# 【CLAIMS】

【Claim 1】

A boil-off gas (BOG) reliquefaction system comprising:

a compressor compressing BOG;

a heat exchanger cooling the BOG compressed by the compressor through heat exchange using BOG not compressed by the compressor as a refrigerant;

a pressure reducer disposed downstream of the heat exchanger and reducing a pressure of fluid cooled by the heat exchanger; and

a gas/liquid separator disposed downstream of the pressure reducer and separating the BOG into liquefied gas generated by reliquefaction and gaseous BOG,

wherein the compressor comprises at least one oil-lubrication type cylinder, and the gas/liquid separator is connected to a lubricant oil discharge line through which lubricant oil collected in the gas/liquid separator is discharged,

and the condensed or solidified lubricant oil accumulated in the heat exchanger melts or decreases in viscosity and is then sent to the gas/liquid separator.

【Claim 2】

The BOG reliquefaction system according to claim 1, wherein the compressor compresses the BOG to a pressure of 150 bar to 350 bar.

【Claim 3】

The BOG reliquefaction system according to claim 1, wherein the compressor compresses the BOG to a pressure of 80 bar to 250 bar.

【Claim 4】

The BOG reliquefaction system according to claim 1, wherein the heat exchanger comprises a micro-channel type fluid channel.

【Claim 5】

The BOG reliquefaction system according to claim 1, wherein the heat exchanger is a printed circuit heat exchanger (PCHE).

【Claim 6】

The BOG reliquefaction system according to claim 1, wherein the lubricant oil discharge line is connected to a lower end of the gas/liquid separator.

【Claim 7】

The BOG reliquefaction system according to claim 1, wherein liquefied gas separated by the gas/liquid separator is discharged from the gas/liquid separator along a fifth supply line and the lubricant oil discharge line is disposed separate from the fifth supply line.

【Claim 8】

The BOG reliquefaction system according to claim 7, wherein one end of the fifth supply line is disposed above a lower end of the gas/liquid separator in the gas/liquid separator connected to the lubricant oil discharge line.

【Claim 9】

The BOG reliquefaction system according to claim 7, wherein one end of the fifth supply line is disposed above a level of the lubricant oil when an amount of the lubricant oil collected in the gas/liquid separator reaches a maximum value.

【Claim 10】

The BOG reliquefaction system according to any one of claims 1 to 9, further comprising:

a bypass line through which the OBG is supplied to the compressor after bypassing the heat exchanger.

【Claim 11】

The BOG reliquefaction system according to any one of claims 1 to 9, further comprising:

an oil separator disposed downstream of the compressor and separating the lubricant oil from the BOG.

【Claim 12】

The BOG reliquefaction system according to claim 11, further comprising:

a first oil filter disposed downstream of the compressor and separating the lubricant oil from the BOG.

【Claim 13】

The BOG reliquefaction system according to claim 12, wherein the first oil filter separates the lubricant oil having a vapor phase or mist phase.

【Claim 14】

The BOG reliquefaction system according to claim 1, further comprising:

a second oil filter disposed on at least one of a location between the pressure reducer and the gas/liquid separator, the fifth supply line through which the liquefied gas separated by the gas/liquid separator is discharged, and a sixth supply line through which the gaseous BOG separated by the gas/liquid separator is discharged,

the second oil filter being a cryogenic oil filter.

【Claim 15】

The BOG reliquefaction system according to claim 14, wherein the second oil filter separates the lubricant oil having a solid phase.

【Claim 16】

The BOG reliquefaction system according to any one of claims 1 to 9, wherein the gaseous BOG separated by the gas/liquid separator is combined with the

BOG to be used as the refrigerant in the heat exchanger and sent to the heat exchanger so as to be used as the refrigerant.

【Claim 17】

A method of discharging lubricant oil from a BOG reliquefaction system configured to reliquefy BOG using the BOG as a refrigerant,

wherein lubricant oil collected in a gas/liquid separator is discharged from the gas/liquid separator through a lubricant oil discharge line separate from a fifth supply line through which liquefied gas generated by reliquefaction of the BOG is discharged from the gas/liquid separator,

and a speed of discharging the lubricant oil from the gas/liquid separator is increased by supplying nitrogen into the gas/liquid separator,

and upon reliquefaction of the BOG, compressed BOG is cooled in a heat exchanger using the BOG as the refrigerant, and upon discharge of the lubricant oil, nitrogen is supplied to the gas/liquid separator along a hot fluid channel through which the compressed BOG is supplied to the heat exchanger.

【Claim 18】

A method of discharging lubricant oil from a BOG reliquefaction system configured to reliquefy BOG using the BOG as a refrigerant,

wherein lubricant oil collected in a gas/liquid separator is discharged from the gas/liquid separator through a lubricant oil discharge line separate from a fifth supply line through which liquefied gas generated by reliquefaction of the BOG is discharged from the gas/liquid separator,

and upon reliquefaction of the BOG, the liquefied gas separated by the gas/liquid separator is sent to a storage tank along the fifth supply line, and an eighth valve is disposed on the fifth supply line to regulate a flow rate of fluid and opening/closing of the fifth supply line, the eighth valve being closed during discharge of the lubricant oil.

【Claim 19】

A method of discharging lubricant oil from a BOG reliquefaction system configured to reliquefy BOG using the BOG as a refrigerant,

wherein lubricant oil collected in a gas/liquid separator is discharged from the gas/liquid separator through a lubricant oil discharge line separate from a fifth supply line through which liquefied gas generated by reliquefaction of the BOG is discharged from the gas/liquid separator,

and upon discharge of the lubricant oil, BOG to be supplied to a cold fluid channel of the heat exchanger is compressed and sent to the hot fluid channel of the heat exchanger after bypassing the heat exchanger.

【Claim 20】

The method of discharging lubricant oil according to claim 17, wherein nitrogen supplied to the gas/liquid separator has a pressure of 5 bar to 7 bar.

【Claim 21】

The method of discharging lubricant oil according to any one of claims 17 to 20, wherein an engine is driven during discharge of the lubricant oil.