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(54) **Bulk fluid transport and discharge apparatus and method**

(57) The present invention relates to an apparatus (1) for transporting fluid comprising a pressure discharge container (2) containing the fluid and an elongate compressed gas pipe (7) secured flush to the pressure discharge container for assisting discharge thereof.

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Description

[0001] The present invention relates to an apparatus for transporting fluid comprising a pressure discharge container containing the fluid and an elongate compressed gas pipe secured flush to the pressure discharge container for assisting discharge thereof.

[0002] Large containers such as intermediate bulk containers (IBCs) are often used to transport fluids such as flammable or combustible chemicals. IBCs are generally pressure discharged and for this purpose are fitted at an upper end with a local point of connection to a compressed gas source and at a lower end with a discharge outlet. If the IBC is particularly large (which is often the case), it is less than straightforward for the operator to connect the compressed gas source to the local point of connection and attempts to do so may compromise operator safety. Where it is desirable (as is often the case) for the IBC to remain on the transporter, these disadvantages are more pronounced because the upper end of the IBC (and therefore the local point of connection) is at an even greater elevation.

[0003] GB-A-2372706 discloses a discrete accessory for fitting to a pallet mounted bulk container which houses within a protective column an air pipe. The upper end of the pipe is connected (before the point of use) to the upper end of the IBC and the lower end of the pipe is connected (at the point of use) to the compressed gas source in a manner more convenient to the operator. However the discrete accessory of GB-A-2372706 is rather prone to accidental damage resulting either from the protruberant nature of the column or the inability to withstand the effect of a dropped container. Added to this, the sophistication of the accessory incurs unduly high manufacturing costs.

[0004] The present invention seeks to improve discharge of a pressure discharge container (eg an IBC) by providing an elongate compressed gas pipe which in practice shifts the point of connection between the container and a compressed gas source to a convenient location whilst being secured flush to the container to withstand accidental damage. Moreover, the elongate compressed gas pipe is elegant in its simplicity and therefore incurs low manufacturing costs

[0005] Thus viewed from one aspect the present invention provides an apparatus for transporting fluid comprising:

a pressure discharge container containing the fluid and comprising at or near to an upper end a compressed gas coupling and at or near to a lower end a discharge outlet; and

an elongate compressed gas pipe for assisting discharge of fluid from the discharge outlet of the pressure discharge container, wherein said elongate compressed gas pipe is secured flush to the pressure discharge container, connected at a first end to the compressed gas coupling and connectable

at a second end to a source of compressed gas,

wherein the elongate compressed gas pipe or the compressed gas coupling includes a non-return valve.

[0006] The elongate compressed gas pipe is connected at the first end to the compressed gas coupling in any convenient manner such as quick coupling. For example, the first end of the elongate compressed gas pipe and the compressed gas coupling may constitute a male/female connection. Typically the compressed gas coupling is a male connecting part (eg a male camlock) to which is connected the first end of the elongate compressed gas pipe via a female connecting part (eg a female camlock).

[0007] The elongate compressed gas pipe is connected at the second end to the source of compressed gas in any convenient manner such as a quick coupling. For example, the second end of the elongate compressed gas pipe and the source of compressed gas may constitute a male/female connection. Typically the source of compressed gas is a female connecting part (eg a female camlock) to which is connected the second end of the elongate compressed gas pipe via a male connecting part (eg a male camlock).

[0008] The non-return valve may be any convenient type such as a non-return ball valve. In a preferred embodiment, the elongate compressed gas pipe includes the non-return valve.

Particularly preferably the non-return valve is near to the first end of the elongate compressed gas pipe. For example, a flexible pipe member may extend between the leading end of the non-return valve and the compressed gas coupling. The flexible pipe member may be clamped to the leading end of the non-return valve in any convenient manner (eg using a Jubilee clip). The flexible pipe member may be clamped to the compressed gas coupling or to a male/female connecting part (eg a female camlock) in any convenient manner (eg using a Jubilee clip).

[0009] Preferably the elongate compressed gas pipe is secured flush to the pressure discharge container such that the non-return direction of the non-return valve is below the horizontal. For example, the non-return direction of the non-return valve may be 5° or more below horizontal, preferably 15° or more below horizontal, particularly preferably 25° or more below horizontal, more preferably 35° or more below horizontal, most preferably about 45° or more below horizontal. By securing the elongate compressed gas pipe in the manner of this preferred embodiment, it ensures that the non-return valve is fully closed in the absence of pressure thereby preventing fluid from passing down the elongate compressed gas pipe and spilling out of the second end.

[0010] In a preferred embodiment, the non-return valve is attached at its trailing end to a rigid elbow pipe (typically a stainless steel elbow pipe). The rigid elbow pipe is angled to divert the elongate compressed gas pipe substantially to the vertical. For example, the rigid

elbow pipe may be connected to a linear pipe member which extends to the second end of the elongate compressed gas pipe (typically to a height which is about the same height as the discharge outlet).

