

DESCRIPTION

Title of Invention

COOLING BOX

Technical Field

5 [0001]

The present invention relates to cooling boxes having double swinging doors.

Background Art

10 [0002]

Cooling boxes having double swinging doors include a rotatable partition disposed on a free end of one of the doors to seal a gap between the doors to prevent leakage of cool air from the gap between the right and left doors. When one of the doors is opened, the partition is guided by a partition rotation guide mounted on a refrigerator casing to rotate into a folded position to avoid a rotation trajectory of the other door. When one of the doors is closed, the partition is guided by the partition rotation guide to rotate in the opposite direction into a position on the back side of the other door to seal the gap between the doors.

20 [0003]

The partition has a function of preventing leakage of cool air from inside to outside of the cooling box, and in addition to that, it also serves as a heat insulation wall that prevents heat entering the cooling box from a dew condensation prevention heater or from the outside of the cooling box. However, since the partition is configured to rotate as the door is opened and closed to seal the gap between the doors, the partition must have a width sufficient to fill the gap between the doors and a thickness that does not reduce the storage volume of door pockets as possible and does not come into contact

with the other door. As a result, it is difficult to ensure a large thickness of the partition. As the thickness of the partition decreases, the thickness becomes insufficient as a heat insulation wall, leading to increase of the amount of heat entering the cooling box.

5 [0004]

Patent Literature 1 discloses a partition whose outer casing is formed of a metal plate, a partition front surface member made of resin and a partition back surface member made of resin to hold the metal plate from each side with a space formed inside the partition. The inner space of the partition is filled with foamed urethane resin having high heat insulating property. The partition back surface member has an injection hole for injecting urethane resin and an air vent hole for exhausting air in the inner space and gas generated during foaming to the outside. A heater for preventing dew condensation on the front surface of the metal plate is disposed on the back side of the metal plate.

15 Citation List

Patent Literature

[0005]

Patent Literature 1: Japanese Unexamined Patent Application Publication No. 2011-174625 (pages 4-5, Fig. 5)

20 Summary of Invention

Technical Problem

[0006]

Since the partition described in Patent Literature 1 has a size limitation as described above, it is almost impossible to provide the partition having a thickness larger than that of the door. In addition, doors of the refrigerator generally have a configuration that is filled with urethane resin. Accordingly, even if the partition is filled with urethane resin, the heat insulating property of the

partition rarely becomes higher than that of the doors. As a result, to decrease the amount of heat entering the refrigerator having double swinging doors, it is highly important to provide a small gap between the doors. To provide a small gap between the doors, it is necessary to decrease a clearance between the rotation trajectory of the partition and the rotation trajectory of the other door as possible.

[0007]

Components of the partition have ununiform temperature distribution. For example, in the partition described in Patent Literature 1, the temperature of the front surface of the partition front surface member becomes high since the front surface is in contact with the metal plate heated by the heater. On the other hand, the back surface of the partition back surface member is cooled by cool air in the cooling box, thus the temperature becomes low. As a result, the front surface of the partition front surface member is heat-expanded, and the back surface of the partition back surface member is heat-shrunk. Changes in size due to heat-expansion or heat-shrinkage have a large effect to the respective member in the longitudinal direction. Further, the partition front surface member and the partition back surface member are so closely in contact with each other and are formed to be integral with each other that an air vent hole needs to be provided to exhaust air to the outside during filling of urethane resin. Further, the partition front surface member and the partition back surface member are also closely in contact with each other and are formed to be integral with each other by the urethane resin, which is filled inside. Accordingly, when the front surface of the partition front surface member is heat-expanded, and the back surface of the partition back surface member is heat-shrunk, the partition is warped and deformed in an arc shape, and the warpage deformation may cause

the center part of the partition in the longitudinal direction to protrude to the outside of the cooling box.

[0008]

When the part of the partition protrudes to the outside of the cooling box, the rotation trajectory of the partition becomes large, and the clearance between the rotation trajectory of the partition and the rotation trajectory of the other door becomes small. Accordingly, when the gap between the doors is designed to be small, the partition and the other door come into contact with each other during opening and closing of the door, which may cause damage on the partition or the other door. On the other hand, when the gap between the doors is designed to be large to prevent the partition and the other door from coming into contact with each other, it is difficult to decrease the amount of heat entering the cooling box.

