CLAIMS

[Claim 1]

A refrigerator, comprising:

a box body including a top wall, a rear wall, lateral walls, and a bottom wall which are formed of an external box and an internal box, the box body forming a storage compartment which has an opening portion formed on a front side of the box body and which is partitioned with a partition wall;

a vacuum heat insulating material arranged between the internal box and the external box which form the real wall;

a foam heat insulating material charged or injected into between the internal box and the vacuum heat insulating material arranged in the rear wall, the foam heat insulating material bonding, attaching, or fixing the vacuum heat insulating material and the internal box to each other;

reinforcing portions formed at corner portions between the rear wall and the lateral walls, the reinforcing portions having a cross-sectional shape which is a circular shape, a curved shape, or a substantially triangular shape;

a cover member covering at least a part of a storage compartment side of the rear wall;

an adhesive agent other than the foam heat insulating material, the adhesive agent bonding between the vacuum heat insulating material and the external box; and

a mount portion provided in the internal box which forms the rear wall, the mount portion being provided separately from the internal box and holding or fixing the cover member,

wherein the foam heat insulating material is charged or injected into between the internal box and the heat insulating material between the reinforcing portions,

the foam heat insulating material is charged or injected into the reinforcing portions between the external box and the heat insulating material, and

the mount portion is provided between the reinforcing portions.

[Claim 2]

A refrigerator, comprising:

a box body including a top wall, a rear wall, lateral walls, and a bottom wall which

are formed of an external box and an internal box, the box body forming a storage compartment which has an opening portion formed on a front side of the box body and which is partitioned with a partition wall;

a vacuum heat insulating material arranged between the internal box and the external box which form the real wall;

a foam heat insulating material charged or injected into between the internal box and the vacuum heat insulating material arranged in the rear wall, the foam heat insulating material bonding, attaching, or fixing the vacuum heat insulating material and the internal box to each other;

reinforcing portions formed at corner portions between the rear wall and the lateral walls, the reinforcing portions being charged or injected with the foam heat insulating material;

an adhesive agent other than the foam heat insulating material, the adhesive agent bonding between the vacuum heat insulating material and the external box; and

a mount portion provided in the internal box which forms the rear wall, the mount portion being provided separately from the internal box and holding or fixing a cover member which covers at least a part of a storage compartment side of the rear wall,

wherein the foam heat insulating material is charged or injected into between the internal box and the heat insulating material between the reinforcing portions,

the reinforcing portions each have an oblique sided which connects the lateral walls and the rear wall, the oblique side has a straight line shape, a circular shape, or a curved shape, and

the mount portion is provided between the reinforcing portions.

[Claim 3]

A refrigerator, comprising:

a box body including a top wall, a rear wall, lateral walls, and a bottom wall which are formed of an external box and an internal box, the box body forming a storage compartment which has an opening portion formed on a front side of the box body and which is partitioned with a partition wall;

a vacuum heat insulating material arranged between the internal box and the external box which form the real wall, or arranged between the internal box and the external box which form the lateral walls;

a foam heat insulating material charged or injected into between the internal box

and the vacuum heat insulating material arranged in the rear wall, or into between the internal box and the vacuum heat insulating material arranged in the lateral walls, the foam heat insulating material bonding, attaching, or fixing the vacuum heat insulating material and the internal box to each other;

reinforcing portions formed at corner portions between the rear wall and the lateral walls, the reinforcing portions having a cross-sectional shape which is a circular shape, a curved shape, or a substantially triangular shape;

a cover member covering at least a part of a storage compartment side of the rear wall;

an adhesive agent other than the foam heat insulating material, the adhesive agent bonding between the vacuum heat insulating material and the external box; and

at least one mount portion provided in the internal box which forms the rear wall, the at least one mount portion holding or fixing the cover member,

wherein the foam heat insulating material is charged or injected into between the internal box and the heat insulating material between the reinforcing portions,

the foam heat insulating material is charged or injected into the reinforcing portions between the external box and the heat insulating material,

the at least one mount portion is separately from the internal box,

the at least one mount portion comprises a plurality of mount portions, and

the plurality of mount portions are provided intermittently over a vertical direction in the box body.

