

SPECIFICATION

TITLE OF THE INVENTION

Low Temperature Showcase

BACKGROUND OF THE INVENTION

The present invention relates to a low temperature showcase in which articles such as ice-cream or frozen foods are displayed and preserved in, for example, a storage chamber and, more particularly, to a low temperature showcase whose upper surface opening is openably closed by transparent doors.

Hitherto, in a shop such as convenience store or supermarket, low temperature showcases in which frozen articles such as ice-cream and frozen foods are displayed and preserved are placed. As shown in Figs. 31 to 36, as for such a low temperature showcase 100, a main body is constructed by a heat insulating housing 102 having an opening 103 on the upper surface thereof and a storage chamber 105 is constructed in the heat insulating housing 102.

On the upper surface opening 103 of the heat insulating housing 102, a rail 107 is provided so as to face front and rear heat insulating walls 104, 104. The rail 107 is constituted of an upper rail 107A and a lower rail 107B in two upper and lower steps. The upper rail 107A is formed so that the widths in the longitudinal and lateral directions are widened and the lower rail 107B is formed so that the widths in the longitudinal and lateral directions are

narrower than those of the upper rail.

On the upper rail 107A and lower rail 107B, sliding type doors 106, 106 are set movably in the lateral direction, respectively (Fig. 32). The door 106 is formed by fitting a transparent glass board 106B into a frame 106A. Reference numeral 106C denotes a knob for opening or closing the door 106.

The opening 103 of the storage chamber 105 is openably closed by the doors 106, 106 and the inside of the storage chamber 105 is maintained at a predetermined freezing temperature. The opening 103 is opened by moving the knob 106C provided on either one of the doors 106 and the article in the storage chamber 105 is taken out. That is, the opening 103 of the heat insulating housing 102 is closed by the openably sliding type doors 106, 106 and the sliding type doors 106, 106 are made transparent, thereby improving sales promotion of the articles received in the storage chamber 105.

As mentioned above, the doors 106 of the low temperature showcase 100 is made transparent, whereby the article in the storage chamber 105 can be selected without opening the doors 106. However, since the glass board 106B has low heat insulating properties, there is a case where dew condensation occurs on the doors 106 depending on installing conditions of the low temperature showcase 100 (such a situation is shown by wavy lines in Fig. 1). When the dew condensation occurs, the internal transparency is noticeably impaired, though the doors are intentionally made of the glass.

It is also considered that a double glazing board or a heat ray reflecting film is used. Even in this case, the direct rays of the sun enter the storage chamber 105 depending on the installing location of the low temperature showcase 100. Consequently, there is a problem that deterioration in quality of the article in the storage chamber 105 occurs and besides costs suddenly rise.

In order to avoid the above, a proposition that heat insulating panels 114 are arranged to the upper and lower rails 107A, 107B in place of the doors 106 as shown in Figs. 33 to 36 is also considered. However, in this case, it cannot function as a showcase.

SUMMARY OF THE INVENTION

The present invention is made to solve the above conventional technical problems and it is an object of the invention to prevent dew condensation on doors by a simple construction in a low temperature showcase having transparent doors.

That is, according to the invention, there is provided a low temperature showcase constructed in such a manner that a storage chamber is constructed in a heat insulating housing whose upper surface is opened and the upper surface opening is openably closed by transparent doors, wherein the showcase has a folding door which is detachably arranged under the doors in the heat insulating housing and is made by a heat ray reflecting transparent panel or an opaque heat insulating panel and the folding door can be

pulled up out of the upper surface opening in a state in which the door is opened by upwardly folding and bending.

According to the invention, there is provided a low temperature showcase constructed in such a manner that a storage chamber is formed in a heat insulating housing whose upper surface is opened and the upper surface opening is openably closed by transparent doors, wherein the showcase has openable sliding doors which are detachably arranged under the doors in the heat insulating housing and are made by heat ray reflecting transparent panels or opaque heat insulating panels.

According to the invention, there is provided a low temperature showcase constructed in such a manner that a storage chamber is formed in a heat insulating housing whose upper surface is opened and the upper surface opening is openably closed by transparent sliding type doors, wherein the showcase has automatic winding roll sheet which is provided under the doors and which is made of heat ray reflecting transparent sheet or opaque heat insulating sheet and one end of the roll sheet is fixed to one end of one door member constructing the doors and the other end is fixed to the other end of the other door member.

According to the invention, there is provided a low temperature showcase constructed in such a manner that a storage chamber is constructed in a heat insulating housing whose upper surface is opened and the upper surface opening is openably closed by transparent doors, wherein opaque heat insulating panels are attached to dew condensation generating

portions of the doors.

