

A PORTABLE ADDITIVE DOSING SYSTEM (PADS) AND A METHOD FOR DOSING OF AN ODORANT INTO LIQUEFIED PETROLEUM GAS (LPG)

FIELD OF THE INVENTION

[001] Embodiments of the present invention relate to gas odorization and more particularly to a Portable Additive Dosing System (PADS) and a method for dosing of an odorant into Liquefied Petroleum Gas (LPG) during ship to ship operations through pipeline.

BACKGROUND ART

[002] Liquefied Petroleum Gas (LPG) is a portable, clean and efficient energy source that is most widely used around the world. LPG is utilised in hundreds of applications. LPG may be used as a fuel for many residential, commercial and agricultural heat applications, including cooking, hot water systems and heating. It is also employed as a propellant, refrigerant, vehicle fuel and petrochemical feedstock. Due to its vast industrial applicability, LPG has to be distributed and transported to various places around the world. There are gas carriers (ships) specifically designed to carry transport LPG, LNG or liquefied chemical gases in bulk. But a major problem with LPG is that due to LPG being an odourless gas, there is a risk that if LPG leaks out of the storage system, it may not be detected easily. And LPG being a highly inflammable gas, dangerous accidents or explosions (specially in case of ship to ship operations) may happen.

[003] One of the existing solution to the above mentioned problem is odorization of LPG. Adding and mixing an odorant in LPG in predetermined quantity such that the properties of LPG are not altered and also when the LPG leaks, deployed personnel can detect the leak by the smell of the odorant. Odorants such as Ethyl Mercaptan and various blends of commonly accepted chemicals are in common use in the industry. The odorants may be added to gas in the main transmission pipeline. There are various systems and methods currently used for odorization of LPG but most of them are large and complex systems. High capital cost and expensive implementation of the methods adds to the deficiencies of the existing systems. Moreover, some of the existing systems require the use of electronics for implementation of the odorization method.

[004] Therefore, there remains a need in the art for a Portable Additive Dosing System (PADS) and a method for dosing of an odorant into Liquefied Petroleum Gas (LPG) during ship to ship operations through pipeline, which does not suffer from above mentioned deficiencies and provides a simple, viable and cost effective solution to the aforementioned problems.

[005] Any discussion of the background art throughout the specification should in no way be considered as an admission that such background art is prior art nor that such background art is widely known or forms part of the common general knowledge in the field.

SUMMARY OF THE INVENTION

[006] The present invention is described hereinafter by various embodiments. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiment set forth herein. Rather, the embodiment is provided so that this disclosure will be thorough and complete and will fully convey the scope of the invention to those skilled in the art.

[007] Embodiments of the present invention aim to provide a portable additive dosing system (pads) and a method for dosing of an odorant into Liquefied Petroleum Gas (LPG) during ship to ship operations through pipeline. According to a first aspect of the invention, there is provided a Portable Additive Dosing System (PADS) for dosing of an odorant into Liquefied Petroleum Gas (LPG). The system comprises an inert gas unit containing an inert gas, the inert gas unit having a first outlet valve configured to allow the inert gas to be dispensed when turned on and a regulator mounted on the first outlet valve, configured to regulate the pressure of the dispensed inert gas, an odorant unit containing an odorant, the odorant unit having a gas inlet valve configured to receive the inert gas when turned on and a second outlet valve configured to allow the odorant to be dispensed when turned on, a first connecting line connecting the first outlet valve of the inert gas unit and the gas inlet valve of the odorant unit, a pump unit comprising an odorant inlet valve configured to receive odorant when turned on, an air supply valve configured to receive air for operating the pump unit when turned on and a discharge valve configured to dispense the odorant, a second connecting line connecting the second outlet valve of the odorant unit and the odorant inlet valve of the pump unit, a third connecting line connecting an air supply unit and the air supply valve of the pump unit, a dispensing unit arranged downstream of the pump unit and a fourth connecting line connecting the discharge valve of the pump unit with the dispensing unit via a mixture valve disposed on the fourth connecting line. Further, the inert gas unit is adapted to dispense the inert gas to the odorant unit via the first connecting line, when the first outlet valve of the inert gas unit and the gas inlet valve of the odorant unit are turned on. Then, the pump unit is configured to receive the odorant from the odorant unit via the second connecting line, when the second outlet valve of the odorant unit and odorant inlet valve of the pump are turned on. Also, the pump unit is adapted to receive air from the air supply unit via the third connecting line, when the air supply valve of the pump unit is turned on. Moreover, the pump

unit is adapted to dispense the odorant to the dispensing unit via the fourth connecting line, when the discharge valve on pump unit and the mixture valve are turned on. And the dispensing unit is configured to dispense the odorant to LPG containers.

[008] In accordance with an embodiment of the present invention, the system further comprises a filtration medium disposed between the pump unit and the dispensing unit, configured for clearing the fourth connecting line off remaining chemicals and for checking the flow before dispensing it through the dispensing unit.

[009] In accordance with an embodiment of the present invention, the mixture valve is a three-way valve.

[010] In accordance with an embodiment of the present invention, the odorant is Ethyl Mercaptan.

[011] In accordance with an embodiment of the present invention, the inert gas is Nitrogen.

[012] In accordance with an embodiment of the present invention, the pump unit further comprises a timer, a reading counter, a leak gauge, a spacer and flange connections.

