(19) DANMARK

Patent- og
Varemærkestyrelsen

(10) **DK/EP 3510317 T3**

(12) Oversættelse af
europæisk patentskrift

(51) Int.Cl.: ***F 17 C 5/04 (2006.01)***

(45) Oversættelsen bekendtgjort den: **2023-02-06**

(80) Dato for Den Europæiske Patentmyndigheds
bekendtgørelse om meddelelse af patentet: **2022-11-16**

(86) Europæisk ansøgning nr.: **17748836.8**

(86) Europæisk indleveringsdag: **2017-07-19**

(87) Den europæiske ansøgnings publiceringsdag: **2019-07-17**

(86) International ansøgning nr.: **FR2017051964**

(87) Internationalt publikationsnr.: **WO2018046809**

(30) Prioritet: **2016-09-06 FR 1658258**

(84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**

(73) Patenthaver: **L'Air Liquide Société Anonyme pour l'Etude et l'Exploitation des Procédés Georges Claude, 75 quai d'Orsay, 75007 Paris, Frankrig**

(72) Opfinder: **Bernhardt, Jean-Marc, 103 rue de l'Isère, 38500 LA BUISSE, Frankrig**
DURAND, Fabien, 85 Allée de la Fontaine aux Merles, 38340 Voreppe, Frankrig
GONDRAND, Cécile, 49 rue du Vercors, 38000 Grenoble, Frankrig
GRABIE, Véronique, 119 impasse des jardins des Bérards, 38500 Coublevie, Frankrig

(74) Fuldmægtig i Danmark: **RWS Group, Europa House, Chiltern Park, Chiltern Hill, Chalfont St Peter, Bucks SL9 9FG, Storbritannien**

(54) Benævnelse: **INSTALLATION OG FREMGANGSMÅDE TIL LAGRING OG FORTÆTNING AF ET FLYDENDE GAS SAMT TILHØRENDE TRANSPORTKØRETØJ**

(56) Fremdragne publikationer:
EP-A1- 1 682 814
DE-A1-102013 018 333
FR-A1- 3 028 306
US-A- 3 302 416
US-A1- 2010 000 253

Description

The present invention relates to a facility for storing and cooling a liquefied gas, for example, a liquefied natural gas. Furthermore, the present invention relates to a storage method for storing a liquefied gas.

A facility for storing liquefied natural gas is known from document US 3302416 A that allows the liquefied natural gas to be stored while it is transported to another building. The cooling device disclosed in document US 3302416 A comprises a plurality of compressors, a plurality of engines, a plurality of heat exchangers configured to cool the liquefied gas coming from the tank and at least one refrigeration source outside the gas storage facility. The refrigeration source corresponds to an item of equipment that is independent relative to the compressors, exchangers, etc. forming the storage facility and allows limited amounts of stored liquefied gas to be sub-cooled in order to be able to avoid a heat gain in said facility and allows the sub-cooled liquid to be reinjected into various zones of the storage space so as to provide relatively uniform temperature conditions in the stored liquid gas with minimal disruption from vapors stratified on the liquid surface. This refrigeration source can be, for example, a container in the form of a cylinder of gas, called cycle gas.

DE102013018333 also discloses a facility for storing liquefied natural gas in accordance with the preamble. However, the storage facility disclosed in this document comprises numerous independent components, which require numerous mutual interconnection interfaces. Furthermore, these numerous components form a large buffer volume that needs to be filled upon each start-up of each cycle. The use of an internal system enables the cycle gas that is used to operate the facility to be stored, said cycle gas being stored in another item of external equipment when it is hot and being reintroduced into the circuit of the facility once it is cool.

Furthermore, in this document, only the transport function is highlighted, there is no reference to the loading and unloading of the liquefied gas. Indeed, this document simply discloses that when the liquefied gas is transported they ensure that the pressure does not increase and therefore everything that evaporates is reliquefied. However, there is no mention of the unloading of said gas once it has reached its destination.

