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(54) Benævnelse: **OFFSHORE-FORSYNINGSSKIB**

(56) Fremdragne publikationer:
WO-A1-2005/054048
WO-A1-2005/056379
WO-A1-2012/022355
DE-A1- 19 707 213
GB-A- 1 000 297
GB-A- 1 407 602
GB-A- 2 269 565
US-A- 3 031 856
US-A- 3 557 740
US-A- 3 844 239
US-A1- 2006 213 419

DESCRIPTION

[0001] The present invention relates to an offshore supply ship for transport of cargo comprising an, in the main, open deck, and also several cargo tanks that lie below the deck where one or more watertight rooms extend between a number of said cargo tanks and the deck.

[0002] Meant by offshore supply ship is both PSV (platform supply vessel) and OSV (offshore service vessel), or for that matter other suitable supply ships for use offshore.

[0003] The present ship is preferably supplied with a central cargo rail (foundation), where the cargo rail can be, for example, equipped with a centrally placed derrick crane which can be moved along on the cargo rail. Because of its central location the cargo rail can preferably be equipped with outlets for ventilation lines for, for example, type 1 and 2 cargo tanks. The central cargo rail can also be used for outlets for ventilation lines for other cargo tanks, such as slop tanks, i.e. for example, tanks for the collection of contaminated liquids such as oil and water.

[0004] From patent literature, reference is made to WO 2005/054048 A1, which relates to an offshore supply ship for the transport of deck cargo, comprising an, in the main, open deck. The ship has cargo rails along the starboard and port sides. Pipe lines go from the cargo tanks to the cargo rails. The cargo rails are equipped with derrick cranes.

[0005] US 2006/0213419 A1 and GB 2162880 A show vessels with cargo tanks below an, in the main, open deck with cargo rails along the starboard and port sides.

[0006] WO 2005/056379 A1 shows an open work deck with cargo tanks below and pipelines that go in a centrally, longitudinal channel.

[0007] GB 1407602 A relates to a vessel for transportation of liquefied gases. US 3031856 A relates to a vessel for transporting low temperature liquids. GB 1000297 A relates to vessel with thermally insulated tanks suitable for containing low temperature liquids. GB 2269565 A relates to a tanker with access trunk.

[0008] IBC, International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk, is an international standard that places operating and construction limitations for safe transport at sea. Type 1 vessels are a chemical tanker for the transport of "Chapter 17" products with serious environmental and safety related cargo that requires maximum safety initiatives to prevent discharges of such cargo. Type 2 vessels are chemical tankers to transport "Chapter 17" products with considerable environmental and safety cargo, and which require stringent safety initiatives to prevent discharges of such cargo. Chapter 17 gives an overview of different chemicals and places the limitations for: Pollution category, safety category, type of ships required for the transport of the products (type 1, 2 or

3), specific operating requirements for the transport of the products, etc.

[0009] The ventilation lines for type 1 cargo are not permitted in side cargo rails. The advantage with the present solution is that shorter lines/pipes can be used, in some cases, usually nearly straight up from the cargo tanks and which are far from said injury zone. Another advantage with a central cargo rail is that lower cargo rails can be used at the sides. This can be important as it will give a better ventilation of the cargo deck which is important when poisonous substances are being transported. Another advantage with lower side cargo rails is that it improves the view from and to the cargo deck.

[0010] For example, for IBC type 1 OSV, use of a central cargo rail (foundation) will be a unique solution which does not exist today. As far as it is known, the only vessels that are permitted to transport IBC type 1 products are a few chemical tankers.

[0011] With the use of a central cargo rail there is a need for one cargo station only, in contrast to the standard stations on starboard and port sides. This can also lead to simpler evacuation routes, as watertight sliding doors, for example, are not necessary.

[0012] A possible advantage is that there might be no need for cofferdams, i.e. for example, watertight rooms between the cargo deck and the cargo tanks, for a pipeline installation over the whole width of the cargo deck. This might be able to increase the cargo capacity for, for example, sludge and saltwater tanks (mud/brine) and other liquid tanks (FO).

[0013] The present invention was basically developed in a response to the above mentioned IBC codes, but it must be emphasised that the invention can, of course, also be used on vessels other than just type 1 and 2 vessels.

[0014] As mentioned, the invention relates, for one thing, to the placing of a cargo rail centrally on the vessel. On traditional offshore supply ships cargo rails are meant to allow the cargo to be stored against the cargo rail, protect the pipe systems, such as for loading and unloading, function as escape routes and also be used as a work area on each side of the vessel. Ventilation channels and pipelines, as well as escape routes, must be routed through the cargo rails, which means extra lengths on the pipelines and also a risk of flooding in cases of damage to the sides that also damage the cargo rails. In addition, for loading and unloading of bulk cargo, it is often necessary to have loading and unloading stations on each side of the vessel.

[0015] Placing of a central cargo rail, generally in combination with two lower and simple cargo rails on each side, will give a better and more efficient way in which to arrange the tanks. This also reduces the amount of pipelines, which in turn results in reduced costs, less maintenance and smaller risks of damages to the pipe systems. This also leads to better protection of the cargo tanks with chemicals and can reduce the need for double loading and unloading stations. Furthermore, it can mean simpler and safer escape routes, a simpler way to arrange the ventilation of pumps and other rooms below the deck and better ventilation of the work deck in cases where the vessel transports dangerous chemicals.