[013] In accordance with an embodiment of the present invention, the dispensing unit comprises a bunker sampler flange and fuel sampler flange configured to ensure sampling of odorant and LPG during bunkering.

[014] In accordance with an embodiment of the present invention, respective ends of each of the first connecting line, the second connecting line, the third connecting line and the fourth connecting line have respective quick release couplings attached.

[015] In accordance with an embodiment of the present invention, the second connecting line and the fourth connecting line are made from chemically inert materials.

[016] In accordance with an embodiment of the present invention, the chemically inert materials include Poly-Tetra-Fluoro-Ethylene (PTFE).

[017] According to a second aspect of the invention, there is provided a method for dosing of an odorant into liquefied petroleum gas (LPG). The method comprises the steps of dispensing an inert gas from an inert gas unit to an odorant unit via a first connecting line, when a first outlet valve of the inert gas unit and a gas inlet valve of the odorant unit are turned on, receiving the odorant at a pump unit from the odorant unit via a second connecting line, a second outlet valve of the odorant unit and an odorant inlet valve of the pump unit when turned on, receiving air at the pump unit from an air supply unit of a ship via a third connecting line for operating the pump unit when an air supply valve of the pump unit is turned on, dispensing the odorant from the pump unit to a dispensing unit via a fourth connecting line, when a discharge valve on pump unit and a mixture valve are turned on and dispensing the odorant from the dispensing unit to the

LPG containers.

[018] In accordance with an embodiment of the present invention, the method further comprises a step of clearing the fourth connecting line by a filtration medium disposed between the pump unit and the dispensing unit.

[019] In accordance with an embodiment of the present invention, the mixture valve is a three-way valve.

[020] In accordance with an embodiment of the present invention, the odorant is Ethyl Mercaptan.

[021] In accordance with an embodiment of the present invention, the inert gas is Nitrogen.

[022] In accordance with an embodiment of the present invention, the method further comprises a step of sampling of the odorant and LPG during bunkering.

[023] In accordance with an embodiment of the present invention, the second connecting line and the fourth connecting line are made from chemically inert materials.

[024] In accordance with an embodiment of the present invention, the chemically inert materials include Poly-Tetra-Fluoro-Ethylene (PTFE).

BRIEF DESCRIPTION OF THE DRAWINGS

[025] So that the manner in which the above recited features of the present invention can be understood in detail, a more particular description of the invention, briefly summarized above, may have been referred by examples, some of which are illustrated in the appended drawings. It is to be noted, however, that the appended drawings illustrate only typical examples of this invention and are therefore not to be considered limiting of its scope, for the invention may admit to other equally effective examples.

[026] These and other features, benefits, and advantages of the present invention will become apparent by reference to the following text figure, with like reference numbers referring to like structures across the views, wherein:

[027] Fig. 1 illustrates a Portable Additive Dosing System (PADS), in accordance with an embodiment of the present invention;

[028] Fig. 2A illustrates a front view of a pump unit of the PADS, in accordance with an embodiment of the present invention;

[029] Fig. 2B illustrates a back view of the pump unit of the PADS, in accordance with an embodiment of the present invention;

[030] Fig. 3 illustrates a dispensing unit of the PADS, in accordance with an embodiment of the present invention; and

[031] Fig. 4 illustrates a method for dosing of an odorant into Liquefied Petroleum Gas (LPG), in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[032] Detailed embodiments of the present disclosure are described herein; however, it is to be understood that disclosed embodiments are merely exemplary of the present disclosure, which may be embodied in various alternative forms. Specific process details disclosed herein are not to be interpreted as limiting, but merely as a representative basis for teaching one skilled in the art to variously employ the present disclosure in any appropriate process.

[033] The terms used herein are for the purpose of describing exemplary embodiments only and are not intended to be limiting. As used herein, the singular forms “a,” “an,” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms “comprises” or “comprising,” when used in this specification, do not preclude the presence or addition of one or more components, steps, operations, and/or elements other than a mentioned component, step, operation, and/or element.

[034] The embodiments of the present disclosure will now be described more fully hereinafter with reference to the accompanying drawings, which form a part hereof, and which show, by way of illustration, specific example embodiments. The following detailed description is not intended to be taken in a limiting sense.

[035] Figure 1 illustrates a Portable Additive Dosing System 100 (PADS) (hereinafter referred to as “the system 100”) for dosing of an odorant into Liquefied Petroleum Gas (LPG) during ship to ship operations through pipeline. The system 100 comprises an inert gas unit 102 containing an inert gas. The inert gas unit 102 may be but not limited to, a cylinder containing nitrogen gas. The inert gas unit 102 is a portable unit and may have a skid that may be used to store a plurality of inert gas cylinders. Further, the inert gas unit 102 has a first outlet valve 1022. The first outlet valve 1022 may have an “On” and an “Off” configurations. The first outlet valve 1022 may be turned-on to open and turned-off to close.

[036] Further, the first outlet valve 1022 is configured to allow the inert gas to be dispensed when turned on. In one embodiment, first the outlet valve 1022 is a one-way valve. The inert gas

unit 102 further has a regulator mounted on the first outlet valve 1022 configured to regulate the pressure of the dispensed inert gas. For example: If desired pressure of the nitrogen is 2.5 bar, then the regulator can be set at 2.5 bar pressure and then the first outlet valve 1022 may be turned on to dispense the nitrogen. A person skilled in the art would appreciate that inert gas units 102 other than nitrogen cylinders that lie within the scope of the present invention may be used, and the invention is not limited to a particular inert gas.