[0009]

The present invention has been made to overcome the above problems, and an objective of the invention is to provide a cooling box having the partition capable of preventing warpage deformation so that the gap between the doors can be designed to be small and the amount of heat entering the cooling box can be reduced.

Solution to Problem

[0010]

A cooling box according to the present invention includes a heat insulation casing having an opening on a front surface; a pair of swinging doors for opening and closing the opening; a partition, which is rotatably mounted on a free end of an inner surface of one of the doors via a hinge member and is configured to seal a gap between the doors; and a heater that prevents dew condensation on the partition; wherein the partition includes a front side member, which is provided facing the gap with the heater disposed on the front side member; a back side

member, which engages the front side member in a manner slidable in a longitudinal direction, and collectively forms a cylindrical body together with the front side member; and a heat insulating material disposed in the cylindrical body.

Advantageous Effects of Invention

[0011]

According to the present invention, since the front side member and the back side member of the partition engage each other in a manner slidable in the longitudinal direction, increase and decrease in the length of the front side member and the back side member in the longitudinal direction can be canceled by mutual sliding of the front side member and the back side member.

Accordingly, warpage deformation of the partition can be prevented. Further, the gap between the doors can be designed to be small, and the amount of heat entering the cooling box can be reduced.

Brief Description of Drawings

[0012]

[Fig. 1] Fig. 1 is a schematic perspective view showing a general configuration of a cooling box 1 according to Embodiment 1 of the present invention.

[Fig. 2] Fig. 2 is a top view showing a configuration in the vicinity of a left door 21 and a right door 22 of the cooling box 1 according to Embodiment 1 of the present invention.

[Fig. 3] Fig. 3 is a sectional view showing a configuration of a partition 40 according to Embodiment 1 of the present invention.

[Fig. 4] Fig. 4 is a view showing an example configuration in which a front side member 43 and a back side member 44 engage each other by claws in the partition 40 according to Embodiment 1 of the present invention.

[Fig. 5] Fig. 5 is an exploded perspective view showing a configuration of a partition 140 according to Embodiment 2 of the present invention.

[Fig. 6] Fig. 6 is an exploded perspective view showing a configuration of a partition 240 according to Embodiment 3 of the present invention.

5 Description of Embodiments

[0013]

Embodiment 1

A cooling box according to Embodiment 1 of the present invention will be described. Fig. 1 is a schematic perspective view showing a general
10 configuration of a cooling box 1 according to Embodiment 1 of the present invention. Fig. 2 is a top view showing a configuration in the vicinity of a left door 21 and a right door 22 of the cooling box 1 according to Embodiment 1 of the present invention. Throughout the drawings including Figs. 1 and Fig. 2, the relative relationship among the sizes of components or the shapes of
15 components may not be to scale. The positional relationship and the direction of components of the cooling box 1 are basically described herein as seen from the front when the cooling box 1 is in an operable state. In Embodiment 1, the cooling box 1 is described by an example of a refrigerator-freezer having a
20 freezer compartment and a refrigerator compartment. However, the cooling box 1 may be a refrigerator having only a refrigerator compartment or a freezer having only a freezer compartment.

[0014]

As shown in Figs. 1 and 2, the cooling box 1 includes a heat insulation casing 10 having an opening on a front surface. The heat insulation casing 10
25 includes an outer wall formed of a thin metal plate or the like, an inner wall formed of a resin or the like, and a heat insulating material, which is filled between the outer wall and the inner wall. The heat insulating material may be,

for example, foamed urethane resin. In the heat insulation casing 10, a refrigerator compartment 20 and a freezer compartment 30 are disposed in the upper and lower shelves respectively as cooling compartments having different cooling temperatures. The refrigerator compartment 20 and the freezer compartment 30 are separated by a partition member (not shown) made of a heat insulating material.

