[20a] In an aspect, the present disclosure refers to a system for supplying liquefied gas adapted to supply liquefied gas from a liquefied gas supply vessel to a vessel including multiple liquefied gas storage tanks, the liquefied gas supply system comprising:

a liquid line along which the liquefied gas is supplied from the liquefied gas supply vessel to the multiple liquefied gas storage tanks;

a gas line along which boil-off gas generated in the one liquefied gas storage tank is discharged;

a first liquid line branched off from the liquid line to a first storage tank among the multiple liquefied gas storage tanks;

a second liquid line branched off from the liquid line to a second storage tank among the multiple liquefied gas storage tanks;

a first gas line branched off from the gas line to the first storage tank;

a second gas line branched off from the gas line to the second storage tank;

a first connection line branched off from the liquid line on the opposite side of the branch point of the first liquid line based on the branch point of the second liquid line and connected to the second liquid line; and

a shut-off valve provided to the liquid line between the branch point of the first connection line and the branch point of the second liquid line to block and open a flow upstream/downstream of the liquid line;

wherein the liquid line is divided into an upstream part where the branch point of the second liquid line is located and a downstream part

where the branch point of the first connection line is located based on the isolation valve, and a gas is discharged from the second storage tank through the second liquid line, the first connection line and the upstream part of the liquid line.

[20b] In an aspect, the present disclosure refers to a method of supplying liquefied gas from a liquefied gas supply vessel to a vessel including multiple liquefied gas storage tanks using a system for supplying liquefied gas, the system comprising:

a liquid line along which the liquefied gas is supplied from the liquefied gas supply vessel to the multiple liquefied gas storage tanks;

a gas line along which boil-off gas generated in the one liquefied gas storage tank is discharged;

a first liquid line branched off from the liquid line to a first storage tank among the multiple liquefied gas storage tanks;

a second liquid line branched off from the liquid line to a second storage tank among the multiple liquefied gas storage tanks;

a first gas line branched off from the gas line to the first storage tank;

a second gas line branched off from the gas line to the second storage tank;

a first connection line branched off from the liquid line on the opposite side of the branch point of the first liquid line based on the branch point of the second liquid line and connected to the second liquid line; and

a shut-off valve provided to the liquid line between the branch point of the first connection line and the branch point of the second liquid line to block and open a flow upstream/downstream of the liquid line;

wherein the liquid line is divided into an upstream part where the branch point of the second liquid line is located and a downstream part

where the branch point of the first connection line is located based on the isolation valve, and

wherein a gas is discharged from the second storage tank through the second liquid line, the first connection line and the upstream part of the liquid line,

and the method comprising:

a liquefied gas supply step in which the liquefied gas is supplied from the liquefied gas supply vessel to a first storage tank among the multiple liquefied gas storage tank by flowing a liquid line upstream of a shut-off valve and a first liquid line branched off from the liquid line to the first storage tank;

a boil-off gas discharge step in which boil-off gas is discharged from the first storage tank through a gas line and a first gas line branched off from the gas line to the first storage tank; and

a gassing-up gas supply step in which the boil-off gas discharged from the first storage tank is supplied to the second storage tank among the multiple liquefied gas storage tank by flowing a second liquid line branched off from the liquid line, liquid line downstream of the shut-off valve and a first connection line branched off from the liquid line and connected to the second liquid line bypassing the shut-off valve,

wherein the liquid line is divided into an upstream part where the branch point of the second liquid line is located and a downstream part where the branch point of the first connection line is located based on the isolation valve, and a gas is discharged from the second storage tank through the second liquid line, the first connection line and the upstream part of the liquid line.

[21] In accordance with one example of the present disclosure, there is provided

a system for supplying liquefied gas to ship adapted to supply liquefied gas from a liquefied gas supply vessel to a vessel including multiple liquefied gas storage tanks, the liquefied gas supply system including: a liquefied gas line along which the liquefied gas is supplied from the liquefied gas supply vessel to one of the multiple liquefied gas storage tanks; a gas discharge line along which boil-off gas generated in the one liquefied gas storage tank upon supply of the liquefied gas thereto is discharged; and a gas supply line along which the boil-off gas is supplied to one or more other liquefied gas storage tanks.

[22] Preferably, the liquefied gas supply system further includes a heater heating the boil-off gas discharged along the gas discharge line, wherein the boil-off gas heated by the heater is supplied to one or more other liquefied gas storage tanks along the gas supply line.

[23] Preferably, the boil-off gas generated in the one liquefied gas storage tank upon supply of the liquefied gas thereto is supplied to another liquefied gas storage tank.