[0011] The elongate compressed gas pipe is secured flush to the pressure discharge container in any convenient manner. For example, the linear pipe member may be secured flush to the pressure discharge container by one or more fasteners. The one or more fasteners may be one or more brackets which may be permanently or non-permanently attached to the elongate compressed gas pipe. For example, the one or more brackets may be permanently attached to the linear pipe member by welding. The one or more brackets may be fastened threadedly or non-threadedly to the pressure discharge container. For example, the one or more brackets may be bolted to threads (eg stud welded threads) on the pressure discharge container.

[0012] The compressed gas is typically compressed air. The fluid is typically a liquid.

[0013] Viewed from a further aspect the present invention provides a method for discharging a pressure discharge container containing a fluid and comprising at or near to an upper end a compressed gas coupling and at or near to a lower end a discharge outlet, said method comprising:

securing flush to the pressure discharge container an elongate compressed gas pipe;
connecting a first end of the elongate compressed gas pipe to the compressed gas coupling;
connecting a second end of the elongate compressed gas pipe to a source of compressed gas;
and
opening the source of compressed gas to cause pressure discharge of fluid from the discharge outlet.

[0014] The present invention will now be described in a non-limitative sense with reference to the accompanying Figures in which:

Figure 1a illustrates a preferred embodiment of an apparatus of the invention; and
Figure 1b illustrates the elongate compressed gas pipe of the embodiment illustrated in Figure 1a.

[0015] A preferred embodiment of the apparatus of the invention is illustrated in Figure 1a and designated generally by reference numeral 1. The apparatus 1 comprises an IBC 2 connected at its upper end via a compressed gas coupling 4 to the first end 3a of an elongate compressed gas pipe 3. Discharge of fluid from the IBC 2 takes place at the lower end through a discharge outlet 5.

[0016] The elongate compressed gas pipe 3 is shown in detail in Figure 1b and comprises a flexible pipe member 11 extending between a non-return ball-valve 12 (to

the leading end of which the flexible pipe member 11 is clamped by a Jubilee clip 13) and a female camlock 4a to which the flexible pipe member 11 is clamped by a Jubilee clip 10. The female camlock 4a is itself connected to a male camlock on the compressed gas coupling 4. The trailing end of the non-return ball valve 12 is screwed to the thread of a stainless steel elbow pipe 13 which diverts the elongate compressed gas pipe 3 to the vertical where it extends to the second end of the elongate compressed gas pipe 3 via a linear pipe member 7 to which it is welded. The second end 3b of the elongate compressed gas pipe 3 is connectable via a male camlock 8 to a female camlock on a source of compressed air (not shown). The male camlock 8 is approximately at a common height with the discharge outlet 5 and is particularly convenient (for example) for assisting an operator to discharge the IBC 2 from its transport location on a transporter.

[0017] The elongate compressed gas pipe 3 is secured flush to the IBC 2 by four brackets 6a-d which are welded to the linear pipe member 7. This is done in a manner such that the non-return direction D of the non-return ball valve 12 is at an angle of approximately 45° below the horizontal.

Claims

1. An apparatus for transporting fluid comprising:

a pressure discharge container containing the fluid and comprising at or near to an upper end a compressed gas coupling and at or near to a lower end a discharge outlet; and
an elongate compressed gas pipe for assisting discharge of fluid from the discharge outlet of the pressure discharge container, wherein said elongate compressed gas pipe is secured flush to the pressure discharge container, connected at a first end to the compressed gas coupling and connectable at a second end to a source of compressed gas,

wherein the elongate compressed gas pipe or the compressed gas coupling includes a non-return valve.

2. An apparatus as claimed in claim 1 wherein the elongate compressed gas pipe is connected at the first end to the compressed gas coupling by a quick coupling.

3. An apparatus as claimed in claim 1 or 2 wherein the first end of the elongate compressed gas pipe and the compressed gas coupling constitute a male/female connection.

4. An apparatus as claimed in any preceding claim

wherein the compressed gas coupling is a male connecting part to which is connected the first end of the elongate compressed gas pipe via a female connecting part.

5. An apparatus as claimed in any preceding claim wherein the elongate compressed gas pipe is connected at the second end to the source of compressed gas by a quick coupling. 5
6. An apparatus as claimed in any preceding claim wherein the second end of the elongate compressed gas pipe and the source of compressed gas constitute a male/female connection. 10
7. An apparatus as claimed in any preceding claim wherein the source of compressed gas is a female connecting part to which is connected the second end of the elongate compressed gas pipe via a male connecting part. 15
8. An apparatus as claimed in any preceding claim wherein the non-return valve is a non-return ball valve. 20
9. An apparatus as claimed in any preceding claim wherein the elongate compressed gas pipe includes the non-return valve. 25
10. An apparatus as claimed in any preceding claim wherein the non-return valve is near to the first end of the elongate compressed gas pipe. 30
11. An apparatus as claimed in any preceding claim wherein a flexible pipe member extends between the leading end of the non-return valve and the compressed gas coupling. 35
12. An apparatus as claimed in any preceding claim wherein the elongate compressed gas pipe is secured flush to the pressure discharge container such that the non-return direction of the non-return valve is below the horizontal. 40
13. An apparatus as claimed in claim 12 wherein the non-return direction of the non-return valve is 5° or more below horizontal, preferably 15° or more below horizontal, particularly preferably 25° or more below horizontal, more preferably 35° or more below horizontal, most preferably about 45° or more below horizontal. 45
14. An apparatus as claimed in any preceding claim wherein the non-return valve is attached at its trailing end to a rigid elbow pipe. 50
15. An apparatus as claimed in claim 14 wherein the rigid elbow pipe is angled to divert the elongate

compressed gas pipe substantially to the vertical.

