An object is to prevent any gap from being generated in an abutment portion between an outer surface cover and a back surface plate or the like, whereby these components are provided with a sense of continuity, and the improvement of an appearance can be achieved. In a low temperature showcase in which insulating side panels are attached to the left and right sides of a main body having a display chamber, each of the insulating side panels includes a see-through transparent wall; an insulating wall which holds upper and lower portions and a rear edge of this transparent wall; a side panel rear cover which covers this insulating wall from the outside; and a side panel front cover which covers the front edges of the insulating wall and the transparent wall and which is attached to the front part of the side panel rear cover, and abutment portions of the side panel front cover and the side panel rear cover are provided with inclined surfaces directed outwards as the surfaces extend rearwards, respectively.
FIG. 19
PRIOR ART
LOW TEMPERATURE SHOWCASE

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a low temperature showcase in which insulating side panels are attached to the left and right sides of a main body including a display chamber therein.

[0002] This type of conventional low temperature showcase is installed in a store such as a convenience store or a supermarket, and has a constitution in which insulating side panels are attached to both side parts of a main body made of an insulating wall having a substantially U-shaped section to define a display chamber in the main body. Transparent walls such as glass plates are attached to the insulating side panels so that the inside of the display chamber can be seen through the walls from the sides of the main body (e.g., see Japanese Patent Application Laid-Open No. 2003-135228 (Patent Document 1)).

[0003] In this case, the insulating side panels are substantially formed into a U-shape, and upper and lower portions and rear edges of the transparent walls are fitted and fixed into concave grooves formed in the end surfaces of the insulating side panels. Moreover, front fixing members are attached to the front ends of the transparent walls so as to extend from the upper ends to the lower ends of openings in the insulating side panels.

[0004] In such a constitution, the front ends of the transparent walls are retreated internally from the front ends of the insulating side panels, and hence the front surface of the insulating wall and the insulating side panels have poor continuity in respect of design. Therefore, it is considered that a structure is provided in which the front ends of the insulating side panels and the front surface of the insulating wall are provided with the continuity in respect of the design, but the transparent walls are held by the concave grooves formed in the opening edges of the insulating side panels, and the outer surfaces of the insulating side panels are positioned outside the outer surfaces of the transparent walls. There is a problem that the front fixing members vertically extending with the width dimensions of the insulating side panels cannot securely fix the transparent walls because gaps are generated between the transparent walls and the insulating side panels.

[0005] To solve the problem, a constitution is suggested in which each of the insulating side panels is constituted of the transparent wall, an insulating wall 101 for holding the upper and lower portions and rear edge of the transparent wall, a side panel rear cover 102 for covering this insulating wall 101 from the outside as shown in FIG. 18, and a side panel front cover 103 extending from the insulating wall 101 to the transparent wall to cover the front edges of the walls.

[0006] As shown in FIGS. 18 and 19, the side panel rear cover 102 is constituted of a flange 102A whose front end is bent internally (on the side of a display chamber 108), and a flange 102B whose rear end is bent internally (on the side of a back surface plate 110 provided on the back surface of a main body). Moreover, an attachment member 105 is vertically fixed to the front end of the insulating wall 101 via a screw 104. Therefore, the flange 102A of the front end of the side panel rear cover 102 is superimposed on the attachment member 105, and fixed thereto via a screw 106. On the other hand, as to the side panel front cover 103 having an openable rear portion, a side wall 103A on an inner side (the display chamber 108 side) is fixed to the attachment member 105 fixed to the insulating wall 101 via a screw 107. At this time, the rear end of an outer side wall 103B of the side panel front cover 103 is brought close to the front end of the side panel rear cover 102.

[0007] Moreover, as shown in FIG. 18, the front surface of a machine chamber disposed outside the display chamber 108 in a lower part of an insulating box member constituted of a main body and insulating side panels is closed with an openable front surface panel 109. The front surface panel 109 is detachably inserted into, for example, a panel receiving part 112 disposed in the front surface of a lower wall of an insulating wall 111 disposed in the main body, and the lower end of the front surface panel 109 can be held by a panel receiving member provided on an angle (not shown) fixed to the main body.

[0008] Furthermore, as shown in FIG. 19, the back surface plate 110 which covers the back surface of the insulating wall of the main body is fixed to the main body by an attachment plate 116 for connecting an angle 113 fixed to the back part of the main body to the end of the back surface plate 110 to fix the back surface plate 110 via a screw or the like. At this time, the end of the flange 102B of the rear end of the side panel rear cover 102 is brought close to the end surface of the back surface plate 110.

[0009] However, in such a constitution, the rear end surface of the side panel front cover 103 and the front end of the side panel rear cover 102, the end surface of the front surface panel 109 and the inner end surface of the side panel front cover 103, or the end surface of the back surface plate 110 and the end surface of the side panel rear cover 102 are brought close to each other by the design of dimensions. However, if they are not substantially closely attached to each other, a gap S is generated in an abutment portion owing to a dimensional error or the like.

[0010] The gap S in such an abutment portion is apparently a black line. Therefore, when these covers, the back surface plate and the like are painted in white or the like, there is a problem that the integrity and continuity of these components are remarkably impaired.

[0011] The present invention has been developed to solve conventional technical problems, and an object thereof is to provide a low temperature showcase in which any gap is prevented from being generated in an abutment portion between an outer surface cover and a back surface plate or the like, whereby these components are provided with a sense of continuity, and the improvement of an appearance can be achieved.