[0016] The above mentioned advantages and aims are obtained with an offshore supply ship for the transport of cargo, comprising an, in the main, open deck, and also several cargo tanks that lie below deck, where one or more watertight rooms extend between a number of said cargo tanks and the deck, and where, on said deck in the longitudinal direction of the ship, a central longitudinally running cargo rail is placed, wherein the cargo rail can support a derrick crane and can be equipped with tracks for said crane, and a number of ventilation lines that run from said cargo tanks through the watertight room and up into the centrally placed cargo rail.

[0017] According to the invention, said ventilation lines can alternatively run from a number of collection tanks, such as slop tanks, and up into the centrally placed cargo rail.

[0018] Furthermore, an outlet to the ventilation lines in the centrally placed cargo rail can comprise a valve, such as a pressure vacuum valve, arranged to regulate the ventilation of the cargo tanks. Each cargo tank can preferably be equipped with a ventilation line that runs up into the centrally placed cargo rail.

[0019] The cargo rail is internally open and has an internal height greater than the normal standing height of a person.

[0020] The central cargo rail is equipped with tracks to move a derrick crane in the longitudinal direction of the deck.

[0021] The invention shall now be described in more detail with reference to the enclosed figures, in which,

Figure 1 shows a partially cross section of a vessel according to the invention.

Figure 2 shows a partially longitudinal cross section of a vessel according to the invention.

[0022] Figure 1 shows an offshore supply ship 10, of the type PSV, OSV, or the like, which is equipped with a central cargo rail 18 that extends centrally and longitudinally on the deck 12 in the longitudinal direction of the ship. Meant by centrally is not exactly mid ship, as the central cargo rail can also be placed, if appropriate, somewhat off-centre. Thereby, the deck 12 is divided into two cargo decks, one on the starboard side and one on the port side, respectively, in contrast to standard ships where the deck is comprised of one large cargo deck. Alternatively, the cargo rail 18 can support a derrick crane 14 (only the lower part of the crane 14 is shown) and furthermore, can be equipped with tracks 20 to permit longitudinal movement of the crane 14. The cargo rail 18 can be a relatively wide, full-height cargo rail with access to personnel centrally. Thereby, the sides of the ship 10 can be equipped with two relatively low and narrower side edges/railings 36 in contrast to the standard full height cargo rails with access for personnel.

[0023] Thereby, the cargo station in a central cargo rail (the foundation 14) gives access for and can be used from both the starboard and port sides, in contrast to the standard need for two cargo stations in each cargo rail on both the starboard and port sides.

[0024] A number of tanks such as cargo tanks 30, slop tanks 32 for the collection of liquid and sludge tanks and saltwater tanks 34 can preferably be placed below the cargo deck 12. It can be seen in the figures that the cargo tanks 30 are placed centrally mid-ship and in a row in the longitudinal direction of the ship 10. Furthermore, the cargo tanks 30 can be equipped with loading and unloading equipment 28 in the form of pumps, pipes and the like.

[0025] In particular, in the area between the cargo tanks 30 and the deck 12, so called cofferdams 24 are provided and which are watertight rooms for the pipe installation or the like. According to the invention ventilation lines/pipes 22 run from the cargo tanks 30, and generally also from the slop tanks 32, through said cofferdams 24 and up into the centrally placed cargo rail 18. The ventilation lines 22 can end up in the cargo rail, possibly on the top or the side of the cargo rail, and one or more of the ventilation line's 22 outlets can be equipped with a valve such as a pressure vacuum valve 26 to control and regulate the venting of each tank.
Thus, shorter ventilation lines are provided, in particular from the central cargo tanks and which are especially important for type 1 products that can not have ventilation within a B/5 safety zone. A B/5 safety zone is the zone that extends from the hull to a fifth part of the line towards the centre for the summer waterline (IBC code Ch. 2.5). Furthermore, there is not a need for cofferdams to guide the pipes to the cargo rails at the sides, in contrast to known solutions where the ventilation lines must go to the sides of the ship through the cofferdams and which thereby take up valuable cargo space. A further advantage is that the ventilation of pump rooms and other rooms that need ventilation is simplified as there is no need for costly, watertight ventilation valves.

