



**Floating craft such as a ship provided with means for
collecting a polluting fluid in case of disaster, and
method for collecting said fluid**

- 5 The present invention relates to a floating craft such as a ship fitted with means for recovering polluting fluid in the event of an emergency, and to a method for recovering this fluid.
- 10 Patents FR2849640, FR2869012 and FR2878225 belonging to the applicant describe various systems for recovering a polluting fluid from inside the tanks of a ship in distress, that is to say a ship that has run aground or sunk.
- 15 These systems use the principle of expelling the polluting fluid from the tank under the effect of injecting seawater into the tank.
- 20 In these systems of the prior art, the ship must be fitted with specific means dedicated to the operations for recovering the polluting fluid: the installation of these specific means requires additional deck piercings, and generates increased complexity and
- 25 increased costs relative to a standard ship not provided with such recovery means.

A particular objective of the invention is to provide a ship fitted with means for recovering polluting fluid

30 requiring fewer additional deck piercings or even none at all.

This objective of the invention is achieved with a floating craft such as a ship comprising at least one

35 tank of polluting fluid and at least one salvage connector communicating with said tank, notable in that this connector is connected to said tank by connecting means whereof at least a portion is assigned to at



least one function which is operational outside salvage situations.

By virtue of these features, the connector is connected
5 to a member which, in normal times, is used for other functions on the floating craft.

In other words, this means that it is not necessary to provide ducts specifically reserved for the operations
10 of recovering polluting fluid in the event of an emergency: in this way, it is possible to dispense with piercing the deck of the floating craft with additional ducts, and to limit the increased complexity and costs related thereto.

15 According to other optional features of the floating craft according to the invention:

- said floating craft comprises at least a first salvage connector and a second salvage connector
20 communicating with said tank, at least one of these connectors being connected to said tank by connecting means whereof at least a portion is assigned to at least one function that is operational outside salvage situations;

25 - said function is chosen from a group comprising the ventilation of said tank, the decompression of said tank, the dipping of said tank, the filling of said tank, the draining of the overflow of said tank, the inspection of said tank, the cleaning of said tank:
30 these functions are those that are routinely fulfilled outside salvage situations by ducts communicating with the tanks of the ships;

- said tank is a bunker for fuel necessary for the propulsion of said floating craft: this, in this
35 instance, is the particular case in which the tank is actually a fuel tank for the floating craft, the polluting fluid then being this fuel;

- said connecting means comprise two independent ducts for ventilating said bunker, surmounted by said connectors and vents;
- said connecting means comprise a first duct for ventilating said bunker surmounted by one of said connectors and a vent, a second ventilation duct connected to said first ventilation duct and a specific salvage duct connected to said second ventilation duct and surmounted by the other connector;
- 10 - said connecting means comprise a duct for ventilating said bunker surmounted by one of said connectors and a vent, and a specific salvage duct connected to said bunker and surmounted by the other connector;
- 15 - said connecting means comprise a duct for dipping said bunker surmounted by one of said connectors, an overflow duct connected to said tank, and a special salvage duct connected to said overflow duct and surmounted by the other connector: the various variants
- 20 indicated in the above four paragraphs correspond to the various bunker configurations that may be encountered on the ships;
- said tank is a tank for transporting said polluting fluid: it involves in this instance the
- 25 situation in which the tank(s) form(s) the majority of the volume of the ship, which is dedicated to the transport of fluid; it is particularly the case with tankers;
- said connecting means comprise a ventilation duct
- 30 surmounted by one of said connectors and a ventilator;
- said connecting means comprise a decompression duct surmounted by one of said connectors and a decompression valve;
- said connecting means comprise a duct for filling
- 35 said tank surmounted by one of said connectors;
- said connecting means comprise a manhole plate mounted removably on said tank and surmounted by one of said connectors;

