CLAIMS

[Claim 1]

A refrigerator having a rear wall and lateral walls and including a storage compartment with an opening at a front side for housing items to be stored, the refrigerator comprising:

convex portions formed at corner portions between the lateral walls and the rear wall and projecting toward the front side;

a vacuum heat insulating material arranged between an internal box corresponding to an inner surface of the rear wall and an external box corresponding to an outer surface of the rear wall in a manner of being partially overlapped with the convex portions in a width direction;

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

a second intermediate member different from a foam heat insulating material, the second intermediate member bonding the vacuum heat insulating material with the external box,

wherein the rear wall includes a concave portion formed on the rear wall in a manner of being recessed to a rear side with respect to the convex portions,

wherein the vacuum heat insulating material is integrally bonded to the internal box and the external box at the convex portions, and

wherein the first intermediate member comprises the foam heat insulating material, and is charged, sealed, or applied to a part of a range of a space between the internal box and the vacuum heat insulating material in the concave portion.

[Claim 2]

A refrigerator having a rear wall and lateral walls and including a storage compartment with an opening at a front side for housing items to be stored, the refrigerator comprising:

convex portions formed at corner portions between the lateral walls and the rear wall and projecting toward the front side;

a vacuum heat insulating material arranged between an internal box corresponding to an inner surface of the rear wall and an external box corresponding to an outer surface of the rear wall in a manner of being partially overlapped with the convex portions in a width direction;

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

a second intermediate member bonding the vacuum heat insulating material with the external box,

wherein the rear wall includes a concave portion formed on the rear wall in a manner of being recessed to a rear side with respect to the convex portions,

wherein the vacuum heat insulating material is integrally bonded to the internal box and the external box at the convex portions, and has a bending elastic modulus of 20 MPa or more,

wherein the first intermediate member is charged, sealed, or applied to a part of a range of a space between the internal box and the vacuum heat insulating material in the concave portion, and

wherein the first intermediate member has a density of more than 60 kg/m^3 and a bending elastic modulus of 15 MPa or more.

[Claim 3]

The refrigerator of claim 1 or 2, further comprising:

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

a protruding portion provided in the concave portion for fixing or holding the cover member.

[Claim 4]

The refrigerator of claim 3,

wherein the cover member includes a mount portion for mounting to the protruding portion,

the mount portion is fixed to or held on the protruding portion by a hooking structure, a fitting structure, or a concavo-convex fitting structure.

[Claim 5]

A refrigerator having a rear wall, a right lateral wall, and a left lateral wall and including a storage compartment with an opening at a front side for housing items to be stored, the refrigerator comprising:

convex portions formed on the rear wall at corner portions between the lateral walls and the rear wall and projecting toward the front side;

a concave portion formed of the rear wall that is recessed to a rear side with respect to the convex portions;

a vacuum heat insulating material arranged between an internal box corresponding to an inner surface of the rear wall and an external box corresponding to an outer surface of the rear wall in a manner of being partially overlapped with the convex portions in a width direction;

a first intermediate member charged, sealed, or applied between the internal box forming the convex portions and the vacuum heat insulating material to bond, attach, or fix the vacuum heat insulating material and the internal box to each other;

a second intermediate member different from the first intermediate

member, the second intermediate member bonding the vacuum heat insulating material with the external box; and

a protruding portion formed in the concave portion and projecting toward the front side,

wherein the vacuum heat insulating material is integrally formed with the internal box, the first intermediate member, and the external box at the convex portions, and

wherein the first intermediate member comprises the foam heat insulating material, and is charged, sealed, or applied to a part of a range of a space between the internal box and the vacuum heat insulating material in the concave portion.

[Claim 6]

A refrigerator having a rear wall, a right lateral wall, and a left lateral wall and including a storage compartment with an opening at a front side for housing items to be stored, the refrigerator comprising:

convex portions formed on the rear wall at corner portions between the lateral walls and the rear wall and projecting toward the front side;

a concave portion formed of the rear wall that is recessed to a rear side with respect to the convex portions;

a vacuum heat insulating material arranged between an internal box corresponding to an inner surface of the rear wall and an external box corresponding to an outer surface of the rear wall in a manner of being partially overlapped with the convex portions in a width direction;

a first intermediate member charged, sealed, or applied between the internal box forming the convex portions and the vacuum heat insulating material to bond, attach, or fix the vacuum heat insulating material and the internal box to each other;

a second intermediate member bonding the vacuum heat insulating material with the external box; and

a protruding portion formed in the concave portion and projecting toward the front side,

wherein the vacuum heat insulating material is integrally formed with the internal box, the first intermediate member, and the external box at the convex portions, and has a bending elastic modulus of 20 MPa or more,

wherein the first intermediate member is charged, sealed, or applied to a part of a range of a space between the internal box and the vacuum heat insulating material in the concave portion, and

wherein the first intermediate member has a density of more than 60 kg/m^3 and a bending elastic modulus of 15 MPa or more.