Liquefaction of natural gas makes its marine transportation conceivable and viable. During shipping, under the effects of thermal ingress in the storage units and of buffeting phenomena, large amounts of gas are generated by evaporation. In order to control the resulting pressure fluctuations, this evaporated gas either can be used for propulsion or can be burnt by a flare or can be reliquefied. Any transfer of liquid to a storage unit in which the pressure and temperature conditions differ from those of the original storage unit leads to the evaporation of the liquefied natural gas, for temperature (hot tank) and/or pressure (flashing of the liquid) reasons. This scenario occurs in the following situations: transfer from a supply vessel to a client, filling of a methane carrier at the terminal, refrigeration of the storage units at the end of the unladen return voyage of a methane carrier.

In particular, the aim of the present invention is to fully or partly overcome the aforementioned problems.

The present invention can involve using a facility that is particularly disclosed in document WO 2009/066044. The facility can comprise at least: one cryogenic device intended to transfer heat from a cold source to a hot source via a working fluid or a cycle gas circulating through a working circuit or through a closed cycle circuit, the working circuit comprising the following in series: a portion for isothermal, or substantially isothermal, compression of the fluid, a portion for isobaric, or substantially isobaric, cooling of the fluid, a portion for isothermal, or substantially isothermal, expansion of the fluid and a portion for isobaric, or substantially isobaric, reheating of the fluid. The compression portion comprises at least two compressors disposed in series, at least one exchanger for cooling compressed fluid disposed at the output of each compressor. The expansion portion comprises at least one expansion turbine and at least one exchanger for reheating expanded fluid, with the compressors and the one or more expansion turbine(s) being driven by at least one engine, called high-speed engine. The engine comprises an output shaft, one of the ends of which supports and sets into rotation a first compressor by direct coupling and the other end of which supports and sets into rotation a second compressor or an expansion turbine by direct coupling.

In the present invention, a "high-speed engine" is understood to be an engine typically running at a rotation speed of 10,000 revolutions per minute or several tens of thousands of revolutions per minute. A low-speed engine instead runs at a speed of a few thousand revolutions per minute.

The aim of the invention is a facility for storing and cooling a liquefied gas, for example, a liquefied natural gas, as defined in Claim 1.

By virtue of this configuration of the facility and particularly due to the closed and autonomous cooling circuit, a buffer volume is not required for storing cycle gas, which reduces the total fluid capacity of the circuit. Indeed, in this configuration, cooling is performed initially: the cycle gas is already at a determined and over-designed pressure in all the items of equipment of the cooling circuit.

Furthermore, this configuration is compact and space-saving, as the distance between the items of equipment of the cooling circuit is not significant. This reduced distance allows a reduced amount of cycle gas to be used and therefore avoids having to excessively increase the pressure in order to cool down to reach an operating pressure. Furthermore, as the turbine is mechanically connected to the compressor by means of the engine, the facility can operate with a single compressor, which reduces the size of the facility and the fluid connections between the various items of equipment of the cooling circuit.

Furthermore, the connection line allows cooling of a liquefied gas to be cooled that comes from a container, which is separate and independent from the facility.

In the present application and according to the invention, the term "container, which is separate and independent from the facility" will be understood to mean a container that does not form part of the facility or of the cooling circuit, for example, the container is on the same vessel, on another vessel or on land.

Moreover, the cooling device does not require valves between the compressor and the turbine, since the speed of the engine simply needs to be controlled and commanded in order to regulate the flow of coolant circulating through the first heat exchanger. Thus, the facility is particularly quick to install and commission, which is particularly advantageous when the facility must be installed on a liquefied gas transport vehicle, for example, on a vessel such as a methane carrier.

When the facility is in operation, the first heat exchanger allows liquefied gas coming from the tank to be cooled, via the cycle gas, to a temperature that is below the temperature of the liquefied gas contained in the tank. This cooling is commonly denoted "sub-cooling".

The facility comprises at least one bypass pipe connected to the injection pipe, said bypass pipe being configured to transfer some of the cooled liquefied gas to a remote container, which is separate and independent from the facility.

