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(54) **Outlet arrangement for multi wall tank**

(57) The present invention relates to an outlet arrangement (1) for a multi wall tank (2) comprising an inner wall forming an inner tank (4) and at least one outer wall (5) forming a secondary containment, said inner and outer walls forming a space (7) in between, wherein said

outlet arrangement comprises an outlet pipeline (6), a valve (13) and a valve containment chamber (9) surrounding the valve (13). The invention further relates to a use of the outlet arrangement, multi wall tank comprising the outlet arrangement and use of the multi wall tank for storing liquid chemicals.

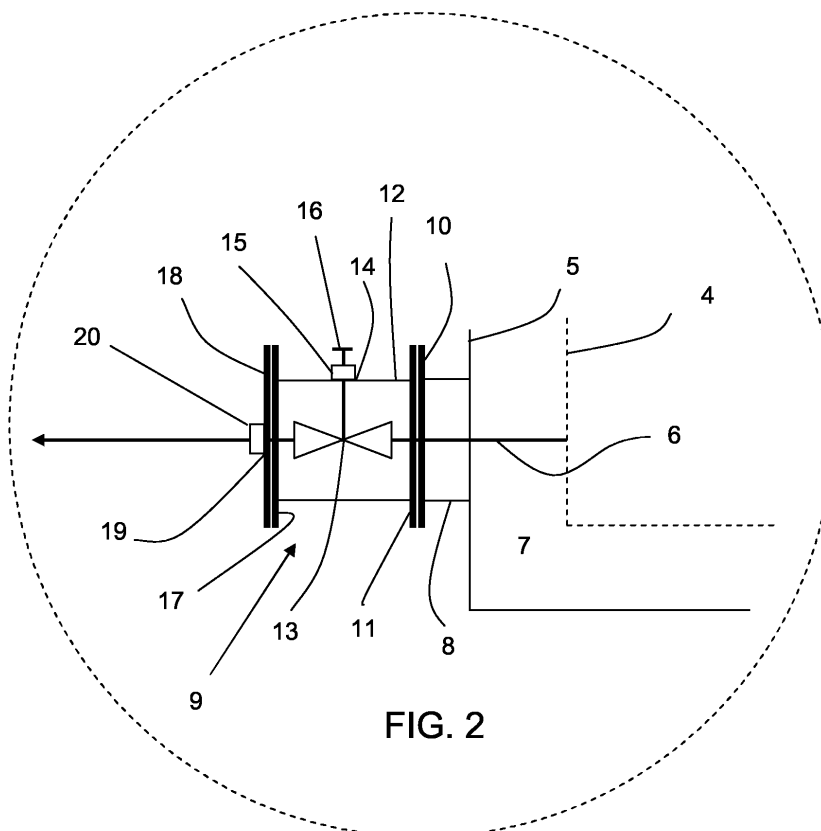


FIG. 2

Description

[0001] The present invention relates to an outlet arrangement for multi wall tanks, use of the outlet arrangement in a multi wall tank, a multi wall tank comprising the outlet arrangement and use of the multi wall tank for storing liquid chemicals.

[0002] Multi wall tanks, such as double wall tanks, comprise means surrounding a primary storage tank. Such a tank construction forms a secondary containment, which is often required when storing and transporting hazardous liquid chemicals. In such tanks spills and leaks can automatically be collected in the event of primary tank or equipment failure.

[0003] Unloading of multi wall tanks usually takes place by pumping contents from the top of the tank. However, it is desirable to unload from the bottom of the tank below the surface level of a liquid because it is more cost effective and easier when pumping for example effervescent liquids, such as those containing hydrogen peroxide. Although tanks with outlet arrangements from the bottom thereof are available, they do not offer an acceptable security in case of a valve or pipeline failure outside the tank walls.

[0004] It is an object of the present invention to provide an outlet arrangement for multi wall tanks that minimizes the risk for a leakage to the surroundings in case of a pipeline and/or valve failure outside the walls of the tank even if situated at the bottom of the tank.

[0005] It is another object of the invention to provide a multi wall tank with a low risk for leakage to the surroundings.

[0006] This and other objects are attained through the invention that will be described below.

[0007] One aspect of the invention concerns an outlet arrangement for a multi wall tank comprising an inner wall forming an inner tank and at least one outer wall forming a secondary containment, said inner and outer walls forming a space in between, wherein the outlet arrangement comprises an outlet pipeline, a valve and a valve containment chamber surrounding the valve.

[0008] Another aspect of the invention concerns use of the outlet arrangement in a multi wall tank.

[0009] Still another aspect of the invention concerns a multi wall tank comprising an inner wall forming an inner tank and at least one outer wall forming a secondary containment, said inner and outer walls forming a space in between, wherein the tank comprises an outlet arrangement as described herein.