- said connecting means comprise a cleaning plug mounted removably on said tank and surmounted by one of said connectors: the various variants indicated in the above four paragraphs correspond to the various communication means that may be encountered on the tanks of tankers;
 - at least one of said connectors is connected in a T-connection to its associated duct: such a T-connector is simple to produce and makes it possible to maintain the normal use of the duct outside salvage situations;
 - said connectors are of the bolted blind flange type: these connectors, of very simple design, are easy and cheap to use;
 - said connectors are placed above the deck of said floating craft: this arrangement allows particularly easy access to these connectors when the ship is in an emergency situation, and particularly when it rests on the sea bottom.
- 20 The present invention also relates to a method for extracting a polluting fluid situated in at least one tank of a floating craft such as a ship in distress, notable in that the user pumps said fluid through at least one duct which is assigned at least partly to at least one function which is operational outside salvage situations.
- 30 The present invention also relates to a method for extracting a polluting fluid situated in at least one tank of a floating craft such as a ship in distress, notable in that the user injects an expulsion fluid such as seawater into said tank through at least a first duct and in that the user recovers said polluting fluid through at least a second duct, at least one of these two ducts being assigned at least partly to at least one function that is operational outside salvage situations.

Other features and advantages of the present invention will appear in the light of the following description and on examination of the appended figures in which:

- figures 1, 4, 6 and 7 represent schematically four configurations of ships comprising bunkers fitted with means for recovering fluid according to the invention,
- figures 2 and 3 represent, in axial section and in top view respectively, a connector forming part of these fluid-recovery means,
- 10 - figures 5 and 8 represent in perspective bunkers arranged according to figures 4 and 7,
- figures 9 and 10, 11 and 12, 13 and 14, 15 and 16, 17 and 18 represent, in respective views in elevation and from above for each case, various members communicating with a tanker tank, fitted with connectors allowing the recovery of the fluid situated inside this tank, and
- 15 - figure 19 represents a cross section of a tanker tank surmounted by a plurality of members represented in figures 9 to 18.

Reference is now made to figure 1, in which a bunker 1 is represented, placed beneath the deck 3 of a ship 5, this bunker being designed to receive, for example, fuel necessary for the propulsion of the ship 5.

This bunker comprises two ventilation ducts 7a and 7b piercing the deck 3 and each surmounted on the one hand by a vent 9a, 9b and on the other hand by a connector 11a, 11b fitted in a T-connection to these ducts.

An exemplary embodiment of such a connector can be seen in figures 2 and 3: this connector 11 comprises a short duct 13 surmounted by a welded collar 15 to which a blind flange 17 is fitted by appropriate fastening means such as screw and nut assemblies 19.

In this first variant, the two ducts 7a and 7b are ducts which exist independently of the question of recovering fluid situated inside the bunker 1 in the event of an emergency; it is however possible to envisage that the diameter of these two ducts is different from that of the ducts that are used routinely for ventilating the bunker 1.

The variant of figure 4 differs from the foregoing in that the ventilation duct 7b is connected to the ventilation duct 7a, an additional salvage duct 21 then being interposed between the duct 7b and a connector 11b mounted on the deck 3 of the ship 5.

This second variant is particularly well-illustrated in figure 5, in which two bunkers 1 are shown each surmounted by its ventilation ducts 7a, 7b, the ducts 7a in turn being surmounted by their connectors 11a and their vents 9a, and the ducts 7b being surmounted, for their part, by their additional salvage ducts 21 and their connectors 11b.

In the variant that can be seen in figure 6, the bunker 1 originally comprises only one ventilation pipe 7a, surmounted by a vent 9a and a connector 11a, and a specific salvage pipe 23 has been connected directly linking the bunker 1 to a connector 11b situated on the deck 3.

In the variant that can be seen in figure 7, the bunker 1 comprises a dipping duct 25 making it possible to measure the level of fluid situated inside the bunker 1, this duct being surmounted by a connector 11a situated on the deck 3 of the ship 5.

An overflow duct 27 is moreover provided, this duct making it possible to draw off into a circuit 29 the overflow of fluid situated inside the bunker 1.

To this overflow duct 27, existing on a standard ship, is fitted a salvage duct 31, surmounted by a connector 11b situated on the deck 3 of the ship 5.

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Figure 8 shows particularly well the overflow duct 27 connected to the circuit 29; also seen in this figure is another overflow duct 27' which, for its part, is a standard duct, that is to say not surmounted by a salvage duct 31.

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Reference is now made to figures 9 to 19, concerning a ship in which the tank(s) of polluting fluid are tanks for transporting this fluid: the ship comprising these tanks may therefore be, for example, a tanker.