[037] Additionally, the system 100 comprises an odorant unit 104 containing an odorant. An odorant is a substance (may be a fluid) added to another possibly hazardous (such as causing a fire hazard or asphyxiation) odourless substance to warn of the presence/leakage of the hazardous substance. The odorant unit 104 may be, but not limited to, a drum or a cylinder having a capacity in the range of 50-55 kilograms (kg). The odorant unit 104 may be made of, but not limited to, stainless steel (for example: stainless steel grade AISI 304). Also, an odorant skid may be provided for storage of the odorant drums. In accordance with an embodiment, the odorant used is Ethanethiol, commonly known as Ethyl Mercaptan. The odorant unit 104 has a gas inlet valve 1042 and a second outlet valve 1044. The gas inlet valve 1042 and the second outlet valve 1044 have respective “On” and ”Off” configurations indicating the opening and closing of the gas inlet valve 1042 and the second outlet valve 1044 respectively. Further, the odorant unit 104 is configured to receive the inert gas when the gas inlet valve 1042 is turned on. Also, the second outlet valve 1044 is configured to allow the odorant to be dispensed when turned on. The gas inlet valve 1042 and the second outlet valve 1044 may be, but not limited to, one-way valves. Additionally, the system 100 comprises a pump unit 108.

[038] Figure 2A illustrates a front view of the pump unit 108 of the system 100, in accordance with an embodiment of the present invention. As shown in figure 2A, the pump unit 108 comprises an odorant inlet valve 1082 and an air supply valve 1084 configurable between respective “On” and “Off” positions. The “On” position indicates that the respective valve is opened and “Off” position indicates that the respective valve is closed. Further, the odorant inlet valve 1082 and subsequently the pump unit 108, is configured to receive the odorant when odorant inlet valve 1082 is turned on and the air supply valve 1084 and subsequently the pump unit 108 is configured to receive air when the air inlet valve turned on. The odorant inlet valve 1082 and the air supply valve 1084 are one-way valves, in accordance with an embodiment of the present invention. Moreover, a plurality of hose connectors 208 may be included in the pump unit 108 for connecting additional components such as connecting lines.

[039] Figure 2B illustrates a back view of the pump unit 108 of the system 100, in accordance

with an embodiment of the present invention. As shown in figure 2B, the pump further comprises a discharge valve 1086 configurable between “Discharge” and “Purging” positions. The discharge valve 1086 is configured to dispense an odorant after receiving the odorant in the pump unit 108. The pump unit 108 also comprises a timer 202, a reading counter 204, a leak gauge 206, a spacer and flange connections 210. The timer 202 is configured to display time duration of a pump discharge and/or and reading counter 204 is used to display a quantity (in millilitres or litres) and a pressure of the pump discharge. The leak gauge 206 may indicate any leak of the pump discharge along with a quantity (in millilitres or litres) of the leaked pump discharge. The pump unit 108 may be configured to maintain a maximum working pressure of 7 bar and discharge the odorant at the rate of, say, 8.51 litres per hour. The pump unit 108 may be constructed using, but not limited to, stainless steel 316 material.

[040] The system 100 further comprises a dispensing unit 116 arranged downstream of the pump unit 108. In one embodiment, the dispensing unit 116 may be a flange. Figure 3 illustrates a dispensing unit 116 of the system 100, in accordance with an embodiment of the present invention. The dispensing unit 116 includes a bunker sampler flange 302 and fuel sampler flange 304 capable of ensuring sampling the odorant and LPG during bunkering. The dispensing unit 116 may be constructed using, but not limited to, stainless steel 316 material. The fuel sampler flange 304 has a plurality of holes 306 for allowing the fluid or the fluid mixture inside the fuel sampler to dispense.

[041] Exemplary specifications of the flange are provided below:

Bunker Sampler: 8 inches

Nominal Pipe Size: 200mm/8 inches

Inner Diameter: 221mm

Outer Diameter: 266mm

Weight: 6.48kg

[042] The system 100 additionally comprises a filtration medium 120 disposed between the pump unit 108 and the dispensing unit 116. The filtration medium 120 is configured for clearing the fourth connecting line. In one embodiment, the filtration medium 120 is a scrubber.

[043] Also included in the system 100 are a first connecting line 106, a second connecting line 110, a third connecting line 112 and a fourth connecting line 114. The first connecting line 106, the second connecting line 110, the third connecting line 112 and the fourth connecting line 114 may be selected from, but not limited to flexible hoses or pipes. The first connecting line 106

connects the first outlet valve 1022 of the inert gas unit 102 and the gas inlet valve 1042 of the odorant unit 104. The second connecting line 110 connects the second outlet valve 1044 of the odorant unit 104 and the odorant inlet valve 1082 of the pump unit 108. The third connecting line 112 connects an air supply unit and the air supply valve 1084 of the pump unit 108. The fourth connecting line 114 connects the discharge valve 1086 of the pump unit 108 with the dispensing unit 116 via a mixture valve 118 disposed on the fourth connecting line 114. In accordance with an embodiment, the mixture valve 118 is 3-way valve connecting with the pump unit 108, the dispensing unit 116 and the filtration medium 120.

