

[54] TANKER VESSEL

[75] Inventor: Walter B. Devine, Houston, Tex.

[73] Assignee: **Esso Research and Engineering Company, Linden, N.J.**

[22] Filed: May 6, 1971

[21] Appl. No.: 140,803

[52] U.S. Cl. 114/74 R, 114/78

[51] Int. Cl. B63b 25/08

[58] Field of Search 114/74 R, 74 A, 72,
114/73, 76, 78, 116, 65 R

[56] **References Cited**

UNITED STATES PATENTS

3,356,600	12/1967	Field et al.	114/74 R X
3,247,822	4/1966	Laskey et al.	114/74 R
R19,374	11/1934	Butterworth	114/74 R UX
3,399,645	9/1968	Dahan	114/74 R

FOREIGN PATENTS OR APPLICATIONS

1,311,097	10/1962	France	114/74 R
1,004,760	9/1965	Great Britain	114/74 R

Primary Examiner—Milton Buchler

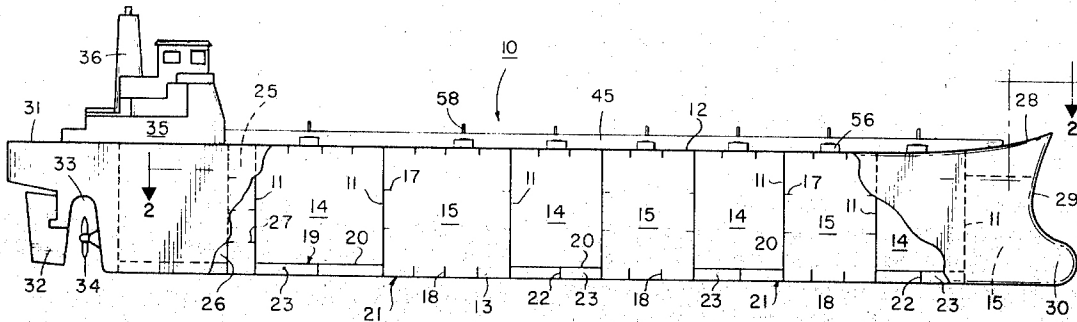
Assistant Examiner—E. R. Kazenske

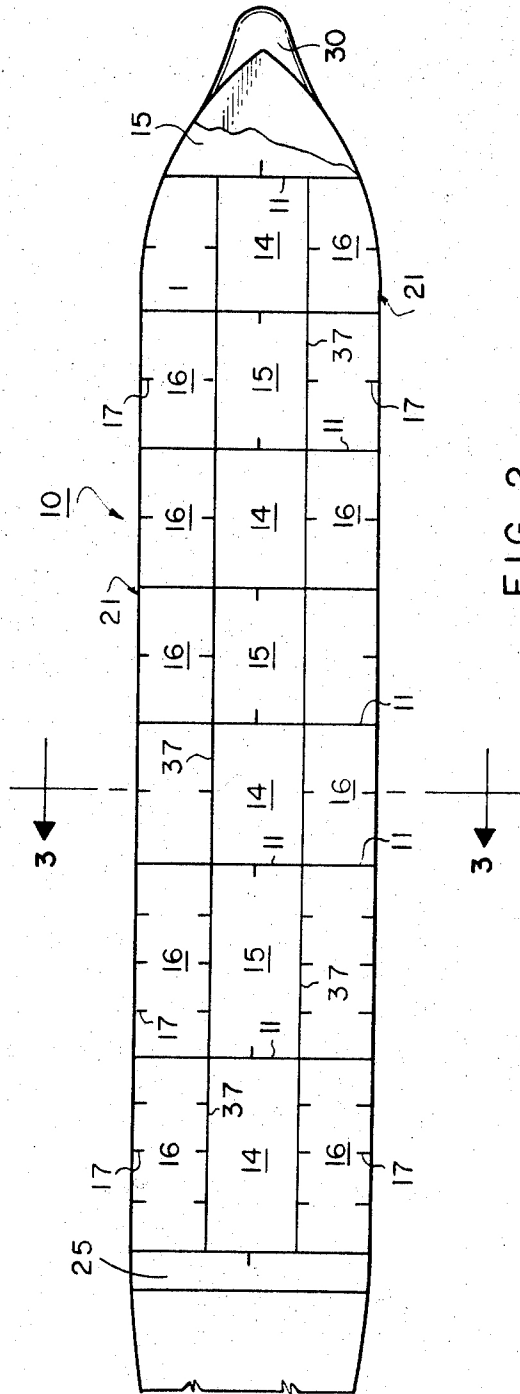
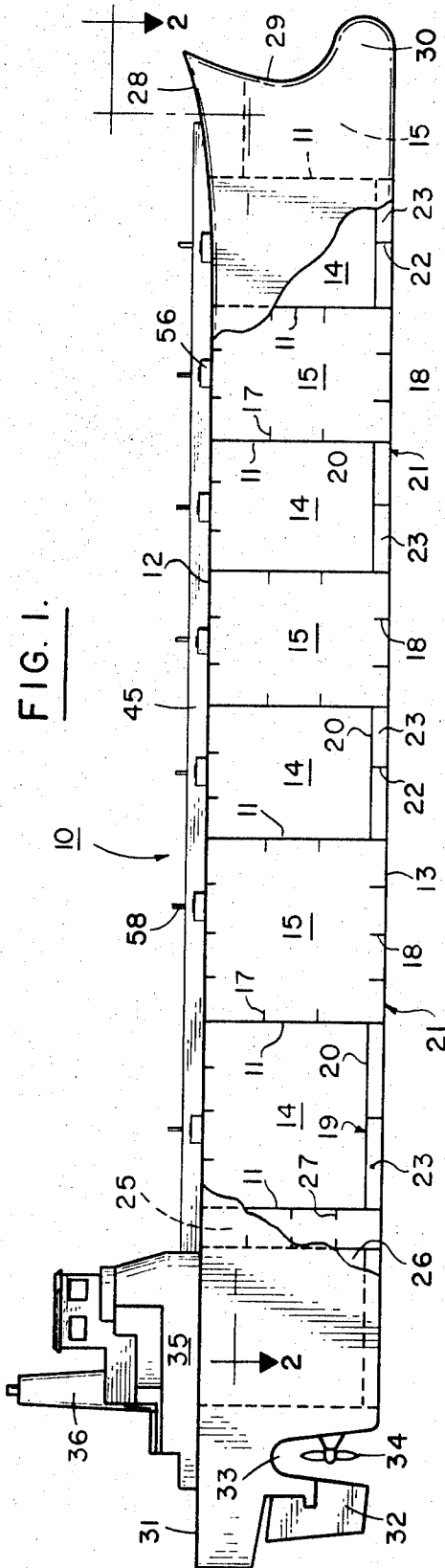
Attorney—Thomas B. McCulloch, Melvin F. Fincke,
John S. Schneider and Sylvester W. Brock, Jr.

[57] **ABSTRACT**

A tanker vessel for carrying liquid material is provided with a cargo area provided with a plurality of spaced apart longitudinal bulkheads and a plurality of parallel transverse bulkheads vertically extending from the main deck of the vessel to the vessel shell, said bulkheads forming a plurality of wing tanks, first central tanks, selected of the first central tanks having a double bottom, divided by a vertical bulkhead into two tanks. The double bottom carries liquid water ballast only, the first selected central tanks carry water ballast or other liquid products, and the remaining tanks carry liquid products. The first selected central tanks are free of bulkhead stiffeners which are provided on the longitudinal and transverse bulkheads.