Further, according to the invention, there is provided a low temperature showcase constructed in such a manner that a storage chamber is constructed in a heat insulating housing whose upper surface is opened and the upper surface opening is openably closed by transparent doors, wherein the showcase has transparent boards provided in dew condensation generating portions of the doors, the transparent boards are detachably attached to the lower sides of the doors, a predetermined space being interposed between each transparent board and the lower side of each door, and sealing materials are fixed around the transparent boards by suction caps so as to reach the doors.

Further, according to the invention, there is provided a low temperature showcase constructed in such a manner that a storage chamber is constructed by heat insulating housing whose upper surface is opened and the upper surface opening is openably closed by transparent doors, wherein the showcase has transparent boards arranged all over under the doors and the transparent boards are detachably attached to the doors by suction caps, a predetermined space being interposed between each transparent board and the lower side of each door, and the peripheral portions are come into contact with the doors.

According to the invention, there is provided a low temperature showcase constructed in such a manner that a storage chamber is constructed in a heat insulating housing whose upper surface is opened and the upper surface opening

is openably closed by transparent doors, wherein heat ray reflecting films are adhered onto the rear surfaces of the doors and bands of black or a color that is approximate to black are formed on the surfaces of the doors at regular intervals.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a low temperature showcase of the invention;

Fig. 2 is a front view of the low temperature showcase of the invention;

Fig. 3 is a cross sectional view taken along the line A-A in Fig. 2;

Fig. 4 is a perspective view of a folding door provided on the lower sides of sliding type doors;

Fig. 5 is a vertical sectional front view of a top portion of the low temperature showcase in which a folding door is provided under the sliding doors;

Fig. 6 is a vertical sectional front view of the upper portion of the low temperature showcase showing a state in which the sliding type door and folding door in Fig. 5 are opened;

Fig. 7 is a vertical sectional side view of an upper portion of a low temperature showcase having sliding doors under sliding type doors;

Fig. 8 is a perspective view of the sliding type doors and sliding doors of the low temperature showcase in Fig. 7;

Fig. 9 is a vertical sectional front view of the upper portion of the low temperature showcase in Fig. 7;

Fig. 10 is a vertical sectional front view of the upper portion of the low temperature showcase showing a state in which the door and sliding door of the low temperature showcase in Fig. 7 are opened;

Fig. 11 is a vertical sectional side view of an upper portion of a low temperature showcase having roll sheet under sliding type doors;

Fig. 12 is a perspective view of the sliding type doors and roll sheet of the low temperature showcase in Fig. 11;

Fig. 13 is a vertical sectional front view of the upper portion of the low temperature showcase in Fig. 11;

Fig. 14 is a vertical sectional front view of the upper portion showing a state in which the door of the low temperature showcase in Fig. 11 is opened;

Fig. 15 is a vertical sectional side view of an upper portion of a low temperature showcase in which heat insulating panels are adhered onto the lower surfaces of sliding type doors;

Fig. 16 is a perspective view of the doors of the low temperature showcase in Fig. 15;

Fig. 17 is a vertical sectional front view of the upper portion of the low temperature showcase in Fig. 15;

Fig. 18 is a vertical sectional front view of the upper portion showing a state in which the door of the low temperature showcase in Fig. 15 is opened;

Fig. 19 is a vertical sectional side view of the upper portion of the low temperature showcase in which transparent boards are adhered onto the lower surfaces of the sliding type doors;

Fig. 20 is a perspective view of the doors of the low temperature showcase in Fig. 19;

Fig. 21 is a vertical sectional front view of the upper portion of the low temperature showcase in Fig. 19;

Fig. 22 is a vertical sectional front view showing a state in which the door of the low temperature showcase in Fig. 19 is opened;

Fig. 23 is a vertical sectional side view of the upper portion of a low temperature showcase in which a heat insulating space is provided on the whole lower surface of the sliding type door by the transparent board;

Fig. 24 is a perspective view of the doors of the low temperature showcase in Fig. 23;

Fig. 25 is a vertical sectional front view of the upper portion of the low temperature showcase in Fig. 23;

Fig. 26 is a vertical sectional front view of the upper portion of the low temperature showcase in Fig. 23 in a state in which the door is opened;

Fig. 27 is a vertical sectional side view of an upper portion of a low temperature showcase in which a heat ray reflecting film is arranged on the lower surface of the sliding type door and bands are provided on the upper surface;

Fig. 28 is a perspective view of the doors of the

low temperature showcase in Fig. 27;