[044] The second connecting line 110 and the fourth connecting line 114 have to come in contact with chemicals, such as the odorant Ethanethiol, therefore may be made from chemically inert materials. The chemically inert materials include, but are not limited to, Poly-Tetra-Fluoro-Ethylene (PTFE). For example: the PTFE hose may be coated with 3014 stainless steel braid to ensure hose pressure containment and this protects the core from abrasion. The end connections of the PTFE hose may be of 316 stainless steel materials. Minimum technical requirements for a PTFE hose may be, for example:

Nominal Hose Size: 1/8 inch or 3.2 mm

Inside Diameter: 0.125 inch or 3.2 mm

Outside Diameter: 0.25 inch or 6.4 mm

Minimum Inside Bend Radius:

Static: 1.50 inch or 3.81 mm

Dynamic: 3.75 inch or 9.52 mm

Temperature Range: (-65 to 450° F) or (-53 to 230° C)

Working Pressure at (-65 to 450° F): 3000 psig or 206 bar

Burst Pressure at 70° F: 12000 psig or 826 bar

Bulk Hose Weight: 0.05 lb/ft or 0.07 kg/m

[045] Furthermore, the first connecting line 106 and the third connecting line 112 come in contact with inert gas and air, therefore issues of chemical compatibility may not be as ominous as for the other connecting lines. However, in cases where the air supply is incapable of providing non-reactive air (such as in severely humid areas or those close to saline water/soil), the first 106 and the third 112 connecting lines may also be need to be made from chemically inert materials such as PTFE. The materials used for making the first connecting line 106 and the third connecting line 112 may be, but not limited to, rubber. For example, the rubber hose may comprise internal fiber reinforcement to enhance hose pressure rating and ensure connection

retention. The end connection of the rubber hose may be made using 316 stainless steel materials or brass materials. Table 1 below provides rubber hose specification desired.

Table 1

Nominal Hose Size in. (mm)	Inside Diameter in. (mm)	Outside Diameter in. (mm)	Minimum inside Bend Radius in. (mm)	Temperature Range °F (°C)	Working Pressure at - 40 to 70° F (-40 to 20°C) psig (bar)	Burst Pressure at 70° F (20°C) psig (bar)	Bulk Hose Weight lb/ft (kg/m)
¼ (6.4)	0.26 (6.6)	0.51 (12.8)	2.50 (6.35)	-40 to 200 (-40 to 93)	350 (24.1)	1400 (96.4)	0.09 (0.13)
3/8 (9.7)	0.39 (9.9)	0.67 (17.0)	3.00 (7.62)		300 (20.6)	1200 (82.6)	0.14 (0.20)
½ (12.7)	0.50 (12.7)	0.75 (19.0)	5.00 (12.7)		300 (20.6)	1200 (82.6)	0.14 (0.20)
¾ (19.0)	0.76 (19.3)	1.07 (27.2)	7.00 (17.8)		300 (20.6)	1200 (82.6)	0.25 (0.37)
1 (25.4)	1.00 (25.4)	1.34 (34.0)	8.00 (20.3)	-20 to 200 (-28 to 93)	300 (20.6)	1200 (82.6)	0.33 (0.49)

[046] Further, in the system 100, respective ends of each of the first connecting line 106, the second connecting line 110, the third connecting line 112 and the fourth connecting line 114 have respective quick release couplings attached. Quick release couplings allow the first connecting line 106, the second connecting line 110, the third connecting line 112 and the fourth connecting line 114 to be quickly connected and disconnected to/from the plurality of hose connectors 208 provided on the pump unit 108. There may be other components such as check valves, accumulators, control valves, pressure transducers, temperature sensors, control circuitry including microcontrollers etc. in the system 100 that may be added to enhance the efficacy and

efficiency of the overall system 100, without departing from the scope of the present invention.

[047] Figure 4 illustrates a method 400 for dosing of an odorant into Liquefied Petroleum Gas (LPG), in accordance with an embodiment of the present invention. The method 400 begins at step 410, by dispensing the inert gas from the inert gas unit 102 to the odorant unit 104 via the first connecting line 106, when the first outlet valve 1022 of the inert gas unit 102 and the gas inlet valve 1042 of the odorant unit 104 are turned on. The regulator may be set at a predetermined pressure, say 2.5 bar to dispense the inert gas at a pressure of 2.5 bar. At step 420, the odorant is received at the pump unit 108 from the odorant unit 104 via the second connecting line 110, when the second outlet valve 1044 of the odorant unit 104 and the odorant inlet valve 1082 of the pump unit 108 are turned on. The inert gas helps in pushing the odorant out the odorant unit 104 and the through to the pump unit 108. The odorant is received in a predetermined quantity at the pump unit 108. For example:

Assuming the loading/transfer of LPG cargo = 1,400 MT

The total LPG cargo in kg = $1,400 \times 0.0212 = 29.68\text{kg}$

As such the total Ethyl Mercaptan need to dose = 29.68kg

The amount of Ethyl Mercaptan dosed in kg into LPG may be measured and monitored during ship to ship operation via a built-in analogue crane weighing scale on odorant (Ethyl Mercaptan) skid.

