

treatment system for a vessel, which includes a cargo tank storing LNG, and an engine using the LNG as fuel, the liquefied gas treatment system including: a compressor line configured to compress BOG generated in the cargo tank by a compressor and supply the compressed BOG to the engine as fuel; a high pressure pump line configured to compress the LNG stored in the cargo tank by a pump and supply the compressed LNG to the engine as fuel; and a heat exchanger configured to liquefy a part of BOG, which is compressed by the compressor, by exchanging heat with BOG that is discharged from the cargo tank and transferred to the compressor and decompressing means configured to decompress the BOG liquefied by the heat exchanger, wherein the BOG, which is liquefied by the heat exchanger and decompressed by the decompressing means, is returned to the cargo tank, wherein a gas component of the BOG, which is decompressed to a gas-liquid mixed state while passing through the decompressing means, is joined with the BOG which is discharged from the cargo tank and supplied to the compressor.

~~The liquefied gas treatment system may further include decompressing means configured to decompress the BOG liquefied by the heat exchanger.~~

~~The BOG, which is liquefied by the heat exchanger and decompressed by the decompressing means, may be returned to the cargo tank.~~

The liquefied gas treatment system may further include a gas-liquid separator configured to separate the BOG, which is decompressed to a gas-liquid mixed state while passing through the decompressing means, into a gas component and a liquid component.

A liquid component of the BOG, which is decompressed to a gas-liquid mixed state while passing through the decompressing means, may be returned to the cargo tank.

A liquid component of the BOG, which is decompressed to a gas-liquid mixed state while passing through the decompressing means, may be joined with the BOG which is discharged from the cargo tank and supplied to the compressor.

The liquefied gas treatment system may further include a cooler configured to cool the BOG, which is liquefied by the heat exchanger and is supplied to the decompressing means, by exchanging heat with the liquid component of the BOG which

is decompressed to the gas-liquid mixed state while passing through the decompressing means.

The compressor may include a plurality of compression cylinders.

The BOG, which is compressed by the compressor and is transferred to the heat
5 exchanger, may be compressed while passing through all or part of the plurality of

WHAT IS CLAIMED IS:

1. A liquefied gas treatment system for a vessel, which includes a cargo tank storing liquefied natural gas (LNG), and an engine using the LNG as fuel, the liquefied gas treatment system comprising:

a compressor line configured to compress boil-off gas (BOG) generated in the cargo tank by a compressor and supply the compressed BOG to the engine as fuel;

a high pressure pump line configured to compress the LNG stored in the cargo tank by a pump and supply the compressed LNG to the engine as fuel; and

a heat exchanger configured to liquefy a part of BOG, which is compressed by the compressor, by exchanging heat with BOG that is discharged from the cargo tank and transferred to the compressor, and

decompressing means configured to decompress the BOG liquefied by the heat exchanger,

wherein the BOG, which is liquefied by the heat exchanger and decompressed by the decompressing means, is returned to the cargo tank,

wherein a gas component of the BOG, which is decompressed to a gas-liquid mixed state while passing through the decompressing means, is joined with the BOG which is discharged from the cargo tank and supplied to the compressor.

~~2. The liquefied gas treatment system according to claim 1, further comprising decompressing means configured to decompress the BOG liquefied by the heat exchanger.~~

~~3. The liquefied gas treatment system according to claim 2, wherein the BOG, which is liquefied by the heat exchanger and decompressed by the decompressing means, is returned to the cargo tank.~~

42. The liquefied gas treatment system according to claim 21, further comprising a gas-liquid separator configured to separate the BOG, which is decompressed to a gas-liquid mixed state while passing through the decompressing means, into a gas component and a liquid component.

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53. The liquefied gas treatment system according to claim 21, wherein a liquid component of the BOG, which is decompressed to a gas-liquid mixed state while passing

through the decompressing means, is returned to the cargo tank.

5 ~~6. The liquefied gas treatment system according to claim 2, wherein a liquid component of the BOG, which is decompressed to a gas-liquid mixed state while passing through the decompressing means, is joined with the BOG which is discharged from the cargo tank and supplied to the compressor.~~

10 ~~74. The liquefied gas treatment system according to claim 61, further comprising a cooler configured to cool the BOG, which is liquefied by the heat exchanger and is supplied to the decompressing means, by exchanging heat with the liquid-gas component of the BOG which is decompressed to the gas-liquid mixed state while passing through the decompressing means.~~

15 ~~85. The liquefied gas treatment system according to claim 1, wherein the compressor includes a plurality of compression cylinders.~~

20 ~~96. The liquefied gas treatment system according to claim 85, wherein the BOG, which is compressed by the compressor and is transferred to the heat exchanger, is compressed while passing through all or part of the plurality of compression cylinders included in the compressor.~~

25 ~~107. The liquefied gas treatment system according to claim 1, further comprising a forcible vaporizer configured to forcibly vaporize the LNG stored in the cargo tank and supply the forcibly vaporized LNG to the compressor.~~

~~118. The liquefied gas treatment system according to claim 21, wherein the decompressing means is an expansion valve or an expander.~~