SUMMARY OF THE INVENTION

[0012] According to a first invention of the present application, there is provided a low temperature showcase in which insulating side panels are attached to the left and right sides of a main body having a display chamber, characterized in that each of the insulating side panels includes a see-through transparent wall; an insulating wall which holds upper and lower portions and a rear edge of this transparent wall; a side panel rear cover which covers this insulating wall from the outside; and a side panel front cover which covers the front edges of the insulating wall and the transparent wall and which is attached to the front part of the side panel rear cover, and abutment portions of the side panel front cover and the side panel rear cover are provided with inclined surfaces directed outwards as the surfaces extend rearwards, respectively.
[0013] A low temperature showcase of a second invention of the present application is a low temperature showcase including an insulating box member having a display chamber, characterized by further including a machine chamber disposed outside the display chamber of a lower part of the insulating box member; and a front surface panel which openably closes the front surface of this machine chamber, and abutment portions of the front surface panel and the insulating box member are provided with inclined surfaces directed inwards as the surfaces extend rearwards, respectively. Therefore, the inclined surface disposed on the front surface panel is attached so as to be superimposed on the inclined surface disposed on the insulating box member, whereby it is possible to eliminate the disadvantage that the line is apparently formed on the abutment portion between these surfaces.

[0014] A low temperature showcase of a third invention of the present application is a low temperature showcase in which insulating side panels are attached to the left and right sides of a main body having a display chamber, characterized by including covers which cover the insulating side panels from the outside; and a back surface plate which covers the rear surface of the main body, a rear edge of each cover is provided with an internally directed flange, the internally directed flange is attached to the back surface plate, the inner surface of the internally directed flange in an abutment portion between the internally directed flange and this back surface plate is an inclined surface retroected toward the tip of this internally directed flange, and the edge of the back surface plate in the abutment portion between the internally directed flange and the back surface plate is inclined and bent forwards. Consequently, it is possible to provide a sense of continuity between the front surface panel and the insulating box member, and the improvement of the appearance can be realized.

[0015] According to the above first invention, in the low temperature showcase in which the insulating side panels are attached to the left and right sides of the main body having the display chamber, each of the insulating side panels includes the see-through transparent wall; the insulating wall which holds the upper and lower portions and the rear edge of this transparent wall; the side panel rear cover which covers this insulating wall from the outside; and the side panel front cover which covers the front edges of the insulating wall and the transparent wall and which is attached to the front part of the side panel rear cover, and the abutment portions of the side panel front cover and the side panel rear cover are provided with the inclined surfaces directed outwards as the surfaces extend rearwards, respectively. The inclined surface disposed on the side panel front cover is attached so as to be superimposed on the inclined surface disposed on the side panel rear cover, whereby it is possible to eliminate a disadvantage that a line is apparently formed on the abutment portion between these covers.

[0016] Such a superimposed portion is formed by superimposing the inclined surfaces of the covers on each other. Therefore, even when the side panel front cover and the side panel rear cover have a slight dimensional error, such a dimensional error can be alleviated to eliminate the disadvantage that the line is apparently formed on the abutment portion. Consequently, it is possible to provide a sense of continuity between the side panel front cover and the side panel rear cover, and the improvement of the appearance can be realized.

[0017] According to the above second invention, the low temperature showcase including the insulating box member having the display chamber further includes the machine chamber disposed outside the display chamber of the lower part of the insulating box member; and the front surface panel which openably closes the front surface of this machine chamber, and the abutment portions of the front surface panel and the insulating box member are provided with the inclined surfaces directed inwards as the surfaces extend rearwards, respectively. Therefore, the inclined surface disposed on the front surface panel is attached so as to be superimposed on the inclined surface disposed on the insulating box member, whereby it is possible to eliminate the disadvantage that the line is apparently formed on the abutment portion between these surfaces.

[0019] Such a superimposed portion is formed by superimposing the inclined surfaces of the panel and the box member on each other. Therefore, even when the front surface panel and the insulating box member have a slight dimensional error, such a dimensional error can be alleviated to eliminate the disadvantage that the line is apparently formed on the abutment portion.

[0020] Consequently, it is possible to provide a sense of continuity between the front surface panel and the insulating box member, and the improvement of the appearance can be realized.

[0021] According to the above third invention, as to the low temperature showcase in which the insulating side panels are attached to the left and right sides of the main body having the display chamber, the showcase includes the covers which cover the insulating side panels from the outside; and the back surface plate which covers the rear surface of the main body. The rear edge of the cover is provided with the internally directed flange, and the internally directed flange is attached to the back surface plate. Moreover, the inner surface of the internally directed flange in the abutment portion between the internally directed flange and this back surface plate is the inclined surface retroected toward the tip of this internally directed flange, and the edge of the back surface plate in the abutment portion between the internally directed flange and the back surface plate is inclined and bent forwards. Therefore, when the inclined surface disposed on the internally directed flange of the cover is attached so as to be superimposed on the edge of the back surface plate inclined and bent forwards, it is possible to eliminate the disadvantage that the line is apparently formed in the abutment portion between the flange and the back surface plate.

[0022] Such a superimposed portion is formed by superimposing the inclined surfaces of the back surface plate and the cover on each other. Therefore, even when the back surface plate and the cover have a slight dimensional error, the dimensional error can be alleviated to eliminate the disadvantage that the line is apparently formed on the abutment portion.

[0023] Consequently, it is possible to provide a sense of continuity between the back surface plate and the cover, and the improvement of the appearance can be realized.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] FIG. 1 is a perspective view of a low temperature showcase to which the present invention is applied:

[0025] FIG. 2 is a vertical side view of the low temperature showcase of FIG. 1:

[0026] FIG. 3 is a rear perspective view of the low temperature showcase of FIG. 1:

[0027] FIG. 4 is a lateral plan view of the top part of the low temperature showcase of FIG. 1 (a sectional view cut along the A-A line of FIG. 1):

