CLAIMS

[Claim 1]

A refrigerator, comprising:

a plurality of storage compartments comprising

a refrigerator compartment arranged at an upper part,

a freezer compartment arranged at a lower part, and

a vegetable compartment arranged under the refrigerator compartment and above the freezer compartment,

the plurality of storage compartments each having an opening at a front side;

convex portions formed at corner portions of an internal box corresponding to inner surfaces of lateral walls and a rear wall of the refrigerator compartment, the convex portions projecting toward the front side beyond the inner surface of the rear wall;

a first vacuum heat insulating material having a flat plate shape, the first vacuum heat insulating material being arranged between the internal box and an external box corresponding to the rear wall;

a first intermediate member charged or sealed between the internal box corresponding to the inner surface of the rear wall and the first vacuum heat insulating material and the convex portions to bond, attach, or fix the internal box and the first vacuum heat insulating material to each other;

a second intermediate member other than the first intermediate member, the second intermediate member bonding, attaching, or fixing the first vacuum heat insulating material with the external box;

a cover member for covering at least a part of a rear of the refrigerator compartment;

a concave portion formed by lateral surfaces of the convex portions and the rear wall, the concave portion being provided with a first mount portion for mounting the cover member;

a partition wall for partitioning the plurality of storage compartments; and

a second vacuum heat insulating material arranged in an internal space of the partition wall,

wherein the cover member is mounted to the first mount portion so that the concave portion is used as an air passage.

[Claim 2]

A refrigerator, comprising:

a plurality of storage compartments comprising

a refrigerator compartment arranged at an upper part,

a freezer compartment arranged at a lower part, and

a vegetable compartment arranged under the refrigerator compartment and above the freezer compartment,

the plurality of storage compartments each having an opening at a front side;

convex portions formed at corner portions of an inner surface of lateral walls of the refrigerator compartment and an inner surface of a rear wall of the refrigerator compartment, the convex portions projecting toward the front side beyond the inner surface of the rear wall and each having a substantially triangular shape in a horizontal sectional view;

a first vacuum heat insulating material having a flat plate shape, the first vacuum heat insulating material being arranged between an internal box and an external box each corresponding to the rear wall;

a first intermediate member charged or sealed between the internal box corresponding to the inner surface of the rear wall and the first vacuum heat insulating material and the convex portions to bond, attach, or fix the internal box and the first vacuum heat insulating material to each other;

a second intermediate member other than the first intermediate member, the second intermediate member bonding, attaching, or fixing the first vacuum heat insulating material with the external box;

a cover member for covering at least a part of a rear of the refrigerator compartment;

a concave portion formed by lateral surfaces of the convex portions and the rear wall, the concave portion being provided with a first mount portion for mounting the cover member;

a partition wall for partitioning the plurality of storage compartments; and

a second vacuum heat insulating material arranged in an internal space of the partition wall,

wherein the cover member is mounted to the first mount portion so that the concave portion is used as an air passage.

[Claim 3]

The refrigerator of claim 1 or 2,

wherein the plurality of storage compartments further comprising

an ice making compartment, and

a switching compartment, and

wherein the ice making compartment and the switching compartment are arranged parallel to each other under the refrigerator compartment, and

the vegetable compartment is arranged under the ice making compartment and the switching compartment that are arranged parallel to each other, and above the freezer compartment.

[Claim 4]

The refrigerator of any one of claims 1 to 3,

wherein the cover member is provided with a second mount portion that is mounted to the first mount portion.

[Claim 5]

The refrigerator of any one of claims 1 to 4,

wherein the first mount portion comprises a protruding portion projecting toward the front side, and

the cover member is fixed or hold to the first mount portion by a screw, a hooking structure, a fitting structure, or a concavo-convex fitting structure.

[Claim 6]

The refrigerator of any one of claims 1 to 3,

wherein the first mount portion is separated from the internal box forming the concave portion.

[Claim 7]

A refrigerator, comprising:

a body portion having a plurality of storage compartments that comprise a refrigerator compartment and a freezer compartment and that each have a rear wall and lateral walls, each of the plurality of storage compartments being provided with an opening portion formed on a front side;

convex portions formed at corner portions of an internal box corresponding to an inner surface of the lateral walls and an inner surface of the rear wall, the convex portions projecting toward the front side beyond the inner surface of the rear wall and each having a substantially triangular shape having an oblique side in a horizontal sectional view;

a first vacuum heat insulating material having a flat plate shape, the first vacuum heat insulating material being arranged between the internal box corresponding to the inner surface of the rear wall and an external box corresponding to an outer surface of the rear wall;

a first intermediate member charged or sealed between the first vacuum heat insulating material and the internal box corresponding to the inner surface of the rear wall and the convex portions to bond, attach, or fix the internal box and the first vacuum heat insulating material to each other;

a second intermediate member other than the first intermediate member, the second intermediate member bonding, attaching, or fixing the first vacuum heat insulating material with the external box;

a concave portion formed by lateral surfaces of the convex portions and the rear wall; and

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

a partition wall provided to an upper part of the storage compartment or a lower part of the storage compartment,

wherein a second vacuum heat insulating material is arranged in an internal space of the partition wall,

the cover member is fixed or hold to the lateral walls or the partition wall, and

the concave portion is used as an air passage.