[Claim 4]

A refrigerator, comprising:

a box body including a top wall, a rear wall, lateral walls, and a bottom wall which are formed of an external box and an internal box, the box body forming a storage compartment which has an opening portion formed on a front side of the box body and which is partitioned with a partition wall;

a vacuum heat insulating material arranged between the internal box and the external box which form the real wall, or arranged between the internal box and the external box which form the lateral walls;

a foam heat insulating material charged or injected into between the internal box and the vacuum heat insulating material arranged in the rear wall, or into between the

internal box and the vacuum heat insulating material arranged in the lateral walls, the foam heat insulating material bonding, attaching, or fixing the vacuum heat insulating material and the internal box to each other;

reinforcing portions formed at corner portions between the rear wall and the lateral walls;

an adhesive agent other than the foam heat insulating material, the adhesive agent bonding between the vacuum heat insulating material and the external box; and

at least one mount portion provided in the internal box which forms the rear wall, the at least one mount portion holding or fixing the cover member which covers at least a part of a storage compartment side of the rear wall,

wherein the foam heat insulating material is charged or injected into between the internal box and the heat insulating material between the reinforcing portions,

the reinforcing portions each have an oblique sided which connects the lateral walls and the rear wall, the oblique side has a straight line shape, a circular shape, or a curved shape,

the reinforcing portions are charged or injected with the foam heat insulating material,

the at least one mount portion is separately from the internal box,

the at least one mount portion comprises a plurality of mount portions, and

the plurality of mount portions are provided intermittently over a vertical direction in the box body.

[Claim 5]

The refrigerator of any one of claims 1 to 4, further comprising

a charging port arranged at near four corners of the rear wall excluding a machine room, the charging port being charged or injected with the foam heat insulating material.

[Claim 6]

A refrigerator, comprising:

a box body including a top wall, a rear wall, lateral walls, and a bottom wall which are formed of an external box and an internal box, the box body forming a storage compartment which has an opening portion formed on a front side of the box body and

which is partitioned with a partition wall;

a vacuum heat insulating material arranged between the internal box and the external box which form the real wall, and arranged between the internal box and the external box which form the lateral walls, the vacuum heat insulating material having a bending elastic modulus of 20 MPa or more;

a foam heat insulating material charged or injected into between the internal box and the vacuum heat insulating material arranged in the rear wall, and into between the internal box and the vacuum heat insulating material arranged in the lateral walls, the foam heat insulating material being foamed between the vacuum heat insulating material and the internal box;

reinforcing portions formed at corner portions between the rear wall and the lateral walls, the reinforcing portions being charged or injected with the foam heat insulating material;

an adhesive agent other than the foam heat insulating material, the adhesive agent bonding between the vacuum heat insulating material and the external box;

a charging port arranged at near four corners of the rear wall excluding a machine room, the charging port being charged or injected with the foam heat insulating material;

a cover member covering at least a part of a storage compartment side of the rear wall; and

a mount portion provided separately from the internal box which forms the rear wall, the mount portion holding or fixing the cover member,

wherein the foam heat insulating material is charged or injected into between the internal box and the heat insulating material between the reinforcing portions,

the reinforcing portions each have an oblique sided which connects the lateral walls and the rear wall, the oblique side has a straight line shape, a circular shape, or a curved shape, and

the mount portion is provided between the reinforcing portions.