[0015]

At the opening end of the refrigerator compartment 20, double swinging doors made up of the left door 21 and the right door 22 are provided for opening and closing the opening of the refrigerator compartment 20. The left door 21 is mounted on the left end of the opening of the refrigerator compartment 20 via a hinge member to be rotatable in a horizontal plane, while the right door 22 is mounted on the right end of the opening of the refrigerator compartment 20 via a hinge member to be rotatable in a horizontal plane. The left door 21 and the right door 22 include an outer wall formed of a thin metal plate or the like, an inner wall formed of a resin or the like, and a heat insulating material such as urethane resin, which is filled between the outer wall and the inner wall. The left door 21 and the right door 22 are provided with a gasket on a periphery of an inner surface to be magnetically attached to a metal plate section on the opening end of the refrigerator compartment 20 to prevent leakage of cool air from the refrigerator compartment 20.

[0016]

Similarly, on the opening end of the freezer compartment 30, double swinging doors made up of the left door 31 and the right door 32 are provided for opening and closing the opening of the freezer compartment 30. The left door 31 is mounted on the left end of the opening of the freezer compartment 30 via a hinge member to be rotatable in a horizontal plane, while the right door 32 is

mounted on the right end of the opening of the freezer compartment 30 via a hinge member to be rotatable in a horizontal plane. The left door 31 and the right door 32 include an outer wall formed of a thin metal plate or the like, an inner wall formed of a resin or the like, and a heat insulating material such as urethane resin, which is filled between the outer wall and the inner wall. The left door 31 and the right door 32 are provided with a gasket on a periphery of an inner surface to be magnetically attached to a metal plate section on the opening end of the freezer compartment 30 to prevent leakage of cool air from the freezer compartment 30.

[0017]

A partition 40 is mounted on the free end of the inner surface of any of the left door 21 and the right door 22 (in this example, the left door 21) of the refrigerator compartment 20 via a hinge member (not shown, an upper end side hinge member and a lower end side hinge member) to seal a gap 24 between the left door 21 and the right door 22. The partition 40 has a rectangular shape elongated in one direction (vertical direction of the cooling box 1). Since the partition 40 is mounted on the left door 21 via the hinge member, the partition 40 is rotatable about a rotation shaft 40a in a horizontal plane. Further, a guide 23 (not shown in Fig. 2) that guides and rotates the partition 40 is mounted on a ceiling of the refrigerator compartment 20.

[0018]

When the left door 21 is closed, the partition 40 is guided by the guide 23 to rotate in a predetermined direction into a back side of the right door 22 and abut on the gaskets of the left door 21 and the right door 22. Accordingly, when the left door 21 and the right door 22 are completely closed, the partition 40 seals the gap 24 between the left door 21 and the right door 22. When the left door 21 is opened, the partition 40 is guided by the guide 23 to rotate in a direction

opposite to the above direction and is folded to avoid the rotation trajectory of the right door 22. In Fig. 2, the rotation trajectory of the right door 22 is shown by a dashed dotted line A, and the rotation trajectory of the partition 40 is shown by a dashed dotted line B.

5 [0019]

A partition having the same configuration as that of the partition 40 of the refrigerator compartment 20 is mounted on the free end of the inner surface of any of the left door 31 and the right door 32 of the freezer compartment 30.

10 [0020]

Fig. 3 is a sectional view showing a configuration of the partition 40 according to Embodiment 1 of the present invention. The upper side of Fig. 3 is the outside of the cooling box (the front side of the cooling box, the side in which the gap 24 is located) when the left door 21 and the right door 22 are completely closed. As shown in Fig. 3, the partition 40 includes a metal plate member 41, a dew condensation prevention heater 42, a front side member 43, a back side member 44, and a heat insulating material 45.

15 [0021]

The metal plate member 41 is disposed on the outer side of the cooling box of the surface of the partition 40, and provides the part of the design on the outside of the cooling box. The metal plate member 41 is a metal member elongated in one direction having a U-shaped cross section with one side open. The metal plate member 41 is configured to be attached to a magnet of the gaskets disposed on the left door 21 and the right door 22. That is, three sides of each of the gaskets disposed on the left door 21 and the right door 22 are generally attached to the opening end of the refrigerator compartment 20, and one side is attached to the metal plate member 41 of the partition 40.

Accordingly, this prevents leakage of cool air from inside to outside of the refrigerator compartment 20.

[0022]

5 The dew condensation prevention heater 42 is disposed on the inner side of the metal plate member 41 and it is affixed, for example, on the inner surface of the metal plate member 41. The dew condensation prevention heater 42 is configured to heat the metal plate member 41 to prevent dew condensation on the partition 40 (on the surface of the metal plate member 41). The dew condensation prevention heater 42 is not limited to an electric heater that
10 converts electricity into heat, but also may be a condenser of a refrigerant circuit in the cooling box 1 or a refrigerant pipe between the compressor and the condenser.