[0010] A further aspect of the invention concerns use of a multi wall tank as described herein for storing liquid chemicals.

[0011] The valve containment chamber preferably has an open connection to the space between the inner and outer walls of the tank enabling passage of liquid there between. In addition, the valve containment chamber preferably comprises a hollow mantle construction and a cover. The outlet pipeline preferably passes through

the cover, for example through a sealed pipeline opening.

[0012] The outlet arrangement is preferably positioned at the bottom or close thereto of a multi wall tank, and may be integral to the tank or attached thereto by any suitable means, such as by welding, bolting or gluing. Close to the bottom refers to a vertical distance from the bottom of less than 50 %, preferably less than 20 %, most preferably less than 10 % of the vertical distance from the bottom to the top of the tank. In an embodiment the multi wall tank comprises a protruding hollow construction with a connecting flange, to which the valve containment chamber is connected via a connecting flange by any suitable means.

[0013] The valve preferably comprises control means for opening and/or closing the valve extending outside the valve containment chamber through the hollow mantle construction, for example through a sealed opening therein.

[0014] In order to detect any leakage that may occur, the space between the inner and outer walls of the tank preferably comprises means for detecting the liquid level therein, for example a level transmitter or switch automatically recording the liquid level or simply a sight glass or the like for manual inspection. The secondary containment may further comprise a drain valve so that liquid leaked inside the space can be removed.

[0015] The invention is useful for any kind of multi wall tank comprising two or more walls forming a space between at least two of them. Usually two walls are sufficient, the tank then being a double wall tank comprising a space between the inner and outer walls. The tank may be stationary or mobile and of any kind of useful configuration. The secondary containment may be open at the top or it may comprise an upper cover. The multi wall tank may comprise a regular single wall tank placed inside an outside tank forming the secondary containment.

[0016] The foregoing and other features and advantages of the invention as well as embodiments thereof will become more apparent from the reading of the following description in connection with the accompanying schematic drawings, of which:

FIG. 1 is a side view of a multi wall tank; and

FIG. 2 is an enlargement of the outlet arrangement.

[0017] The following detailed description illustrates embodiments of the invention by way of example and is not to be interpreted as limiting the scope thereof.

[0018] FIG. 1 shows a double wall tank 2 comprising an inner wall 4 forming an inner tank and an outer wall 5 forming a secondary containment. The tank 2 is provided with an outlet arrangement 1 at the bottom thereof and a dome 3 overlapping the outer wall 5 of the secondary containment to prevent rainwater, snow and debris from entering into the space 7 between the walls 4, 5.

[0019] FIG. 2 shows an enlargement of the outlet arrangement 1 comprising an outlet pipeline 6 passing through the space 7 between the inner wall 4 and the

outer wall 5, a valve 13 and a valve containment chamber 9 surrounding the valve 13. The valve containment chamber 9 has an open connection into the space 7 allowing chemicals to flow from the valve containment chamber 9 into the space 7 in case of a valve or outlet pipeline failure.

[0020] The valve containment chamber 9 comprises a hollow mantle construction 12 having a substantially circular cross section and thereby a substantially cylindrical shape. However, any other appropriate geometrical shape is also possible, the cross section of the hollow mantle construction for example being square, rectangular or triangular.

[0021] The valve containment chamber 9 further comprises a cover 18, which is separate and attached to the valve containment chamber 12 by a flange connection via a connecting flange 17 integral with the hollow mantle construction 12. The attachment can be made by any suitable means, such as by means of bolts, screws or clamps.

[0022] However, the cover may also be attached to the mantle construction 12 by any other suitable means such as welding or gluing, and may even be an integral part thereof.

[0023] The valve containment chamber 9 is attached to the double wall tank 2 at the bottom thereof via a connecting flange 11 connected to a connecting flange 10 on a protruding hollow construction 8 of the tank 2. The connection may be done by any suitable means, such as bolts, screws, clamps, welding or gluing.

[0024] The valve 13 is located inside the valve containment chamber 9 and may be of any suitable type such as a ball valve, plug valve or the like. The valve 13 comprises control means 16 extending outside the valve containment chamber 9 through the hollow mantle construction 12 through an opening 14 therein that is sealed with sealing means 15 to achieve a liquid tight opening. The sealing means may be of any suitable type, such as a packing gland, allowing slippage and accommodating to thermal expansion of the piping. The control means 16 may, for example, be in the form of a handle that can be operated manually or any kind of remote control.

