CLAIMS

[Claim 1]

A humidifier for humidifying a target space (201), comprising:

an air path (220) through which water-extraction air to be supplied to the target space (201) flows;

a cooling unit (240) that cools the water-extraction air in the air path (220);

a water extracting unit (250) that extracts water that is generated when the water-extraction air is cooled by the cooling unit (240) in the air path (220); and

a humidifying unit (260) that humidifies the target space (201) by using the water extracted by the water extracting unit (250),

wherein the air path (220) includes a main path (221, 222, 263) that communicates with the target space (201) and a discharge path (223) that discharges a part or all of the water-extraction air to the outside of the target space (201),

wherein the humidifier comprises a refrigerator (270) that cools air in the target space (201), and

wherein the cooling unit (240) cools the water-extraction air by using the air in the target space (201) cooled by the refrigerator (270).

[Claim 2]

A humidifier for humidifying a target space (201), comprising:

an air path (220) through which water-extraction air flows;

a cooling unit (240) that cools the water-extraction air in the air path (220);

a water extracting unit (250) that extracts water that is generated when the water-extraction air is cooled by the cooling unit (240) in the air path (220); and

a humidifying unit (260) that humidifies the target space (201) by using the water extracted by the water extracting unit (250),

wherein the air path (220) includes a main path (221, 222, 263) that communicates with the target space (201) and a discharge path (223) that discharges a part or all of the water-extraction air to the outside of the target space (201), and

wherein the water extracting unit (250, 251) is provided at each of the inside and the outside of the target space (201).

[Claim 3]

The humidifier according to Claim 1, comprising:

a compressing unit (230) that compresses external air as the water-extraction air,

wherein the cooling unit (240) cools the external air

compressed by the compressing unit (230).

[Claim 4]

The humidifier according to Claim 2, comprising:

a compressing unit (230) that compresses external air as the water-extraction air,

wherein the cooling unit (240) cools the external air compressed by the compressing unit (230).

[Claim 5]

The humidifier according to Claim 3 or 4,

wherein the compressing unit (230) is a pump unit including an air pump (231) that compresses the external air and discharges air that has a temperature higher than a temperature of sucked external air.

[Claim 6]

The humidifier according to any one of Claims 1 to 5,

wherein the main path (221, 222, 263) includes an air-supply path (263) that supplies air that flows in the main path (221, 222, 263) to the humidifying unit (260).

[Claim 7]

The humidifier according to Claim 4, comprising:

a refrigerator (270) that cools air in the target space (201),

wherein the cooling unit (240) cools the external air by using the air in the target space (201) cooled by the refrigerator (270).

[Claim 8]

The humidifier according to Claim 1, 3, or 7,

wherein the cooling unit (240) includes a cooling heat exchanger (140) that cools the external air by using a refrigerant of a refrigerant circuit included in the refrigerator (270).

[Claim 9]

The humidifier according to any one of Claims 1 to 8,

wherein the air path (220) includes a switching valve that switches flow of external air from the main path (221, 222, 263) to the discharge path (223).

[Claim 10]

The humidifier according to Claim 9,

wherein, when a humidity of the target space (201) is lower than a predetermined value, the switching valve is switched so that airflow in the air path (220) is directed toward the main path (221, 222, 263), and, when the humidity of the target space (201) is higher than or equal to the predetermined value, the switching valve is switched so that airflow in the air path (220) is directed toward the discharge path (223).

[Claim 11]

An air composition adjustment device for adjusting composition of air in a target space (5), comprising:

the humidifier (130) according to Claim 1 or 2; and

a composition adjuster (40, 60) that includes a separating unit (41,61) that separates, from air-to-be-treated, supply air having a composition different from a composition of the air-to-be-treated,

wherein the main path of the air path includes a path through which the air-to-be-treated flows to the separating unit (41,61) and a path through which the supply air generated in the separating unit (41,61) flows to the target space (5),

wherein the cooling unit (140) is configured to cool and dehumidify the air-to-be-treated or the supply air in the air path,

wherein the water extracting unit (150) is configured to extract water generated by cooling the air-to-be-treated or the supply air that flows through the air path (135), and

wherein the humidifying unit (160) is configured to humidify the target space (5) by using the water extracted by the water extracting unit (150).

[Claim 12]

The air composition adjustment device according to Claim 11,

wherein the cooling unit (140) is disposed on an upstream side of the separating unit (41,61) in the air path (135).

[Claim 13]

The air composition adjustment device according to Claim 12,

wherein, in the air path (135), a heating unit (170) that heats the air-to-be-treated between the cooling unit (140) and the separating unit (41,61) is provided.

[Claim 14]

The air composition adjustment device according to any one of Claims 11 to 13,

wherein the separating unit (41,61) is configured to separate the supply air from external air that is the air-to-be-treated, and

wherein the humidifying unit (160) is configured to humidify the supply air generated from the external air.

[Claim 15]

The air composition adjustment device according to any one of Claims 11 to 13,

wherein the separating unit (41,61) is configured to separate the supply air from internal air of the target space, the internal air being the air-to-be-treated, and

wherein the humidifying unit (160) is configured to humidify the supply air generated from the internal air.

[Claim 16]

The air composition adjustment device according to any one of Claims 11 to 13,

wherein the separating unit (41,61) includes a first

separating unit (41) that separates the supply air from external air that is first air-to-be-treated, and a second separating unit (61) that separates the supply air from internal air of the target space, the internal air being second air-to-be-treated, and

wherein the humidifying unit (160) is configured to humidify the supply air generated from the external air and the supply air generated from the internal air.

[Claim 17]

The air composition adjustment device according to any one of Claims 11 to 16,

wherein, in the air path (135), a pressurizing unit (180) that pressurizes the air-to-be-treated on an upstream side of the cooling unit (140) is provided.

[Claim 18]

The air composition adjustment device according to any one of Claims 11 to 17,

wherein the air-to-be-treated is internal air of a container including a refrigerator (270) that cools the internal air, and

wherein the cooling unit (140) is configured to cool the air-to-be-treated by using cold energy generated by the refrigerator (270).

[Claim 19]

The air composition adjustment device according to any

one of Claims 11 to 18,

wherein the separating unit (41,61) includes a separation membrane (85) that separates, from air-to-be-treated, supply air having a composition different from a composition of the air-to-be-treated.