[0023]

15 The front side member 43 is a resin member elongated in one direction having substantially H-shaped cross section with recesses formed on both sides. The metal plate member 41 and the dew condensation prevention heater 42 are disposed in the recess on the outer side of the cooling box of the front side member 43. The metal plate member 41 engages the recess to cause the front side member 43 to hold the metal plate member 41 and the dew condensation
20 prevention heater 42. The front side member 43 and the metal plate member 41 may engage each other in a manner slidable in the longitudinal direction. The recess on the inner side of the cooling box of the front side member 43 and the back side member 44 collectively form a cylindrical body. When the left door 21 and the right door 22 are closed, the front side member 43 is located on the
25 outer side of the cooling box of the cylindrical body. Further, the front side member 43 and the metal plate member 41 collectively form an outer shape of the outer side of the cooling box of the partition 40.

[0024]

The back side member 44 is a resin member elongated in one direction having a U-shaped cross section with one side open. The back side member 44 engages the recess on the inner side of the cooling box of the front side member 43 in a manner slidable in the longitudinal direction (vertical direction of the cooling box 1), and the back side member 44 and the front side member 43 collectively form a cylindrical body. In this example, it is desirable that the back side member 44 and the front side member 43 are in contact with each other over a small area as possible. When the left door 21 and the right door 22 are closed, the back side member 44 is located on the inner side of the cooling box of the cylindrical body. The back side member 44 forms an outer shape of the inner side of the cooling box of the partition 40.

[0025]

The heat insulating material 45 is disposed in the cylindrical body that is formed of the front side member 43 and the back side member 44. In this example, the heat insulating material 45 is held by the back side member 44 during assembling of the partition 40. The heat insulating material 45 has a function of preventing heat entering the cooling box from the dew condensation prevention heater 42 or from outside of the cooling box. The heat insulating material 45 may be, for example, expanded polystyrene.

[0026]

The front side member 43 and the back side member 44 may engage each other by claws. Fig. 4 shows an example of a configuration in which the front side member 43 and the back side member 44 engage each other by claws in the partition 40 according to Embodiment 1 of the present invention. Fig. 4 (a) is a side view showing a schematic configuration of one side surface of the partition 40, and Fig. 4 (b) is a cross-sectional view taken along the line C-C of

Fig. 4 (a), and Fig. 4 (c) is a cross-sectional view taken along the line D-D of Fig. 4 (a). As shown in Figs. 4 (a) to 4 (c), a plurality of claws 46 (for example, several claws in the entire longitudinal direction) is disposed on one side of the front side member 43 in a portion in the longitudinal direction. The claws 46 protrude downward from a lower end face 83 of the front side member 43. A groove 47 is formed to extend in the longitudinal direction on one side of the back side member 44 so that the claws 46 engage the groove 47. The claws 46 and the groove 47 are mutually slidable in the longitudinal direction. In a portion in which the claws 46 are not formed in the longitudinal direction, the front side member 43 and the back side member 44 are in contact with each other over a relatively small area, or alternatively, the front side member 43 and the back side member 44 are not in contact with each other. In this example, the lower end face 83 of the front side member 43 is substantially flush with an upper end face 84 of the back side member 44.

[0027]

Claws and a groove are also disposed on the other side of the front side member 43 and the back side member 44. The claws on the other side may be disposed at positions symmetrical to the claws 46 on one side, or alternatively, the claws 46 on one side and the claws on the other side may be alternately arranged in the longitudinal direction.

[0028]

In this example, the groove 47 extends in the entire longitudinal direction of the back side member 44. However, the grooves 47 may be discontinuously formed at positions that correspond to the claws 46. Further, in this example, the claws 46 are formed on the front side member 43, and the groove 47 is formed on the back side member 44. However, the claws may be formed on the

back side member 44, and the groove may be formed on the front side member 43.

