[CLAIMS]

[Claim 1]

A gas treatment system comprising:

a liquefied gas storage tank;

a cooling device supercooling and returning a liquefied gas of the liquefied gas storage tank; and

a main compressor pressurizing a boil off gas of the liquefied gas storage tank and supply it to a demander,

wherein the cooling device includes:

a supercooler for supercooling a liquefied gas with a refrigerant;

a refrigerant line through which refrigerant circulate;

a boil off gas heat exchanger cooling a refrigerant using a boil off gas discharged from the liquefied gas storage tank and transferred to the demander; and

a liquefied gas heat exchanger cooling a refrigerant using a liquefied gas discharged from the liquefied gas storage tank and transferred to the demander;

wherein the boil off gas heat exchanger and the liquefied gas heat exchanger are provided in series on the refrigerant line,

wherein the boil off gas heat exchanger is provided downstream of the liquefied gas heat exchanger based on the flow of the liquified gas,

wherein the boil off gas heat exchanger or the liquefied gas heat exchanger comprises:

a gas flow path through which at least one of a liquefied gas or a boil off gas flows; and

a plurality of refrigerant flow path connected to the refrigerant line.

[Claim 2]

The gas treatment system according to claim 1, further comprising:

a boil off gas line transferring a boil off gas from the liquefied gas storage tank to the demander; and

a liquefied gas line transferring a liquefied gas from the liquefied gas storage tank to the demander,

wherein the boil off gas line and the liquefied gas line are provided to share the gas flow path of the gas heat exchanger.

[Claim 3]

The gas treatment system according to claim 2, further comprising:

a boil off gas bypass line branched off from the boil off gas line and bypassing the boil off gas heat exchanger;

a liquefied gas bypass line branched off from the liquefied gas line and bypassing the liquified gas heat exchanger; and

a control portion controlling a flow of the boil off gas bypass line and the liquefied gas bypass line.

[Claim 4]

The gas treatment system according to claim 2, wherein the supercooler is provided on the refrigerant line interconnecting the plurality of refrigerant flow path.

[Claim 5]

The gas treatment system according to claim 4, wherein the cooling device further includes:

a refrigerant compressor compressing a refrigerant and transferring it the refrigerant flow path; and

a refrigerant expander expanding a refrigerant discharged from the refrigerant flow paths and transferring it to the supercooler.

[Claim 6]

The gas treatment system according to claim 4, wherein the boil off gas heat exchanger has the gas flow path shared by the boil off gas line and the liquefied gas line.

[Claim 7]

A gas treatment system comprising:

a liquefied gas storage tank;

a cooling device supercooling and returning a liquefied gas of the liquefied gas storage tank; and

a main compressor pressurizing a boil off gas of the liquefied gas storage tank and supply it to a demander,

wherein the cooling device includes:

a supercooler for supercooling a liquefied gas with a refrigerant

a gas heat exchanger cooling a refrigerant using at least one of a boil off gas discharged from the liquefied gas storage tank and transferred to the demander or a liquefied gas discharged from the liquefied gas storage tank and transferred to the demander,

wherein the gas heat exchanger has a refrigerant flow path through which a refrigerant flows and a gas flow path through which at least one of a liquefied gas or a boil off gas flows,

wherein the cooling device further includes:

a refrigerant compressor compressing a refrigerant and transferring it to one of the refrigerant flow paths of the gas heat exchanger;

a refrigerant expander expanding a refrigerant discharged from one of the refrigerant flow paths of the gas heat exchanger and transferring it to the supercooler; and

a refrigerant heat exchanger mutually heat-exchanging a refrigerant downstream of the refrigerant compressor and a refrigerant downstream of the supercooler,

wherein the refrigerant heat exchanger is provided in parallel with the gas heat exchanger.

[Claim 8]

The gas treatment system according to claim 5, wherein the cooling device further includes:

a refrigerant heat exchanger mutually heat-exchanging a refrigerant downstream of the refrigerant compressor and a refrigerant downstream of the supercooler,

wherein the refrigerant heat exchanger and the liquefied gas heat exchanger are provided in parallel on the refrigerant line, and

wherein the boil off gas heat exchanger and the liquefied gas heat exchanger or the refrigerant heat exchanger are provided in series on the refrigerant line.

[Claim 9]

A ship comprising the gas treatment system according to any one of the preceding claims.