16. A method for discharging a pressure discharge container containing a fluid and comprising at or near to an upper end a compressed gas coupling and at or near to a lower end a discharge outlet, said method comprising:

securing flush to the pressure discharge container an elongate compressed gas pipe;
connecting a first end of the elongate compressed gas pipe to the compressed gas coupling;
connecting a second end of the elongate compressed gas pipe to a source of compressed gas; and
opening the source of compressed gas to cause pressure discharge of fluid from the discharge outlet.

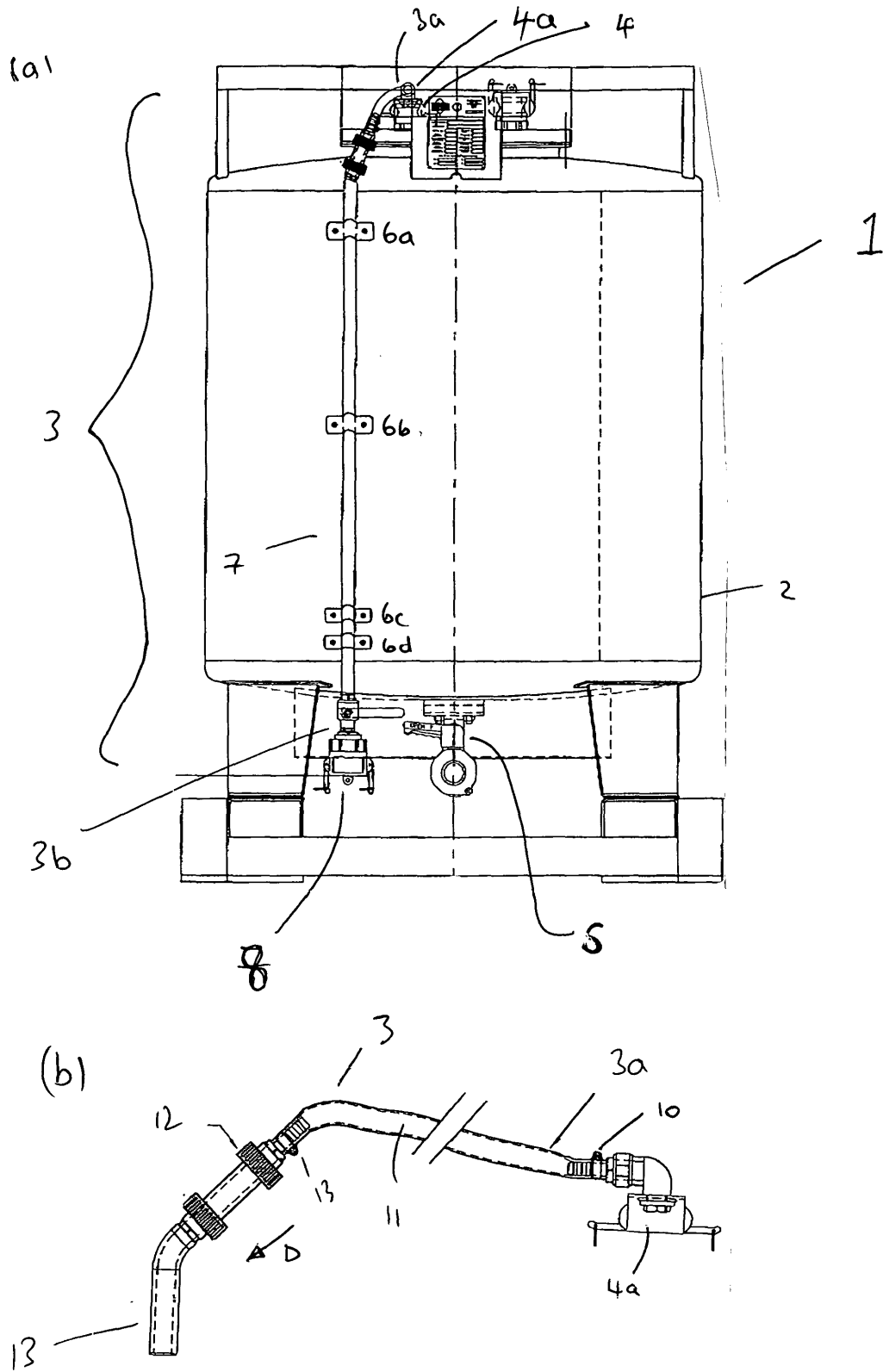


Figure 1



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 04 25 4817

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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B67D B65D B60P
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		12 November 2004	Martínez Navarro, A.
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 25 4817

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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