CLAIMS

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

a pump (36) configured to compress and discharge air-to-be-treated to be supplied to the target space (5);

a separator (41) including a first separation membrane (85) which has a nitrogen permeability lower than an oxygen permeability and a carbon dioxide permeability, a first primary-side outlet (43) from which a low oxygen concentration gas that has not permeated through the first separation membrane (85) flows out, and a first secondary-side outlet (44) from which a high oxygen concentration gas that has permeated through the first separation membrane (85) flows out;

a first primary-side pipe (53) having one end connected to the first primary-side outlet (43) and another end connected to a supply pipe (120) for supplying the air that has flows out from the separator to the target space (5);

a first secondary-side pipe (54) having one end connected to the first secondary-side outlet (44) and another end opening to an outside of the target space (5);

a first primary-side switching valve (56) disposed in a middle part of the first primary-side pipe (53), having three ports, and configured to be switched between a first state in which a first port communicates with a second port and is shut off from a third port, and a second state in which the first port communicates with the third port and is shut off from the second port; and

a first secondary-side switching valve (58) disposed in a middle part of the first secondary-side pipe (54), having three ports, and configured to be switched between a first state in which a first port communicates with a second port and is shut off from a third port, and a second state in which the first port communicates with the third port and is shut off from the second port,

the first port and the second port of the first primary-side switching valve (56) being connected to the first primary-side pipe (53), and the third port of the first primary-side switching valve (56) being connected to the first secondary-side pipe (54),

the first port and the second port of the first secondary-side switching valve (58) being connected to the first secondary-side pipe (54), and the third port of the first secondary-side switching valve (58) being connected to the supply pipe (120).

2. The air composition adjusting device according to claim 1, further comprising:

a gas supply path (135) having a high concentration gas supply path (136) configured to supply the high oxygen concentration gas that has permeated through the first separation membrane (85) to the target space (5), a low concentration gas supply path (137) configured to supply the low oxygen concentration gas that has not permeated through the first separation membrane (85) to the target space (5), and the first primary-side switching valve (56) and the first secondary-side switching valve (58) that selectively supply one of the high oxygen concentration gas and the low oxygen concentration gas to the target space (5); and

a controller (110) configured to supply the high oxygen concentration gas or the low oxygen concentration gas to the target space (5) by switching the first primary-side switching valve (56) and the first secondary-side switching valve (58).

3. The air composition adjusting device according to claim 2, further comprising

a second separator (41, 61) including a second separation membrane (85) which has a nitrogen permeability lower than an oxygen permeability and a carbon dioxide permeability, a second primary-side outlet (43, 63) from which a low carbon dioxide concentration gas that has not permeated through the second separation membrane (85) flows out, and a second secondary-side outlet (44, 64) from which a high carbon dioxide concentration gas that has permeated through the first separation membrane (85) flows out, wherein

the high concentration gas supply path (136) is further configured to supply the high carbon dioxide concentration gas that has permeated through the second separation membrane (85) to the target space (5).

4. The air composition adjusting device according to claim 3, wherein

the low concentration gas supply path (137) is further configured to supply the low carbon dioxide concentration gas that has not permeated through the first separation membrane (85) to the target space (5), and the gas supply path (135) includes a second primary-side switching valve (76) and a second secondary-side switching valve (78) that selectively supply one of the high carbon dioxide concentration gas and the low carbon dioxide concentration gas to the target space (5), and

the controller (110) is configured to be capable of supplying the high carbon dioxide concentration gas or the low carbon dioxide concentration gas to the target space (5) by switching the second primary-side switching valve (76) and the second secondary-side switching valve (78).

5. The air composition adjusting device according to claim 1 or 2, further comprising

an adsorber (234, 235) that is provided with an adsorbent, that is configured to separate nitrogen, oxygen, and carbon dioxide from the air-to-be-treated, and that is capable of generating a low oxygen concentration gas and a high oxygen concentration gas, the low oxygen concentration gas having a higher nitrogen concentration, a lower oxygen concentration, and a lower carbon dioxide concentration than the air-to-be-treated before being treated, and the high oxygen concentration gas having a lower nitrogen concentration, a higher oxygen concentration, and a higher carbon dioxide concentration than the air-to-be-treated before being treated.