This allows at least one container, which is separate and independent, to be supplied for the use of cooled liquefied gas.

According to one feature of the invention, the supply line is at least partly coincident with the bypass pipe. Alternatively, the supply line is separate from the bypass pipe.

The engine can be directly connected to the compressor.

The engine can be directly connected to the turbine.

According to one possible feature, the facility further comprises a pump configured to supply the cooling device with liquefied gas in the liquid state coming from the tank. In other words, the cooling circuit is fluidly connected to the pump.

According to one possible feature, the pump is arranged in the lower region of the tank.

According to one feature of the invention, the output of the turbine is directly fluidly connected to the first heat exchanger.

According to one feature of the invention, the output of the compressor is indirectly fluidly connected to the first heat exchanger.

According to one feature of the invention, the cooling circuit further comprises a second heat exchanger configured to generate a heat exchange between the compressed cycle gas coming from the compressor and the expanded cycle gas coming from the turbine.

According to one feature of the invention, the input of the compressor is fluidly connected to the output of the turbine without an intermediate component other than the first heat exchanger and the second heat exchanger.

According to another possible feature, the turbine is fluidly connected to the first heat exchanger by a first connection pipe, without an intermediate component.

According to another possible feature, the compressor is fluidly connected to the first heat exchanger by a second connection pipe.

According to one possible feature, the cooling circuit comprises at least one first connection component mechanically connecting the engine to the compressor, and at least one second connection component mechanically connecting the engine to the turbine.

According to another possible feature, the first connection component comprises a first rotary shaft.

According to another possible feature, the second connection component comprises a second rotary shaft.

According to one possible feature, the cooling circuit is configured to operate on the basis of a Brayton cycle. In the present application, "Brayton cycle" will be understood to mean a thermodynamic cycle developed by George Brayton that generates a gas, which in the present invention is called cycle gas.

According to one feature of the invention, the cooling circuit comprises a third heat exchanger configured to generate a heat exchange between the cycle gas and a fluid at ambient temperature, for example, water or a coolant, which allows the heat from the cycle gas to be discharged outwards.

According to one feature of the invention, the injection component is arranged in the upper region of the tank. In other words, the injection component injects the cooled liquefied gas in the vapor phase, i.e. above the level of the liquefied gas in the liquid state.

By way of a variation, the injection component is arranged in the lower region of the tank. In other words, the injection component injects the cooled liquefied gas in the liquid phase, i.e. below the level of the liquefied gas in the liquid state.

According to one possible feature, the injection component comprises a plurality of injection nozzles arranged in series and/or in parallel.

According to one feature of the invention, the cooling circuit is configured to cool liquefied gas coming from the tank to a temperature between 35 K and 150 K, for example, equal to 110 K or 80 K.

According to another possible feature, the cooling circuit is configured to cool liquefied gas coming from the tank at a flow rate between 5 m^3/h and 50 m^3/h.

According to one feature of the invention, the tank contains a liquefied gas selected from the group formed by a liquefied natural gas, or another methane-rich gas such as biomethane, nitrogen, oxygen, argon and mixtures thereof.

According to one possible feature, the cooling circuit contains a coolant selected from the group comprising nitrogen, argon, neon, helium and mixtures thereof.

According to one feature of the invention, the bypass pipe comprises a terminal end comprising a connector intended to be connected to a remote container.

According to the invention, the bypass pipe comprises a valve, in particular an isolation valve.

A further aim of the invention is a method for using a facility according to the invention for a liquefied gas, for example, a liquefied natural gas, the method comprising at least the following steps:

- at least partially receiving liquefied gas coming from a container, which is separate and independent from the facility according to the invention, via the connection line fluidly connecting the at least one tank to the remote container, which is separate and independent from the facility;

- supplying the cooling circuit with liquefied gas coming from the tank;
- cooling the liquefied gas coming from the tank by means of the cooling circuit; and
- injecting the cooled liquefied gas into the tank by means of the injection component.

