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(54) **DEVICE AND METHOD FOR PROVIDING LIQUEFIED NATURAL GAS**

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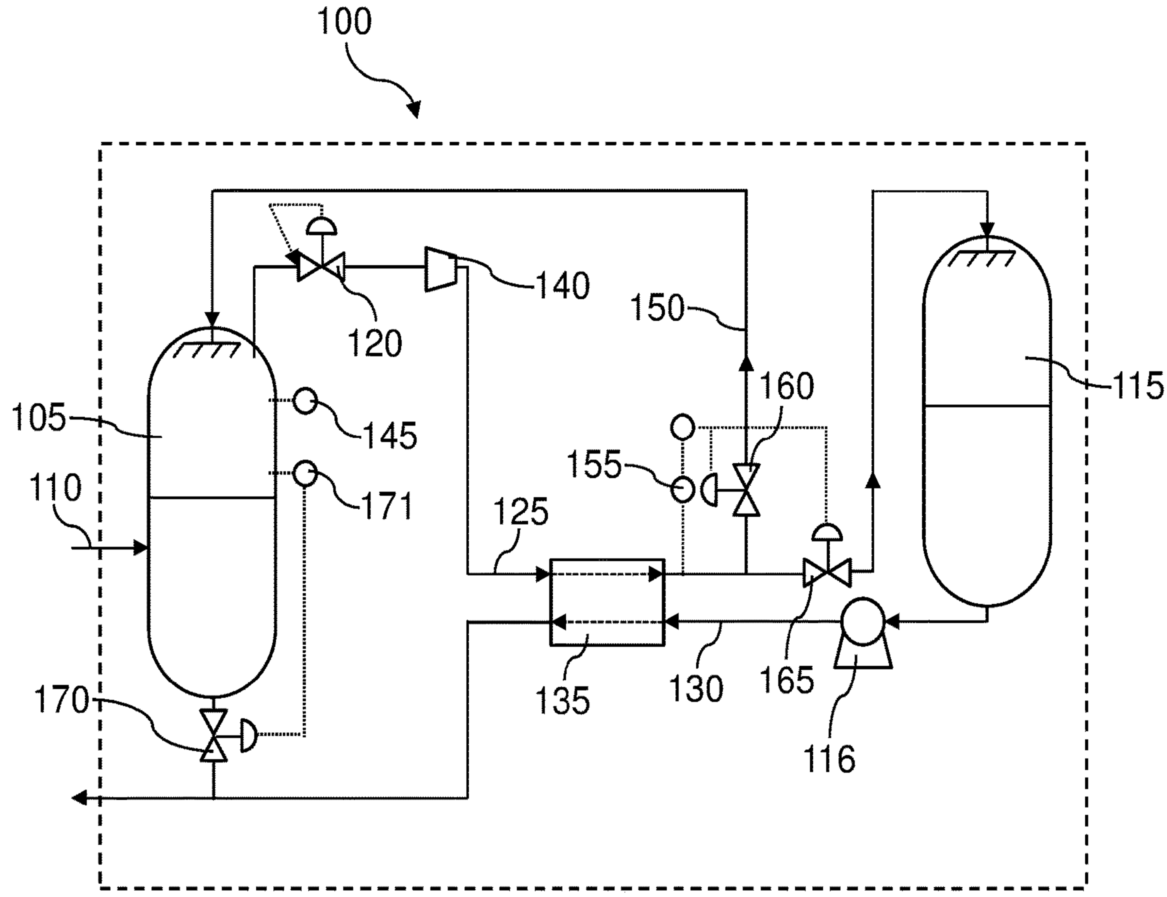
(57) **ABSTRACT**

The device (**100**) for providing liquefied natural gas, referred to as LNG, comprises:
- an evaporation gas buffer tank (**105**) comprising an inlet (**110**) for evaporation gas suitable for receiving evaporation gas from a third-party device,
- a member (**115**) for transferring evaporation gas from the buffer tank to an LNG storage capacity (**120**),
- downstream from the transfer member (**120**), a compressor (**140**) for compressing the evaporation gas,
- an evaporation gas transfer pipe (**125**) for transferring evaporation gas from the transfer member to the storage capacity,
- the LNG storage capacity,
- an LNG transfer pipe (**130**) for transferring LNG from the storage capacity to a third-party device and
- a heat exchanger (**135**) for exchanging heat between evaporation gas passing through the evaporation gas transfer pipe and LNG passing through the LNG transfer pipe configured to liquefy or cool the evaporation gas.