[0029]

In the configuration of this example, the front side member 43 and the back side member 44 can be in contact with each other over a relatively small area because the front side member 43 and the back side member 44 are combined by partial engagement of the claw 46 and the groove 47. Accordingly, heat transfer area between the front side member 43 and the back side member 44 can be small, and the front side member 43 and the back side member 44 can be thermally isolated from each other. Further, the small contact area allows the front side member 43 and the back side member 44 to be mutually slidable in the longitudinal direction.

[0030]

Although not shown in the figure, the partition 40 of this example includes a resin upper end member that engages the upper end of one of or both the front side member 43 and the back side member 44 and forms the upper end of the partition 40, an upper end side hinge member held by the upper end member, a resin lower end member that engages the lower end of one of or both the front side member 43 and the back side member 44 and forms the lower end of the partition 40, and a lower end side hinge member held by the lower end member.

[0031]

When the cooling box 1 is in operation, the refrigerator compartment 20 is cooled and the dew condensation prevention heater 42 generates heat. As a result, the back side member 44 is cooled by cool air in the refrigerator compartment 20 and is heat-shrunk, while the front side member 43 is heated by the dew condensation prevention heater 42 and is heat-expanded. Both the front side member 43 and the back side member 44 have a horizontal direction

size (width) that is larger than the vertical direction size (thickness) in Fig. 3. Accordingly, each of the members has a large cooled or heated area relative to the entire area. Since a temperature gradient in the vertical direction in Fig. 3 decreases, warpage deformation in both the front side member 43 and the back side member 44 in the plane shown in Fig. 3 due to temperature gradient is reduced.

[0032]

In the longitudinal direction (depth direction in Fig. 3), the length of the back side member 44 decreases due to heat-shrinkage and the length of the front side member 43 increases due to heat-expansion. In Embodiment 1, however, the front side member 43 and the back side member 44 engage each other in a manner mutually slidable in the longitudinal direction, increase and decrease in the length in the longitudinal direction of the front side member 43 and the back side member 44 is canceled by mutual sliding of the front side member 43 and the back side member 44. Accordingly, in Embodiment 1, warpage of the entire partition 40 can be prevented. Since the gap 24 between the left door 21 and the right door 22 can be designed to be small, the amount of heat entering the refrigerator compartment 20 can be reduced. In addition, since the partition 40 or the right door 22 can be prevented from being damaged due to contact with each other, the cooling box 1 can be used for a long period of time.

[0033]

Embodiment 2

Next, Embodiment 2 according to the present invention will be described. Fig. 5 is an exploded perspective view showing a configuration of a partition 140 according to Embodiment 2 of the present invention. Further, components having the same function and operation as those of the partition 40 of the above

Embodiment 1 are denoted by the same reference numbers, and the description thereof is omitted.

[0034]

As shown in Fig. 5, the partition 140 of Embodiment 2, one of or both the front side member 43 and the back side member 44 (in this example, only the front side member 43) are divided into two portions at a part (in this example, substantially at the center) in the longitudinal direction. That is, the front side member 43 is divided into an upper member 43a and a lower member 43b. The upper member 43a and the lower member 43b have connecting sections 63a and 63b, respectively, which can be connected to each other by engagement or the like.

[0035]

In Embodiment 2, the upper member 43a has a specific engagement shape for engaging the upper end side hinge member 51 as a hinge member holding section for holding the upper end side hinge member 51. The lower member 43b has a specific engagement shape for engaging the lower end side hinge member 52 as a hinge member holding section for holding the lower end side hinge member 52. Further, the upper member 43a and the lower member 43b have a specific engagement shape for engaging the back side member 44. For example, the upper member 43a and the lower member 43b have a shape that holds the upper and lower ends of the back side member 44 from the upper and lower sides (the shape that allows the upper and lower ends of the back side member 44 to be fitted therein) at the upper and lower ends. Further, the front side member 43 made up of the upper member 43a and the lower member 43b and the back side member 44 may engage each other in a manner slidable in the longitudinal direction.

[0036]

The back side member 44 is formed by extrusion molding and has a uniform cross-sectional shape in the longitudinal direction. The heat insulating material 45 is held by the back side member 44.

[0037]

5 In Embodiment 2, since the engagement shape for engaging other members is provided on the front side member 43, the back side member 44 has little limitation in shape. This allows the back side member 44 to have a uniform cross-sectional shape in the longitudinal direction and the back side member 44 to be formed by extrusion molding. Accordingly, the cost of a mold for the back
10 side member 44 can be substantially reduced.