According to one feature of the invention, the method comprises a transfer step performed after the injection of the cooled liquefied gas, the transfer step comprising transferring at least some of the cooled liquefied gas to at least one remote container, which is separate and independent from said facility, by means of the injection pipe and the bypass pipe of the facility.

Advantageously, the transfer of the liquefied gas can be partial or total depending on the number of tanks of the facility and depending on the requested amount of cooled liquefied gas.

According to one possible feature, the facility that is used comprises at least two tanks configured to contain liquefied gas, said method according to the invention being implemented during a journey, in the course of which the tanks are full.

Following delivery, at least one tank can be empty (empty or practically empty of liquid).

According to one feature of the invention, the method comprises an additional step of refrigerating the at least one empty tank of the facility or one or more other empty container(s) of at least one other facility, the refrigeration step comprising:

- transferring the cooled liquefied gas remaining in the at least one tank of the facility to one or more empty container(s) of at least one other facility; or
- transferring the cooled liquefied gas remaining in at least one container of at least one other facility to the at least one empty tank of the facility; or

-transferring, when the facility comprises at least two tanks, one of which is empty and the other one of which is not empty, the cooled liquefied gas remaining in the non-empty tank to the empty tank.

This means that, particularly for the purposes of a journey of the facility (on a ship), instead of keeping one or more tank(s) empty, liquefied gas is transferred from a non-empty tank to one or more other empty tank(s), particularly to keep them cool.

Advantageously, this refrigeration step is performed after unloading the liquefied gas and before the subsequent filling of the one or more tank(s) of the facility or of the one or more container(s) of at least one other facility.

Advantageously, this refrigeration step is performed continuously to avoid leaving the tanks empty and hot and to allow the thermal load to be equalized in order to limit any losses associated with the final vaporization peak of liquefied gas.

The advantage is to thus only maintain liquid in the tanks of a ship that enables the return voyage, without considering the cooling losses on arrival.

In the end, this allows the amount of liquid to be increased that is transported to the destination in the same ship.

According to one possible feature, the refrigeration step is performed during a journey, in the course of which at least one of the tanks is empty.

Furthermore, a further aim of the present invention is a transport vehicle, for example, a transport vessel, for transporting a liquefied gas, for example, a liquefied natural gas, the transport vehicle being characterized in that it comprises a facility according to the invention.

The embodiments and the variations mentioned above can be taken separately or according to any possible technical combination, within the scope of the claims.

The invention will be better understood from the following description, which relates to embodiments according to the present invention, which are provided by way of non-limiting examples and are explained with reference to the accompanying schematic drawings, in which:

- figure 1 is a schematic view of the facility;
- figure 2 is a schematic view of a cooling device forming part of the facility of figure 1;
- figure 3 is a schematic view of the facility; and
- figure 4A is a simplified graphic representation showing the distribution of the consumption of the natural gas vaporized on a ship over time toward the engine, toward a flare and toward a reliquefaction system according to the prior art;
- figure 4B is a simplified graphic representation similar to that of figure 4A showing the distribution of the consumption of the natural gas vaporized on a ship over time toward the engine, toward a flare and toward a reliquefaction system according to an embodiment of the invention.

As shown in figure 1, the facility 1 comprises a tank 4 comprising a lower region 4.1 intended to contain liquefied gas 2 in the liquid state and an upper region 4.2 intended to contain the vapors of the liquefied gas 2. Furthermore, the facility 1 comprises a cooling circuit 10, particularly shown in figure 2. The cooling circuit 10 is located outside the tank, i.e. the liquefied gas is (only) cooled outside the tank. In other words, the liquefied gas is taken from the tank, is cooled outside the tank and is then reinjected into the tank in the cooled state. The cooling device 10 is connected to the fluid inside the tank 4 via a sampling pipe that penetrates the tank. The tank 4 is equipped with a pump 22 that allows the liquefied gas in the liquid state to be brought to the cooling circuit in order to be cooled and with at least one injection component 20 that allows the cooled liquefied gas to be reinjected into the tank

4. The injection component comprises a return pipe that connects the cooling device (outside the tank) to the inside of the tank 4 and comprises the injection component 20. Advantageously, the injection component 20 can comprise a plurality of nozzles.