[24] Preferably, the boil-off gas generated in the one liquefied gas storage tank upon supply of the liquefied gas thereto is supplied to all of the other liquefied gas storage tanks.

[25] Preferably, the liquefied gas line includes: a liquid crossover line connecting the liquefied gas supply vessel to the liquefied gas storage tanks and adapted to transfer the liquefied gas from the liquefied gas supply vessels; and a liquid line adapted to supply the liquefied gas to each of the liquefied gas storage tanks after division of the liquefied gas received through the liquid crossover line.

[26] Preferably, the liquid line further includes at least one shut-off valve blocking the liquid line to prevent the liquefied gas from being supplied to one or more other liquefied gas storage tanks upon supply of the liquefied gas along the liquid crossover line.

[27] Preferably, the shut-off valve is disposed between a point at which the liquid crossover line meets the liquid line and a point at which the liquid crossover line is branched off from the point at which the liquid crossover line meets the liquid

line to a liquefied gas storage tank that the liquid line first meets.

[28] In accordance with another example of the present disclosure, there is provided a method of supplying liquefied gas from a liquefied gas supply vessel to a vessel including multiple liquefied gas storage tanks, the method including: a liquefied gas supply step in which the liquefied gas is supplied from the liquefied gas supply vessel to one of the multiple liquefied gas storage tanks; a boil-off gas discharge step in which boil-off gas generated in the one liquefied gas storage tank upon supply of the liquefied gas thereto is discharged; and a gassing-up gas supply step in which the boil-off gas discharged from the one liquefied gas storage tank is supplied to one or more other liquefied gas storage tanks.

[29] Preferably, the boil-off gas discharged in the boil-off gas discharge step is heated and supplied to one or more other liquefied gas storage tanks.

[30] Preferably, the boil-off gas generated in the one liquefied gas storage tank upon supply of the liquefied gas thereto is discharged to another liquefied gas storage tank.

[31] Preferably, the boil-off gas generated in the one liquefied gas storage tank upon supply of the liquefied gas thereto is discharged to all of the other liquefied gas storage tanks.

[32] Preferably, the liquefied gas is blocked from being supplied to one or more other liquefied gas storage tanks upon supply of the liquefied gas to one of the liquefied gas storage tanks.

[33] In accordance with another example of the present disclosure, there is provided a method of supplying liquefied gas for test operation from a liquefied gas supply vessel to a liquefied gas carrier including multiple liquefied gas storage tanks, the method including: a cooling-down liquefied gas supply step in which the liquefied gas is supplied from the liquefied gas supply vessel to a cooling-down storage tank ready for a cooling-down process among the multiple liquefied gas storage tanks along a stripping line adapted to spray the liquefied gas to the liquefied gas storage tank; a cooling-down boil-off gas discharge step in which boil-off gas generated in the cooling-down storage tank upon supply of the liquefied gas thereto is discharged along a gas line adapted to discharge a gas from the liquefied gas

[38] Preferably, the method further includes a second inert gas discharge step in which, with the second gassing-up storage tank filled with an inert gas, the inert gas discharged from the second gassing-up storage tank by supplying the boil-off gas to the second gassing-up storage tank is supplied to a vent master along the liquid line and a second connection line connecting the liquid line to the vent master.

[39] Preferably, the liquid line is connected to the storage tank for supply by a first liquid line; the liquid line is connected to the second gassing-up storage tank by a third liquid line; and a shut-off valve is disposed between a point at which the first liquid line is branched off from the liquid line and a point at which the third liquid line is branched off from the liquid line, the shut-off valve being closed in the second inert gas discharge step.

[40] Preferably, the second gassing-up gas supply step further includes a second boil-off gas treatment step in which the boil-off gas discharged from the storage tank for supply is compressed and heated before the boil-off gas is supplied to the second gassing-up storage tank.

[41] In accordance with a further example of the present disclosure, there is provided a system for supplying liquefied gas for test operation adapted to supply liquefied gas for test operation from a liquefied gas supply vessel to a liquefied gas carrier including multiple liquefied gas storage tanks, the system for supplying liquefied gas including: a stripping line adapted to spray the liquefied gas from the liquefied gas supply vessel to the liquefied gas storage tanks, a liquefied gas for cooling-down being transferred to a cooling-down storage tank among the multiple liquefied gas storage tanks along the stripping line; a liquid line adapted to supply the liquefied gas to the liquefied gas storage tanks or to discharge the liquefied gas therefrom, a liquefied gas for test operation being transferred to a storage tank for supply ready for storage of the liquefied gas along the liquid line after completion of cooling-down; and a gas line along which a gas is discharged from the liquefied gas storage tanks and along which boil-off gas generated in the cooling-down storage tank or in the storage tank for supply upon supply of the liquefied gas to the cooling-down storage tank or to the storage tank for supply is discharged, wherein the boil-off gas discharged from the cooling-down storage tank and the storage tank for

supply along the gas line is transferred to a gassing-up storage tank ready for gassing-up among the multiple liquefied gas storage tanks.

