CLAIMS

[Claim 1]

An internal air adjustment device that adjusts a composition of internal air existing inside a storage (1), comprising:

a first composition adjustment unit (40) that includes a first separation unit (41) that separates supply air from external air existing outside the storage (1), the supply air having a composition that differs from a composition of the external air, the first composition adjustment unit (40) supplying the supply air into the storage (1); and

a second composition adjustment unit (60) that includes a second separation unit (61) that separates discharge air from the internal air existing inside the storage (1), the discharge air having a composition that differs from the composition of the internal air, the second composition adjustment unit (60) discharging the discharge air to outside of the storage (1), wherein

the first separation unit (41) separates untreated external air, which is external air introduced from the outside of the storage (1), into first external air and second external air having different compositions,

the first composition adjustment unit (40) supplies, as the supply air, one of the first external air and the second external air into the storage (1) and discharges other of the first external air and the second external air to the outside of the storage (1),

the second separation unit (61) separates untreated internal air, which is internal air introduced from inside the storage (1), into first internal air and second internal air having different compositions,

the second composition adjustment unit (60) supplies one of the first internal air and the second internal air into the storage (1) and discharges, as the discharge air, other of the first internal air and the second internal air to the outside of the storage (1),

the first composition adjustment unit (40) includes

a first primary-side switching valve (56) configured to be switched between a state in which the first external air is supplied into the transport container (1) as the supply air and a state in which the first external air is discharged to the outside of the transport container (1), and

a first secondary-side switching valve (58) configured to be switched between a state in which the second external air is supplied into the transport container (1) as the supply air and a state in which the second external air is discharged to the outside of the transport container (1), and

the second composition adjustment unit (60) includes

a second primary-side switching valve (76) configured to be switched between a state in which the first internal air is supplied into the transport container (1) and a state in which the first internal air is discharged to the outside of the transport container (1) as the discharge air, and

a second secondary-side switching valve (78) configured to be switched between a state in which the second internal air is supplied into the transport container (1) and a state in which the second internal air is discharged to the outside of the transport container (1) as the discharge air.

[Claim 2]

The internal air adjustment device according to Claim 1, wherein the first composition adjustment unit (40) supplies the supply air into the storage (1) so that air pressure inside the storage (1) differs from air pressure outside the storage (1).

[Claim 3]

The internal air adjustment device according to Claim 1, wherein the first composition adjustment unit (40) supplies the supply air into the storage (1) so that air

pressure inside the storage (1) becomes positive.

[Claim 4]

The internal air adjustment device according to Claim 3, wherein a flow rate of the supply air that is supplied into the storage (1) by the first composition adjustment unit (40) is higher than a flow rate of the discharge air that is discharged to the outside of the storage (1) by the second composition adjustment unit (60).

[Claim 5]

The internal air adjustment device according to any one of Claims 1 to 4, wherein a carbon dioxide concentration reduction operation of reducing a carbon dioxide concentration of the internal air in the storage (1) is performed by causing the second separation unit (61) of the second composition adjustment unit (60) to separate the discharge air from the internal air existing inside the storage (1), the discharge air having a carbon dioxide concentration that is higher than the carbon dioxide concentration of the internal air.

[Claim 6]

The internal air adjustment device according to any one of Claims 1 to 4, wherein an oxygen concentration reduction operation of reducing an oxygen concentration of the internal air in the storage (1) is performed by causing the first separation unit (41) of the first composition adjustment unit (40) to separate the supply air from the external air existing outside the storage (1) and the second separation unit (61) of the second composition adjustment unit (60) to separate the discharge air from the internal air, the supply air having an oxygen concentration that is lower than an oxygen concentration of the external air, the discharge air having an oxygen concentration that is higher than the oxygen concentration of the internal air.

[Claim 7]

The internal air adjustment device according to any one of Claims 1 to 6, comprising:

a ventilation exhaust passage (100) for allowing inside and the outside of the storage (1) to communicate with each other; and

a ventilation exhaust valve (101) that is provided in the ventilation exhaust passage (100).

[Claim 8]

The internal air adjustment device according to Claim 1, wherein the first separation unit (41) is configured to separate the untreated external air into first external air having a nitrogen concentration that is higher than a nitrogen concentration of the untreated external air and an oxygen concentration that is lower than an oxygen concentration of the untreated external air and second external air having a nitrogen concentration that is lower than the nitrogen concentration of the untreated external air and an oxygen concentration that is higher than the oxygen concentration of the untreated external air, and

the second separation unit (61) is configured to separate the untreated internal air into first internal air having a nitrogen concentration that is higher than a nitrogen concentration of the untreated internal air and an oxygen concentration that is lower than an oxygen concentration of the untreated internal air and second internal air having a nitrogen concentration that is lower than the nitrogen concentration of the untreated internal air and an oxygen concentration that is higher than the oxygen concentration of the untreated internal air.

[Claim 9]

The internal air adjustment device according to Claim 1, wherein the first separation unit (41) and the second separation unit (61) are each provided with a gas

separation membrane (85) where a passing rate of nitrogen is lower than both a passing rate of oxygen and a passing rate of carbon dioxide,

the first separation unit (41) is configured to bring the untreated external air into contact with the gas separation membrane (85), cause air that did not pass through the gas separation membrane (85) to be defined as the first external air, and cause air that passed through the gas separation membrane (85) to be defined as the second external air, and

the second separation unit (61) is configured to bring the untreated internal air into contact with the gas separation membrane (85), cause air that did not pass through the gas separation membrane (85) to be defined as the first internal air, and cause air that passed through the gas separation membrane (85) to be defined as the second internal air.

[Claim 10]

The internal air adjustment device according to any one of Claims 1 to 9, wherein the first composition adjustment unit (40) includes

a first bypass passage (51, 255) for supplying the external air existing outside the storage (1) into the storage (1) by causing the external air to bypass the first separation unit (41), and

a first bypass valve mechanism (50, 256) for changing a flow rate of the external air that flows into the first bypass passage (51, 255).

[Claim 11]

The internal air adjustment device according to any one of Claims 1 to 10, wherein the second composition adjustment unit (60) includes

a second bypass passage (71) for supplying the internal air existing inside the storage (1) into the storage (1) by causing the internal air to bypass the second separation unit (61), and

a second bypass valve mechanism (70) for changing a flow rate of the internal air

that flows into the second bypass passage (71).