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As is seen in these figures, the connectors designed for salvage operations are in this case incorporated into various members for communication with the tank.

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Figures 9 and 10 show a connector 11 of the type mentioned above fitted in a T-connection mounted on a ventilation duct 33 itself mounted on the deck 3 of the ship 5 and communicating with a tank 1 situated beneath this deck.

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As is known per se, such a ventilation duct may be surmounted by a ventilator 35.

In figures 11 and 12, the duct 33 furnished with the connector 11 is surmounted by a decompression valve 37, known per se, and making it possible to draw off to the outside of the tank 1 the pressurized gases contained in this tank.

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Figures 13 and 14 show a loading line 39, that is to say a duct allowing the tank 1 to be loaded with fluid to be transported.

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In this case, the connector 11 may be fitted in a T-connection to the duct 39, so as to be directed upward, as can be seen in figures 13 and 14.

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In the variant shown in figures 15 and 16, the connector 11 is welded to a plate 41 itself bolted to the deck of the ship, above the tank 1; such a plate, of oblong shape for example as can be seen in figure 16, is routinely called a "manhole" plate and allows a person to go into the tank 1 in order to inspect it.

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In the variant shown in figures 17 and 18, the connector 11 is welded to a plate 43, itself bolted to a cleaning plug 45.

As is known per se, such a cleaning plug forms a passageway through the deck 3 of the ship making it possible to insert into the tank 1 tools for cleaning this tank.

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Figure 19 shows, as an example, a ventilation assembly 11, 33, 35, a decompression assembly 11, 33, 37 and two isolated connectors 11 mounted on cleaning plugs 45 attached to the deck 3 of a ship 5 above a tank 1.

Naturally any other combination of the members represented in figures 9 to 18 is possible.

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The operating mode and the advantages of the invention result directly from the foregoing description.

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As it will have been possible to understand, the connectors 11 are connected to ducts which fulfill particular functions when the ship 3 is in a normal operating mode, that is to say outside salvage situations: these ducts make it possible, for example,

to provide the ventilation, the decompression, the dipping, the filling, the emptying, the inspection or else the cleaning of the tank.

- 5 Installing the connectors 11 on these ducts therefore makes it possible to limit the number of piercings through the deck 3 of the ship 5, and therefore to reduce the complexity and the cost of installation of these salvage connectors.

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It should be noted in addition that limiting the number of these piercings makes it possible to limit the number of weak points in the deck 3, and to increase free space on this deck.

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- In the event of an emergency for the ship 5, that is to say in particular in the event of stranding or sinking, salvors pierce the blind flanges 17 of the connectors 11 for example by means of a bell saw (or else they can
20 unbolt this flange), and they attach to these connectors pipes making it possible on the one hand to inject seawater under pressure into the tank 1, and, on the other hand, to recover the polluting fluid situated inside the tank 1, expelled due to the inflow of the
25 seawater.

- Note that ensuring that the connectors 11 are situated on the deck 3 considerably eases access to them particularly by means of an ROV (remotely operated
30 underwater vehicle).

- Naturally, the present invention is in no way limited to the embodiments described and shown but are provided simply as examples.

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It is in this way, for example, that it would be possible to envisage a single salvage connector per tank, mounted on a duct assigned at least partly to at

least one function which is operational outside salvage situations: such a single connector would make it possible to introduce a pumping hose into the tank of a ship that has run aground or a ship of which at least
5 one of the tanks has a breach.

It is in this way also that it would be possible to envisage more than two salvage connectors per tank.