Fig. 29 is a vertical sectional front view of the low temperature showcase in Fig. 27;

Fig. 30 is a vertical sectional front view of the upper portion of the low temperature showcase in Fig. 27 in a state in which the door is opened;

Fig. 31 is a side view of a low temperature showcase having conventional sliding type doors;

Fig. 32 is a vertical sectional view taken along the line B-B in Fig. 31;

Fig. 33 is a vertical sectional side view of an upper portion of a conventional low temperature showcase using heat insulating panels;

Fig. 34 is a perspective view of the heat insulating panels in Fig. 33;

Fig. 35 is a vertical sectional front view of the upper portion of the low temperature showcase in Fig. 33; and

Fig. 36 is a vertical sectional front view of the upper portion of the low temperature showcase in a state in which the heat insulating panel in Fig. 33 is opened.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Embodiments of the invention will now be described in detail with reference to the drawings. In Figs. 1 to 6, a low temperature showcase 1 is used to display and preserve frozen articles such as ice-cream and frozen foods and is constructed in such a manner that a main body is constructed by a heat insulating housing 2 having an opening 3 on the

upper surface thereof and the inside of the heat insulating housing 2 is used as a storage chamber 5. On the upper surface opening 3 of the heat insulating housing 2, an upper side rail 7 comprising an upper rail 7A and a lower rail 7B formed on two upper and lower steps in conventional peripheral walls is formed.

The upper rail 7A is formed so that the widths in the longitudinal and lateral directions are wider than those of the lower rail 7B. On the rails 7A, 7B, a pair of sliding type doors 6, 6 are mounted movably in the lateral direction, respectively. Each of the doors 6, 6 is constructed by a frame 6A and a glass board 6B which is fitted into the frame 6A and which can be seen through, for example, which is transparent. On the one side of each frame 6A, a knob 6C is provided. The door 6 is constructed openably in the lateral direction by operating the knob 6C. The opening 3 of the storage chamber 5 is closed by the doors 6, 6, so that the inside of the storage chamber 5 is maintained at a predetermined freezing temperature.

A step portion 9 is formed under the rails 7A, 7B so as to leave a little space in the heat insulating housing 2. The step portion 9 is formed inside the lower rail 7B. A folding door 11 in which knobs 11A are formed on both ends is detachably arranged to the step portion 9. The folding door 11 is made of a heat ray reflecting transparent panel or an opaque heat insulating panel. Two folding portions 11B are formed near the center in the folding door 11 so as to leave a little space between them. The folding portions 11B are

folded and bent by pulling up either one of the right and left knobs 11A (Fig. 4).

That is, the folding door 11 is provided under both the doors 6, 6, detachably arranged in the heat insulating housing 2, and constructed in such a manner that after either one of the doors 6 is opened, the knob 11A of the folding door 11 provided on the lower side of the door is taken and pulled up out of the chamber, so that the folding portions 11B can be opened upward by folding and bending (Fig. 6).

As mentioned above, since the folding door 11 is provided on the inside of both the doors 6, 6, even under conditions that outside temperature and humidity are bad, for example, in the event that the low temperature showcase 1 is placed outside, the folding door 11 blocks heat rays which enter the storage chamber 5 from the outside through the sliding type doors 6, 6, thereby enabling to heat-insulate the storage chamber 5 from the side of the sliding type doors 6, 6.

Consequently, the dew condensation on the glass board 6B as shown by wavy lines in Fig. 1 can be avoided or be remarkably reduced and a cooling ability of the storage chamber 5 is improved.

Since the folding door 11 is detachably arranged on the inside of the sliding type doors 6, 6, the folding door 11 can be detached under conditions that the temperature or humidity in the storage chamber 5 are stabilized, for example, inside. Particularly, even in the state in which the folding door 11 is attached, the folding door 11 can be pulled up out

of the upper surface opening 3 in a state in which either one of the sliding type doors 6 is opened by upwardly folding and bending it, so that the articles can be easily gotten in or out of.

Figs. 7, 8, 9, and 10 show another embodiment of the low temperature showcase 1 of the invention. In this case, in the heat insulating housing 2, the sliding type doors 6, 6 similar to the above are mounted on the upper rail 7, thereby closing the upper surface opening 3 of the heat insulating housing 2. On the lower sides of the sliding type doors 6, 6, the lower rail 8 is provided so as to leave a little space. The lower rail 8 is located inside the lower rail 7B.