Furthermore, and as shown in figure 1, the facility 1 comprises a connection line 31 configured to route gas to be liquefied from at least one remote container 100, which is separate and independent from the facility 1, to the tank of the facility.

In figure 3, the facility 1 comprises an injection pipe 30 fluidly connecting the cooling circuit and the injection component 20, and at least one bypass pipe 32 connected to the injection pipe 30 and intended to transfer some of the cooled liquefied gas 2 to a remote container (not shown), which is separate and independent from the facility 1.

For example, another tank 4 is shown as a dotted line in figure 3. This tank 4, of the same facility or of another facility, can be supplied with liquefied gas via the bypass pipe 32 and a respective injection component 20, where applicable.

The bypass pipe 32 and the connection line 31 are installed on the same facility.

As shown in figure 2, and irrespective of the configuration of the facility 1, the cooling circuit 10 is closed and autonomous and is configured to be supplied with liquefied gas 2 in the liquid state coming from the tank 4. The cooling circuit 10 comprises at least one compressor 12 configured to compress a cycle gas 3, at least one engine 14, at least one turbine 18, and at least one first heat exchanger 16 configured to generate a heat exchange between the liquefied gas 2 and the cycle gas.

As can be seen in figure 2, the engine 14 is mechanically connected, on the one hand, to the compressor 12 in order to drive the compressor 12 and, on the other hand, to the turbine 18 so that the turbine 18 drives the engine 14.

The cooling circuit 10 further comprises a second heat exchanger 24 configured to generate a heat exchange between the compressed cycle gas 3 and the expanded cycle gas 3, as shown in figure 2.

The cooling circuit 10 further comprises a third heat exchanger 26 configured to generate a heat exchange between the compressed cycle gas 3 and water or air or any other coolant coming from an external source.

In the event that one or more of the tank(s) 4 contain(s) liquefied natural gas on a vehicle, in particular a ship, the natural gas that vaporizes can be used as fuel for an engine of the vehicle and any excess gas is burnt in a flare, for example.

Figure 4A shows the distribution of the consumption (axis of ordinates y in tons per day) of the natural gas vaporized on a ship over time (axis of abscissae x) toward the engine (C: section with horizontal shading), toward the flare (A: section with inclined shading) and toward the reliquefaction system (B: section without shading) for a known facility.

Figure 4B shows the distribution of the consumption in tons per day (y axis) of the natural gas vaporized on a ship over time (x axis) toward the engine (C), toward the flare (A) and toward the reliquefaction system (B) for the facility according to the invention.

It can be seen that, according to the known facility (figure 4A), losses of vaporized gas remain at the end of the journey since the engines and the facility are not designed to recover this gas. However, in figure 4B, by virtue of the facility according to the invention, there is no longer a peak at the end of the journey, the losses are minimal, particularly by virtue of the system for refrigerating the tanks.