[0028] FIG. 5 is a lateral plan view of the upper part of the low temperature showcase of FIG. 1 (a sectional view cut along the B-B line of FIG. 3);
[0029] FIG. 6 is a lateral plan view of the lower part of the low temperature showcase of FIG. 1 (a sectional view cut along the C-C line of FIG. 3);
[0030] FIG. 7 is an enlarged view of a circular J part of FIG. 4;
[0031] FIG. 8 is an exploded perspective view of an insulating side panel of the low temperature showcase;
[0032] FIG. 9 is a vertical sectional view of an insulating side panel part from the rear part (a sectional view cut along the D-D line of FIG. 3);
[0033] FIG. 10 is an enlarged rear perspective view of the upper part of the insulating side panel of the low temperature showcase (an enlarged view of a circular E part of FIG. 3);
[0034] FIG. 11 is an enlarged rear perspective view of the lower part of the insulating side panel of the low temperature showcase (an enlarged view of a region F part of FIG. 3);
[0035] FIG. 12 is an enlarged lateral sectional view of the upper part of the insulating side panel of the low temperature showcase (an enlarged view of a circular G part of FIG. 4);
[0036] FIG. 13 is an enlarged lateral sectional view showing the holding state of a transparent wall of the insulating side panel of the low temperature showcase (an enlarged view of a circular H part of FIG. 5);
[0037] FIG. 14 is an enlarged lateral sectional view of the insulating side panel corresponding to a machine chamber part of the low temperature showcase (an enlarged view of a circular I part of FIG. 6);
[0038] FIG. 15 is a front view of the lower part of the low temperature showcase;
[0039] FIG. 16 is an enlarged view of a circular K part of FIG. 15;
[0040] FIG. 17 is a sectional view cut along the L-L line of FIG. 16;
[0041] FIG. 18 is an enlarged view of a part of an insulating side panel of a conventional showcase; and
[0042] FIG. 19 is an enlarged view of a part of a back part of the conventional showcase.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0043] Next, an embodiment of the present invention will be described in detail with reference to the drawings. A low temperature showcase 1 of the present embodiment is an open showcase which is installed in a store such as a convenience store and which displays commodities while cooling the commodities, and an insulating box member 2 is constituted of a main body 2 having an openable front surface and made of an insulating wall having a substantially U-shaped section, insulating side panels 7, 7 vertically provided on the left and right sides of this main body 2, base leg angles 12 and the like. It is to be noted that the detailed constitution of the insulating side panels 7 will be described in detail.

[0044] The main body 2 is constituted of an outer box 5 having an openable front surface and made of a steel plate; an inner box 6 which is incorporated in the outer box 5 with a space being left from the outer box and which has an openable front surface and which is made of a steel plate or a hard synthetic resin; and an insulating material 4 made of foam polyurethane foamed and charged between the outer box 5 and the inner box 6.

[0045] Moreover, a display chamber 3 having an openable front surface is surrounded by both the insulating side panels 7, 7 in the inner box 6. A partition plate 10 is attached to a rear part in the display chamber 3 with a predetermined space being left from a back wall 2B of the main body 2. Moreover, a top partition plate 14 is attached to the top part of the display chamber 3 with a predetermined space being left from a top wall 2C of the main body 2. Furthermore, a deck pan 15 is attached to the bottom part of the display chamber 3 with a predetermined space being left from a bottom wall 2A of the main body 2. A series of ducts 11 are disposed between the partition plate 10 and the back wall 2B, between the top partition plate 14 and the top wall 2C and between the deck pan 15 and the bottom wall 2A.

[0046] A cooler 13 including a known refrigerant circuit of a refrigerating cycle is vertically provided in this duct 11. Moreover, the front end of the upper part of the duct 11 is provided with a cold air discharge port 16 through which cold air is discharged from the outer upper edge of the opening of the front surface of the display chamber 3, and the front end of the lower part of the duct 11 is provided with a cold air suction port 17 which sucks the cold air from the lower edge of the opening of the front surface of the display chamber 3. Moreover, a cold air circulating blower 18 is disposed in the duct 11 disposed under the deck pan 15. It is to be noted that in the drawing, reference numerals 19 are a plurality of shelves disposed for displaying the commodities.

[0047] In consequence, the cold air in the display chamber 3 is sucked into the duct 11 through the cold air suction port 17 by the cold air circulating blower 18, and blown out in a cooler 13 direction, and the cold air cooled by the cooler 13 flows upwards through the duct 11, and is discharged into the display chamber 3 through the cold air discharge port 16.

[0048] On the other hand, the base leg angles 12 having a predetermined height are attached to four corners of the bottom surface of the main body 2, and parts between the front and rear base leg angles 12 are covered with the insulating side panels 7, 7 together with both side surfaces of the main body 2. In consequence, under the main body 2, a machine chamber 21 having a front opening 20 is disposed outside the display chamber 3 disposed in the lower part of the insulating box member 8.

[0049] In this machine chamber 21, as shown in FIGS. 2 and 6, an attachment base 26 including the bottom part of a cooling unit R is received. Moreover, on this attachment base 26, there are arranged a compressor 22, a condenser 23 and the like constituting the refrigerating circuit of the refrigerating cycle together with the cooler 13; a blower 24 for the condenser which blows the air to the condenser and the like; an evaporation unit 25 for an evaporation treatment of drain water discharged from the display chamber 3 and the like. Casters 26A are attached to four corners of the attachment base 26.

[0050] Moreover, the front surface of the machine chamber 21 is openably closed with a front surface panel 28 provided with a plurality of suction ports 27. It is to be noted that the detailed constitution of the front surface panel 28 will be described later. It is to be noted that the sucked air is partitioned from a discharged heat side by use of a seal material (not shown) on the front surface of the condenser 23, and the blower 24 for the condenser is operated to define a high pressure chamber on the inner side of the end of the front surface panel 28.

[0051] Furthermore, a back part support 30 is vertically provided so as to extend from the lower part of the machine chamber 21 to the rear part of the top wall 2C of the main body 2 on the rear substrates of the base leg angles 12, 12 positioned in the left and right corners of the rear part of the
machine chamber 21. This back part support 30 has an internally opened section having a substantially U-shape, and the front wall of the support abuts on and is fixed to the back wall 2B of the main body 2 via screws. Moreover, the side wall of the back part support 30 on a side opposite to an opening side has substantially the same plane as both side ends of the main body 2, and abuts on the insulating side panel 7 which closes the side surfaces of the display chamber 3 and the machine chamber 21.