[048] At step 430, the air is received at the pump unit 108 from the air supply unit of the ship via the third connecting line 112 for operating the pump unit 108, when the air supply valve 1084 of the pump unit 108 is turned on. Further, at step 440, the odorant is dispensed from the pump unit 108 to the dispensing unit 116 via the fourth connecting line 114, when the discharge valve 1086 on pump unit 108 and the mixture valve 118 are turned on. The readings from leak gauge 206 on pump unit 108 are regularly recorded during this step and the connecting lines are checked for leakage. Finally at step 440, the odorant is dispensed from the dispensing unit 116 to the LPG containers for mixing.

[049] Exemplary procedure for assembling the system 100 and implementing the above method 400, assuming the inert gas to be nitrogen, the odorant being EM, the connecting lines being hoses, the dispensing unit 116 being the flange and filtration medium 120 being the scrubber, is described below:

- (i) Connect the PTFE steel braided hoses and rubber hoses to the pump unit 108, Nitrogen cylinder and odorant unit 104;
- (ii) Turn on the first outlet valve 1022 and the regulator and set at 2.5 bar on the Nitrogen

- cylinder;
- (iii) Turn on the gas inlet valve 1042 on the odorant unit 104;
 - (iv) Turn on the 3-way valve to the scrubber for purging;
 - (v) Turn on the odorant inlet valve 1082 on the pump unit 108;
 - (vi) Turn on the discharge valve 1086 on the pump unit 108;
 - (vii) Turn on the second outlet valve 1044 on the odorant unit 104 and allow the EM to flow through to the scrubber;
 - (viii) Turn on the air supply valve 1084 on pump unit 108 and set at 6.9 bar;
 - (ix) Turn on the 3-way valve to the flange;
 - (x) Turn on the timer 202 on pump unit 108 and start recording the time and counter readings to ensure the pump discharge pressure is 207 bar and each dosing is 3.2ml.

[050] Similar procedure may be followed for dismantling the system 100 upon completion of dosing operations. Following are the steps:

- (i) Turn off the timer 202 on the pump unit 108;
- (ii) Turn off the air supply valve 1084 on the pump unit 108;
- (iii) Turn off the odorant inlet valve 1082 on the pump unit 108;
- (iv) Turn off the discharge valve 1086 on the pump unit 108;
- (v) Turn-off the 3-way valve;
- (vi) Turn off the gas inlet valve 1042 on the odorant unit 104;
- (vii) Turn off the second outlet valve 1044 on the odorant unit 104;
- (viii) Turn off the regulator and first outlet valve 1022 on the nitrogen cylinder;
- (ix) Release pressure from Nitrogen cylinder.

All hoses connections may be disconnected and cleaned.

[051] The present invention offers a number of advantages. Firstly, the method and the system offer a simple and cost effective solution to the deficiencies of the existing LPG dosing systems or odorizing techniques. All the connections are simple and do not complicate system. Capital and operational costs of the present invention is comparatively lower than the existing systems. Furthermore, the present invention does not require electronics to implement the dosing of the odorant into LPG in ship to ship operations. Sufficient safety measures are taken before, during and after the odorizing process to prevent any accidents.

[052] The terms and descriptions used herein are set forth by way of illustration only and are not meant as limitations. Examples and limitations disclosed herein are intended to be not limiting in any manner, and modifications may be made without departing from the spirit of the

present disclosure. Those skilled in the art will recognize that many variations are possible within the spirit and scope of the disclosure, and their equivalents, in which all terms are to be understood in their broadest possible sense unless otherwise indicated.

[053] Various modifications to these embodiments are apparent to those skilled in the art from the description and the accompanying drawings. The principles associated with the various embodiments described herein may be applied to other embodiments. Therefore, the description is not intended to be limited to the embodiments shown along with the accompanying drawings but is to be providing broadest scope of consistent with the principles and the novel and inventive features disclosed or suggested herein. Accordingly, the disclosure is anticipated to hold on to all other such alternatives, modifications, and variations that fall within the scope of the present disclosure and appended claims.

CLAIMS

1. A Portable Additive Dosing System (PADS) for dosing of an odorant into Liquefied Petroleum Gas (LPG), the system comprising:

an inert gas unit containing an inert gas, the inert gas unit having a first outlet valve configured to allow the inert gas to be dispensed when turned on and a regulator mounted on the first outlet valve, configured to regulate the pressure of the dispensed inert gas;

an odorant unit containing the odorant, the odorant unit having a gas inlet valve configured to receive the inert gas when turned on and a second outlet valve configured to allow the odorant to be dispensed when turned on;

a first connecting line connecting the first outlet valve of the inert gas unit and the gas inlet valve of the odorant unit;

a pump unit comprising an odorant inlet valve configured to receive the odorant when turned on, an air supply valve configured to receive air when turned on and a discharge valve configured to dispense the odorant;

a second connecting line connecting the second outlet valve of the odorant unit and the odorant inlet valve of the pump unit;

a third connecting line connecting an air supply unit and the air supply valve of the pump unit;

a dispensing unit arranged downstream of the pump unit; and

a fourth connecting line connecting the discharge valve of the pump unit with the dispensing unit via a mixture valve disposed on the fourth connecting line;

wherein the inert gas unit is adapted to dispense the inert gas to the odorant unit via the first connecting line, when the first outlet valve of the inert gas unit and the gas inlet valve of the odorant unit are turned on;

wherein the pump unit is configured to receive the odorant from the odorant unit via the second connecting line, when the second outlet valve of the odorant unit and odorant inlet valve of the pump are turned on;

wherein the pump unit is adapted to receive air from the air supply unit via the third connecting line, when the air supply valve of the pump unit is turned on;

wherein the pump unit is adapted to dispense the odorant to the dispensing unit via the fourth connecting line, when the discharge valve on pump unit and the mixture valve are turned on; and

wherein the dispensing unit is configured to dispense the odorant to LPG containers.