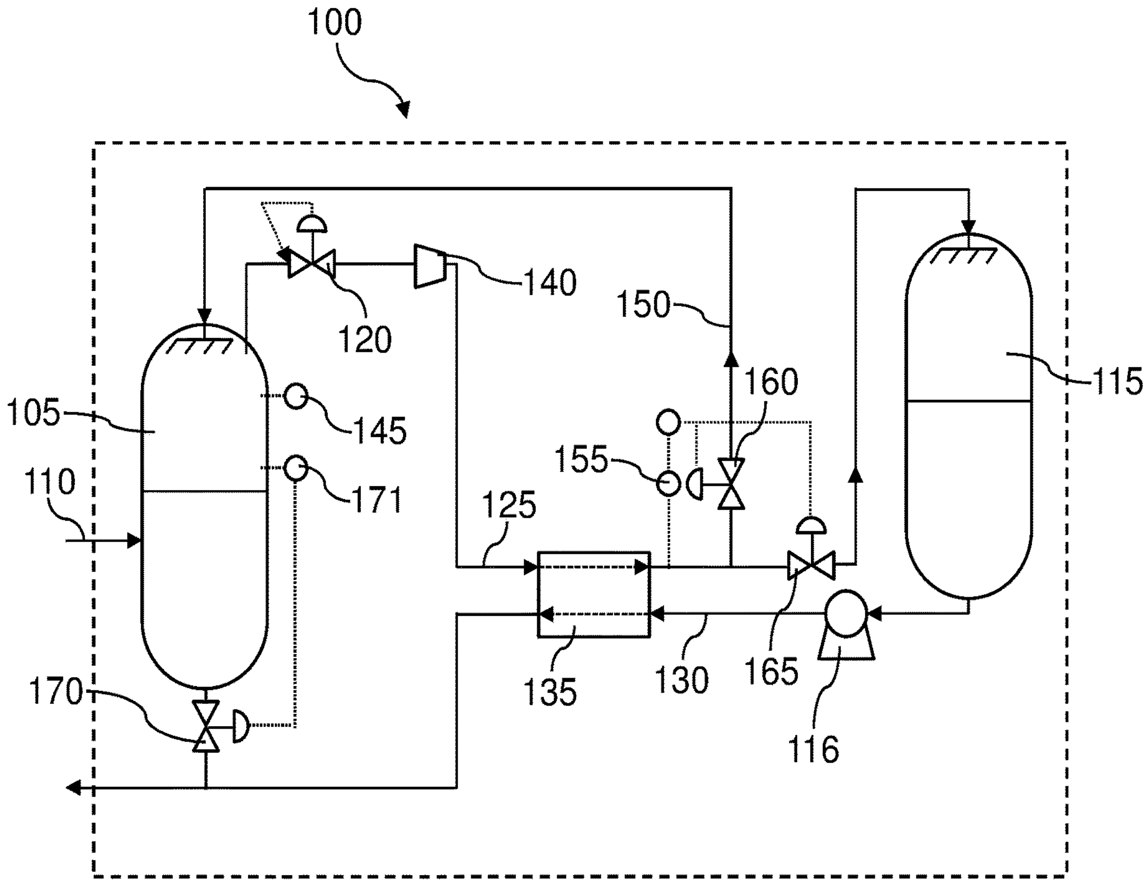



Figure 1

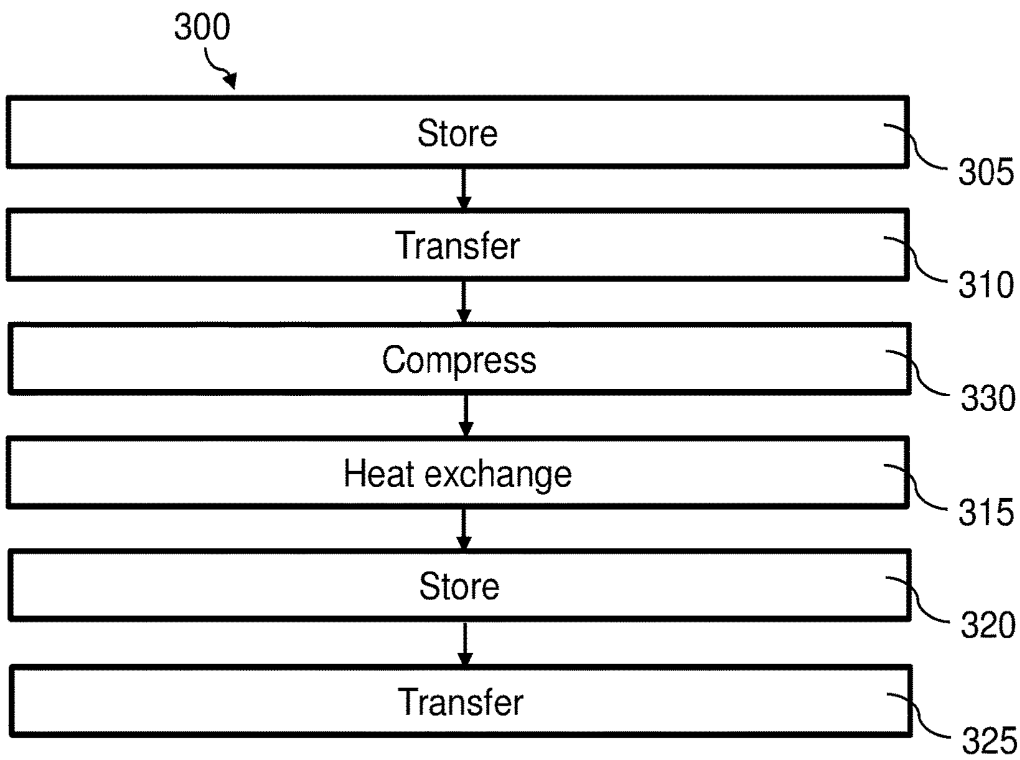



Figure 2

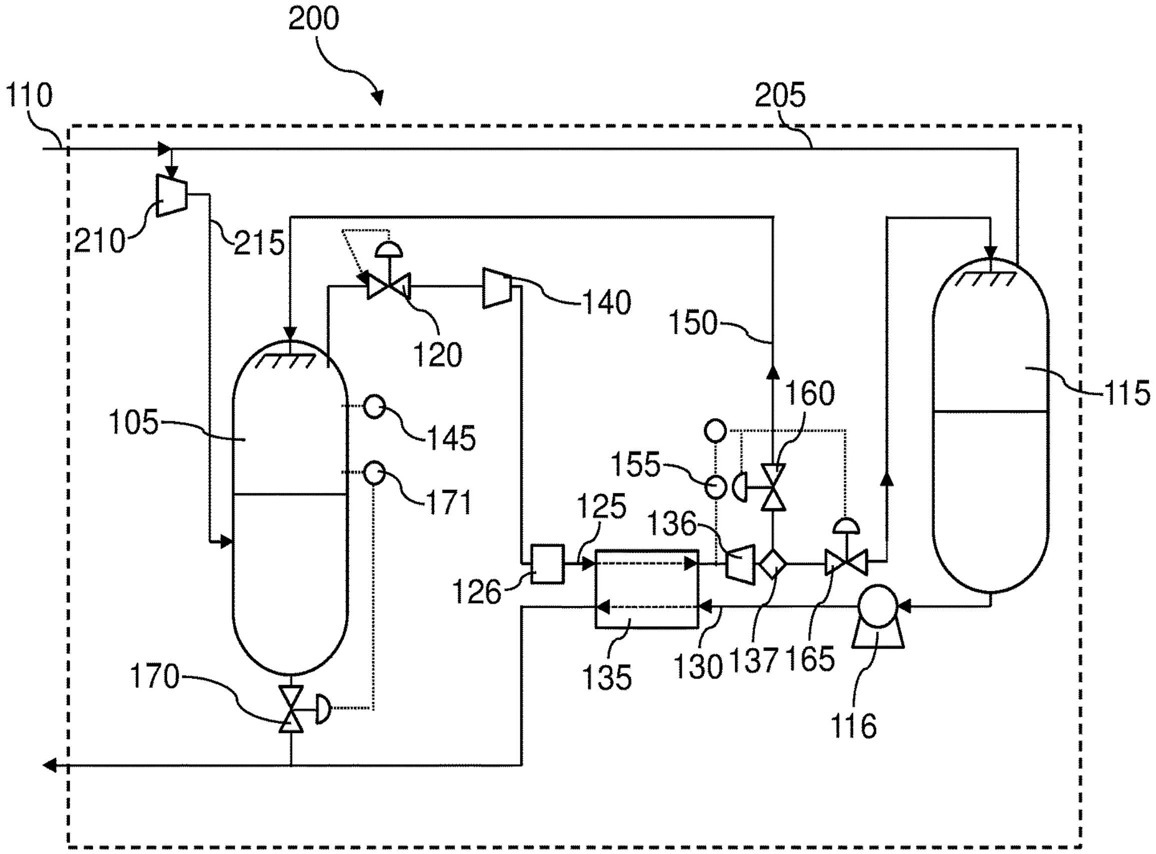

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Figure 3

# DEVICE AND METHOD FOR PROVIDING LIQUEFIED NATURAL GAS

## TECHNICAL FIELD OF THE INVENTION

**[0001]** The present invention relates to a device and method for providing liquefied natural gas. It applies, in particular, to the field of the provision of LNG suitable for land- and sea-going vessels.

## STATE OF THE ART

**[0002]** The use of liquefied natural gas (hereinafter "LNG") as a road or marine fuel is expanding rapidly, boosted by the environmental and economic advantages that LNG offers compared to other fossil fuels.

**[0003]** In general, LNG service stations consist of an LNG receiving system, cryogenic storage allowing the LNG to be stored in a subcooled state at an operating pressure generally between 7 and 9 bar, a cryogenic pump enabling the LNG to be transferred, and a distribution system for fueling the vehicle.

**[0004]** Today, three categories of vehicles are likely to be refueled with LNG:

- **[0005]** a first category is fueled with cold LNG, i.e. having a pressure of 3 bar;
- **[0006]** a second category is fueled with saturated LNG, having a pressure of 8 bar; and
- **[0007]** a third category is fueled with super saturated LNG, having a pressure of 18 bar.

**[0008]** Currently, most vehicles have a pressure of 8 bar. There is relatively significant LNG vaporization, creating BOG (Boil-off gas), during the refueling of 8- and 18-bar vehicles. Vehicle tanks have been sized to withstand rises in pressure, but the design of this equipment is nevertheless restricted by a maximum allowable pressure.

**[0009]** Thus, to prevent this maximum pressure being reached there is a return of gas from the vehicle to the station, leading to a significant release of gas into the atmosphere.

**[0010]** This gas returned to the LNG storage is a source of heat for the LNG, boosting LNG evaporation and therefore increasing the pressure in the storage. These evaporations or BOGs must be managed without being released into the atmosphere.