[0052] Attachment members 31 for attaching a back surface plate 32 are fixed to the rear wall of the back part support 30. The back surface plate 32 is a plate-like member which covers the rear surface of the back wall 2B of the main body 2 with a predetermined space being left from the rear surface, and both side ends 32A, 32A and an upper end 32B tilt and are bent forwards at a predetermined angle.

[0053] Moreover, as shown in FIG. 4 and FIG. 7 as an enlarged view of a circular J part of FIG. 4, each attachment member 31 is formed by bending a plate-like member. One end of the attachment member is a fixing piece 65 which abuts on and is fixed to the rear wall of the back part support 30 via screws, and the other end thereof is a fixing piece 66 which abuts on and is fixed to the front surface of the side part of the back surface plate 32 via screws. Furthermore, a concave dent 67 is disposed between the fixing pieces 65 and 66, and protrudes forwards so as to avoid the forwardly bent end of the back surface plate 32.

[0054] Therefore, the back surface plate 32 is attached to the rear surface of the fixing piece 66 and fixed to the main body 2 via screws while the side ends 32A, 32A are received in the concave dents 67, 67 of the attachment members 31 fixed to the back part supports 30. It is to be noted that at this time, the lower end of the back surface plate 32 is fixed to a base leg angle 12A provided between the left and right rear base leg angles 12 so as to extend over the angles. According to such a constitution, an exhaust duct 33 connecting the rear part of the machine chamber 21 to the upper rear part of the back wall 2B is disposed between the back wall 2B of the main body 2 and the back surface plate 32.

[0055] Moreover, the top surface of the top wall 2C of the main body 2 is provided with a top surface plate 34 which extends from the front end of the top wall 2C to the upper end of the back surface plate 32. The rear part of this top surface plate 34 is provided with a plurality of exhaust holes 34A positioned above the exhaust duct 33. It is to be noted that attachment members (not shown) having a constitution similar to that of attachment members 31 are provided on the upper ends of the back part supports 30, 30, and the rear end of the top surface plate 34 is provided with an internally directed flange 34B extending downwards. In consequence, the detailed constitution of each attachment member is similar to that of an abutment part of the back surface plate 32 on a side panel rear cover 43.

[0056] Next, a detailed constitution of the insulating side panels 7 will be described with reference to FIGS. 8 to 14. FIG. 8 shows an exploded perspective view of the insulating side panel 7 of the low temperature showcase 1; FIG. 9 shows a vertical sectional view of an insulating side panel 7 part from the rear part (a sectional view cut along the D-D line of FIG. 3); FIG. 10 shows an enlarged rear perspective view of the upper part of the insulating side panel 7 of the low temperature showcase 1 (an enlarged view of a circular E part of FIG. 3); FIG. 11 shows an enlarged rear perspective view of the lower part of the insulating side panel 7 of the low temperature showcase 1 (an enlarged view of a region F part of FIG. 3); FIG. 12 shows an enlarged lateral sectional view of the upper part of the insulating side panel 7 of the low temperature showcase 1 (an enlarged view of a circular G part of FIG. 4); FIG. 13 shows an enlarged lateral sectional view showing the holding state of a transparent wall 40 of the insulating side panel 7 of the low temperature showcase 1 (an enlarged view of a circular H part of FIG. 5); and FIG. 14 shows an enlarged lateral sectional view of the insulating side panel 7 corresponding to a machine chamber 21 part of the low temperature showcase 1 (an enlarged view of a circular I part of FIG. 6), respectively.

[0057] Each of the insulating side panels 7, 7 in the present embodiment is constituted of the see-through transparent wall 40; an insulating wall 42 which holds this transparent wall 40; the side panel rear cover 43 which covers this insulating wall 42 from the outside; and a side panel front cover 44 which extends from the insulating wall 42 to the transparent wall 40 to cover the front edges of these walls (from a front part).

[0058] In the insulating wall 42, the edges of an outer surface material 35 and an inner surface material 36 made of steel plates are connected to each other by a trim 38 formed by bending a stainless steel plate, and an insulating material 37 such as foam polyurethane is charged into a space surrounded by the outer surface material 35, the inner surface material 36 and the trim 38 by an in-situ foam system. Moreover, the center of the front surface of this trim 38 in a vertical direction is retreaded in a substantially rectangular shape to form a retreated part 39 (having a substantially U-shaped section). The upper and lower portions of this retreated part 39 are substantially horizontal, and the rear portion thereof vertically lowers, whereby the transparent wall 40 is fitted into the retreated part 39. As shown in FIG. 8, the front end of the transparent wall 40 is provided so as to extend forwardly as much as a predetermined dimension from the front end of the insulating wall 42.

[0059] As shown in FIGS. 5 and 13, the transparent wall 40 has a constitution in which two transparent glass plates 40A, 40A are joined to each other via a spacer 40B, and the upper edge, lower edge and rear edge of the transparent wall have a shape formed along the shape of the retreated part 39 of the trim 38 of the insulating wall 42. Moreover, in the present embodiment, the insulating wall 42, into which the transparent wall 40 is fitted as shown in FIG. 5, is formed into such a thickness dimension that the outer surface (the outer surface material 35) of the insulating wall is positioned outside the outer surface of the transparent wall 40.

[0060] Thus, the insulating walls 42, into which the transparent walls 40 are fitted, are fixed to the left and right end surfaces of the main body 2 and the left and right side surfaces of the base leg angles 12 via screws, respectively.

[0061] The side panel rear cover 43 is a cover member which covers the insulating wall 42 from the outside, and is made of, for example, a vacuum-formed hard synthetic resin. In the present embodiment, the side panel rear cover 43 is disposed so as to extend to the inner side of the insulating side panel 7 from the retreated part 39 of the insulating wall 42, thereby covering at least a joining portion between the trim 38 and the transparent wall 40 outside the insulating wall 42.