Patentkrav

1. Installation (1) til lagring og afkøling af en flydende gas, for eksempel en flydende naturgas, hvilken installation omfatter:
- mindst én tank (4), der er konfigureret til at indeholde flydende gas (2), hvilken tank (4) omfatter mindst ét nedre område (4.1), der er beregnet til at indeholde den flydende gas (2) i flydende tilstand, og mindst ét øvre område (4.2), der er beregnet til at indeholde dampene fra den flydende gas (2)
- mindst ét lukket kølekredsløb (10), der befinder sig uden for tanken (4), og som er konfigureret til at blive forsynet med flydende gas (2) i flydende tilstand, som kommer fra tanken (4), idet kølekredsløbet (10) omfatter mindst én første varmeveksler (16), der er konfigureret til at udføre en varmeudveksling uden for tanken mellem den flydende gas (2) i flydende tilstand, som kommer fra tanken (4), og en kredsløbsgas (3), for eksempel nitrogen, for at afkøle flydende gas (2), som kommer fra tanken (4), når installationen er i drift, og
- mindst ét injektionselement (20), der er fluidummæssigt forbundet med kølekredsløbet (10) gennem en injektionsledning (30), idet injektionsledningen (20) er konfigureret til at injicere den afkølede flydende gas (2) igen i tanken
- mindst én forbindelsesledning (31), der er konfigureret til at genvinde en gas, der skal afkøles (2), fra mindst én fjernbeholder (100), der er adskilt fra og uafhængigt af installationen, hvilken forbindelsesledning (31) er fluidummæssigt forbundet med installationens tank (4), idet installationen (1) er kendetegnet ved, at kølekredsløbet (10) omfatter mindst én kompressor (12), der er konfigureret til at komprimere en kredsløbsgas (3), mindst én motor (14) og mindst én turbine (18), motoren (14) er mekanisk forbundet dels med kompressoren (12) for at drive kompressoren (12), og dels med turbinen (18), således at turbinen (18) driver motoren (14), samt ved, at installationen omfatter mindst én bypass-ledning (32), der er forbundet med injektionsledningen (30), hvilken bypass-ledning omfatter en ventil, især en afspærringsventil, og er konfigureret til at overføre en del af den afkølede

flydende gas (2) til en fjernbeholder, der er adskilt fra og uafhængig af installationen.

2. Installation ifølge krav 1, hvor turbinens (18) udløb er direkte fluidummæssigt forbundet med indløbet til den første varmeveksler (16).

3. Installation ifølge et hvilket som helst af kravene 1 til 2, hvor kompressorens (12) udløb er indirekte fluidummæssigt forbundet med den første varmeveksler (16).

4. Installation ifølge et hvilket som helst af kravene 1 til 3, hvor kølekredsløbet (10) i øvrigt omfatter en anden varmeveksler (24), der er konfigureret til at udføre en varmeudveksling mellem den komprimerede kredsløbsgas (3), som kommer fra kompressoren (12), og den ekspanderede kredsløbsgas (3), som kommer fra turbinen (18).

5. Installation ifølge krav 4, hvor kompressorens (12) indløb er fluidummæssigt forbundet med turbinens (18) udløb uden andet mellemelement end den første varmeveksler (16) og den anden varmeveksler (24).

6. Installation ifølge et hvilket som helst af kravene 1 til 5, hvor kølekredsløbet (10) omfatter mindst ét første forbindelseselement, der mekanisk forbinder motoren (14) med kompressoren (12), og mindst et andet forbindelseselement, der mekanisk forbinder motoren (14) med turbinen (18).

7. Installation ifølge et hvilket som helst af kravene 1 til 6, hvor kølekredsløbet (10) omfatter en tredje varmeveksler (26), der er konfigureret til at udføre en varmeudveksling mellem kredsløbsgassen (3) og et fluidum ved stuetemperatur, for eksempel vand eller et kølefluidum.

8. Installation ifølge et hvilket som helst af kravene 1 til 7, hvor injektionselementet (20) er anbragt i tankens (4) øvre område (4.2).

9. Installation ifølge et hvilket som helst af de foregående krav, hvor kølekredsløbet er konfigureret til at afkøle flydende gas, der kommer fra tanken, til en temperatur på mellem 35 K og 150 K, for eksempel en temperatur på 110 K eller 80 K.

10. Installation ifølge et hvilket som helst af de foregående krav, hvor tanken (4) indeholder en flydende gas, der er valgt fra gruppen bestående af en flydende naturgas eller en anden gas, der er rig på methan, såsom biomethan, nitrogen, oxygen, argon og blandinger af disse.

11. Installation ifølge et hvilket som helst af de foregående krav, hvor kølekredsløbet (10) indeholder et kølefluidum, der er valgt fra gruppen omfattende nitrogen, argon, neon, helium og blandinger af disse.

