exhaust passage (122). The heat exchanger (10) is disposed in the casing (110) such that the first passage (21) communicates with the air supply passage (121) and the second passage (51) communicates with the exhaust passage (122).

[0028]

The ventilator (100) further includes an air supply fan (131) and an exhaust fan (132). The air supply fan (131) is disposed downstream of the heat exchanger (10) in the air supply passage (121). The exhaust fan (132) is disposed downstream of the heat exchanger (10) in the exhaust passage (122).

[0029]

–General Configuration of Heat Exchanger–

A heat exchanger (10) of this embodiment is a so-called total heat exchanger. In the ventilator (100), this heat exchanger (10) causes outdoor air (supply air) supplied into a room and room air (exhaust air) exhausted out of the room to exchange sensible heat and latent heat (moisture).

[0030]

As illustrated in FIGS. 2 and 3, the heat exchanger (10) is formed in a prism shape having polygonal end faces. Each end face of the heat exchanger (10) of this embodiment has a horizontally oriented octagonal shape. The heat exchanger (10) includes a main heat exchange section (11) and two auxiliary heat exchange sections (12a, 12b).

[0031]

The main heat exchange section (11) is located at the middle of the heat exchanger (10) in the right-to-left direction in FIG. 3. When the heat exchanger (10) is viewed in plan as illustrated in FIG. 3, the main heat exchange section (11) is a horizontally oriented rectangular portion. The auxiliary heat exchange sections (12a, 12b) are portions of the heat exchanger (10) located on the sides of the main heat exchange section (11) in the right-to-left direction in FIG.

end face of the ridge (64) are flat surfaces substantially orthogonal to the thickness direction of the frame portion (60).

[0065]

As illustrated in FIG. 6, an elongated recess (65) is provided in the frame portion (60). The elongated recess (65) is provided along the outermost peripheral edge of the frame portion (60). The elongated recess (65) is open on both of the back surface and the outer peripheral surface of the frame portion (60). The back surface of the frame portion (60) and the bottom surface of the elongated recess (65) are flat surfaces substantially orthogonal to the thickness direction of the frame portion (60).

[0066]

The cross-sectional shape of the elongated recess (65) corresponds to the cross-sectional shape of the ridge (34) of the first frame (25). The ridge (34) of the first frame (25) fits into the elongated recess (65) of the second frame (55).

[0067]

As illustrated in FIG. 5, the frame portion (60) of the second frame (55) has six second notches (68). Each of the second notches (68) is open on the outer peripheral surface of the frame portion (60), and extending toward inside of the frame portion (60). The second notch (68) has the same shape as the first notch (38).

[0068]

The second frame (55) includes second inner ribs (70) and second holding ribs (71). The second inner ribs (70) and the second holding ribs (71) are provided in each end area (57a, 57b) of the second frame (55).

[0069]

Each of the second inner ribs (70) is formed in a straight bar shape, and extends in a direction intersecting with the second communication opening (52). In this embodiment, the

portion (60), the second inner ribs (70), the second holding ribs (71), the intra-second passage ribs (75), and the second support ribs (76) constitute a joining surface (58), and the partition sheet (15) is joined to this joining surface (58). The joining surface (58) of the second frame (55) is a flat surface.

[0075]

–Partition Sheet–

As illustrated in FIG. 8, the partition sheet (15) includes a sheet-like porous base (16) and a moisture permeable layer (17) provided on the porous base (16). The porous base (16) has a first surface (16a) and a second surface (16b). In the partition sheet (15) of this embodiment, the moisture permeable layer (17) is provided to cover the first surface (16a) of the porous base (16).

[0076]

<Porous Base>

The porous base (16) is a porous, sheet-like member made of polyolefin-based resin, for example. The porous base (16) may be non-woven fabric made of fibrous resin. The porous base (16) has a thickness of 10 μm, for example. Preferably, the porous base (16) is an element that serves as a support for the moisture permeable layer (17), and exhibits excellent moisture permeability.