**[0011]** As well as the product losses incurred, this adds to the site's operational complexity.

**[0012]** Furthermore, the LNG stored in the service station's storage tank is generally in a subcooled state. The heat source allowing the LNG to be brought to saturation (8 bar and 18 bar) comes from the open air, requiring the installation of a substantial exchanger surface on site.

**[0013]** In addition, there are two methods of providing LNG fuel for 8- and 18-bar vehicles:

- **[0014]** the bulk saturation method, which consists of storing the LNG at saturation; and
- **[0015]** a method consisting of using an 'LNG saturation on the fly' module designed to provide LNG at saturation from subcooled LNG.

**[0016]** With regard to compressed LNG (CLNG) service stations, storage of the returned gas in a buffer tank for CNG use is known. Some LNG stations accept the returned gas and are not concerned about its impact on the generation of BOG. These stations are generally equipped with a BOG liquefaction system.

**[0017]** The current solutions use air vaporizers to obtain saturated LNG, requiring very large exchange surfaces and a significant footprint.

**[0018]** The "saturation on the fly" systems have the drawbacks of requiring very efficient, but costly, exchangers, and needing a very complex control system, which poses the problem of operational stability.

**[0019]** Lastly, the bulk saturation systems cannot fuel vehicles operating at a pressure of 3 bar, and have reduced storage capacity and storage time.

**[0020]** It should be noted that, in the case of stations equipped with BOG liquefaction systems, these systems are expensive and have no potential return on investment.

## SUBJECT OF THE INVENTION

**[0021]** The present invention aims to remedy all or part of these drawbacks.

**[0022]** To this end, according to a first aspect, the present invention envisages a device for providing liquefied natural gas, referred to as LNG, which comprises:

- **[0023]** a buffer tank for evaporation gas, comprising an inlet for evaporation gas suitable for receiving evaporation gas from a third-party device;
- **[0024]** a transfer member for transferring evaporation gas from the buffer tank to an LNG storage capacity;
- **[0025]** downstream from the transfer member, a compressor for compressing the evaporation gas;
- **[0026]** an evaporation gas transfer pipe for transferring evaporation gas from the transfer member to the storage capacity;
- **[0027]** the LNG storage capacity;
- **[0028]** an LNG transfer pipe for transferring LNG from the storage capacity to a third-party device; and
- **[0029]** a heat exchanger for exchanging heat between evaporation gas passing through the evaporation gas transfer pipe and LNG passing through the LNG transfer pipe, configured to liquefy or cool the evaporation gas.

**[0030]** Thanks to these provisions, the evaporation gas transferred from the buffer tank to the storage capacity is liquefied, which enables the LNG stored in the capacity to be kept at a low temperature, reducing the formation of BOG in this capacity.

**[0031]** These provisions also improve the performance of the device in terms of liquefaction of the evaporation gas.

**[0032]** In some embodiments, the transfer member is a valve controlled as a function of a value of the pressure inside the buffer tank measured by a pressure sensor, or a discharge device.

**[0033]** In some embodiments, the evaporation gas and the LNG circulate in opposite directions inside the heat exchanger.

**[0034]** These embodiments improve the performance of the device in terms of liquefaction of the evaporation gas.

**[0035]** In some embodiments, the buffer tank has an operating pressure value at least two bar greater than the operating pressure value of the storage capacity.

**[0036]** These embodiments allow the evaporation gas to flow naturally from the buffer tank to the storage capacity.

**[0037]** In some embodiments, the device that is the subject of the present invention comprises, downstream from the heat exchanger, a bypass of the transfer pipe for liquefied or cooled evaporation gas in the heat exchanger, the provision of evaporation gas to the bypass being controlled as a function of a temperature measured by a temperature sensor for the evaporation gas on exit from the heat exchanger.

**[0038]** These embodiments allow evaporation gas that has not reached a defined temperature value to be recycled.

**[0039]** In some embodiments, the device that is the subject of the present invention comprises a first valve on the bypass and a second valve on the evaporation gas transfer pipe downstream from the bypass, the opening of the first or second valve being controlled as a function of the evaporation gas temperature measured.

**[0040]** These embodiments allow evaporation gas that has not reached a defined temperature value to be recycled.

**[0041]** In some embodiments, the device that is the subject of the present invention comprises a member for transferring liquefied evaporation gas from the buffer tank to the LNG transfer pipe.

**[0042]** These embodiments make it possible to saturate the LNG transferred to the third-party device.

**[0043]** In some embodiments, the device that is the subject of the present invention comprises:

- **[0044]** an extraction line for extracting evaporation gas inside the storage capacity;
- **[0045]** a compressor for compressing evaporation gas passing through the extraction line; and
- **[0046]** a supply line for supplying compressed evaporation gas to the buffer tank.

**[0047]** These embodiments allow the storage volume required by the buffer tank to be minimized.

**[0048]** In some embodiments, the evaporation gas compressor comprises the inlet for evaporation gas suitable for receiving evaporation gas from a third-party device.

**[0049]** In some embodiments, the device that is the subject of the present invention comprises a means for cooling the evaporation gas flow downstream from the transfer member.

**[0050]** These embodiments make it possible to partially or fully cool or liquefy an evaporation gas flow on exit from the heat exchanger.

**[0051]** In some embodiments, the device that is the subject of the present invention comprises, downstream from the heat exchanger, a regulator for the gaseous flow, configured to expand the liquefied natural gas to a defined pressure.