2. The system as claimed in claim 1, further comprising a filtration medium disposed between the pump unit and the dispensing unit, configured for clearing the fourth connecting line.
3. The system as claimed in claim 2, wherein the mixture valve is a three-way valve.
4. The system as claimed in claim 1, wherein the odorant is Ethyl Mercaptan.
5. The system as claimed in claim 1, wherein the inert gas is Nitrogen.
6. The system as claimed in claim 1, the pump unit further comprises a timer, a reading counter, a leak gauge, a spacer and flange connections.
7. The system as claimed in claim 1, wherein the dispensing unit comprises a bunker sampler flange and fuel sampler flange configured to ensure sampling of odorant and LPG during bunkering.
8. The system as claimed in claim 1, wherein respective ends of each of the first connecting line, the second connecting line, the third connecting line and the fourth connecting line have respective quick release couplings attached.
9. The system as claimed in claim 1, wherein the second connecting line and the fourth connecting line are made from chemically inert materials.
10. The system as claimed in claim 9, wherein the chemically inert materials include Poly-Tetra-Fluoro-Ethylene (PTFE).
11. A method for dosing of an odorant into Liquefied Petroleum Gas (LPG), the method comprising steps of:

dispensing an inert gas from an inert gas unit to an odorant unit via a first connecting line, when a first outlet valve of the inert gas unit and a gas inlet valve of the odorant unit are turned on;

receiving the odorant at a pump unit from the odorant unit via a second connecting line, a second outlet valve of the odorant unit and an odorant inlet valve of the pump unit when turned on;

receiving air at the pump unit from an air supply unit of a ship via a third connecting line for operating the pump unit, when an air supply valve of the pump unit is turned on;

dispensing the odorant from the pump unit to a dispensing unit via a fourth connecting line, when a discharge valve on pump unit and a mixture valve are turned on; and

dispensing the odorant from the dispensing unit to the LPG containers.

12. The method as claimed in claim 11, further comprising a step of clearing the fourth connecting line by a filtration medium disposed between the pump unit and the dispensing unit.
13. The method as claimed in claim 12, wherein the mixture valve is a three-way valve.
14. The method as claimed in claim 11, wherein the odorant is Ethyl Mercaptan.
15. The method as claimed in claim 11, wherein the inert gas is Nitrogen.
16. The method as claimed in claim 11, further comprises a step of sampling of the odorant and LPG during bunkering.
17. The method as claimed in claim 11, wherein the second connecting line and the fourth connecting line are made from chemically inert materials.
18. The method as claimed in claim 17, wherein the chemically inert materials include Poly-Tetra-Fluoro-Ethylene (PTFE).

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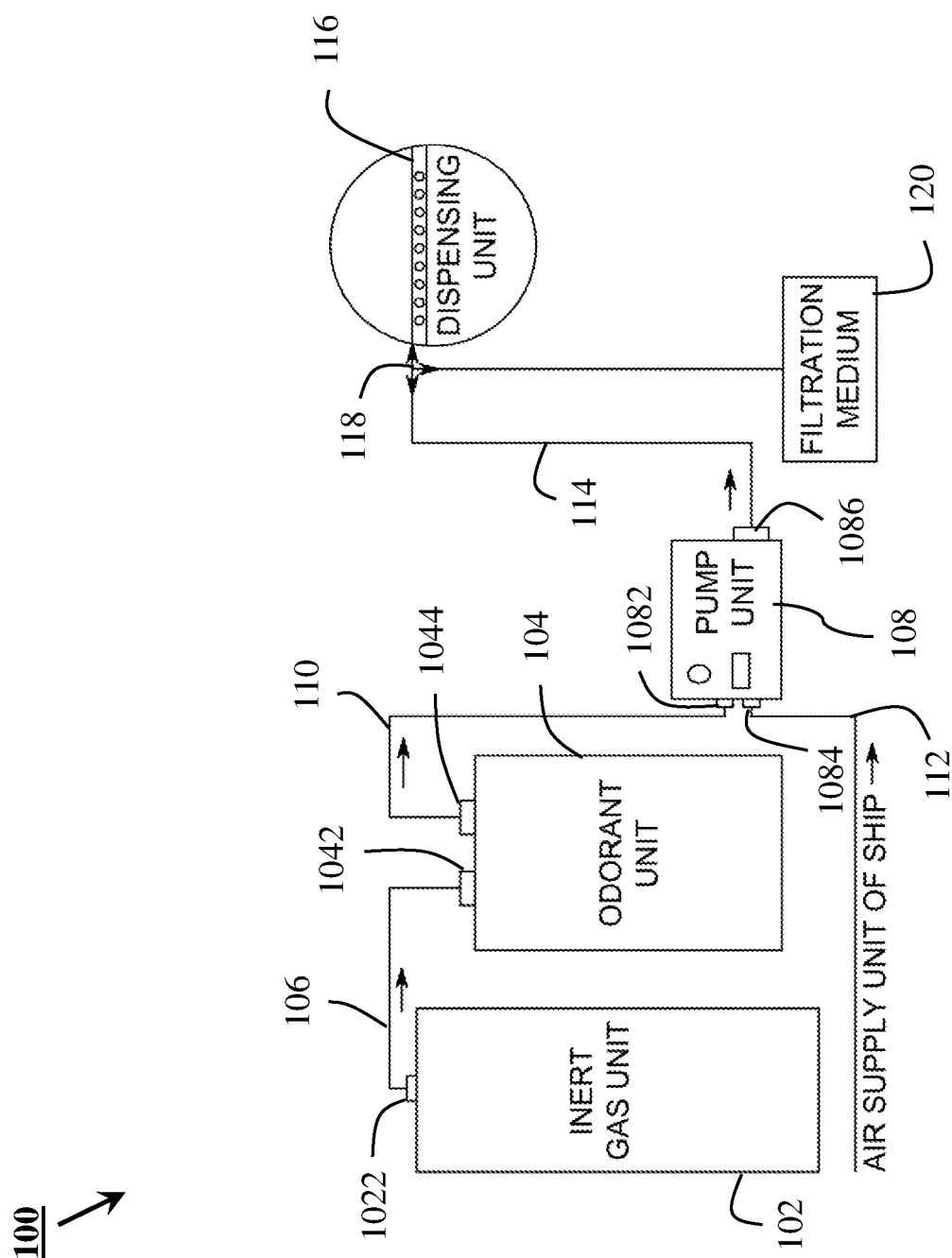