[0025] The outlet pipeline 6 passes through a pipeline opening 19 in the cover 18. The opening 19 is sealed with sealing means 20 to achieve a liquid tight opening. The sealing means 20 may be of any suitable type, such as a packing gland.

[0026] If failure occurs in the valve 13 or in the outlet pipeline 6 outside the walls 4, 5 of the double wall tank 2, any liquid leaked out is usually held inside the valve containment chamber 9 or within the space 7 between the inner and outer walls 5, 6 of the tank 2. Thus, the outlet arrangement as described minimizes the risk for leakage of chemicals to the surroundings.

[0027] Leakage can be detected in several ways, for example by a level transmitter (not shown) or a switch (not shown) recording the liquid level at a suitable place in the space 7. Also, visual methods, such as a sight

glass may be used. To enable removal of liquid from the space 7 after a leakage a separate, normally closed, drain valve (not shown) may be positioned on the outer wall 5.

[0028] The various parts of the tank 2 and the outlet arrangement 1, including the valve containment chamber 9, can be made of any suitable material, such as metals or polymers, preferably being resistant to the liquid stored in the tank 2.

Claims

1. Outlet arrangement (1) for a multi wall tank (2) comprising an inner wall forming an inner tank (4) and at least one outer wall (5) forming a secondary containment, said inner and outer walls forming a space (7) in between, wherein said outlet arrangement comprises an outlet pipeline (6), a valve (13) and a valve containment chamber (9) surrounding the valve (13).
2. Outlet arrangement (1) as claimed in claim 1, wherein the valve containment chamber (9) has an open connection to the space (7) of the multi wall tank (2).
3. Outlet arrangement (1) as claimed in any one of the claims 1-2, wherein the valve containment chamber (9) comprises a hollow mantle construction (12) and a cover (18).
4. Outlet arrangement (1) as claimed in any one of the claims 1-3, wherein the multi wall tank comprises a protruding hollow construction (8) with a connecting flange (10), to which the valve containment chamber (9) is connected via a connecting flange (11).
5. Outlet arrangement (1) as claimed in any one of the preceding claims, wherein the valve (13) comprises control means (16) for opening and/or closing the valve extending outside the valve containment chamber (9) through the hollow mantle construction (12).
6. Outlet arrangement (1) as claimed in claim 5, wherein the hollow mantle construction (12) has a sealed opening (14) for the control means (16).
7. Outlet arrangement (1) as claimed in any one of the preceding claims, wherein the outlet pipeline (6) passes through the cover (18).
8. Outlet arrangement (1) as claimed in claim 7, wherein the cover (18) comprises a pipeline opening (19) which is sealed.
9. Use of the outlet arrangement (1) according to any one of the claims 1-8 in a multi wall tank for liquid chemicals.

- 10.** Multi wall tank (2) comprising an inner wall forming an inner tank (4) and at least one outer wall (5) forming a secondary containment, said inner and outer walls forming a space (7) in between, wherein the multi wall tank (2) comprises an outlet arrangement (1) according to any one of claims 1 to 8. 5
- 11.** Multi wall tank (2) as claimed in claim 10, wherein the outlet arrangement (1) is positioned at the bottom of the tank (2) or close thereto. 10
- 12.** Multi wall tank (2) as claimed in any one of the claims 10-11, wherein the space (7) comprises means for detecting the liquid level. 15
- 13.** Multi wall tank (2) as claimed in any one of the claims 10-12 wherein the secondary containment comprises a drain valve.
- 14.** Use of a multi wall tank according to any one of the claims 10-13 for storing liquid chemicals. 20

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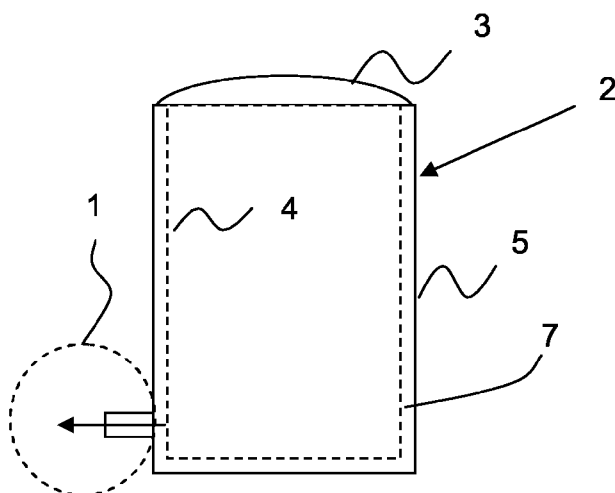