**[0052]** In some embodiments, the device that is the subject of the present invention comprises, downstream from the regulator, a gas/liquid separator, the gaseous evaporation gas being supplied to the bypass and the liquid evaporation gas being supplied to the storage capacity.

**[0053]** According to a second aspect, the present invention envisages a method for providing liquefied natural gas, referred to as LNG, which comprises:

- **[0054]** a step of storing evaporation gas from a third-party device in an evaporation gas buffer tank comprising an evaporation gas inlet suitable for receiving evaporation gas from a third-party device;
- **[0055]** a step of transferring evaporation gas from the buffer tank to an LNG storage capacity;
- **[0056]** downstream from the transfer step, a step of compressing the evaporation gas;
- **[0057]** a step of exchanging heat between the transferred evaporation gas and the LNG transferred to a third-party device from the LNG storage capacity in order to liquefy or cool the evaporation gas;
- **[0058]** a step of storing LNG in the storage capacity;
- **[0059]** a step of transferring LNG from the storage capacity to a third-party device.

**[0060]** As the particular aims, advantages and features of the method that is the subject of the present invention are similar to those of the device that is the subject of the present invention, they are not repeated here.

## BRIEF DESCRIPTION OF THE FIGURES

**[0061]** Other advantages, aims and particular features of the invention will become apparent from the non-limiting description that follows of at least one particular embodiment of the device and method that are the subjects of the present invention, with reference to drawings included in an appendix, wherein:

**[0062]** FIG. **1** represents, schematically, a first particular embodiment of the device that is the subject of the present invention;

**[0063]** FIG. **2** represents, schematically and in the form of a logical diagram, a particular series of steps of the method that is the subject of the present invention; and

**[0064]** FIG. **3** represents, schematically, a second particular embodiment of the device that is the subject of the present invention.

## DESCRIPTION OF EXAMPLES OF REALIZATION OF THE INVENTION

**[0065]** The present description is given in a non-limiting way, each characteristic of an embodiment being able to be combined with any other characteristic of any other embodiment in an advantageous way.

**[0066]** It is now noted that the figures are not to scale.

**[0067]** Subsequently, "third-party device" will refer to any device using LNG to produce energy. Such a third-party device is, for example, a land, sea, river or air vehicle.

**[0068]** FIG. **1**, which is not to scale, shows a schematic view of an embodiment of the device **100** that is the subject of the present invention. This device **100** for providing liquefied natural gas, referred to as LNG, comprises:

- **[0069]** an evaporation gas buffer tank **105** comprising an inlet **110** for evaporation gas suitable for receiving evaporation gas from a third-party device;
- **[0070]** a member **120** for transferring evaporation gas from the buffer tank to an LNG storage capacity **115**;
- **[0071]** an evaporation gas transfer pipe **125** for transferring evaporation gas from the transfer member to the storage capacity;
- **[0072]** the LNG storage capacity;
- **[0073]** an LNG transfer pipe **130** for transferring LNG from the storage capacity to a third-party device; and
- **[0074]** a heat exchanger **135** for exchanging heat between evaporation gas passing through the evaporation gas transfer pipe and LNG passing through the LNG transfer pipe, configured to liquefy or cool the evaporation gas.

**[0075]** The tank **105** is, for example, an evaporation gas storage volume designed to hold a predefined amount of evaporation gas in a defined pressure range. The inlet **110** is, for example, a hole made in the storage volume and configured to receive an injector for injecting evaporation gas into the volume. Such an injector is, for example, a nozzle or a one-way valve.

**[0076]** This tank **105** is configured, for example, to operate at an operating pressure greater than 11 bar.

[0077] This tank **105** has, for example, a one cubic meter capacity, and the capacity **115** has, for example, an eighty cubic meters capacity.

[0078] The inlet **110** is preferably linked to a connector with the third-party device configured to collect the evaporation gas returned. The type of connector depends on the standard used by the third-party device and the envisaged purpose of the device **100**.

[0079] The evaporation gas is supplied from the third-party device to the tank **105**, for example, by means of the pressure gradient.

[0080] This tank **105** is equipped, preferably in the upper portion, with an evaporation gas outlet linked to the transfer member **115**. The transfer member **115** is, for example, a discharge device or a valve controlled as a function of a pressure value measured inside the tank **105**. This pressure value is measured, for example, by a pressure sensor **145**. When the measured pressure is above a setpoint value, the valve is opened.

[0081] The choice of this setpoint value is arbitrary, and is set by the operator. It depends on the design and cost objectives of the station. For example, a setpoint pressure of 15 or 16 bar can be utilized if the station is sized to supply vehicles operating at 18 bar.

[0082] The gas transfer pipe **125** links the transfer member **115** to the storage capacity **115**. Preferably, the device **100** comprises, downstream from the transfer member **120**, a compressor **140** or a booster.

[0083] Such a compressor **140** is, for example, a reciprocating compressor, preferably a reciprocating piston compressor type.

[0084] On exit from the compressor **140** or booster, the gas has sufficient pressure to overcome the load losses of the circuit and enable recycling to be realized. The choice of discharge pressure is set as a function of sizing objectives for the station and of the operating mode desired by the operator.