[0038]

Further, when the upper member 43a and the lower member 43b have a shape that holds the upper and lower ends of the back side member 44 from the upper and lower sides, the upper and lower end faces, which are cut during
15 extrusion molding, can be covered by the upper member 43a and the lower member 43b. Accordingly, the partition 140 can be provided without risk of injury to a user's hand even if the upper and lower end faces do not have an edge processing.

[0039]

20 Further, in Embodiment 2, the effect similar to that of Embodiment 1 can be obtained by allowing the front side member 43 and the back side member 44 to engage with each other in a manner slidable in the longitudinal direction.

[0040]

In Embodiment 2, in a portion of the front side member 43 (the upper
25 member 43a and the lower member 43b) that holds the upper and lower ends of the back side member 44, one surface of the front side member 43 is heated by the dew condensation prevention heater 42 and the other surface of the front

side member 43 is cooled by cool air in the cooling box. As a consequence, one surface of the above portion of the front side member 43 may be heat-expanded and the other surface may be heat-shrunk. However, since the portion of the front side member 43 that holds the upper and lower ends of the back side member 44 is a small area of the upper and lower ends of the partition 140, the effect to cause the warpage of the entire partition 140 can be reduced.

[0041]

Further, the partition 140 is a structure of a high aspect ratio having a longitudinal direction size that is extremely larger than a shorter direction size. Accordingly, the front side member 43 and the back side member 44, which are disposed substantially across the entire length of the partition 140, also have a high aspect ratio. In general, when components are formed by injection molding or the like, the molding machine needs to be selected depending on the longitudinal direction size. As a result, a large-sized molding machine for molding an extremely large-sized component must be used for molding components of a high aspect ratio.

[0042]

In Embodiment 2, since the front side member 43 is divided into the upper member 43a and the lower member 43b substantially at the center in the longitudinal direction, the aspect ratio of the respective members (the upper member 43a and the lower member 43b) can be decreased. This allows the upper member 43a and the lower member 43b to be molded by using a smaller molding machine. Accordingly, the manufacturing cost of the partition 140 (particularly, the front side member 43) can be substantially reduced.

[0043]

Although the front side member 43 in Embodiment 2 has been described as being divided into two members (the upper member 43a and the lower

member 43b) in the longitudinal direction, the front side member 43 may be divided into three or more members. Further, although the back side member 44 is not divided in Embodiment 2, the back side member 44 may be divided into two or more members in the longitudinal direction. When the back side member 44 is divided, the engagement shape for engaging other member may be provided on the back side member 44. This allows the front side member 43 to have a uniform cross-sectional shape in the longitudinal direction, and accordingly, the front side member 43 can be formed by extrusion molding and the cost of a mold for the front side member 43 can be substantially reduced.

[0044]

When the left door 21 is opened and closed in the cooling box 1, the upper end of the partition 140 is guided by the guide 23, and this allows the entire partition 140 to rotate. As a result, a predetermined strength in a torsion direction is necessary for the partition 140. Generally, when a component of the partition is divided in the longitudinal direction, the strength of the partition in the torsion direction is decreased. In Embodiment 2, however, even if either of the front side member 43 and the back side member 44 is divided, one of the members that is divided can be reinforced by the other of the members that is not divided and the metal plate member 41. Accordingly, the entire partition 140 easily has a sufficient strength in the torsion direction.

[0045]

In Embodiment 2, increase and decrease in the length can be canceled in the distance between the connecting section 63a of the upper member 43a and the connecting section 63b of the lower member 43b. Accordingly, the warpage deformation of the partition 140 can be prevented.

[0046]

Embodiment 3

Next, Embodiment 3 according to the present invention will be described.

Fig. 6 is an exploded perspective view showing a configuration of a partition 240 according to Embodiment 3 of the present invention. Further, components having the same function and operation as those of the partition 40 of the above Embodiment 1 are denoted by the same reference numbers, and the description thereof is omitted.