[0062] In the present embodiment, the side panel rear cover is formed in consideration of the design properties thereof. As described above, the outer surface of the insulating wall 42 is formed into such a thickness dimension as to be positioned
outside the outer surface of the transparent wall 40, and hence the upper part lower edge, rear part front edge and lower part upper edge of the side panel rear cover 43 corresponding to the retreated part 39 constitute a frame part 43A inclined toward the outer surface of the transparent wall 40 at a predetermined curvature. It is to be noted that a portion of the transparent wall 40 extending along the shape of the frame part 43A and corresponding to the side panel rear cover 43 is provided with, for example, an imprinted white portion 41 so as to prevent the inner surface of the side panel rear cover 43 from being seen therethrough from the side of the display chamber 3.

Moreover, the upper end of the side panel rear cover 43 is provided with an upper flange 43B which covers the upper surface of the insulating wall 42 from the outside, and the end surface of the upper flange 43B is brought close to the side end surface of the top surface plate 34 attached to the main body 2.

As shown in Figs. 4, 6, the front ends of the upper and lower parts of the side panel rear cover 43 which cover the insulating wall 42 are disposed so as to extend forwards as much as a predetermined dimension from the front end of the insulating wall 42, and the front ends of the side panel rear cover are provided with front flanges 43C directed inwards (toward the display chamber 3 and the machine chamber 21). The end of the front flange 43C is positioned outside at least the inner surface material 36 of the insulating wall 42. Moreover, the outer surfaces of the corner portions of the front flanges 43C are abutment portions between the outer surfaces and the rear end of the side panel front cover 44, and the outer surfaces are inclined surfaces 46 which are directed outwards as the surfaces extend rearwards as shown in enlarged sectional views of Figs. 12 and 14. It is to be noted that in the present invention, the abutment portion includes not only portions which abut on and are imposed on each other but also portions which face each other with a slight gap being left therebetween. This applies to any abutment portion in the following description. Moreover, each inclined surface 46 is not limited to the surface inclined at a predetermined angle, but may include a curved surface bent at a predetermined curvature and formed so as to be directed outwards as the surface extends rearwards.

Moreover, plate-like attachment members 49, 50 are fixed to the front ends of the upper and lower parts of the insulating wall 42 via screws 51, respectively. Here, the attachment members 49, 50 have a substantially similar section, and hence the attachment member 50 will be described with reference to Fig. 12. The attachment member 50 has a fixing surface 50A which abuts on the front end of the insulating wall 42. The outer end of the fixing surface 50A is an attachment piece 50B bent forwards and then bent along the rear surface of the front flange 43C of the side panel rear cover 43. This attachment piece 50B is provided with a screw hole (not shown), and the screw hole is aligned with a screw hole (not shown) formed in the front flange 43C of the side panel rear cover 43, whereby the attachment piece can be fixed via a screw 52.

Furthermore, the inner end of the fixing surface 50A of the attachment member 50 is an attachment piece 50C bent forwards and then extended forwards from the front flange 43C. This attachment piece 50C is also provided with a screw hole (not shown), and the screw hole is aligned with a screw hole 53 formed in the side panel front cover 44 described later, whereby the side panel front cover 44 can be fixed to the attachment member 50 via a screw 54.

On the other hand, the rear end of the side panel rear cover 43 is provided with an internally directed flange 47 which vertically extends. This internally directed flange 47 is disposed so as to protrude further from the inner surface material 36 of the insulating side panel 7 to a back surface plate 32 side, and the end surface of the flange is an abutment portion between the end surface and the side end surface of the back surface plate 32. As shown in Fig. 7, the inner surface of the internally directed flange 47 at the end surface as the abutment portion is an inclined surface 48 retreated toward the tip of this internally directed flange 47.

On the other hand, the side panel front cover 44 is a cover member which extends from the upper end of the front edge of the upper part of the insulating wall 42 to the front edge of the transparent wall 40 and the lower end of the front edge of the lower part of the insulating wall 42 to cover them from the front part, and the cover is made of a hard synthetic resin formed by injection using, for example, a divided type mold. In the present embodiment, the side panel front cover 44 extends in a longitudinal direction (vertical direction), and has a substantially U-shaped section having a rear opening.

A side wall 57 positioned on an outer surface side opposite to the display chamber 3 or machine chamber 21 side is disposed and positioned outside the outer surface of the transparent wall 40, and the rear end surface of the side wall disposed in positions corresponding to the upper and lower parts of the side panel rear cover 43 side abutment portions on the inclined surfaces 46 of the side panel rear cover 43. As shown in Figs. 12 and 14, each abutment portion is an inclined surface 58 directed outwards as the surface extends rearwards.

A side wall 56 on the display chamber 3 or machine chamber 21 side is disposed so as to extend to the front end of the transparent wall 40, thereby abutting on the inner surface of the front end of the transparent wall 40, and the inner side of the side wall 57 disposed so as to face the side wall 56 is provided with a plurality of ribs 59 which reach the outer surface of the transparent wall 40.

In the present embodiment, the ribs 59 are arranged vertically and are formed corresponding to the front end of the transparent wall 40 at a predetermined interval, that is, a gap which can disturb the entrance of at least a finger, for example, 10 mm between the ribs.

Moreover, a plurality of front ribs 61 protruding toward the front end of the transparent wall 40 are disposed on the back surface of a front wall 60 (the inner surface of the side panel front cover 44) disposed so as to extend between the front ends of the side walls 56 and 57 of the side panel front cover 44. Furthermore, the upper end of the side panel front cover 44 is provided with a top part flange 44A having substantially the same plane as the top surface plate 34 or the upper flange 43B of the side panel rear cover 43.

It is to be noted that as described above, the side panel front cover 44 can easily be constituted of the front wall 60, both the side walls 56, 57, the respective ribs 59 and the respective front ribs 61, by the injection using the divided type mold.