6 Claims, 3 Drawing Figures

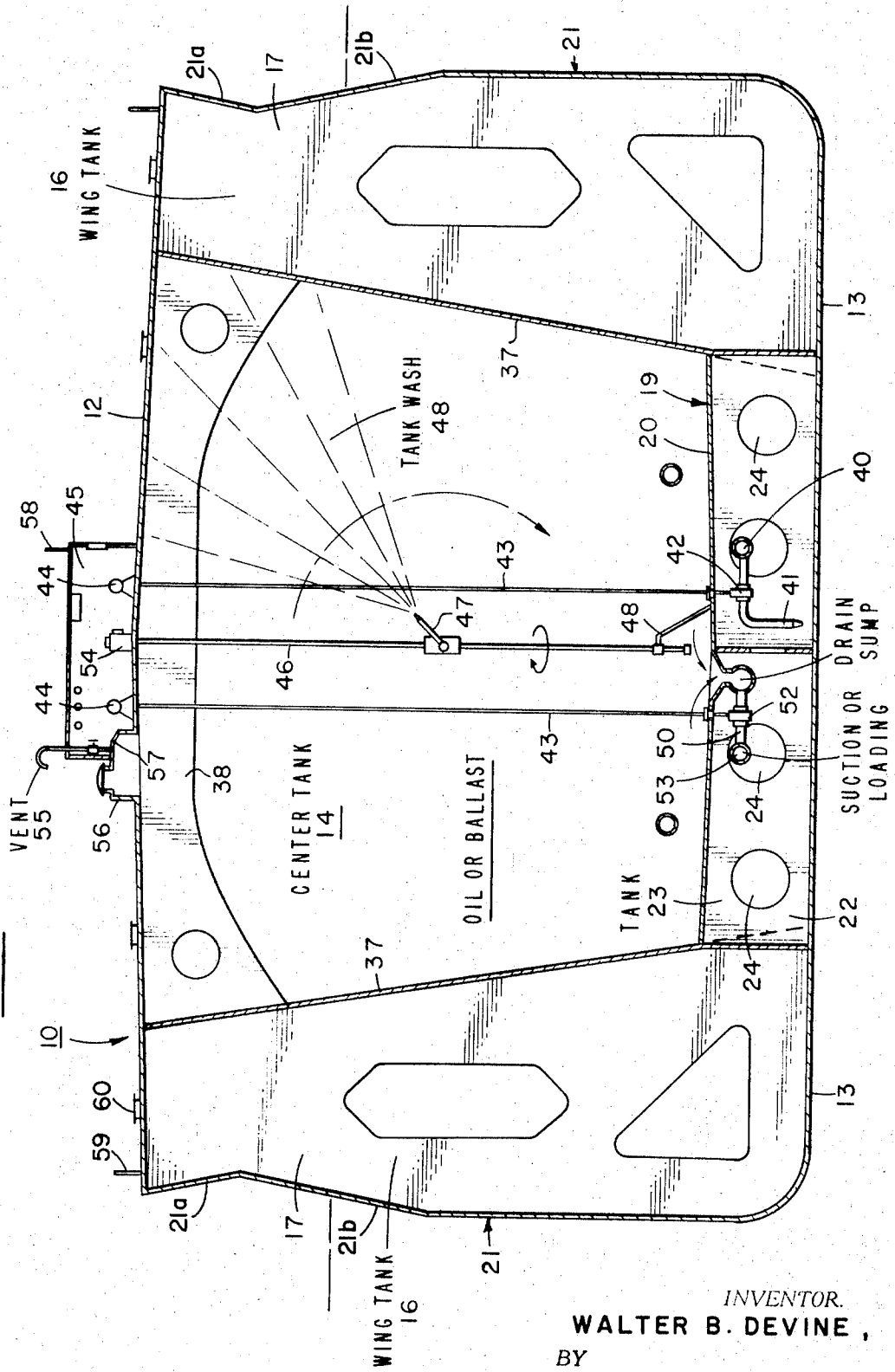




INVENTOR.
WALTER B. DEVINE,
BY

James D. [Signature]
ATTORNEY.

FIG. 3.



INVENTOR.
WALTER B. DEVINE,
BY
John P. [Signature]
ATTORNEY.

TANKER VESSEL

CROSS-REFERENCE TO RELATED APPLICATION

This application contains common subject matter to an application entitled "TANK VESSEL" filed May 5, 1971 for Walter B. Devine, Ser. No. 139,430.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention is directed to tanker ships particularly marine vessels which are suitable for use in the arctic. More particularly the invention is concerned with a tanker vessel having a particular arrangement of bulkheads and tanks. In its more specific aspects the invention is directed to an arctic tank ship which has an arrangement of tanks wherein there is a minimum of metal exposed to corrosive fluids and in which the strength of the vessel is unimpaired.

2. Description of the Prior Art

It is known to employ longitudinal and transverse bulkheads in tank ships. It is also disclosed in the patent literature that the corrosivity of certain products such as gasoline and the like may be overcome by using a combination of layers of steel of diverse electrochemical potential in tank ships. It is also known to provide tunnels under the tanks of a tank ship to carry pipelines and the like. The prior art teaches the provision of ballast bags in tank ships to avoid contamination with liquefied cargo. Various water ballast configurations have been devised and/or proposed to achieve various tank configurations other than that obtained with intersecting longitudinal and transverse bulkheads. All of these proposals and prior teachings are still open to various objections in providing tank ships wherein the tanks and the ships are constructed in an expensive manner and the problems which are encountered in the arctic where special strength is needed are not solved. It is, therefore, novel and unobvious to provide tanker vessels or ships for arctic usage in accordance with the present invention which are sufficiently strong that navigation in ice covered waters may be achieved.