[Claim 7]

A refrigerator, comprising:

a box body including a top wall, a rear wall, lateral walls, and a bottom wall which are formed of an external box and an internal box, the box body forming a storage compartment which has an opening portion formed on a front side of the box body and

which is partitioned with a partition wall;

a vacuum heat insulating material arranged between the internal box and the external box which form the real wall, and arranged between the internal box and the external box which form the lateral walls;

a foam heat insulating material charged or injected into between the internal box and the vacuum heat insulating material arranged in the rear wall, and into between the internal box and the vacuum heat insulating material arranged in the lateral walls, the foam heat insulating material being foamed between the vacuum heat insulating material and the internal box;

reinforcing portions formed at corner portions between the rear wall and the lateral walls;

an adhesive agent other than the foam heat insulating material, the adhesive agent bonding between the vacuum heat insulating material and the external box;

a charging port arranged at near four corners of the rear wall excluding a machine room, the charging port being charged or injected with the foam heat insulating material;

a cover member covering at least a part of a storage compartment side of the rear wall; and

at least one mount portion provided separately from the internal box which forms the rear wall, the at least one mount portion holding or fixing the cover member,

wherein the foam heat insulating material is charged or injected into between the internal box and the heat insulating material between the reinforcing portions,

the at least one mount portion comprises a plurality of mount portions,

the plurality of mount portions are provided intermittently over a vertical direction in the box body,

the reinforcing portions each have an oblique sided which connects the lateral walls and the rear wall, the oblique side has a straight line shape, a circular shape, or a curved shape,

the reinforcing portions is charged or injected with the foam heat insulating material, and

the vacuum heat insulating material has a bending elastic modulus of 20 MPa or more.

[Claim 8]

The refrigerator of any one of claims 1 to 7, wherein
the reinforcing portions are formed at left and right corner portions, and

the mount portion is provided in the internal box between the reinforcing portions formed at the left and right corner portions.

[Claim 9]

The refrigerator of any one of claims 1 to 8, further comprising
a cooler for generating cooling air for cooling the storage compartment,
wherein the rear wall forms a cooling air passage for supplying the cooling air generated by the cooler into the storage compartment.

[Claim 10]

The refrigerator of any one of claims 1 to 8, further comprising:

a cooler for generating cooling air for cooling the storage compartment;

a cooling air passage through which the cooling air generated by the cooler is supplied into the storage compartment; and

a second member provided at a rear side of the cover member and forming at least a part of the cooling air passage.

[Claim 11]

The refrigerator of any one of claims 1 to 8, further comprising:

a cooler for generating cooling air for cooling the storage compartment; and

a cooling air passage through which the cooling air generated by the cooler is supplied into the storage compartment, wherein

a second member which forms at least a part of the cooling air passage is provided at a rear side of the cover member, and

the second member abuts against the internal box.

[Claim 12]

The refrigerator of any one of claims 1 to 8, further comprising:

a cooler for generating cooling air for cooling the storage compartment; and

a cooling air passage through which the cooling air generated by the cooler is supplied into the storage compartment, wherein

a second member comprising two members or a plurality of members and forming an independent air passage is provided at a rear side of the cover member, and

the air passage of the second members is the cooling air passage.

[Claim 13]

The refrigerator of any one of claims 9 to 12, wherein

the cooling air passage has a cross-sectional shape that is formed in an elliptical shape elongated in a width direction.

[Claim 14]

The refrigerator of any one of claims 9 to 13, wherein
the cover member includes

an air passage cover portion forming or covering at least a part of the cooling air passage, and

a second mount portion configured to mount to the mount portion.

[Claim 15]

The refrigerator of claim 14, wherein

the cover member is fixed or hold by a hooking structure, a fitting structure, or a concavo-convex fitting structure of the mount portion and the second mount portion.

[Claim 16]

The refrigerator of any one of claims 5 to 15, wherein

$Y1 \leq T1 + A$, where T1 represents a thickness of one of the lateral walls, A represents a widthwise length of one of the reinforcing portions, and Y1 represents a distance between a widthwise end portion of a rear side of the refrigerator and an widthwise inside end portion of the charging port.

[Claim 17]
The refrigerator of any one of claims 5 to 16, wherein

the charging port is provided in a range of the reinforcing portions.