As for the lower side rail 8 as well, in a manner similar to the upper side rail 7, the upper rail 8A and lower rail 8B provided on the two upper and lower stages on the peripheral walls of the heat insulating housing 2 are formed. The upper rail 8A provided on the upper side are formed so that the widths in the longitudinal and lateral directions are widened and the lower rail 8B provided on the lower side are formed so that the widths in the longitudinal and lateral directions are narrower than those of the upper rail 8A. On the upper rail 8A and lower rail 8B of the lower side rail 8, sliding doors 12, 12 are openably mounted. The sliding doors 12, 12 are made of heat ray reflecting transparent panels or opaque heat insulating panels. Reference numerals 12A, 12A denote knobs for opening or closing the sliding doors 12, 12.

As mentioned above, since the sliding doors 12, 12 are provided on the lower sides of the sliding type doors 6,

6 on the upper side of the heat insulating housing 2 and the sliding doors 12, 12 are made of the heat ray reflecting transparent panels or opaque heat insulating panels, heat rays which enter the storage chamber 5 from the outside can be blocked and the storage chamber 5 side can be heat-insulated from the sides of the doors 6, 6 provided above the sliding doors 12, 12.

When the temperature and humidity in the storage chamber 5 are stabilized in a manner similar to the above and the sliding doors 12, 12 are not needed, they can be detached. Since either one of the sliding doors 12 can be easily opened in a state in which either one of the doors 6 is opened, the articles can be also easily gotten in or out of.

Figs. 11, 12, 13, and 14 show still another embodiment of the low temperature showcase 1 of the invention. In this case, the sliding type doors 6, 6 similar to the above are mounted on the upper side rail 7 on the peripheral walls of the heat insulating housing 2, thereby closing the upper surface opening 3 of the heat insulating housing 2. In the heat insulating housing 2 under the sliding type doors 6, 6, a pair of step portions 10, 10 are provided in front and in rear so as to leave a space. The step portions 10, 10 are located inside the lower rail 7B of the upper side rail 7.

In this case, roll sheet 13 is attached on the lower sides of the doors 6, 6. The one end of the roll sheet 13 is fixed to the right side of the frame 6A of the right door 6 and the other end is fixed to the left side of the frame 6A of the left door 6. The roll sheet 13 is made of the heat

ray reflecting transparent sheet or opaque heat insulating sheet. The roll sheet 13 is also constructed so that it can be automatically wound substantially around the center.

Further, the roll sheet 13 is arranged on the lower sides of the sliding type doors 6, 6 mounted on the opening 3 of the heat insulating housing 2 so as to leave a little space. In a state in which the opening 3 of the storage chamber 5 is closed by both the sliding type doors 6, 6, substantially the whole areas on the lower sides of the doors 6, 6 are covered by the roll sheet 13. When the right sliding type door 6 or left sliding type door 6 is opened, the roll sheet 13 is wound substantially around the center, thereby preventing that the roll sheet 13 is lowly sagged and disturbs the getting the articles in and out of (Fig. 14).

As mentioned above, since the roll sheet 13 which can be wound is attached on the lower sides of the upper sliding type doors 6, 6 of the heat insulating housing 2 and the roll sheet 13 is made of the heat ray reflecting transparent sheet or opaque heat insulating sheet, the opening 3 of the storage chamber 5 which is located on the lower sides of the sliding type doors 6, 6 in a state in which both of the sliding type doors 6, 6 are closed can be covered by the roll sheet 13, heat rays which enter the storage chamber 5 from the outside through the sliding type doors 6, 6 can be blocked, and then, the storage chamber 5 can be heat-insulated from the side of the sliding type doors 6, 6. Since the roll sheet 13 can be wound in accordance with the opening/closing of either one of the sliding type

doors 6, the sheet does not disturb the getting the articles in and out of.

Figs. 15, 16, 17, and 18 show further another embodiment of the low temperature showcase 1 of the invention. In this case as well, in a manner similar to the above, the pair of sliding type doors 6, 6 are mounted on the upper side rail 7 on the peripheral walls of the heat insulating housing 2, thereby closing the upper surface opening 3 of the heat insulating housing 2. Opaque heat insulating panels 14, 14 are adhered onto both the sliding type doors 6, 6, respectively. The heat insulating panels 14, 14 are adhered onto portions where the dew condensation occurs in the glass boards 6B, 6B constructing the sliding type doors 6, 6 (on this side shown in Fig. 1). The heat insulating panels 14, 14 are adhered onto the rear surfaces of the sliding type doors 6, 6 and are also adhered to substantially the lower half portions from the center of both the sliding type doors 6, 6. Consequently, the heat rays which enter the storage chamber 5 are cut off and the portions where the dew condensation occurs of the sliding type doors 6, 6 is thermally insulated from the storage chamber 5 side.