[0085] The evaporation gas, compressed or not by the compressor **140** according to the presence of the compressor **140** in the device **100**, passes through the heat exchanger **135**.

[0086] The heat exchanger **135** is, for example, a finned or plate exchanger exchanging heat between the evaporation gas passing through the transfer pipe **125** and the LNG passing through the transfer pipe **130**. The evaporation gas acts as hot fluid and the LNG as cold fluid, such that the outlet evaporation gas temperature is lower than the inlet evaporation gas temperature in the heat exchanger **135**. Preferably, the heat exchanger **135** is designed such that the evaporation gas is liquefied or cooled on exit from the heat exchanger **135** for defined LNG and evaporation gas flow rates.

[0087] The heat exchanger **135** is also designed, preferably, to heat the LNG to a defined temperature. The flow rate of gas passing through the transfer pipe **125** is adjusted as a function of said temperature. If the temperature of the LNG has to be raised, the gas transfer flow rate in the pipe **125** is increased.

[0088] Preferably, the LNG and evaporation gas circulate in opposite directions so as to optimize the heat exchange between the two fluids.

[0089] The storage capacity **115** is, for example, an evaporation gas storage volume designed to hold a predefined amount of LNG in a defined pressure range. The capacity **115** preferably comprises an inlet for liquefied evaporation gas. This inlet is, for example, a hole made in the storage capacity and configured to receive an injector for injecting liquefied evaporation gas into the volume. Such an injector is, for example, a nozzle or a one-way valve.

[0090] The capacity **115** is configured to operate, for example, at a pressure of 7 to 9 bar.

[0091] Preferably, the operating pressure inside the storage capacity **115** is at least two bar less than the operating pressure inside the buffer tank **105**.

[0092] The capacity **115** is equipped with an outlet for LNG, preferably in the lower portion, linked to the transfer pipe **130**.

[0093] The transfer pipe **130** is linked to a connector whose nature depends on the type of third-party device connected to the device **100**.

[0094] In some variants, the device **100** comprises a pump **116** configured to facilitate the transfer of LNG from the capacity **115** to the third-party device.

[0095] In some preferred embodiments, such as that shown in FIG. **1**, the device **100** comprises, downstream from the heat exchanger **135**, a bypass **150** of the transfer pipe **125** for liquefied or cooled evaporation gas in the heat exchanger, the provision of evaporation gas to the bypass being controlled as a function of a temperature measured by a temperature sensor **155** for the evaporation gas on exit from the heat exchanger.

[0096] In some preferred embodiments, such as that shown in FIG. **1**, the device **100** comprises a first valve **160** on the bypass **150** and a second valve **165** on the evaporation gas transfer pipe **125** downstream from the bypass, the opening of the first or second valve being controlled as a function of the evaporation gas temperature measured.

[0097] When the evaporation gas has a temperature below a predefined threshold temperature, the first valve **160** is open and the second valve **165** is closed. Conversely, when the evaporation gas has a temperature above the predefined threshold temperature, the first valve **160** is closed and the second valve **165** is open.

[0098] In some preferred embodiments, such as that shown in FIG. **1**, the device **100** comprises a member **170** for transferring liquefied evaporation gas from the buffer tank **105** to the LNG transfer pipe **130**.

[0099] The member **170** is, for example, a valve controlled as a function of the pressure measured inside the storage tank **105** by a pressure sensor **171**.

[0100] FIG. **3**, which is not to scale, shows a schematic view of an embodiment of the device **200** that is the subject of the present invention. This device **200** for providing liquefied natural gas, referred to as LNG, comprises:

[0101] an evaporation gas buffer tank **105** comprising an inlet **110** for evaporation gas suitable for receiving evaporation gas from a third-party device;

- [0102] a member **115** for transferring evaporation gas from the buffer tank to an LNG storage capacity **120**;
- [0103] downstream from the transfer member **120**, a compressor **140** for compressing the evaporation gas;
- [0104] an evaporation gas transfer pipe **125** for transferring evaporation gas from the transfer member to the storage capacity;
- [0105] the LNG storage capacity;
- [0106] an LNG transfer pipe **130** for transferring LNG from the storage capacity to a third-party device; and

[0107] a heat exchanger **135** for exchanging heat between evaporation gas passing through the evaporation gas transfer pipe and LNG passing through the LNG transfer pipe, configured to liquefy or cool the evaporation gas.

[0108] The tank **105** is, for example, an evaporation gas storage volume designed to hold a predefined amount of evaporation gas in a defined pressure range. The inlet **110** is, for example, a hole made in the storage volume and configured to receive an injector for injecting evaporation gas into the volume. Such an injector is, for example, a nozzle or a one-way valve.

[0109] The tank **105** is, for example, configured to operate at an operating pressure greater than 30 bar.

[0110] This tank **105** has, for example, a one cubic meter capacity, and the capacity **115** has, for example, an eighty cubic meters capacity.

[0111] The inlet **110** is preferably linked to a connector with the third-party device configured to collect the evaporation gas returned. The type of connector depends on the standard used by the third-party device and the envisaged purpose of the device **200**.

[0112] The evaporation gas is supplied from the third-party device to the tank **105**, for example, by means of the pressure gradient, or thanks to the use of a booster.