Fig. 1

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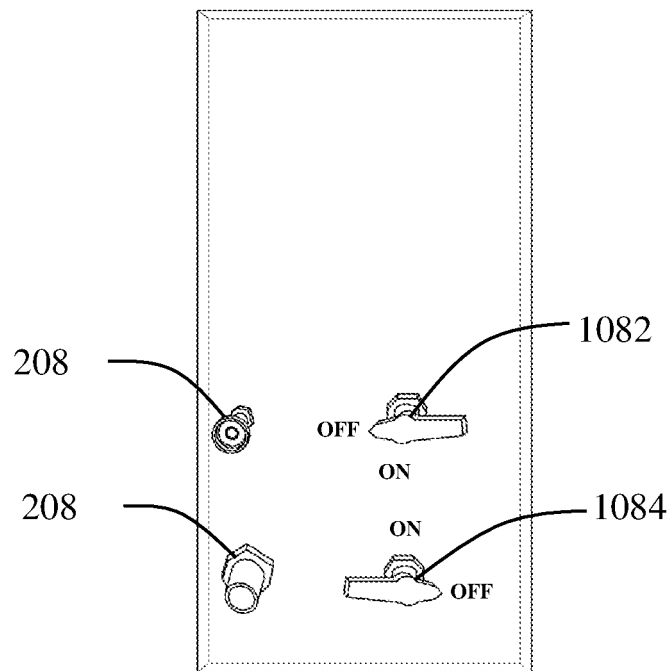
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Fig. 2A

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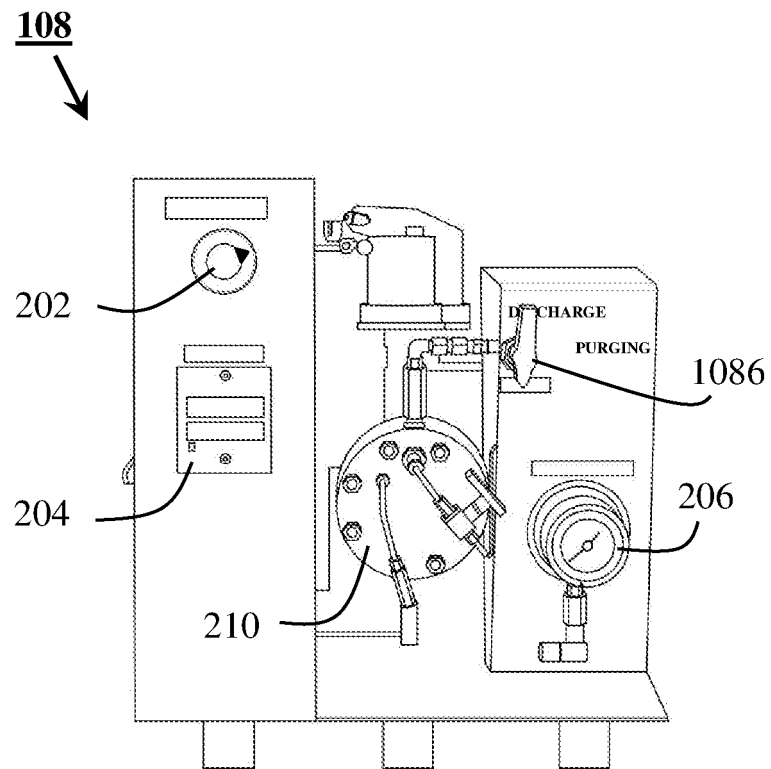