[Claim 7]

The refrigerator of claim 5 or 6, further comprising

a cover member for covering at least a part of the rear wall,

wherein the cover member comprises

an air passage cover portion that forms at least a part of a cooling air passage or covers at least the part of the cooling air passage, and

a mount portion for mounting to the protruding portion.

[Claim 8]

The refrigerator of any one of claims 3 to 7,

wherein the protruding portion is formed separately from the internal box forming the concave portion.

[Claim 9]

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

a refrigerator compartment arranged in an upper stage;

a freezer compartment arranged in a lower stage;

a refrigerator compartment cooler; and

a freezer compartment cooler,

wherein the storage compartment is the refrigerator compartment, and

wherein the refrigerator compartment cooler is provided behind the refrigerator compartment.

[Claim 10]

A refrigerator comprising:

a refrigerator compartment arranged in an upper stage and including a rear wall, a right lateral wall, and a left lateral wall;

a freezer compartment arranged in a lower stage;

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

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

convex portions formed at right and left corner portions between the lateral walls and the rear wall and projecting toward a front side;

a concave portion formed between the convex portions;

a vacuum heat insulating material arranged between an internal box corresponding to an inner surface of the rear wall and an external box corresponding to an outer surface of the rear wall in a manner of being partially overlapped with the convex portions in a width direction;

a first intermediate member charged, sealed, or applied ino the convex portions to bond, attach, or fix the vacuum heat insulating material and the internal box to each other; and

a second intermediate member bonding the vacuum heat insulating material with the external box,

wherein the refrigerator compartment cooler is arranged behind the refrigerator compartment,

wherein the vacuum heat insulating material is integrally formed with the internal box, the first intermediate member, and the external box at the convex portions, and

wherein the first intermediate member comprises a foam heat insulating material, and is charged, sealed, or applied to a part of a range of a space between the internal box and the vacuum heat insulating material in the concave portion.

[Claim 11]

The refrigerator of claim 10, further comprising

a protruding portion provided in the concave portion for mounting a cover member that covers at least a part of the rear wall,

wherein the protruding portion projects toward the front side.

[Claim 12]

The refrigerator of any one of claims 1 to 11,

wherein, after foaming, the first intermediate member that is charged, sealed, or applied in the concave portion has a thickness of less than 10 mm.

[Claim 13]

The refrigerator of any one of claims 1 to 12,

wherein the rear wall or each of the lateral walls forming the concave portion is used directly as a cooling air passage.

[Claim 14]

The refrigerator of any one of claims 1 to 13,

wherein the concave portion is formed of lateral surfaces of the convex portions and the rea wall.

[Claim 15]

The refrigerator of any one of claims 1 to 14,

wherein the convex portions each have a substantially triangular shape having an oblique side in a horizontal cross section.

[Claim 16]

The refrigerator of claim 15,

wherein the oblique side is substantially linear, curved, or arched shape.

[Claim 17]

The refrigerator of any one of claims 3 to 8, or claim 11,

wherein the protruding portion is formed to at least two positions in the width direction.

[Claim 18]

The refrigerator of any one of claims 1 to 17,

wherein the vacuum heat insulating material overlaps with the convex

portions for a length of 30 mm or more and 200 mm or less.

[Claim 19]

The refrigerator of any one of claims 1 to 18, further comprising

injection ports provided on the rear wall and charging or injecting the first intermediate member,

wherein the injection ports are provided in a range of the convex portions.

[Claim 20]

The refrigerator of any one of claims 1 to 18,

wherein the external box corresponding to the rear wall includes injection ports that charges or injects the first intermediate member, and

wherein Y1 <= T1 + A, where T1 is a thickness of the lateral walls, A is a widthwise length of the convex portions, and Y1 is a distance between an widthwise end portion of a rear of the refrigerator and an widthwise inside end portion of the injection ports.

[Claim 21]

The refrigerator of any one of claims 1 to 20, further comprising

control lead wires arranged in the convex portions.

[Claim 22]

The refrigerator of claim 7,

wherein the cover member includes a rear cover portion extended in the width direction from the air passage cover portion, and

the rear cover portion covers the rear wall or at least a part of the concave portion.

[Claim 23]

The refrigerator of claim 7 or 22,

wherein the cover member includes a lateral cover portion for covering at least a part of the lateral walls.

[Claim 24]

The refrigerator of any one of claims 7, 22, or 23,

wherein the cover member is provided with a rib in the width direction or in a vertical direction.

[Claim 25]

The refrigerator of any one of claims 7, 22, 23, or 24, further comprising

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

[Claim 26]

The refrigerator of any one of claims 1-8, 10, 11, or 22-25,

wherein the storage compartment comprises

a refrigerator compartment arranged in an upper stage,

a freezer compartment arranged in a lower stage, and

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

[Claim 27]

The refrigerator of claim 26, further comprising

an ice making compartment and a switching compartment that are arranged parallel to each other under the refrigerator compartment,

wherein 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 28]

The refrigerator of claim 26 or 27,

wherein the storage compartment is partitioned by a partition plate, and

wherein the vacuum heat insulating material is arranged in an internal space of the partition plate, and the internal space of the partition plate is charged with an urethane foam.