CLAIMS

[Claim 1]

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

a composition adjustment unit (40) that includes a 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 composition adjustment unit (40) supplying the supply air into the storage (1), wherein

the 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 separation unit (41) includes an introducing port (42) into which the untreated external air flows, a first primary-side guide-out port (43) from which the first external air flows out, and a secondary-side guide-out port (44) from which the second external air flows out,

the 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 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),

a pressure sensor (45) that measures the pressure of the first external air that has flowed out from the first primary-side guide-out port (43) of the separation unit (41), and

a valve mechanism (46) that is provided at a pipe where the first external air flows, and that has an opening degree adjusted based on a measured value of the pressure

sensor (45),

a primary-side switching valve (56) having a first port communicating with the first primary-side guide-out port (43) of the separation unit (41), a second port communicating with the inside of the storage (1), and a third port communicating with the outside of the storage (1), and configured to be switched between a first state in which the first port communicates with the second port and is blocked from the third port, and a second state in which the first port communicates with the third port and is blocked from the second port, and

a first secondary-side switching valve (58) having a first port communicating with the secondary-side guide-out port (44) of the separation unit (41), a second port communicating with the outside of the storage (1), and a third port communicating with the inside of the storage (1), and configured to be switched between a first state in which the first port communicates with the second port and is blocked from the third port, and a second state in which the first port communicates with the third port and is blocked from the second port.

[Claim 2]

The internal air adjustment device according to Claim 1, wherein the 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 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 any one of Claims 1 to 3, wherein

an oxygen concentration reduction operation of reducing an oxygen concentration of the internal air in the storage (1) is performed by causing the separation unit (41) of the composition adjustment unit (40) to separate the supply air 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.

[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 Claim 1, wherein the 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.

[Claim 7]

The internal air adjustment device according to Claim 6, wherein the separation unit (41) is 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, and 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 any one of Claims 1 to 7, wherein the composition adjustment unit (40) includes

a 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 separation unit (41), and

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