FIG. 1

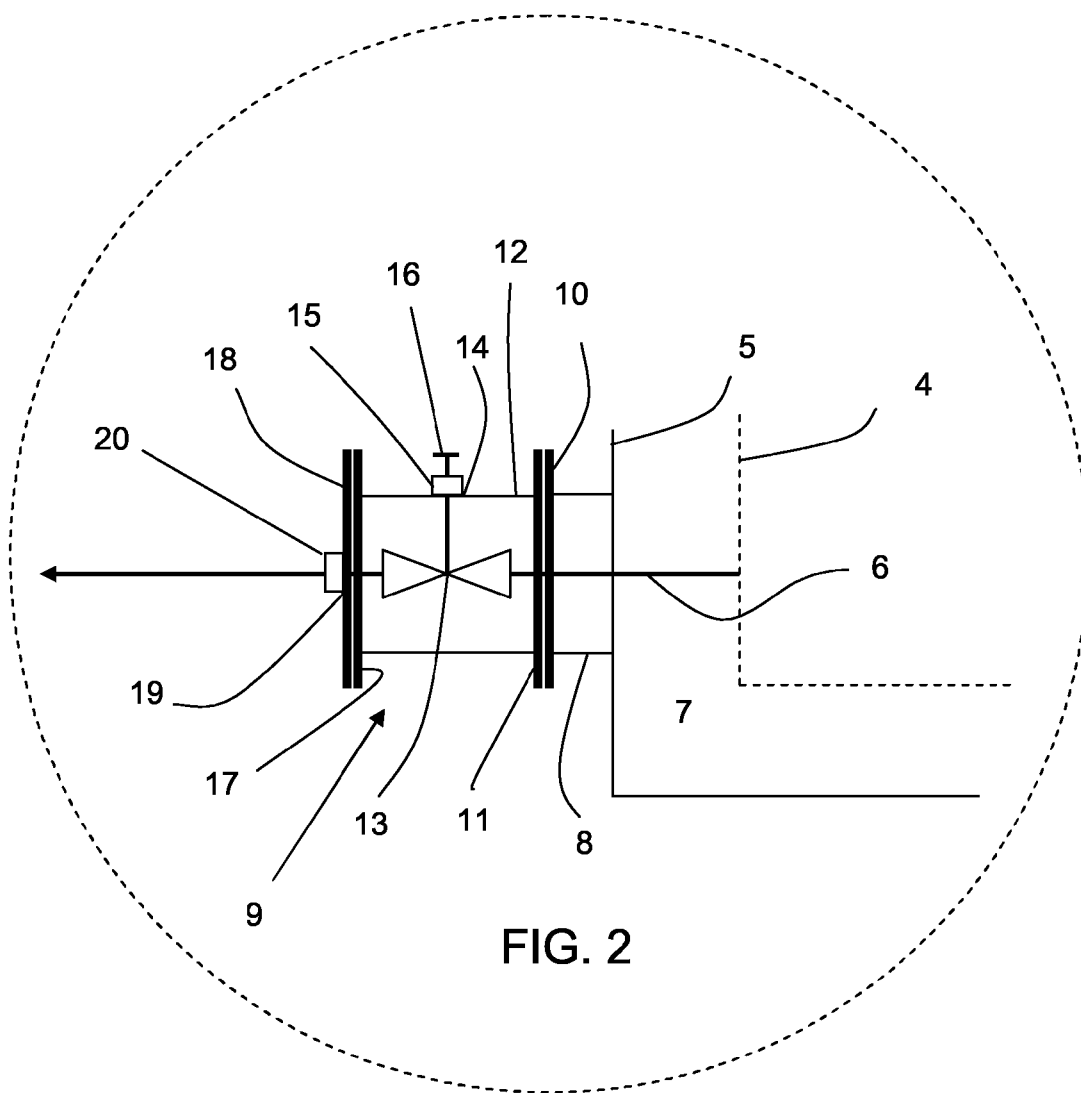


FIG. 2



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 22 24 781 A1 (UNION RHEINISCHE BRAUNKOHLEN) 17 January 1974 (1974-01-17) * the whole document *	1-3, 5-11,14	INV. B65D90/24
X	DE 202 19 946 U1 (CHRISTEN & LAUDON GMBH KUNSTST [DE]) 24 April 2003 (2003-04-24) * the whole document *	1,3,7-14	
A	US 6 634 676 B1 (LAMPSON MARSHALL [US] ET AL) 21 October 2003 (2003-10-21) * abstract; figures 1-4 *	1,9,10, 14	
A	US 2005/224500 A1 (HEBBLETHWAITE RUSS [CA]) 13 October 2005 (2005-10-13) * the whole document *	1-14	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 29 November 2006	Examiner Visentin, Mauro
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 11 5922

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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29-11-2006

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DE 2224781	A1	17-01-1974	NONE	
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