As mentioned above, since the opaque heat insulating panels 14, 14 are adhered onto the rear surfaces of the upper sliding type doors 6, 6 of the heat insulating housing 2 and are adhered onto substantially the lower half portions from the center of the sliding type doors 6, 6, the heat rays which enters the storage chamber 5 from the outside can be blocked and the dew condensation generating portions of the

sliding type doors 6, 6 can be thermally insulated from the inside of the storage chamber. The heat insulating panels 14, 14 can be also attached to the existing sliding type doors. Since the heat insulating panels 14, 14 are opaque, an advertisement for the article can be also added. Even under conditions that outside temperature and humidity are bad, for example, in the event that the low temperature showcase 1 is placed outside, the dew condensation on the surface of the sliding type doors 6, 6 and deterioration in quality of the articles in the storage chamber 5 can be prevented in a manner similar to the above.

Figs. 19, 20, 21, and 22 show still another embodiment of the low temperature showcase 1 of the invention. In this case as well, the pair of sliding type doors 6, 6 similar to the above are mounted on the upper rail 7 on the peripheral walls of the heat insulating housing 2, whereby the upper surface opening 3 of the heat insulating housing 2 is closed. In this case, transparent boards 15, 15 are adhered onto both of the sliding type doors 6, 6. The transparent boards 15, 15 are attached onto the surfaces where the dew condensation occurs of substantially the lower half portions from the center of the glass boards 6B, 6B constructing the sliding type doors 6, 6.

Around the transparent boards 15, 15, packings 15A, 15A as sealing members for preventing waterdrops and air from entering are arranged and suction caps 15B ... are fixed on four corners. The transparent boards 15, 15 are fixed to the rear surfaces of the sliding type doors 6, 6 by the suction

caps 15B ..., whereby the packings 15A, 15A arranged around the transparent boards 15, 15 are come into contact with the lower surfaces of the glass boards 6B, 6B, an air layer is formed on each of the lower surfaces of the sliding type doors 6, 6, and it is set as a heat insulating space 16. Consequently, the dew condensation generating portions of the doors 6, 6 are constructed so as to be enable to be thermally insulated from the storage chamber 5 side.

As mentioned above, the transparent boards 15, 15 are attached to the lower surfaces of the upper sliding type doors 6, 6 of the heat insulating housing 2 by the plurality of suction caps 15B ..., the transparent boards 15, 15 are attached to substantially the lower half portions from the center of the sliding type doors 6, 6, and the predetermined heat insulating spaces 16, 16 are formed on the lower surfaces of the sliding type doors 6, 6. Consequently, the heat rays which enter the storage chamber 5 from the outside can be blocked and the dew condensation generating portions of the sliding type doors 6, 6 can be thermally insulated from the inside of the storage chamber 5.

Since the transparent boards 15, 15 can be detachably attached to the sliding type doors 6, 6 by the plurality of suction caps 15B ..., when the temperature and humidity in the storage chamber 5 are stabilized and the transparent boards 15, 15 are not needed in a manner similar to the above, the boards can be detached and they can be also attached to the existing sliding type doors. Even under conditions that the outside temperature and humidity are bad,

for example, in the event that the low temperature showcase 1 is placed outside, the dew condensation on the surfaces of the sliding type doors 6, 6 and deterioration in quality of the article in the storage chamber 5 can be prevented in a manner similar to the above.

Figs. 23, 24, 25, and 26 show still another embodiment of the low temperature showcase 1 of the invention. In this case as well, the pair of sliding type doors 6, 6 are arranged on the upper side rail 7 on the peripheral walls of the heat insulating housing 2 in a manner similar to the above, thereby closing the upper surface opening 3. Transparent boards 17, 17 similar to the above description are attached all over under the glass boards 6B, 6B constructing the sliding type doors 6, 6. The suction caps 15B ... are fixed to the four corners of each of the transparent boards 17, 17 in a manner similar to the above description and the peripheries of the transparent boards 17, 17 are formed so as to be closely adhered and come into contact with the lower surfaces of the frames 6A, 6A.

The transparent boards 17, 17 are fixed to the lower surfaces of the sliding type doors 6, 6 by the suction caps 15B ..., whereby the peripheries of the transparent boards 17, 17 are closely adhered onto the frames 6A, 6A of the sliding type doors 6, 6, air layers are formed all over under the sliding type doors 6, 6 which face the glass boards 6B, 6B, and the air layers are set to the heat insulating spaces 16, 16. Consequently, the whole areas of the doors 6, 6 can be thermally insulated from the side of the storage chamber 5.

