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),

the first separation unit (41) of the first composition adjustment unit (40) separating, from the external air existing outside the storage (1), the supply air having an oxygen concentration that is lower than an oxygen concentration of the external air to reduce an oxygen concentration of the internal air existing inside the storage (1),

the internal air adjustment device further comprising

an oxygen sensor (91) configured to measure the oxygen concentration of the internal air existing inside the storage (1), and

a controller (110) configured to determine whether or not air pressure inside the storage (1) is positive based on a change in a measured value of the oxygen sensor (91) in a situation where the first composition adjustment unit (40) supplies the supply air to the inside of the storage (1).

[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) becomes positive.

[Claim 3]

The internal air adjustment device according to Claim 2, 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 a second composition adjustment unit (60).

[Claim 4]

The internal air adjustment device according to Claim 1,

when the controller (110) determines that the air pressure inside the storage (1) is not positive, the controller (110) performs a controlling operation for increasing a flow rate of the supply air that is supplied into the storage (1) by the first composition adjustment unit (40).

[Claim 5]

The internal air adjustment device according to any one of Claims 1 to 4, 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 6]

The internal air adjustment device according to any one of Claims 1 to 5, wherein

the first separation unit (41) is configured to separate untreated external air, which is external air introduced from the outside of the storage (1), 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 first composition adjustment unit (40) supplies the first external air into the storage (1) as the supply air and discharges the second external air to the outside of the storage (1).

[Claim 7]

The internal air adjustment device according to Claim 6, wherein the first separation unit (41) and a 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.

[Claim 8]

The internal air adjustment device according to Claim 7, wherein the first composition adjustment unit (40) includes a first pump (36) that compresses the untreated external air and supplies the untreated external air to the first separation unit (41).

[Claim 9]

The internal air adjustment device according to Claim 8, wherein the first composition adjustment unit (40) includes a first valve mechanism (46) that is provided at a pipe where the first external air flows, and that has a variable opening degree.

[Claim 10]

The internal air adjustment device according to Claim 6, wherein the first separation unit (41) includes an adsorption unit (234, 235) that is provided with an adsorbent that adsorbs nitrogen,

the first separation unit (41) is configured to perform an adsorption operation of

producing the first external air by causing nitrogen contained in the untreated external air supplied to the adsorption unit (234, 235) to be adsorbed onto the adsorbent of the adsorption unit (234, 235), and a desorption operation of producing the second external air by causing nitrogen to be desorbed from the adsorbent of the adsorption unit (234, 235), and

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

[Claim 11]

The internal air adjustment device according to any one of Claims 1 to 10, 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).