DESCRIPTION

TITLE

GAS COMPOSITION ADJUSTMENT APPARATUS

TECHNICAL FIELD

[0001]

The present disclosure relates to a gas composition adjustment apparatus.

BACKGROUND ART

[0002]

Patent Document 1 discloses an oxygen concentrator. This oxygen concentrator is a gas composition adjustment apparatus of what is called a pressure swing adsorption (PSA) type.

[0003]

The oxygen concentrator of Patent Document 1 includes an adsorption vessel filled with an adsorbent. This oxygen concentrator performs a pressurization operation in which a supply pump supplies air (atmospheric air) to the adsorption vessel so that the adsorbent adsorbs nitrogen in the air, and a depressurization operation in which a discharge pump sucks gas from the adsorption vessel so that the adsorbent desorbs nitrogen.

[0004]

In the pressurization operation, the adsorbent in the adsorption vessel adsorbs nitrogen in the air, and oxygen-enriched gas flows out from the adsorption vessel. The oxygen-enriched gas has an oxygen concentration higher than that of the atmospheric air and a nitrogen concentration lower than that of the atmospheric air. In the depressurization operation, nitrogen-enriched gas, which contains nitrogen as a main component desorbed from the adsorbent in the adsorption vessel, is sucked from the adsorption vessel by the discharge pump. The nitrogen-

between the seal fixing plate (324) and the piston body (322a).

[0119]

In the discharge pump (320), the internal space of each discharge-side cylinder (321) is divided into the gas chamber (327) closer to the cylinder head (325) and a back-pressure chamber (328) closer to the crankcase (301) by the piston body (322a) of the discharge-side piston (322). When the discharge-side piston (322) reciprocates, gas is sucked from the suction port (325a) into the gas chamber (327), and the gas in the gas chamber (327) is discharged through the discharge port (325b).

[0120]

<Material and Characteristics of Air Seal>

The main components of the supply-side air seal (313) are a fluororesin and a particulate carbon material. The fluororesin of the supply-side air seal (313) is polytetrafluoroethylene (PTFE). The particulate carbon material of the supply-side air seal (313) is particulate carbon with an average particle size of about 35 nm. The supply-side air seal (313) contains 75% by mass of PTFE and 23% by mass of the particulate carbon material. The supply-side air seal (313) has a linear expansion coefficient expressed by 7.7×10^{-5} [1/°C] along the radius. The supply-side air seal (313) has a Young's modulus of 0.67 [GPa] at a temperature of 75°C.

[0121]

The main components of the discharge-side air seal (323) are a fluororesin and a fibrous carbon material. The fluororesin of the discharge-side air seal (323) is polytetrafluoroethylene (PTFE). The fibrous carbon material of the discharge-side air seal (323) has a diameter of about 5 μm to about 15 μm and a length of about 20 μm to about 30 μm. The discharge-side air seal (323) contains 90% by mass of PTFE and 10% by mass of the fibrous carbon material. The discharge-side air seal (323) has a linear expansion coefficient expressed