As mentioned above, the transparent boards 17, 17 are attached to the lower surfaces of the upper sliding type doors 6, 6 of the heat insulating housing 2 by the plurality of suction caps 15B ... and the transparent boards 17, 17 are closely adhered to the whole surfaces on the lower side of the sliding type doors 6, 6, thereby forming the predetermined heat insulating spaces 16, 16 on the rear surfaces of the sliding type doors 6, 6. Therefore, the heat rays which enter the storage chamber 5 from the outside can be cut off and the occurrence of the dew condensation in the sliding type doors 6, 6 can be prevented by heat-insulating from the inside of the storage chamber 5.

Since the transparent boards 17, 17 can be detachably attached to the rear surfaces of the sliding type doors 6, 6 by the suction caps 15B, when the temperature and humidity in the storage chamber 5 are stable and the transparent boards 17, 17 are not needed, they can be detached in a manner similar to the above and can be also attached to the existing sliding type doors. Even under conditions that the outside temperature and humidity are bad, for example, in the event that the low-temperature showcase 1 is installed outside, the dew condensation on the surfaces of the sliding type doors 6, 6 and deterioration in quality of the articles in the storage chamber 5 can be prevented in a manner similar to the above.

Figs. 27, 28, 29, and 30 show still another embodiment of the low temperature showcase 1 of the invention. In this case as well, the pair of sliding type doors 6, 6

similar to the above are set on the upper rail 7 on the peripheral walls of the heat insulating housing 2, whereby the upper surface opening 3 of the heat insulating housing 2 is closed. In this case, heat ray reflecting films 18, 18 are adhered onto the rear surfaces of the glass boards 6B, 6B constructing the doors 6, 6, respectively, and a plurality of bands 19 of black or a color approximate to black are formed at regular intervals on the surfaces of the glass boards 6B, 6B.

That is, the plurality of bands 19 having a predetermined width are formed on the surfaces of the sliding type doors 6, 6 in a stripe manner (in this case, they may be blacken in a vertical stripe, oblique stripe, cross stripe, or dot manner) and the heat ray reflecting films 18, 18 are adhered onto the rear surfaces of the sliding type doors 6, 6.

In this instance, the articles in the storage chamber 5 can be easily confirmed by viewing through gaps between the bands 19 ... and a part of light which enters the storage chamber 5 from the outside can be absorbed by the plurality of bands 19 The light which is not absorbed by the bands 19 ... but passes and enters the storage chamber 5 is reflected by the heat ray reflecting films 18, 18.

As mentioned above, since the plurality of bands 19 ... having a predetermined width are formed in a stripe manner on the upper surfaces of the glass boards 6B, 6B of the sliding type doors 6, 6 provided in the heat insulating housing 2 and the heat ray reflecting films 18, 18 are adhered onto the rear surfaces of the sliding type doors 6, 6,

the light which enters the storage chamber 5 from the outside can be absorbed by the bands 19 ... and residual light which passes through portions between the bands 19 ... can be reflected by the heat ray reflecting films 18, 18.

In this case, since the temperature of the sliding type doors 6, 6 can be raised due to a fact that the bands 19 absorb the light and a part of the light reflected by the heat ray reflecting films 18, 18 is also absorbed to the bands 19 ..., the temperature of the sliding type doors 6, 6 can be further raised. Consequently, the dew condensation on the sliding type doors 6, 6 can be prevented.

Since the plurality of bands 19 ... are formed at predetermined intervals, the inside of the storage chamber 5 can be seen through from the gaps and can be easily confirmed by viewing, and the bands 19 ... or heat ray reflecting film 18 can be also adhered to the existing sliding type door. Therefore, even under conditions that the outside temperature and humidity are bad, for example, in the event that the low temperature showcase 1 is placed outside, the dew condensation on the surfaces of the sliding type doors 6, 6 and deterioration in quality of the articles in the storage chamber 5 can be prevented in a manner similar to the above.

As described in detail above, according to the invention of claim 1, in the low temperature showcase constructed in such a manner that the storage chamber is formed in the heat insulating housing whose upper surface is opened and the upper surface is openably closed by the transparent doors, the showcase has the folding door which is

detachably arranged on the lower sides of the doors in the heat insulating housing and which is made of the heat ray reflecting transparent panel or opaque heat insulating panel and the folding door can be pulled up out of the upper surface opening in a state in which the door is opened by upwardly folding and bending the folding door, so that the heat rays which pass through and enter from the outside are blocked, or the storage chamber side can be thermally insulated from the door side.