Next, an attachment structure of the front surface panel 28 and a shape of the side panel front cover 44 corresponding to the front part of the machine chamber 21 will be described with reference to Figs. 15 to 17. Fig. 15 shows a
front view of the lower part of the low temperature showcase 1. FIG. 16 shows an enlarged view of a circular K part of FIG. 15, and FIG. 17 shows a sectional view cut along the L-L line of FIG. 16, respectively.

**0075** The front surface panel 28 is provided with an inclined surface 75 directed inwards as the surface extends rearwards so as to engage an upper end 28A of the panel with the front end of the upper part of the front wall of the bottom wall 2A of the main body 2. Moreover, the lower end of the front surface panel 28 is provided with a lower flange 28B directed rearwards. In consequence, the inclined surface 75 of the upper end 28A is engaged with the front end of the upper part of the front wall of the bottom wall 2A of the main body 2, and the lower flange 28B is held by holding portions 72 attached to the front ends of the base leg angles 12 positioned in the front end of the machine chamber 21, whereby the opening of the front surface of the machine chamber 21 and the front surface of the bottom wall 2A of the main body 2 are unaverably covered.

**0076** Moreover, magnets 70, 70 are attached to the front surfaces of the base leg angles 12, 12 positioned in the front end of the machine chamber 21, and the front surface panel 28 is detachably held by holding members 71, 71 attached to the rear surfaces of the side parts of the front surface panel 28 and directed toward the front surfaces of the base leg angles 12, and by the absorption forces of the members.

**0077** Here, to engage the upper end of the front surface panel 28 with the upper end of the front part of the bottom wall 2A, the upper and lower ends of the panel are bent so as to tilt rearwards at a predetermined angle so that the upper part of the panel is disposed slightly ahead of the center of the panel.

**0078** Moreover, both side ends of the front surface panel 28 are attached so as to abut on the side walls 56 of the side panel front covers 44 of the insulating side panels 7, respectively. Here, both side ends 28C, 28C in portions other than portions around a bent portion 28D are bent rearwards so as to form an inclined surface 73 directed inwards as the surface extends rearwards.

**0079** Accordingly, as shown in FIG. 17, a part of the side wall 56 of the side panel front cover 44 corresponding to the inclined surface 73 is provided with an inclined surface 74 directed inwards as the surface extends rearwards, in a position as an abutment portion between the surfaces, and the side wall 56 positioned behind the inclined surface 74 is disposed so as to extend rearwards from the rear end of the inclined surface 74. To correspond to such a constitution, the attachment piece 50C of the attachment member 50 for fixing the side panel front cover 44 to the insulating wall 42 is bent so as to extend along the inner surface of the rear part of the side wall 56 provided with the inclined surface 74. The attachment piece 50C is fixed to the side wall 56 of the side panel front cover 44 via a screw as described above.

**0080** Moreover, as shown in FIGS. 8 and 14, a plurality of communication holes 80 are formed in the side wall of the base leg angle 12 which is positioned in the front corner of the machine chamber 21 so as to abut on the attachment member 50. In the attachment member 50 which abuts on the base leg angle 12, a plurality of communication holes 81 are formed in positions corresponding to the communication holes 80. In consequence, the inside of the machine chamber 21 is connected to the inside of the side panel rear cover 43, that is, a space surrounded by the front wall 60 and both the side walls 56, 57 through waste heat passages 82.

**0081** To circulate air in the machine chamber 21 flowing upwards through the waste heat passages 82 through spaces between the ribs 59 of the side panel front cover 44 and on the side of the outer surfaces of the transparent walls 40, as shown in FIG. 13, a plurality of communication holes 83 are formed in the front ribs 61 which abut on the front ends of the transparent walls 40.

**0082** To assemble the low temperature showcase 1 having such a constitution, first the transparent walls 40 are fitted into the retracted parts 39 of the insulating walls 42, and the insulating walls 42 are fixed to the left and right end surfaces of the main body 2 and the left and right side surfaces of the base leg angles 12 via the screws.

**0083** Afterward, the side panel rear covers 43 are attached to the outer surfaces of the insulating walls 42, and the front ends of the covers are superimposed on the attachment pieces 50B of the attachment members 49, 50 where the front flanges 43C are attached to the front ends of the insulating walls 42 via the screws as described above (see FIG. 11), whereby the front ends of the covers are fixed via the screws 52.

**0084** Moreover, as to the rear ends of the side panel rear covers 43, the internally directed flanges 47 are attached along the rear surfaces of the insulating walls 42, and the end surfaces of the flanges are disposed so as to abut on the side ends 32A of the back surface plate 32 as shown in FIG. 4 and FIG. 5. At this time, the front surfaces of the internally directed flanges 47 are attached to the rear surfaces of the fixing pieces 65 of the attachment members 31 provided so as to abut on the rear surfaces of the back part supports 30, and are fixed thereto via screws. Furthermore, the inclined surfaces 48 at the tips of the internally directed flanges 47 are attached so as to abut on the outer surfaces of the bent portions of the side edges 32A of the back surface plate 32 bent so as to tilt forwards.

**0085** In consequence, the abutment portions between the back surface plate 32 and the internally directed flanges 47 of the side panel rear covers 43 can eliminate a disadvantage that lines are apparently formed in these abutment portions, when the inclined surfaces 48 of the internally directed flanges 47 of the side panel rear covers 43 are attached so as to be imposed on the side edges 32A of the back surface plate 32 bent so as to tilt forwards.

**0086** In particular, such superimposed portions are disposed when the inclined surfaces 48 are superimposed on the side edges 32A. Therefore, even when a slight dimensional error is present in the back surface plate 32 or the side panel rear covers, the dimensional error can be alleviated to eliminate the disadvantage that the lines are apparently formed in the abutment portions.

**0087** Therefore, a sense of continuity can be provided in the back surface plate 32 and the side panel rear covers 43, and the improvement of the appearance can be realized.

