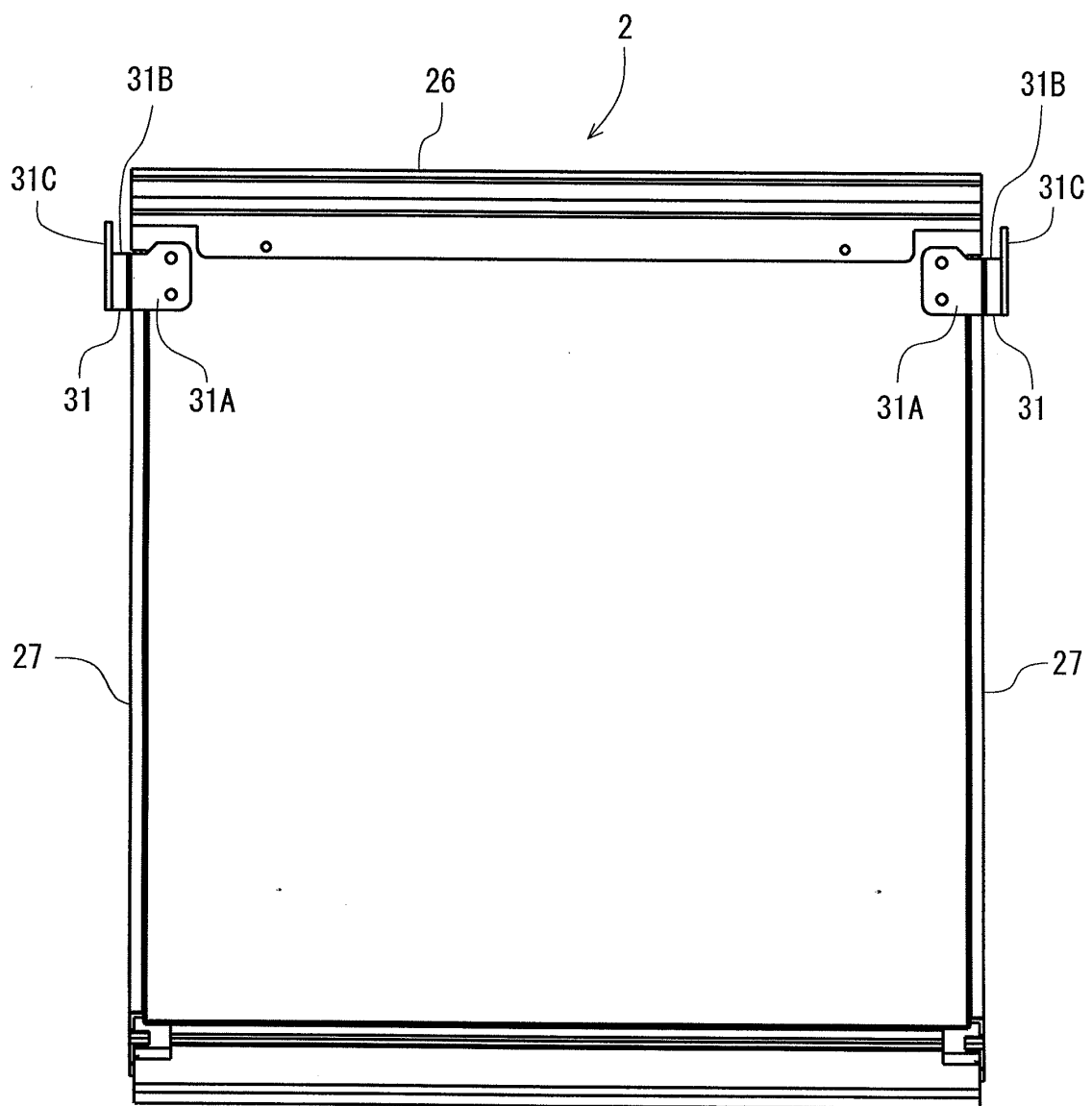


FIG. 7

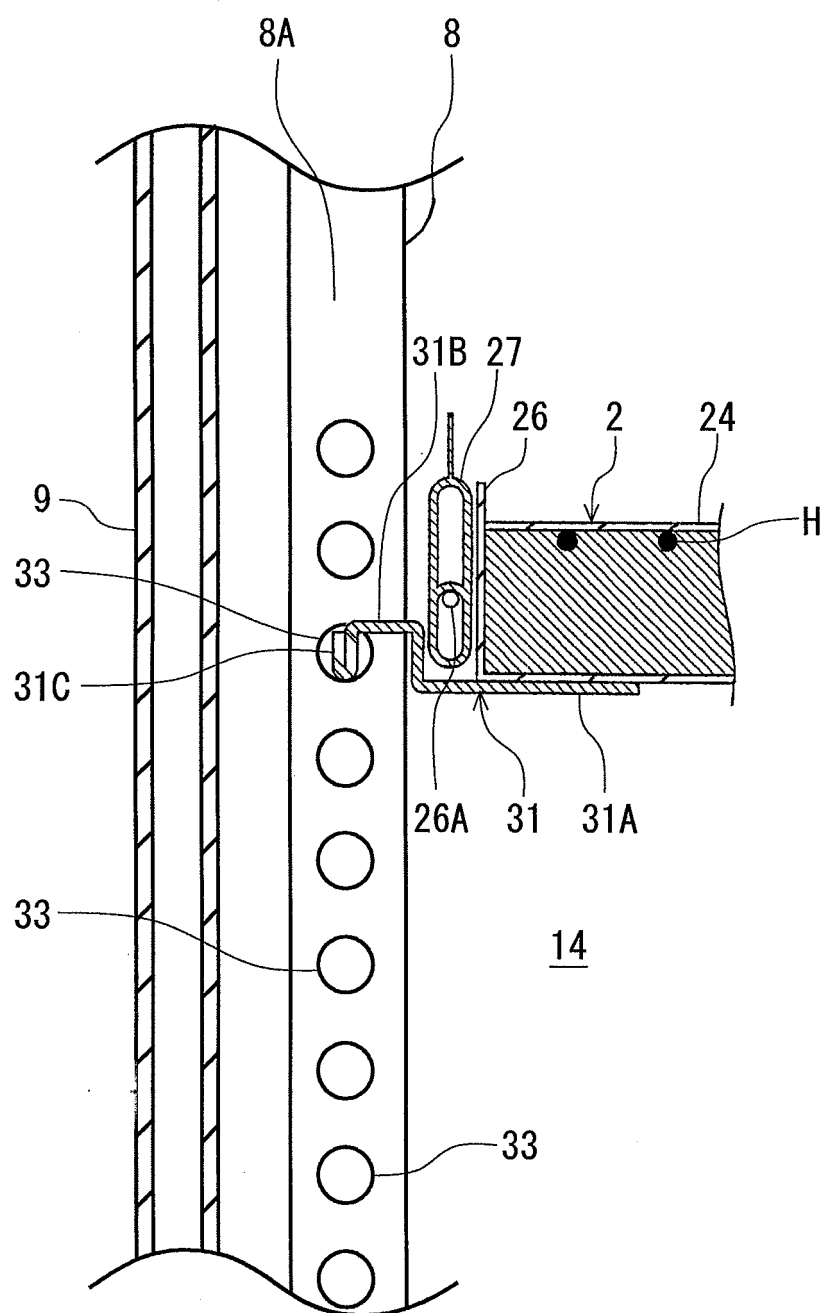


FIG. 8