Fig. 2B

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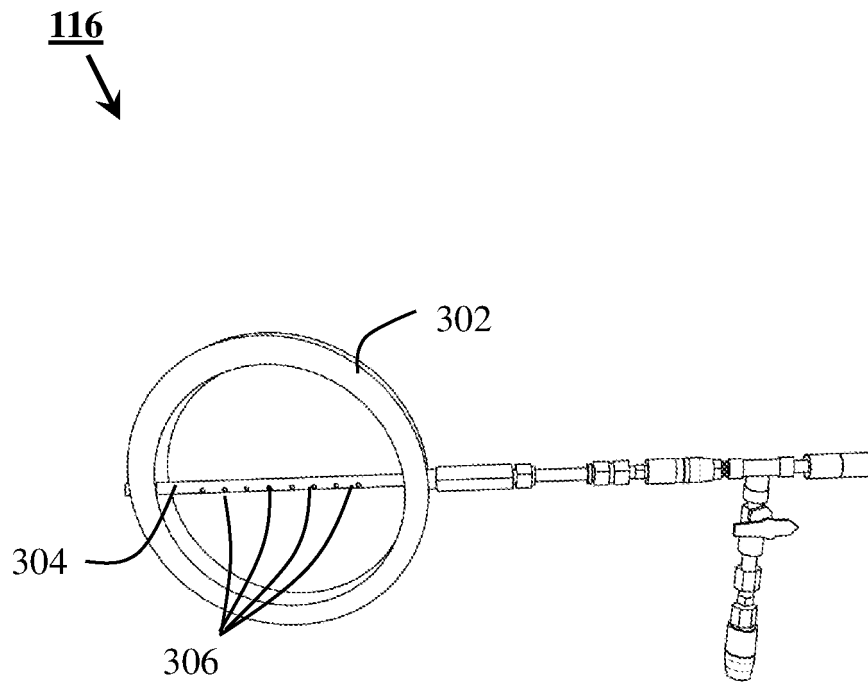


Fig. 3

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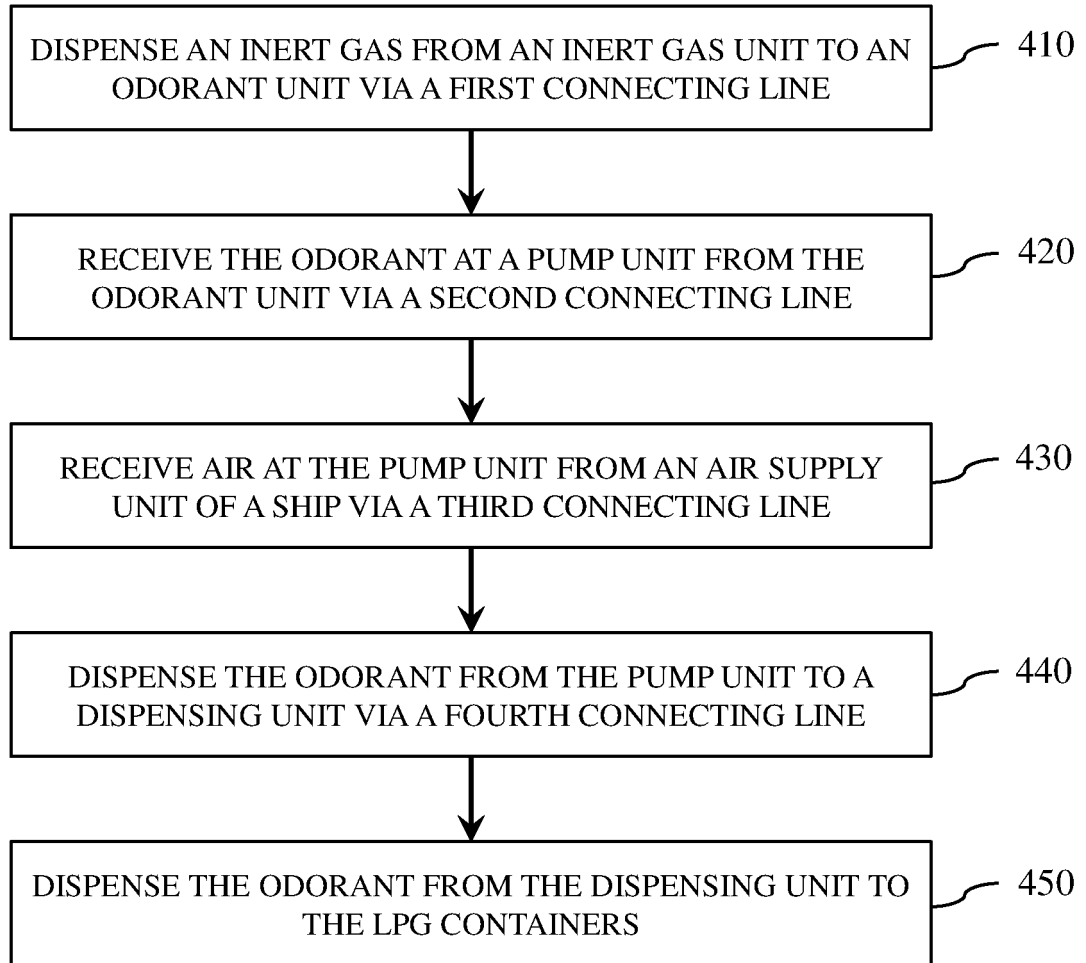
400

Fig. 4