[42] Preferably, the liquefied gas supply system further includes a second connection line connecting the liquid line to a vent mast, wherein, the gassing-up storage tank is filled with an inert gas, the inert gas discharged from the gassing-up storage tank by supplying the boil-off gas to the gassing-up storage tank is transferred to the vent mast along the liquid line and the second connection line.

[43] Preferably, liquefied gas supply system further includes a supply liquid branch-off line connecting the liquid line to the cooling-down storage tank or the storage tank for supply; a gassing-up liquid branch-off line connecting the liquid line to the gassing-up storage tank; and a shut-off valve disposed between a point at which the supply liquid branch-off line is branched off from the liquid line and a point at which the gassing-up liquid branch-off line is branched off from the liquid line, the shut-off valve being adapted to block a path of the liquid line along which the liquefied gas flows to the cooling-down storage tank or the storage tank for supply from a path of the liquid line along which the inert gas discharged from the gassing-up storage tank flows through shut-off control.

[44] In accordance with yet another example of the present disclosure, there is provided system for supplying liquefied gas to ship adapted to supply liquefied gas from a liquefied gas supply vessel to a vessel including multiple liquefied gas storage tanks, the system for supplying liquefied gas including: a liquefied gas line along which the liquefied gas is supplied from the liquefied gas supply vessel to one of the multiple liquefied gas storage tanks; a gas supply line along which boil-off gas generated in the one liquefied gas storage tank upon supply of the liquefied gas thereto is discharged to one or more other liquefied gas storage tanks, wherein a gas discharged from the liquefied gas storage tank by supplying the boil-off gas to the liquefied gas storage tank is discharged along the liquefied gas line; and a shut-off valve provided to a portion of the liquefied gas line disposed between the liquefied gas storage tank to which the liquefied gas is supplied along the liquefied gas line and the liquefied gas storage tank to which the boil-off gas is supplied, the shut-off valve being adapted to block the liquefied gas flowing along the liquefied gas line

from mixing with the boil-off gas.

[45] Preferably, the liquefied gas supply system further includes: a manifold; and a crossover line connecting the manifold to the liquefied gas line, wherein the shut-off valve is a three-way valve disposed at a point at which the crossover line meets the liquefied gas line.

[46] Preferably, the liquefied gas supply system further includes: a heater heating the boil-off gas discharged along the gas discharge line, wherein the boil-off gas heated by the heater is supplied to one or more other liquefied gas storage tanks along the gas supply line.

[47] Preferably, the liquefied gas supply system s further includes: a connection line connecting the liquefied gas line to the vent mast, wherein the gas discharged from the liquefied gas storage tank to which the boil-off gas is supplied is an inert gas, the inert gas being transferred from the liquefied gas storage tank to the vent mast.

[48] In accordance with yet another example of the present disclosure, there is provided a method of supplying liquefied gas from a liquefied gas supply vessel to a vessel including multiple liquefied gas storage tanks, the method including: a liquefied gas supply step in which the liquefied gas is supplied from the liquefied gas supply vessel to one of the multiple liquefied gas storage tanks; a boil-off gas discharge step in which boil-off gas generated in the one liquefied gas storage tank upon supply of the liquefied gas thereto is discharged; a gassing-up gas supply step in which the boil-off gas discharged from the one liquefied gas storage tank is supplied to one or more other liquefied gas storage tanks; and an inert gas discharge step in which an inert gas filling the liquefied gas storage tank to which the boil-off gas is supplied is discharged when the liquefied gas storage tank receives the boil-off gas, wherein the inert gas is discharged along a liquefied gas supply line along which the liquefied gas is supplied to the liquefied gas storage tank.

[49] Preferably, the inert gas discharge step further include a shut-off step in which a portion of the liquefied gas supply line along which the liquefied gas flows to the liquefied gas storage tank is blocked from a portion of the liquefied gas supply line along which the inert gas flows.

[50] Preferably, the boil-off gas discharged in the boil-off gas discharge step is heated and supplied to one or more other liquefied gas storage tanks.