[0113] This tank **105** is equipped, preferably in the upper portion, with an evaporation gas outlet linked to the transfer member **115**. The transfer member **115** is, for example, a discharge device or a valve controlled as a function of a pressure value measured inside the tank **105**. This pressure value is measured, for example, by a pressure sensor **145**. When the measured pressure is above a setpoint value, the valve is opened.

[0114] The setpoint value is chosen, for example, to correspond to the maximum operating pressure of the capacity **105**. Note that the operator can also permit the transfer of gas remotely without this maximum pressure being reached, if necessary, by a second on-off valve, for example.

[0115] The gas transfer pipe **125** links the transfer member **115** to the storage capacity **115**. Preferably, the device **200** comprises, downstream from the transfer member **120**, a compressor **140**.

[0116] On exit from the compressor **140** the gas has, for example, a pressure greater than or equal to 50 bar.

[0117] The evaporation gas, compressed or not by the compressor **140** according to the presence of the compressor **140** in the device **200**, passes through the heat exchanger **135**.

[0118] In some embodiments, such as that shown in FIG. **3**, the device **200** comprises a means **126** for cooling the evaporation gas flow downstream from the transfer member **120**. This cooling means **126** is, for example, a heat exchanger utilizing liquid nitrogen as cold fluid. On exit from the heat exchanger **135**, the evaporation gas flow is preferably two-phase, i.e. partially liquid and partially gaseous, or more generally cooled. This flow can be injected into the storage capacity **115**.

[0119] In some embodiments, such as that shown in FIG. **3**, the device **200** comprises, downstream from the heat exchanger **135**, a regulator **136** for the gaseous flow, configured to expand the liquefied natural gas to a defined pressure.

[0120] In some embodiments, such as that shown in FIG. **3**, the device **200** comprises, downstream from the regulator **136**, a gas/liquid separator **137**, the gaseous evaporation gas being supplied to the bypass **150** and the liquid evaporation gas being supplied to the storage capacity **115**.

[0121] The separator **137** is, for example, a separator drum.

[0122] The heat exchanger **135** is, for example, a finned or plate exchanger exchanging heat between the evaporation gas passing through the transfer pipe **125** and the LNG passing through the transfer pipe **130**. The evaporation gas acts as hot fluid and the LNG as cold fluid, such that the outlet evaporation gas temperature is lower than the inlet evaporation gas temperature in the heat exchanger **135**.

[0123] Preferably, the heat exchanger **135** is designed such that the evaporation gas is liquefied or cooled on exit from the heat exchanger **135** for defined LNG and evaporation gas flow rates.

[0124] The heat exchanger **135** is also designed, preferably, to heat the LNG to a defined temperature. The flow rate of gas passing through the transfer pipe **125** is adjusted as a function of said temperature. If the temperature of the LNG has to be raised, the gas transfer flow rate in the pipe **125** is increased.

[0125] Preferably, the LNG and evaporation gas circulate in opposite directions so as to optimize the heat exchange between the two fluids.

[0126] The storage capacity **115** is, for example, an evaporation gas storage volume designed to hold a predefined amount of LNG in a defined pressure range. The capacity **115** preferably comprises an inlet for liquefied evaporation gas. This inlet is, for example, a hole made in the storage capacity and configured to receive an injector for injecting liquefied evaporation gas into the volume. Such an injector is, for example, a nozzle or a one-way valve.

[0127] The capacity **115** has, for example, an operating pressure value between 7 and 9 bar.

[0128] Preferably, the operating pressure inside the storage capacity **115** is at least two bar less than the operating pressure inside the buffer tank **105**.

[0129] The capacity **115** is equipped with an outlet for LNG, preferably in the lower portion, linked to the transfer pipe **130**.

[0130] The transfer pipe **130** is linked to a connector whose nature depends on the type of third-party device connected to the device **200**.

[0131] In some variants, the device **200** comprises a pump **116** configured to facilitate the transfer of LNG from the capacity **115** to the third-party device.

[0132] In some preferred embodiments, such as that shown in FIG. **3**, the device **200** comprises, downstream from the heat exchanger **135**, a bypass **150** of the transfer pipe **125** for liquefied or cooled evaporation gas in the heat exchanger, the provision of evaporation gas to the bypass being controlled as a function of a temperature measured by a temperature sensor **155** for the evaporation gas on exit from the heat exchanger.

[0133] In some preferred embodiments, such as that shown in FIG. **3**, the device **200** comprises a first valve **160** on the bypass **150** and a second valve **165** on the evaporation gas transfer pipe **125** downstream from the bypass, the opening of the first or second valve being controlled as a function of the evaporation gas temperature measured.

[0134] When the evaporation gas has a temperature below a predefined threshold temperature, the first valve **160** is open and the second valve **165** is closed. Conversely, when the evaporation gas has a temperature above the predefined threshold temperature, the first valve **160** is closed and the second valve **165** is open.

**[0135]** In some preferred embodiments, such as that shown in FIG. **3**, the device **200** comprises a member **170** for transferring liquefied evaporation gas from the buffer tank **105** to the LNG transfer pipe **130**.

**[0136]** The member **170** is, for example, a valve controlled as a function of the pressure measured inside the storage tank **105** by a pressure sensor **171**.