12. Fremgangsmåde til anvendelse af en installation ifølge et hvilket som helst af de foregående krav til en flydende gas, hvilken fremgangsmåde i det mindste omfatter de følgende trin:
- i det mindste delvist at modtage flydende gas fra en beholder, der er adskilt fra og uafhængig af installationen (1), gennem forbindelsesledningen (31), der fluidummæssigt forbinder den mindst ene tank (4) med fjernbeholderen (100), der er adskilt fra og uafhængig af installationen
- at tilføre flydende gas (2), som kommer fra tanken (4), til kølekredsløbet (10)
- at afkøle den flydende gas (2), som kommer fra tanken (4), ved hjælp af kølekredsløbet (10), og
- at injicere den afkølede flydende gas (2) i tanken (4) ved hjælp af injektionselementet (20).

13. Fremgangsmåde ifølge krav 12, der omfatter et overførselstrin, som udføres efter injektionen af den afkølede flydende gas, idet overførselstrinnet består i at overføre mindst en del af den afkølede flydende gas til i det mindste fjernbeholderen, der er adskilt fra og uafhængig af installationen, eller til en anden fjernbeholder, der er adskilt

fra og uafhængig af installationen, ved hjælp af injektionsledningen og installationens bypass-ledning.

14. Fremgangsmåde ifølge krav 13, der omfatter et yderligere trin til ny afkøling af den mindst ene tank i installationen eller én eller flere andre tomme beholdere i mindst én anden installation, idet trinnet til ny afkøling består i:
- at overføre den afkølede flydende gas, der er tilbage i installationens mindst ene tank, til én eller flere tomme beholdere i mindst én anden installation, eller
- at overføre afkølet flydende gas, der er tilbage i mindst én beholder i mindst én anden installation, til den mindst ene tomme tank i installationen, eller
- når installationen omfatter mindst to tanke, hvoraf den ene er tom og den anden ikke-tom, at overføre afkølet flydende gas, der er tilbage i den ikke-tomme tank, til den tomme tank.

15. Transportkøretøj, for eksempel et transportskib, til transport af en flydende gas, for eksempel en flydende naturgas, idet transportkøretøjet er kendetegnet ved, at det omfatter en installation ifølge et hvilket som helst af kravene 1 til 11.