[51] In accordance with yet another example of the present disclosure, there is provided a test operation-system for supplying liquefied gas for ship adapted to supply a liquefied gas for test operation from a liquefied gas supply vessel to a liquefied gas carrier including multiple liquefied gas storage tanks, each of the multiple liquefied gas storage tanks being provided with a liquid branch-off line for transferring liquefied gas, a stripping branch-off line for spraying the liquefied gas, and a gas branch-off line for transferring boil-off gas, the multiple liquefied gas storage tanks being filled with an inert gas and including: a gassing-up storage tank in which a gassing-up process is performed; and a storage tank ready to receive liquefied gas after completion of the gassing-up process, the test operation-system for supplying liquefied gas including: a gas line connecting the gas branch-off lines to one another; a liquid line connecting the liquid branch-off lines to one another; and a shut-off valve controlling flow paths of the liquefied gas and the inert gas such that the liquefied gas is supplied from the liquefied gas supply vessel along the liquid branch-off line connected to the storage tank ready to receive the liquefied gas or along the stripping branch-off line while the boil-off gas discharged from the storage tank ready to receive the liquefied gas is transferred to the gassing-up storage tank along the gas line, and such that the inert gas filling the gassing-up storage tank is discharged along the liquid branch-off line provided to the gassing-up storage tank.

[52] Preferably, the test operation- liquefied gas supply system further includes a liquid crossover line connecting the liquid line to a manifold of the liquefied gas carrier, wherein the shut-off valve is a three-way valve disposed at a point at which the liquid line is connected to the liquid crossover line.

[53] Preferably, the shut-off valve is disposed between a point at which the liquid branch-off line of the storage tank ready to receive the liquefied gas is connected to the liquid line and a point at which the liquid branch-off line of the gassing-up storage tank is connected to the liquid line.

[54] Preferably, the gas line is provided with a compressor compressing the boil-

off gas and a heater heating the boil-off gas compressed by the compressor to allow the boil-off gas to be compressed and heated while being transferred from the storage tank ready to receive the liquefied gas to the gassing-up storage tank.

[55] Preferably, the storage tank ready to receive the liquefied gas includes: a cooling-down storage tank as a cooling-down target after completion of the gassing-up process; and a storage tank for supply as a target for a process of supplying a liquefied gas for test operation after completion of cooling-down, the cooling-down storage tank receiving the liquefied gas along the stripping branch-off line, and the storage tank for supply receiving the liquefied gas along the liquid branch-off line.

[56] Preferably, the gassing-up storage tank includes a first gassing-up storage tank receiving the boil-off gas from the cooling-down storage tank; and a second gassing-up storage tank receiving the boil-off gas from the storage tank for supply.

[57] In accordance with yet another example of the present disclosure, there is provided a system for supplying liquefied gas fuel for ship adapted to supply a liquefied gas fuel from a liquefied gas supply vessel to a liquefied gas fuel vessel including at least two liquefied gas fuel tanks, the system for supplying liquefied gas including: a first fuel tank storing liquefied gas fuel; and a second fuel tank storing liquefied gas fuel, wherein the liquefied gas fuel is supplied from the liquefied gas supply vessel to the liquefied gas fuel vessel along a liquid branch-off line or a stripping branch-off line connected to the first fuel tank while boil-off gas discharged from the first fuel tank is supplied as a gassing-up gas to the second fuel tank along a gas line.

[58] Preferably, the gas line is provided with a compressor compressing the boil-off gas and a heater heating the boil-off gas compressed by the compressor to compress and heat the boil-off gas while the boil-off gas is transferred from the first fuel tank to the second fuel tank.

[59] Preferably, the liquefied gas fuel supply system further includes: a liquid line connecting the liquid branch-off lines to each other; and a shut-off valve disposed between a point at which the liquid branch-off line of the first fuel tank is branched off from the liquid line and a point at which a liquid branch-off line of the second fuel tank is branched off from the liquid line.