Accordingly, even under conditions that the outside temperature and humidity are inferior, for example, in the event that the low temperature showcase is placed outside, the dew condensation on the surfaces of the doors and deterioration in quality of the articles in the storage chamber can be effectively prevented.

Particularly, since the folding door is detachably arranged in the heat insulating housing, it can be detached when it is not needed. Since the folding door can be pulled up out of the upper surface opening in a state in which the sliding door is opened by upwardly folding and bending the folding door, it doesn't interfere with the getting the articles in and out of and it is extremely convenient.

According to the invention of claim 2, in the low temperature showcase constructed in such a manner that the storage chamber is formed in the heat insulating housing whose upper surface is opened and the upper surface opening is openably closed by the transparent doors, since the sliding doors which are detachably arranged on the lower

sides of the doors in the heat insulating housing and which are made of the heat ray reflecting transparent panels or opaque heat insulating panels are provided, the heat rays which pass through the doors and enter from the outside are blocked by the sliding doors or the storage chamber side can be thermally insulated from the side of the doors.

Therefore, even under conditions that the outside temperature and humidity are bad, for example, in the event that the low temperature showcase is placed outside, the dew condensation on the surfaces of the doors and deterioration in quality of the article in the storage chamber can be effectively prevented.

Particularly, since the sliding doors are detachably arranged in the heat insulating housing, when they are not needed, the doors can be detached. Since they can be easily opened or closed, they don't interfere with the getting the articles in and out of and it is very convenient.

According to the invention of claim 3, in the low temperature showcase constructed in such a manner that the storage chamber is constructed in the heat insulating housing whose upper surface is opened and the upper surface opening is openably closed by the transparent sliding type doors, since the automatic winding roll sheet which is made of the heat ray reflecting transparent sheet or opaque heat insulating sheet is provided under the doors and one end of the roll sheet is fixed to one end of the one door member constructing the doors and the other end is fixed to the other end of the other door member, in a state in which the

door is closed, the roll sheet covers the lower sides of the doors, blocks the heat rays which pass through the doors and enter from the outside or can thermally insulate the storage chamber side from the door side.

Consequently, even under conditions that the outside temperature and humidity are inferior, for example, in the event that the low temperature showcase is placed outside, the dew condensation onto the surfaces of the doors and deterioration in quality of the article in the storage chamber can be effectively prevented.

Particularly, since the roll sheet is wound in accordance with the opening or closing of the door, it doesn't interfere with the getting the article in and out of and it is detached together with the doors, so that it is very convenient. Further, since the roll sheet is arranged to the existing doors, it is also excellent in general-purpose properties.

According to the invention of claim 4, in the low temperature showcase constructed in such a manner that the storage chamber is formed in the heat insulating housing whose upper surface is opened and the upper surface opening is openably closed by the transparent sliding type doors, since the opaque heat insulating panels are attached to the dew condensation generating portions of the doors, the heat rays which pass through the doors and enter from the outside are blocked by the heat insulating panels and the dew condensation generating portions of the doors can be thermally insulated from the storage chamber side.

Consequently, even under conditions that the outside temperature and humidity are bad, for example, in the event that the low temperature showcase is placed outside, the dew condensation on the surfaces of the doors and the deterioration in quality of the article in the storage chamber can be effectively prevented.

Especially, since the heat insulating panel is opaque, the advertisement for the article can be added to it, so that it is very convenient. Since the heat insulating film is attached to the existing doors, it is also excellent in general-purpose properties.

According to the invention of claim 5, in the low temperature showcase constructed in such a manner that the storage chamber is formed in the heat insulating housing whose upper surface is opened and the upper surface opening is openably closed by the transparent sliding type doors, since the transparent boards are provided on the dew condensation generating portions of the doors and are detachably attached to the lower sides of the doors by suction caps, a predetermined space being interposed between each transparent board and the lower side of each door, and the sealing materials are fixed around the transparent boards so as to reach the doors, the heat insulating spaces can be formed in the dew condensation generating portions of the doors on the rear surfaces of the doors by the transparent boards and the doors.

Therefore, even under conditions that the outside temperature and humidity are bad, for example, in the event

that the low temperature showcase is placed outside, the dew condensation on the surfaces of the doors and the deterioration in quality of the article in the storage chamber can be effectively prevented.

Particularly, since the transparent board can be detachably attached to the door by the suction caps, it can be easily attached or detached and, when the board is not needed, it can be detached. Since it can be attached to the existing door, it is excellent in convenience.