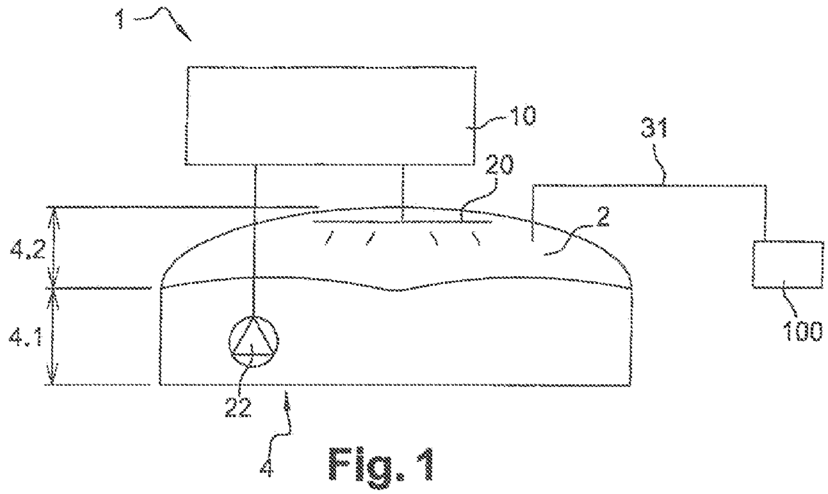

Fig. 1

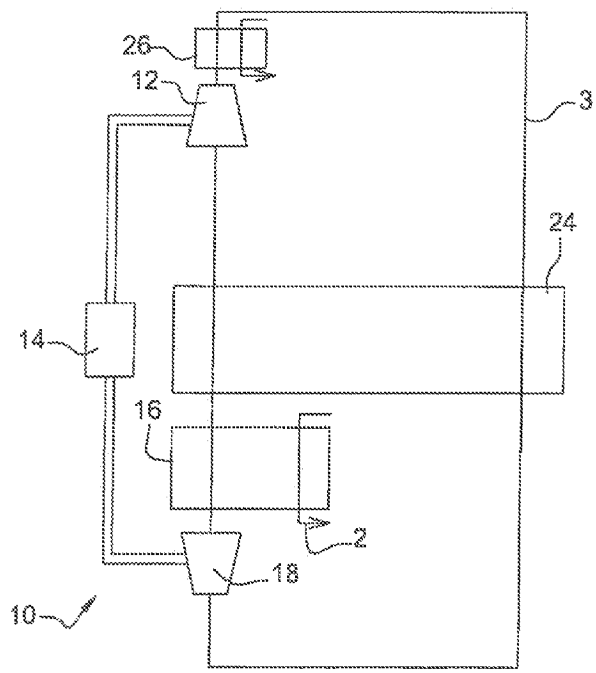

Fig. 2

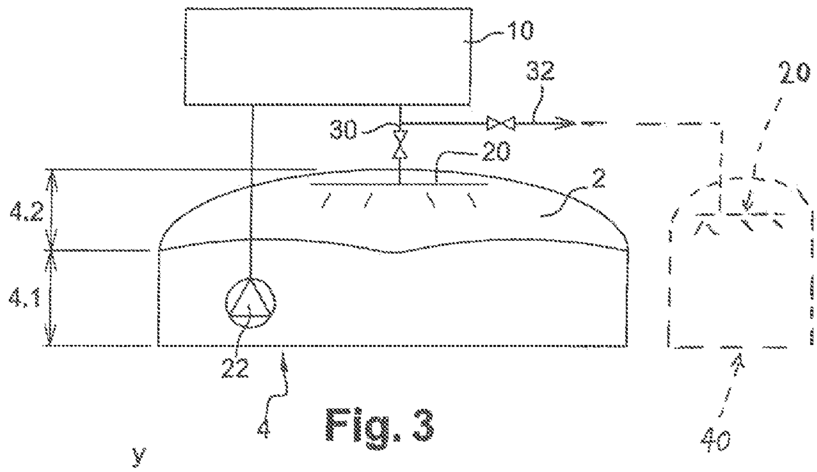

Fig. 3

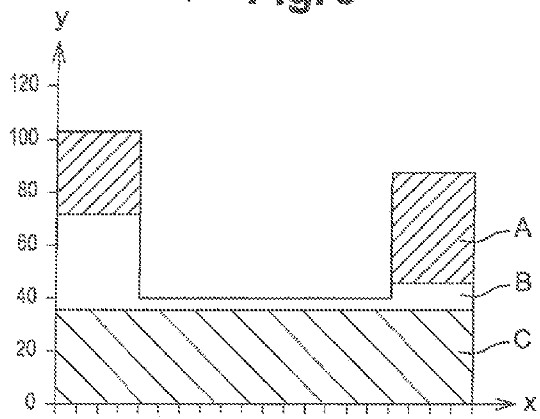

Fig. 4A

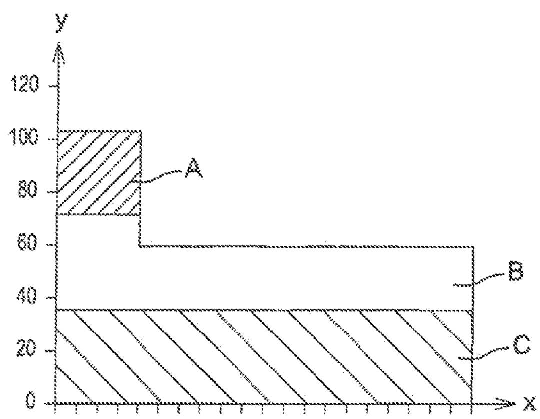

Fig. 4B