**[0137]** In some preferred embodiments, such as that shown in FIG. **3**, the device **200** comprises:

**[0138]** an extraction line **205** for extracting evaporation gas inside the storage capacity **115**;

**[0139]** a compressor **210** for compressing evaporation gas passing through the extraction line; and

**[0140]** a supply line **215** for supplying compressed evaporation gas to the buffer tank **105**.

**[0141]** The line **205** is preferably linked to the upper portion of the storage capacity **115**.

**[0142]** The compressor **210** is configured to, for example, bring the gas pressure to a value greater than 30 bar.

**[0143]** In some preferred embodiments, such as that shown in FIG. **3**, the evaporation gas compressor **210** comprises the inlet **110** for evaporation gas suitable for receiving evaporation gas from a third-party device.

**[0144]** FIG. **2** shows, schematically, a particular embodiment of the method **300** that is the subject of the present invention. This method **300** for providing liquefied natural gas, referred to as LNG, is characterized in that it comprises:

**[0145]** a step **305** of storing evaporation gas from a third-party device in an evaporation gas buffer tank comprising an inlet for evaporation gas suitable for receiving evaporation gas from a third-party device;

**[0146]** a step **310** of transferring evaporation gas from the buffer tank to an LNG storage capacity;

**[0147]** downstream from the transfer step **310**, a compression step **330** for compressing the evaporation gas;

**[0148]** a step **315** of exchanging heat between the transferred evaporation gas and the LNG transferred to a third-party device from the LNG storage capacity in order to liquefy or cool the evaporation gas;

**[0149]** a step **320** of storing LNG in the storage capacity;

**[0150]** a step **325** of transferring LNG from the storage capacity to a third-party device.

**[0151]** The operation of this method **200** is performed, for example, by utilizing devices **100** and **300**, as described with reference to FIGS. **1** and **3**, all the variants and embodiments of devices **100** and **300** can be transposed in the form of steps of the method **200**.

**1**. A device for providing liquefied natural gas, referred to as LNG, comprising:

an evaporation gas buffer tank comprising an inlet for evaporation gas suitable for receiving evaporation gas from a third-party device;

a member for transferring evaporation gas from the buffer tank to an LNG storage capacity;

downstream from the transfer member, a compressor for compressing the evaporation gas;

an evaporation gas transfer pipe for transferring evaporation gas from the transfer member to the storage capacity;

the LNG storage capacity;

an LNG transfer pipe for transferring LNG from the storage capacity to a third-party device; and

a heat exchanger for exchanging heat between evaporation gas passing through the evaporation gas transfer pipe and LNG passing through the LNG transfer pipe, configured to liquefy or cool the evaporation gas.

**2**. A device according to claim **1**, wherein the transfer member is a valve controlled as a function of a value of the pressure inside the buffer tank measured by a pressure sensor, or a discharge device.

**3**. A device according to claim **1**, wherein the evaporation gas and the LNG circulate in opposite directions inside the heat exchanger.

**4**. A device according to claim **1**, wherein the buffer tank has an operating pressure value at least two bar greater than the operating pressure value of the storage capacity.

**5**. A device according to claim **1**, which comprises, downstream from the heat exchanger, a bypass of the transfer pipe for liquefied or cooled evaporation gas in the heat exchanger, the provision of evaporation gas to the bypass being controlled as a function of a temperature measured by a temperature sensor for the evaporation gas on exit from the heat exchanger.

**6**. A device according to claim **5**, which comprises a first valve on the bypass and a second valve on the evaporation gas transfer pipe downstream from the bypass, the opening of the first or second valve being controlled as a function of the evaporation gas temperature measured.

**7**. A device according to claim **1**, which comprises a member for transferring liquefied evaporation gas from the buffer tank to the LNG transfer pipe.

**8**. A device according to claim **1**, which comprises:

an extraction line for extracting evaporation gas inside the storage capacity;

a compressor for compressing evaporation gas passing through the extraction line; and

a supply line for supplying compressed evaporation gas to the buffer tank.

**9**. A device according to claim **8**, wherein the evaporation gas compressor comprises the inlet for evaporation gas suitable for receiving evaporation gas from a third-party device.

**10**. A device according to claim **1**, which comprises a means for cooling the evaporation gas flow downstream from the transfer member.

**11**. A device according to claim **10**, which comprises, downstream from the heat exchanger, a regulator for the gaseous flow, configured to expand the liquefied natural gas to a defined pressure.

**12**. A device according to claim **5**, which comprises, downstream from the regulator, a gas/liquid separator, the gaseous evaporation gas being supplied to the bypass and the liquid evaporation gas being supplied to the storage capacity.

**13**. A method for providing liquefied natural gas, referred to as LNG, comprising:

a step of storing evaporation gas from a third-party device in an evaporation gas buffer tank comprising an inlet for evaporation gas suitable for receiving evaporation gas from a third-party device;

a step of transferring evaporation gas from the buffer tank to an LNG storage capacity;

downstream from the transfer step, a compression step for compressing the evaporation gas;

a step of exchanging heat between the transferred evaporation gas and the LNG transferred to a third-party device from the LNG storage capacity in order to liquefy or cool the evaporation gas;

a step of storing LNG in the storage capacity;

a step of transferring LNG from the storage capacity to a third-party device.

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