**0088** Moreover, the upper end 32B of the back surface plate 32 and the top surface plate 34 have a similar constitution, and hence it is possible to eliminate a disadvantage that a line is apparently formed in the abutment portion between the back surface plate 32 and the top surface plate 34, whereby a sense of continuity can be provided in the plates. In consequence, the improvement of the appearance can be improved.

**0089** Next, the side panel front covers 44 are attached to the insulating walls 42 to which the side panel rear covers 43 are attached as described above. Each side panel front cover 44 is attached along the front end of the upper part of the
insulating wall 42, the front end of the transparent wall 40 and the front end of the lower part of the insulating wall 42 while interposing the front end of the transparent wall 40 between the side walls 56 and 57 until the front end abuts on the front ribs 61 formed on the inner surface of the front wall 60. It is to be noted that at this time, the front ends of the front ribs 61 may be bonded to the front ends of the transparent walls 40 by a silicon adhesive or an adhesive tape.

[0090] Then, as shown in FIG. 12, the inner side surface of the side wall 56 of the side panel front cover 44 is attached on the side of the inner surface of the attachment piece 50C of the attachment member 49 attached to the front end of the upper part of the insulating wall 42, and the side wall is fixed from the side of the display chamber 3, or via the screw 54 from the side of the machine chamber 21 as shown in FIG. 17.

[0091] In consequence, the rear ends of the side walls 57 on the outer parts of the side panel front covers 44 are attached to the front parts of the side panel rear covers 43. At this time, the rear end surfaces of the side walls 57 of the side panel front covers 44 are the inclined surfaces 58 directed outwards as the surfaces extend rearwards. Moreover, the outer surfaces of the corners of the front flanges 43C of the side panel rear covers 43 are similarly the inclined surfaces 46 directed outwards as the surfaces extend rearwards. Therefore, as shown in FIG. 12, these components are attached so as to be superimposed on each other, whereby it is possible to eliminate the disadvantage that the lines are apparently formed in the abutment portions.

[0092] Such superimposed portions are formed when the inclined surfaces 46, 58 are superimposed on each other. Therefore, even when slight dimensional errors are present in the side panel front covers 44 and the side panel rear covers 43, the dimensional errors can be alleviated to eliminate the disadvantage that the lines are apparently formed in the abutment portions.

[0093] Therefore, the sense of continuity can be provided in the side panel front covers 44 and the side panel rear covers 43, and the improvement of the appearance can be realized.

[0094] Moreover, the outer surfaces of the insulating walls 42 are positioned outside the outer surfaces of the transparent walls 40, but the side panel front covers 44 are attached so as to cover the front ends of the transparent walls 40, whereby the inner sides of the transparent walls 40 are held by the side walls 56 of the side panel front covers 44, and the outer sides of the transparent walls 40 are held by the plurality of ribs 59 formed on the side walls 57 of the side panel front covers 44.

[0095] At this time, each of the plurality of ribs 59 formed on the inner surfaces of the side walls 57 over the outer surfaces of the transparent walls 40 can perform a function of a spacer between the outer surface of the transparent wall 40 and the side wall 57 of the side panel front cover 44, and the transparent walls 40 can stably be held.

[0096] Moreover, the plurality of ribs 59 formed on the side panel front covers 44 can suppress the twists of the side panel front covers 44 themselves, and strength can be improved. Furthermore, by the presence of the plurality of ribs 59, when the side panel front covers 44 are seen obliquely from the rear part as shown in FIGS. 10, 11, the ribs can be blinders of the inner parts of the side panel front covers 44. In consequence, the appearance can be improved.

[0097] Furthermore, since the plurality of ribs 59 are arranged with the gap which can disturb the entrance of at least the finger being left between the ribs as described above, it is possible to avoid a disadvantage that the fingers are caught between the ribs 59 and 59 by mistake or unnecessarily, and safety can be secured.

[0098] Next, the front surface panel 28 is attached to the front surface openings of the main body 2, the insulating side panels 7 and the machine chamber 21 constituted of the base leg angles 12 and the like and provided outside the display chamber 3 in the lower part of the insulating box member. In this case, the end surface of the inclined surface 75 of the upper end 28A of the front surface panel 28 is engaged with the upper end of the front part of the bottom wall 2A of the main body 2, and the lower flange 28B of the lower end of the front surface panel 28 is held by the holding portions 72 provided on the base leg angles 12. At this time, the holding members 71, 71 attached to the rear surfaces of the side parts of the front surface panel 28 so as to face the front surfaces of the base leg angles 12 are adsorbed by the magnets 70 attached to the front surfaces of the base leg angles 12 and the magnetic forces of the magnets, and the front surface panel 28 can stably be held by the insulating box member.

[0099] In this case, the side walls 56 of the side panel front covers 44 in the abutment portions on the side ends 28C of the front surface panel 28 are provided with the inclined surfaces 74 directed inwards as the surfaces extend rearwards as shown in FIG. 17, and the side walls are provided with the inclined surfaces 73 directed inwards as the surfaces extend rearwards in the abutment portions between both the side ends 28C of the front surface panel 28 and the side walls 56 of the side panel front covers 44. In consequence, the front surface panel is attached so as to superimpose the surfaces on each other.

[0100] Therefore, it is possible to eliminate the disadvantage that the lines are apparently formed in these abutment portions. Such superimposed portions are formed when the inclined surfaces 74, 73 are superimposed on each other. Therefore, even when slight dimensional errors are present in the front surface panel 28 and the side panel front covers 44, the dimensional errors can be alleviated to eliminate the disadvantage that the lines are apparently formed in the abutment portions.

[0101] Therefore, the sense of continuity can be provided in the front surface panel 28 and the side panel front covers 44, and the improvement of the appearance can be realized.