[0077]

The first surface (16a), i.e., one of the surfaces of the porous base (16), is subjected to hydrophilic treatment. Examples of the hydrophilic treatment include corona discharge treatment and plasma treatment. The hydrophilic treatment allows generation of a carboxy group, a hydroxy group, or a carbonyl group on the first surface (16a) of the porous base (16).

[0078]

<Moisture Permeable layer>

The moisture permeable layer (17) is a coating covering the entirety of the first surface (16a) of the porous base (16). The moisture permeable layer (17) is made of a polymer having moisture permeability. The polymer forming the moisture permeable layer (17) is a copolymer having a first constitutional unit and a second constitutional unit. The moisture permeable layer (17) has a thickness of 1 μm, for example. The thickness of the moisture permeable layer (17) is not particularly limited, and is preferably 0.05 μm to 1 μm, more preferably 0.1 μm to 0.5 μm. In a case where the thickness of the moisture permeable layer (17) is 0.05 μm or more, favorable film formability is exhibited, leading to improvement in gas barrier properties. In a case where the above-described thickness is 1 μm or less, more favorable moisture permeability is exhibited.

[0079]

Examples of monomer forming the first constitutional unit may include 2-methacryloyloxyethyl phosphorylcholine. Examples of monomer forming the second constitutional unit may include (meth)acrylic acid alkyl ester having an alkyl group with a carbon number of 2 or more in an ester moiety, such as (meth)acrylic acid stearyl. In the copolymer forming the moisture permeable layer (17), the form of copolymer having the first constitutional unit and the second constitutional unit is not particularly limited, and the copolymer forming the moisture permeable layer (17) may be any of a block copolymer, an alternating copolymer, and a random copolymer.

[0080]

<Method for Forming Moisture Permeable layer>

A step of forming a moisture permeable layer (17) on a porous base (16) includes an applying step and a heating-drying step. The applying step is a step of applying a raw material liquid for forming a moisture permeable layer (17) to a first surface (16a) of the porous base (16). The heating-drying step is a step of heating a coating film formed in the applying step to

CLAIMS

1. A heat exchanger comprising:

a plurality of flow pass elements (20, 50) each including a moisture permeable, sheet-like partition member (15) and a frame (25, 55) forming an air flow path (21, 51) by joining to the partition member (15);

the heat exchanger (10) being configured by stacking the plurality of flow pass elements (20, 50),

in each of the plurality of flow pass elements (20, 50), the partition member (15) being joined to the frame (25, 55) in direction contact,

a joining strength of the partition member (15) to the frame (25, 55) being smaller than a breaking strength of the partition member (15).

2. A heat exchanger comprising:

a plurality of flow pass elements (20, 50) each including a moisture permeable, sheet-like partition member (15) and a frame (25, 55) forming an air flow path (21, 51) by joining to the partition member (15);

the heat exchanger (10) being configured by stacking the plurality of flow pass elements (20, 50),

in each of the plurality of flow pass elements (20, 50), the partition member (15) being joined to the frame (25, 55) in direction contact,

a joining strength of the partition member (15) to the frame (25, 55) being a joining strength at which the partition member (15) is not broken when the partition member (15) is peeled off from the frame (25, 55).

3. The heat exchanger (10) of claim 1 or 2, wherein

the partition member (15) includes a sheet-like porous base (16) and a moisture permeable layer (17) covering a surface of the porous base (16), and

the moisture permeable layer (17) of the partition member (15) faces the frame (25, 55), and only the moisture permeable layer (17) out of the porous base (16) and the moisture permeable layer (17) is in direct contact with the frame (25, 55).

4. The heat exchanger (10) of of any one of claims 1 to 3, wherein

a flat joining surface (28, 58) to which the partition member (15) is joined is provided on the frame (25, 55).

5. The heat exchanger (10) of any one of claims 1 to 3, wherein

the partition member (15) is joined to the frame (25, 55) by entering fine irregularities on a surface of the frame (25, 55).

6. A ventilator comprising:

the heat exchanger (10) of any one of claims 1 to 3,

the ventilator is being configured to cause the heat exchanger (10) to exchange heat between supply air supplied into a room from outside and exhaust air exhausted out of the room from inside.