【CLAIMS】

【Claim 1】

A system for supplying liquefied gas adapted to supply liquefied gas from a liquefied gas supply vessel to a vessel including multiple liquefied gas storage tanks, the liquefied gas supply system comprising:

a liquid line along which the liquefied gas is supplied from the liquefied gas supply vessel to the multiple liquefied gas storage tanks;

a gas line along which boil-off gas generated in the one liquefied gas storage tank is discharged;

a first liquid line branched off from the liquid line to a first storage tank among the multiple liquefied gas storage tanks;

a second liquid line branched off from the liquid line to a second storage tank among the multiple liquefied gas storage tanks;

a first gas line branched off from the gas line to the first storage tank;

a second gas line branched off from the gas line to the second storage tank;

a first connection line branched off from the liquid line on the opposite side of the branch point of the first liquid line based on the branch point of the second liquid line and connected to the second liquid line; and

a shut-off valve provided to the liquid line between the branch point of the first connection line and the branch point of the second liquid line to block and open a flow upstream/downstream of the liquid line;

wherein the liquid line is divided into an upstream part where the branch point of the second liquid line is located and a downstream part where the branch point of the first connection line is located based on the isolation valve, and a gas is discharged from the second storage tank through the second liquid line, the first connection line and the upstream part of the liquid line.

【Claim 2】

The liquefied gas supply system according to claim 1, further comprising:

a heater heating the boil-off gas discharged along the first gas line,

wherein the boil-off gas heated by the heater is supplied to the second storage tanks along the second gas line.

【Claim 3】

The liquefied gas supply system according to claim 1, further comprising

a manifold to connect the liquefied gas supply vessel and the vessel including multiple liquefied gas storage tanks;

wherein the shut-off valve is disposed between a point at which the manifold meets the liquid line and the point at which the first connection line branched off from the liquid line.

【Claim 4】

The liquefied gas supply system according to claim 1, further comprising:

a manifold to connect the liquefied gas supply vessel and the vessel including multiple liquefied gas storage tanks;

wherein the shut-off valve is a three-way valve disposed at a point at which the manifold meets the liquid line.

【Claim 5】

The liquefied gas supply system according to claim 1, further comprising:

a vent mast;

a second connection line connecting the liquid line to the vent mast,

wherein the gas discharged from the second storage tank to which the boil-off gas is supplied is an inert gas, and the inert gas is transferred from the second storage tank to the vent mast.

【Claim 6】

A method of supplying liquefied gas from a liquefied gas supply vessel to a vessel including multiple liquefied gas storage tanks using a system for supplying liquefied gas, the system comprising:

a liquid line along which the liquefied gas is supplied from the liquefied gas supply vessel to the multiple liquefied gas storage tanks;

a gas line along which boil-off gas generated in the one liquefied gas storage tank is discharged;

a first liquid line branched off from the liquid line to a first storage tank among the multiple liquefied gas storage tanks;

a second liquid line branched off from the liquid line to a second storage tank among the multiple liquefied gas storage tanks;

a first gas line branched off from the gas line to the first storage tank;

a second gas line branched off from the gas line to the second storage tank;

a first connection line branched off from the liquid line on the opposite side of the branch point of the first liquid line based on the branch point of the second liquid line and connected to the second liquid line; and

a shut-off valve provided to the liquid line between the branch point of the first connection line and the branch point of the second liquid line to block and open a flow upstream/downstream of the liquid line;

wherein the liquid line is divided into an upstream part where the branch point of the second liquid line is located and a downstream part where the branch point of the first connection line is located based on the isolation valve, and

wherein a gas is discharged from the second storage tank through the second liquid line, the first connection line and the upstream part of the liquid line,

and the method comprising:

a liquefied gas supply step in which the liquefied gas is supplied from the liquefied gas supply vessel to a first storage tank among the multiple liquefied gas storage tank by flowing a liquid line upstream of a shut-off valve and a first liquid line branched off from the liquid line to the first storage tank;

a boil-off gas discharge step in which boil-off gas is discharged from the first storage tank through a gas line and a first gas line branched off from the gas line to the first storage tank; and

a gassing-up gas supply step in which the boil-off gas discharged from the first storage tank is supplied to the second storage tank among the multiple liquefied

gas storage tank by flowing a second liquid line branched off from the liquid line, liquid line downstream of the shut-off valve and a first connection line branched off from the liquid line and connected to the second liquid line bypassing the shut-off valve,

wherein the liquid line is divided into an upstream part where the branch point of the second liquid line is located and a downstream part where the branch point of the first connection line is located based on the isolation valve, and a gas is discharged from the second storage tank through the second liquid line, the first connection line and the upstream part of the liquid line.

【Claim 7】

The liquefied gas supply method according to claim 6, wherein the boil-off gas discharged in the boil-off gas discharge step is heated and supplied to the second storage tanks.

【Claim 8】

The liquefied gas supply method according to claim 6, wherein the inert gas discharge step comprises: a shut-off step in which a portion of the liquid line along which the liquefied gas flows to the first storage tank is blocked from a portion of the liquid line along which the inert gas flows from the second storage tank.