[0102] In the above-mentioned constitution, when the blower 24 for the condenser disposed in the machine chamber 21 is operated, the air is sucked into the machine chamber 21 through the suction ports 27 of the front surface panel 28. The inside of the machine chamber 21 has a high pressure as described above, and hence a part of the air heated by the waste heat of the condenser 23 reaches the waste heat passages 82 formed in the side panel front covers 44 through the communication holes 80 formed in the base leg angles 12 and the communication holes 81 of the attachment member 50 aligned with the communication holes formed in the angles. It is to be noted that the remaining air flows upwards through the exhaust duct 33 disposed between the rear part of the machine chamber 21 and the back wall 2B of the main body 2, and is discharged externally through the exhaust holes 34A of the top surface plate 34.

[0103] As shown by a solid-line arrow in FIG. 14, the warm air flowing from the machine chamber 21 through the waste heat passages 82 in the side panel front covers 44 flows upward through the side panel front covers 44 and is discharged externally from the spaces of the outer surfaces of the
transparent walls 40 through gaps between the side walls 57 of the side panel front covers 44 and the outer surfaces of the transparent walls 40, that is, gaps among the plurality of ribs 59 each formed between the side wall of the side panel front cover and the outer surface of the transparent wall. It is to be noted that a part of the warm air flowing upwards through the spaces between the front ribs 61 and the transparent walls 40 is discharged from the gaps among the plurality of ribs 59 to the spaces of the outer surfaces of the transparent walls 40 through the communication holes 83 formed in the front ribs 61.

[0104] In consequence, the waste heat in the machine chamber 21 can efficiently be supplied to the outer surfaces of the transparent walls 40 through the waste heat passages 82 formed in the side panel front covers 44. Therefore, the outer surfaces of the transparent walls 40 can be heated, and it is possible to effectively suppress a disadvantage that dew condensation occurs on the outer surfaces of the transparent walls 40. Therefore, it is possible to remarkably suppress a disadvantage that the visibility of each transparent wall 40 lowers and a disadvantage that customers' clothes are made dirty by the dew condensation.

[0105] Moreover, it is possible to remarkably suppress dew condensation water generated in the outer surfaces of the transparent walls 40, and it is therefore possible to avoid a disadvantage that an installation floor surface or the like is wetted by the dew condensation water flowing downwards along the outer surfaces of the transparent walls 40.

[0106] In the present embodiment, the outer surfaces of the insulating walls 42 are positioned outside the outer surfaces of the transparent walls 40, and the waste heat passages 82 are disposed in the side panel front covers 44 which cover the front edges of the insulating walls 42 and the transparent walls 40. Therefore, the waste heat from the machine chamber 21 can effectively be supplied to the outer surfaces of the transparent walls by use of gaps formed between the side walls 57 of the side panel front covers 44 positioned outside the outer surfaces of the transparent walls 40 and the outer surfaces of the transparent walls 40.

[0107] In particular, the side panel front covers 44 provided with the waste heat passages 82 are provided vertically over the transparent walls 40, and hence the waste heat from the machine chamber 21 provided in the lower part of the main body 2 outside the display chamber 3 can vertically be supplied to the transparent walls 40, whereby the occurrence of the dew condensation on the outer surfaces of the transparent walls 40 can remarkably be suppressed.

[0108] Moreover, since the waste heat from the machine chamber 21 is supplied to the outer surfaces of the transparent walls 40 from the gaps between the outer surfaces of the transparent walls 40 and the side walls 57 of the side panel front covers 44, the waste heat can more effectively be directed and supplied to the outer surfaces of the transparent walls 40. In consequence, the heating efficiency of the whole outer surfaces of the transparent walls 40, especially the front parts of the walls can be increased, and the occurrence of the dew condensation can remarkably be suppressed.

[0109] In particular, in the inner parts from the ends of the front surface panel 28, the high pressure chamber is defined as described above. However, in the present embodiment, as shown in FIG. 17, the ends of the front surface panel 28 are attached to the side panel front covers 44 by the abutment between the inclined surfaces 74, 73, respectively (the surfaces are superimposed on each other in this case). Therefore, the air in the high pressure chamber does not easily leak from these abutment portions. Furthermore, the inclined surfaces 46, 58 of the side panel front covers 44 including the waste heat passages 82 and the side panel rear covers 43 attached to the side panel front covers are superimposed on each other, whereby waste heat leakage paths in these superimposed portions are long and have a large resistance, and the leakage of the waste heat from such a superimposed portion can be prevented. In consequence, the waste heat from the machine chamber 21 can more effectively be discharged to the spaces of the outer surfaces of the transparent walls 40 through the waste heat passages 82, and an effect of preventing the dew condensation can be improved.

What is claimed is:

1. A low temperature showcase in which insulating side panels are attached to the left and right sides of a main body having a display chamber, wherein each of the insulating side panels includes a see-through transparent wall; an insulating wall which holds upper and lower portions and a rear edge of the transparent wall; a side panel rear cover which covers the insulating wall from the outside; and a side panel front cover which covers the front edges of the insulating wall and the transparent wall and which is attached to the front part of the side panel rear cover, and abutment portions of the side panel front cover and the side panel rear cover are provided with inclined surfaces directed outwards as the surfaces extend rearwards, respectively.

2. A low temperature showcase including an insulating box member having a display chamber, the showcase further including:

a machine chamber disposed outside the display chamber of a lower part of the insulating box member; and
a front surface panel which openly closes the front surface of the machine chamber, and
abutment portions of the front surface panel and the insulating box member are provided with inclined surfaces directed inwards as the surfaces extend rearwards, respectively.

3. A low temperature showcase in which insulating side panels are attached to the left and right sides of a main body having a display chamber, the showcase including:

covers which cover the insulating side panels from the outside; and
a back surface plate which covers the rear surface of the main body.

wherein a rear edge of each cover is provided with an internally directed flange, the internally directed flange is attached to the back surface plate, the inner surface of the internally directed flange in an abutment portion between the internally directed flange and the back surface plate is an inclined surface retreated toward the tip of the internally directed flange, and the edge of the back surface plate in the abutment portion between the internally directed flange and the back surface plate is inclined and bent forwards.

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