[Claim 18]

The refrigerator of any one of claims 1 to 4, 6, or 7, wherein

the reinforcing portions are formed at left and right corner portions, and

the foam heat insulating material which is charged or injected into between the vacuum heat insulating material arranged in the rear wall and the internal box forming the rear wall is charged into a partial range between the reinforcing portions.

[Claim 19]

The refrigerator of any one of claims 5 to 18, wherein

the vacuum heat insulating material arranged in the rear wall has a cutout portion formed in at least one corner portion out of four corner portions of a substantially rectangular shape, and

the cutout portion is arranged to face the charging port.

[Claim 20]

The refrigerator of any one of claims 1 to 18, wherein

the vacuum heat insulating material arranged between the internal box and the external box between a left reinforcing portion and a right reinforcing portion of the reinforcing portions.

[Claim 21]

The refrigerator of any one of claims 1 to 20, wherein

a proportion of a volume of the vacuum heat insulating materials relative to a volume of a space between the external box and the internal box which form the box body is 40% or more and 90% or less,

a ratio of areas of the vacuum heat insulating materials relative to surface areas of the external box is 60% or more, and

a proportion of a sum of areas of projection of the vacuum heat insulating material arranged in the rear wall and the lateral walls onto the rear wall and the lateral walls relative to a total surface area of the rear wall and the lateral walls is 70% or more.

[Claim 22]

The refrigerator of any one of claims 1 to 21, wherein

the vacuum heat insulating material arranged between the internal box and the external box which form the rear wall, or the vacuum heat insulating material arranged between the internal box and the external box which form the lateral walls is arranged in a manner of being overlapped with the reinforcing portions.

[Claim 23]

The refrigerator of any one of claims 1 to 22, wherein

the foam heat insulating material comprises rigid urethane foam.

[Claim 24]

The refrigerator of any one of claims 1 to 23, wherein

a ratio of a thickness of the vacuum heat insulating material relative to (a wall internal thickness of one of the lateral walls or the rear wall) is 0.7 or more.

[Claim 25]

The refrigerator of any one of claims 1 to 4, 6, or 7, further comprising

a case of a pull-out type housed in the storage compartment and pulled out through intermediation of a rail member arranged on the storage compartment side of the lateral walls, wherein

the foam heat insulating material is charged or injected into between the internal box and the vacuum heat insulating material at a position facing the rail member.

[Claim 26]

The refrigerator of any one of claims 1 to 4, 6, or 7, further comprising:

a case of a pull-out type housed in the storage compartment and pulled out through intermediation of a rail member arranged on the storage compartment side of the lateral walls; and

a member arranged on an external box side at a position facing the rail member, wherein

the foam heat insulating material is charged or injected into between the member and the vacuum heat insulating material.

[Claim 27]

The refrigerator of any one of claims 1 to 4, 6, or 7, wherein

the foam heat insulating material charged or injected into between the internal box which forms the rear wall and the vacuum heat insulating material has a thickness of less than 10 mm.

[Claim 28]

The refrigerator of claim 25 or 26, wherein

the lateral walls each have a thickness of 20 mm or more and 40 mm or less,
the vacuum heat insulating material at the position facing the rail member has a bending elastic modulus of 20 MPa or more, and

the foam heat insulating material has a thickness of less than 10 mm.

[Claim 29]

The refrigerator of claim 25 or 26, wherein

the rail member is arranged near the bottom wall or the partition wall which forms a bottom surface of the storage compartment.

[Claim 30]

The refrigerator of claim 25 or 26, further comprising
a rail support portion supporting the rail member, wherein

the rail support portion is placed on the bottom wall or the partition wall which forms a bottom surface of the storage compartment.

[Claim 31]

The refrigerator of claim 25 or 26, wherein
the case including

case lateral walls forming the case, and

a step portion formed on one of the case lateral walls and configured to allow the case to be supported by the rail member,

the step portion is arranged at a lower position of 1/3 or less from a top in a height direction of the case.