[0047]

As shown in Fig. 6, in the partition 240 of Embodiment 3, either the front side member 43 or the back side member 44 (in this example, the front side member 43) is divided into an intermediate member 43e, an upper end member 43c (an example of the end member), which is positioned on one end (upper end) in the longitudinal direction of the intermediate member 43e and having an engagement shape for engaging the upper end side hinge member 51, and a lower end member 43d (an example of the end member), which is positioned on the other end (lower end) in the longitudinal direction of the intermediate member 43e and having an engagement shape for engaging the lower end side hinge member 52. The upper end member 43c has a configuration in which only a minimum area including an engagement portion (hinge member holding section) for engaging the upper end side hinge member 51 is separated from the intermediate member 43e. Similarly, the lower end member 43d has a configuration in which only a minimum area including an engagement portion (hinge member holding section) for engaging the lower end side hinge member 52 is separated from the intermediate member 43e. The intermediate member 43e is formed by extrusion molding and has a uniform cross-sectional shape in the longitudinal direction. Similarly, the back side member 44 is formed by extrusion molding and has a uniform cross-sectional shape in the longitudinal direction. The front side member 43 (the upper end member 43c, the lower end

member 43d, and the intermediate member 43e) and the back side member 44 may engage each other in a manner slidable in the longitudinal direction.

[0048]

In Embodiment 3, the longitudinal direction size of the upper end member 43c and the lower end member 43d formed by injection molding can be minimized and the aspect ratio can be reduced. Accordingly, the cost of the mold can be further reduced compared with the case in Embodiment 2.

[0049]

Further, in Embodiment 3, the intermediate member 43e and the back side member 44 are formed by extrusion molding. Accordingly, even if it is necessary to develop the cooling box that includes the left door 21 and the right door 22 having different length in the vertical direction, it can be achieved only by adjusting the cutting length of the intermediate member 43e and the back side member 44 without providing a new mold for resin molding. Accordingly, the cost for developing cooling boxes of different sizes can be substantially reduced.

[0050]

Other Embodiments

The present invention is not limited to the above Embodiments and various modifications are possible.

For example, although both the front side member 43 and the back side member 44 of Embodiments 1 to 3 are described as a resin member, one of or both the front side member 43 and the back side member 44 may be a metal member.

[0051]

Further, each of the above Embodiments and modification examples can be achieved in combination with each other.

Reference Signs List

CLAIMS

[Claim 1]

A cooling box comprising:

a heat insulation casing having an opening on a front surface;

a pair of swinging doors for opening and closing the opening;

a partition that is rotatably mounted on a free end of a cooling box inner side of one of the doors via a hinge member and is configured to seal a gap between the doors; and

a heater that prevents dew condensation on the partition, wherein the partition includes:

a front side member that is provided with the heater disposed on a side of the front side member facing the gap;

a back side member that engages the front side member in a manner slidable in a longitudinal direction, the back side member and the front side member collectively forming a body; and

a heat insulating material disposed in the body.

[Claim 2]

The cooling box of claim 1, wherein one of the front side member and the back side member includes a claw disposed in a portion in the longitudinal direction, and the other of the front side member and the back side member includes a groove that engages the claw in a manner slidable in the longitudinal direction.

[Claim 3]

The cooling box of claim 1 or 2, wherein one of the front side member and the back side member includes a hinge member holding section on an end in the longitudinal direction to hold the hinge member, and the other of the front side member and the back side member is formed by extrusion molding.

[Claim 4]

The cooling box of any one of claims 1 to 3, wherein one of or both the front side member and the back side member are divided into a plurality of portions in the longitudinal direction.

[Claim 5]

The cooling box of any one of claims 1 to 4, wherein one of the front side member and the back side member is divided into an intermediate member, and an end member that is disposed on an end of the intermediate member in the longitudinal direction and includes a hinge member holding section that holds the hinge member, and the intermediate member and the other of the front side member and the back side member are formed by extrusion molding.

[Claim 6]

The cooling box of any one of claims 1 to 5, wherein the partition further includes a metal plate member disposed on the outer side of the cooling box of the surface of the partition.

[Claim 7]

The cooling box of claim 6, wherein the metal plate member is a metal member elongated in one direction having a U-shaped cross section with one side open.

[Claim 8]

The cooling box of claim 6 or 7, wherein the front side member is a resin member elongated in one direction having substantially H-shaped cross section with recesses formed on both sides.

[Claim 9]

The cooling box of claim 8, wherein the metal plate member and the heater are disposed in the recess on the outer side of the cooling box of the front side member.