[0026] Furthermore, it shall be mentioned that the central cargo rail 14 can be placed both in line with the B/5 safety zone or, for that matter, also somewhat deviating from B/5, i.e. off-centre.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO2005054048A1 **[0004]**
- US20060213419A1 **[0005]**
- GB2162880A **[0005]**
- WO2005056379A1 **[0006]**
- GB1407602A **[0007]**
- US3031856A **[0007]**
- GB1000297A **[0007]**
- GB2269565A **[0007]**

Patentkrav

1. Offshore-forsyningsskib (10) til transport af gods der omfatter i det væsentlige, åbne dæk (12), adskillige lasttanke (30), der er anbragt under det åbne dæk (12), og et eller flere vandtætte rum (24) der strækker sig mellem et antal af lasttankene (30) og det åbne dæk (12), hvilket skib (10) yderligere omfatter:

- en central og i længderetningen kørende lastskinne (18), der strækker sig på det åbne dæk (12) i længderetningen af skibet (10), hvilket deler dækket (12) i to lastdæk, et på styrbord side og et på bagbord side, henholdsvis, hvilken lastskinne understøtter en Derrick-kran (14) og er udstyret med spor (20) til bevægelse af Derrick-kranen (14), og hvilken lastskinne (18) er åben indadtil og har en indre højde der er højere end den normale højde for en stående person, og

- et antal ventilationsledninger (22) der er løber fra lasttankene (30) gennem de vandtætte rum (24) og op i den centralt anbragte lastskinne (18).

2. Offshore-forsyningsskibet ifølge krav 1, **kendetegnet ved, at** ventilationsledningerne (22) løber fra et antal opsamlingstanke (32), såsom spildevandstanke, og op ind i den centralt anbragte lastskinne (18).

3. Offshore-forsyningsskibet ifølge krav 1, **kendetegnet ved, at** et udløb til ventilationsledningerne (22) i den centralt anbragte lastskinne (18) omfatter en ventil (26), såsom en tryk/vakuumventil, der er indrettet til at regulere ventilationen fra lasttankene (30).

4. Offshore-forsyningsskibet ifølge krav 1, **kendetegnet ved, at** hver type 1 lasttank (30) er udstyret med en ventilationsledning (22), der løber op i den centralt anbragte lastskinne (18).

DRAWINGS

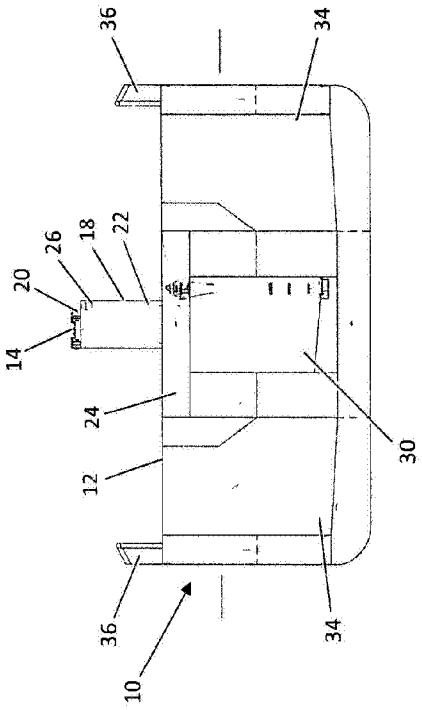


Fig. 1

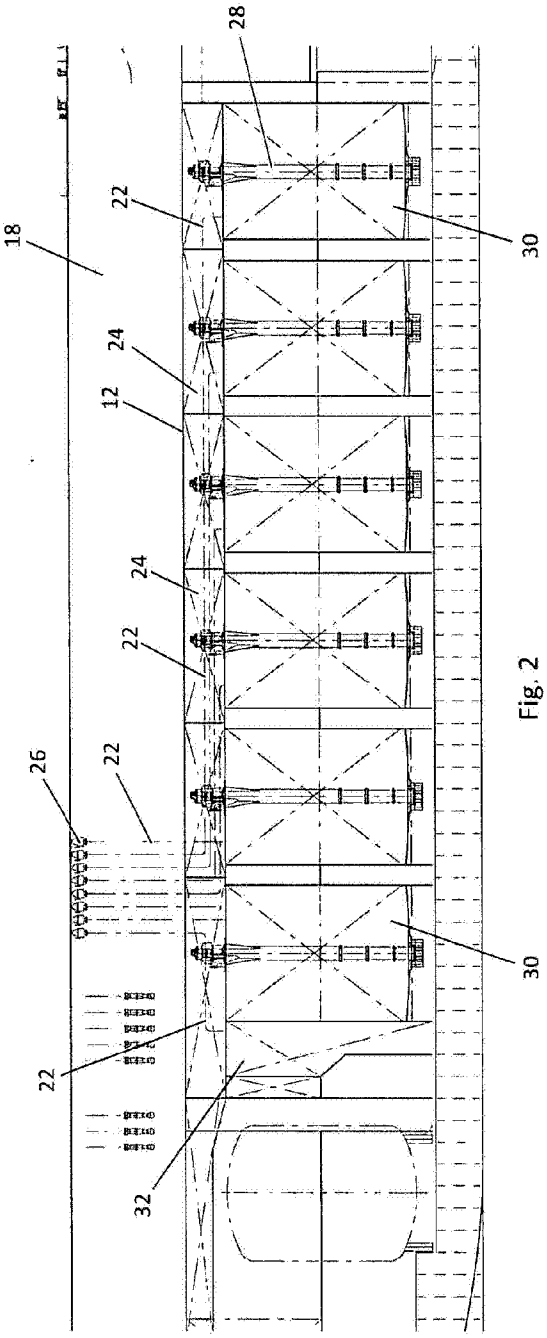


Fig. 2