According to the invention of claim 6, in the low temperature showcase constructed in such a manner that the storage chamber is formed in the heat insulating housing whose upper surface is opened and the upper surface opening is openably closed by the transparent sliding type doors, since the transparent boards are arranged all over under the doors and are detachably attached to the doors by the suction caps, a predetermined space being interposed between each transparent board and the lower side of each door, and the peripheral portions are come into contact with the doors, the heat insulating spaces can be formed on the whole areas of the rear surfaces of the doors by the transparent boards and doors.

Consequently, even under conditions that the outside temperature and humidity are bad, for example, in the event that the low temperature showcase is placed outside, the dew condensation on the surfaces of the doors and the deterioration in quality of the article in the storage chamber can be effectively prevented.

Particularly, since the transparent board can be detachably attached to the door by the suction caps, it can be easily attached or detached and, when the board is not needed, it can be detached. Since it can be attached to the existing door, it is excellent in general-purpose properties.

According to the invention of claim 7, in the low temperature showcase constructed in such a manner that the storage chamber is formed in the heat insulating housing whose upper surface is opened and the upper surface opening is openably closed by the transparent doors, since the heat ray reflecting films are adhered onto the rear surfaces of the doors and the bands of black or a color that is approximate to black are formed at predetermined intervals onto the surfaces of the doors, a part of light which enters the doors from the outside is absorbed to the bands and the residual light passes through gaps between the bands and reaches the heat ray reflecting films and is reflected.

Since the reflected light is partly absorbed to the bands, the temperature of the whole door including the bands is effectively raised. Consequently, even under conditions that the outside temperature and humidity are bad, for example, in the event that the low temperature showcase is placed outside, the dew condensation on the surfaces of the doors and the deterioration in quality of the article in the storage chamber can be effectively prevented.

Particularly, since the bands are formed at predetermined intervals, the inside of the storage chamber can be seen through from the gaps between them, so that

visibility in the storage chamber can be also favorably maintained.



WHAT IS CLAIMED IS:

1. A low temperature showcase constructed in such a manner that a storage chamber is formed in a heat insulating housing whose upper surface is opened and said upper surface opening is openably closed by transparent doors,

wherein the low temperature showcase has a folding door which is detachably arranged on the lower sides of said doors in said heat insulating housing and which are made of a heat ray reflecting transparent panel or an opaque heat insulating panel and said folding door can be pulled up out of said upper surface opening in a state in which said door is opened by upwardly folding and bending.

2. A low temperature showcase constructed in such a manner that a storage chamber is formed in a heat insulating housing whose upper surface is opened and said upper surface opening is openably closed by transparent doors,

wherein the showcase has sliding doors which are detachably arranged on the lower sides of said doors in said heat insulating housing and each of which is made of a heat ray reflecting transparent panel or an opaque heat insulating panel.

3. A low temperature showcase constructed in such a manner that a storage chamber is formed in a heat insulating housing whose upper surface is opened and said upper surface opening is openably closed by transparent sliding type doors,



wherein the showcase has automatic winding roll sheet which is provided on the lower sides of said doors and which is made of heat ray reflecting transparent sheet or opaque heat insulating sheet and one end of said roll sheet is fixed to one end of one door member constructing said doors and the other end is fixed to the other end of the other door member.

4. A low temperature showcase constructed in such a manner that a storage chamber is formed in a heat insulating housing whose upper surface is opened and said upper surface opening is openably closed by transparent doors,

wherein opaque heat insulating panels are attached to dew condensation generating portions of said doors.

5. A low temperature showcase constructed in such a manner that a storage chamber is formed in a heat insulating housing whose upper surface is opened and said upper surface opening is openably closed by transparent doors,

wherein the showcase has transparent boards provided in dew condensation generating portions of said doors, said transparent boards are detachably attached to the lower sides of said doors by suction caps, a predetermined space being interposed between each transparent board and the lower side of each door, and sealing materials are fixed around said transparent boards so as to reach the doors.

6. A low temperature showcase constructed in such a



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manner that a storage chamber is formed in a heat insulating housing whose upper surface is opened and said upper surface opening is openably closed by transparent doors,

wherein the showcase has transparent boards arranged all over under said doors, said transparent boards are detachably attached to said doors by suction caps, a predetermined space being interposed between each transparent board and the lower side of each door, and peripheral portions are come into contact with said doors.

7. A low temperature showcase constructed in such a manner that a storage chamber is formed in a heat insulating housing whose upper surface is opened and said upper surface opening is openably closed by transparent doors,

wherein heat ray reflecting films are adhered onto the rear surfaces of said doors and bands of black or a color that is approximate to black are formed at predetermined intervals onto the surfaces of said doors.