[Claim 8]

The refrigerator of any one of claims 1 to 7, wherein

an urethane foam is charged or sealed in the partition wall, and

a charging rate of the second vacuum heat insulating material relative to the internal space of the partition wall is 40% or more and 95% or less.

[Claim 9]

The refrigerator of any one of claims 1 to 8, wherein

an urethane foam is charged or sealed in the internal space of the partition wall, and

wherein the urethane foam has a thickness of less than 10 mm.

[Claim 10]

The refrigerator of any one of claims 1 to 9, further comprising

an air passage component fixed or hold to the cover member to form the air passage,

wherein the air passage is formed by the air passage component that is fixed or hold to the cover member.

[Claim 11]

The refrigerator of any one of claims 1 to 9, further comprising

an air passage component fixed or hold to the cover member to form a part of the air passage.

[Claim 12]

The refrigerator of any one of claims 1 to 9,

wherein the cover member forms at least a part of the air passage or covers at least the part of the air passage.

[Claim 13]

The refrigerator of any one of claims 1 to 9,

wherein the cover member comprises

a first member having design characteristics, and

a second member arranged on a rear side of the first member.

[Claim 14]

The refrigerator of any one of claims 1 to 13,

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

[Claim 15]

The refrigerator of any one of claims 1 to 14,

wherein the first intermediate member is charged, sealed, or applied in a partial range between the internal box forming the concave portion and the vacuum heat insulating material at the concave portion.

[Claim 16]

The refrigerator of any one of claims 1 to15, further comprising

a charging port for injecting the first intermediate member,

wherein the charging port is provided at a position facing the one of the convex portions.

[Claim 17]

The refrigerator of any one of claims 1 to15, further comprising

a charging port for injecting the first intermediate member,

wherein the charging port has an end portion in a width direction that is provided in a range of the convex portions at a same height level with the concave portion.

[Claim 18]

The refrigerator of any one of claims 1 to 17,

wherein the lateral walls each have a thickness of 20 mm or more and 40 mm or less, and

wherein the refrigerator further comprises

a third vacuum heat insulating material arranged between the internal box corresponding to the inner surface of the lateral walls and an external box corresponding to an outer surface of the lateral walls, and

a foam heat insulating material charged between the third vacuum heat insulating material and the internal box corresponding to the inner surface of the lateral walls,

the foam heat insulating material between the third vacuum heat insulating material and the internal box corresponding to the inner surface of the lateral walls has a thickness of less than 10 mm.

[Claim 19]

The refrigerator of claim 18, further comprising

a pull-out case housed in one of the storage compartments and pulled out through intermediation of rail members each arranged on the lateral walls,

wherein the third vacuum heat insulating material is arranged between the external box and the internal box corresponding to the lateral walls at positions facing the rail members, and is bonded to the external box with an adhesive agent other than the foam heat insulating material,

the foam heat insulating material charged between the internal box and the third vacuum heat insulating material at the positions facing the rail members foams after being charged between the internal box and the third vacuum heat insulating material, and has a density of more than 60 kg/m^3 and 100 kg/m^3 or less.

[Claim 20]

The refrigerator of any one of claims 1 to 19,

wherein the first intermediate member at a part facing the first vacuum heat insulating material has a thickness of less than 10 mm.

[Claim 21]

The refrigerator of any one of claims 1 to 20,

wherein the first intermediate member comprises rigid urethane foam, and

wherein the rigid urethane foam has a bending elastic modulus of 15 MPa or more and 150 MPa or less.

[Claim 22]

The refrigerator of any one of claims 1 to 21, further comprising

a door for closing the opening portion formed on the front side of each of the storage compartments,

wherein the door comprises

a door outer shell formed of a door frame portion and a door inner plate,

a glass plate member arranged to the door outer shell,

a fourth vacuum heat insulating material arranged in a door internal space formed of the glass plate member and the door outer shell, and

a foam heat insulating material charged, applied, or sealed in the door internal space, and

wherein the foam heat insulating material between the glass plate member and the fourth vacuum heat insulating material has a thickness of less than 10 mm.

[Claim 23]

The refrigerator of any one of claims 1 to 22, further comprising

a refrigerator compartment cooler and a freezer compartment cooler, and

wherein the refrigerator compartment cooler is provided on a rear of a lower part of the refrigerator compartment.

[Claim 24]

The refrigerator of any one of claims 1 to 23, further comprising

a controller configured to control temperatures of the storage compartments; and

a transmitting-and-receiving unit provided to or near to the controller, the transmitting-and-receiving unit performing transmission and reception to and from an external device.

[Claim 25]

The refrigerator of any one of claims 1 to 24,

wherein the first vacuum heat insulating material is arranged in a manner of being partially overlapped with the convex portions, and is integrally formed with the external box and the internal box at the convex portions.