CLAIMS

1. A floating craft such as a ship (5) comprising at least one tank (1) of polluting fluid and at least one salvage connector (11a, 11b) communicating with said tank (1), characterized in that this connector (11a, 11b) is connected to said tank by connecting means (7a, 7b; 25, 27; 33; 39; 41; 45) whereof at least a portion is assigned to at least one function which is operational outside salvage situations.
2. The floating craft (5) as claimed in claim 1, comprising at least a first salvage connector (11a) and a second salvage connector (11b) communicating with said tank (1), characterized in that at least one of these connectors (11a, 11b) is connected to said tank by connecting means (7a, 7b; 25, 27; 33; 39; 41; 45) whereof at least a portion is assigned to at least one function that is operational outside salvage situations.
3. The floating craft (5) as claimed in one of claims 1 or 2, characterized in that said function is chosen from a group comprising the ventilation of said tank (1), the decompression of said tank, the dipping of said tank, the filling of said tank, the draining of the overflow of said tank, the inspection of said tank, the cleaning of said tank.
4. The floating craft (5) as claimed in claim 3, characterized in that said tank (1) is a bunker for fuel necessary for the propulsion of said floating craft.
5. The floating craft (5) as claimed in claim 4, characterized in that said connecting means comprise two independent ducts (7a, 7b) for ventilating said

bunker (1), surmounted by said connectors (11a, 11b) and vents (9a, 9b).

6. The floating craft (5) as claimed in claim 4,
5 characterized in that said connecting means comprise a first duct (7a) for ventilating said bunker (1) surmounted by one (11a) of said connectors and a vent (9a), a second ventilation duct (7b) connected to said first ventilation duct (7a) and a specific salvage duct
10 (21) connected to said second ventilation duct (7b) and surmounted by the other connector (11b).

7. The floating craft (5) as claimed in claim 3,
characterized in that said connecting means comprise a
15 duct (7a) for ventilating said bunker (1) surmounted by one (11a) of said connectors and a vent (9a), and a specific salvage duct (23) connected to said bunker (1) and surmounted by the other connector (11b).

20 8. The floating craft (5) as claimed in claim 3, characterized in that said connecting means comprise a duct (25) for dipping said bunker (1) surmounted by one (11a) of said connectors, an overflow duct (27) connected to said tank (1), and a special salvage duct
25 (31) connected to said overflow duct and surmounted by the other connector (11b).

9. The floating craft (5) as claimed in claim 3,
characterized in that said tank (1) is a tank for
30 transporting said polluting fluid.

10. The floating craft (5) as claimed in claim 3,
characterized in that said connecting means comprise a ventilation duct (33) surmounted by one of said
35 connectors (11) and a ventilator (35).

11. The floating craft (5) as claimed in one of claims 9 or 10, characterized in that said connecting

means comprise a decompression duct (33) surmounted by one of said connectors (11) and a decompression valve (37).

- 5 12. The floating craft (5) as claimed in any one of claims 9 to 11, characterized in that said connecting means comprise a duct (39) for filling said tank (1) surmounted by one of said connectors (11).
- 10 13. The floating craft (5) as claimed in any one of claims 9 to 12, characterized in that said connecting means comprise a manhole plate (41) mounted removably on said tank (1) and surmounted by one of said connectors (11).
- 15 14. The floating craft (5) as claimed in any one of claims 9 to 13, characterized in that said connecting means comprise a cleaning plug (45) mounted removably on said tank (1) and surmounted by one of said connectors (11).
- 20 15. The floating craft (5) as claimed in one of claims 6 to 8 and 10 to 12, characterized in that at least one of said connectors (11a, 11b) is connected in a T-connection to its associated duct.
- 25 16. The floating craft (5) as claimed in any one of the preceding claims, characterized in that said connectors (11a, 11b) are of the bolted blind flange (17) type.
- 30 17. The floating craft (5) as claimed in any one of the preceding claims, characterized in that said connectors (11a, 11b) are placed above the deck of the floating craft.
- 35 18. A method for extracting a polluting fluid situated in at least one tank (1) of a floating craft such as a

ship (5) in distress, characterized in that said fluid
is pumped through at least one duct (7a, 7b; 21; 23;
31; 33; 39; 41; 45) which is assigned at least partly
to at least one function that is operational outside
5 salvage situations.

19. The method for extracting a polluting fluid
situated in at least one tank (1) of a floating craft
such as a ship (5) in distress, characterized in that
10 an expulsion fluid such as seawater is pumped into said
tank through at least a first duct (7a, 7b; 21; 23; 31;
33; 39; 41; 45) and in that the user recovers said
polluting fluid through at least a second duct (7a, 7b;
21; 23; 31; 33; 39; 41; 45), at least one of these two
15 ducts being assigned at least partly to at least one
function that is operational outside salvage
situations.