The following listed U.S. patents were considered in connection with this invention:

U.S. Pat. No. 2,237,321
 U.S. Pat. No. 2,428,050
 U.S. Pat. No. 2,979,009
 U.S. Pat. No. 3,247,822
 U.S. Pat. No. 3,364,893
 U.S. Pat. No. 3,385,251

SUMMARY OF THE INVENTION

The present invention may be briefly described and summarized as a tanker vessel for arctic and the like use wherein versatile center tanks for arctic tankers are provided wherein said tanks are so constructed and arranged as to carry cargo on one leg of a journey and ballast water on the return leg of such journey. By virtue of positioning bulkhead stiffeners outside selected center tanks and by virtue of fitting said selected tanks with double bottoms, the amount of steel exposed to the different corrosive effects of salt water and oil is significantly reduced. Furthermore, the tanks are easy to clean since the stiffeners are exteriorly positioned and therefore do not interfere with the flow of liquid through the suction ports. The double bottoms serve not only as tanks but also reinforcement for the se-

lected center tanks which are substantially free of internal stiffeners or trusses.

BRIEF DESCRIPTION OF THE DRAWING

The present invention will be described further by reference to the drawing in which:

FIG. 1 is an inboard profile of the tanker ships of the present invention;

FIG. 2 is a sectional view of the main bulkhead arrangement taken along the line 2—2 of FIG. 1; and

FIG. 3 is a cross-sectional view of the tanker vessel taken along the line 3—3 of FIG. 2, showing the inner construction of the wing tanks and selected center tanks as well as the bottom tanks under the selected tanks.

DESCRIPTION OF THE PREFERRED EMBODIMENT WITH RESPECT TO THE DRAWING

Referring now to the drawing and particularly to FIGS. 1 and 2, number 10 designates a tanker vessel such as a marine vessel designed for use in the arctic and like environments. The vessel 10 is provided with a plurality of transverse vertical bulkheads 11 which extend from the main deck 12 to the bottom shell 13. Selected of the bulkheads 11 form selected tanks 14 which are substantially free of internal trusses or stiffeners, and the internal structure, excepting the bulkheads, is not subject to corrosion. The selected tanks 14 may alternate between tanks 15 which are provided with bulkhead stiffeners 17 and beams 18. The bulkheads 37 and 11 with shell 21 form wing tanks 16 along the starboard and port sides of vessel 10.

The selected tanks 14 have double bottoms 19 formed of members 20 and shell 21 of the vessel 10. The double bottoms 19 have internal plates 22 which support the inner bottom 20 and forms inner bottom tank 23 underneath the tanks 14. Plates 22 are provided with openings 24 therethrough for fluid communication in tank 23 and also to allow passage of conduits as shown in FIG. 3. A pump room 25 is defined by one of the transverse bulkheads 11 and a bulkhead 26 and is provided with internal stiffening means 27 which suitably may be trusses. The bulkhead 26 and the bulkhead 27 form an engine room for the motive power for the ship which may be a diesel engine, a steam engine, or nuclear power means, and the like.

The outside shell of the first of the tanks 15 which is used for ballast defines a fore peak 28, a prow 29 having a bulbous bow 30. The stern of the vessel or fantail 31 is provided with a steering means 32 and a tunnel 33 in which is located one or more propulsion means such as screws 34. On the main deck 13 is arranged the bridge and living quarters 35 through which protrudes a stack 36 leading from the engine room to carry off steam, smoke, other vapors, gases, and the like.

In FIG. 2 it will be seen that longitudinal bulkheads 37 intersect the transverse bulkheads 11 and form with the shell and the transverse bulkheads the several tanks described with respect to FIG. 1.

Referring now to FIG. 3 which is a cross section of the tank ship of the present invention, it will be noted that the tank 14 is strengthened by upper beam 38, inner bottom 20, shell 21, and the internal vertical plate 22 supporting the inner bottom 20 and by using bulkheads 37 referred to in FIG. 2. The wing bulkheads 37 are preferably angled to provide maximum tank ca-

capacity for the combination oil/ballast tanks 14 for a minimum steel weight and the upper part of it may form an angle greater than 90° with the main deck 13, while the lower portion of the wing bulkhead 37 may form an angle of 90° with the bottom shell or an angle greater than 90° with the bottom shell as indicated by the dotted lines.

Referring again to FIG. 3, it will be noted that the bottom 20 of tank 14 slopes slightly from each bulkhead 37 toward the center of the vessel where there is provided a drain sump. Connected into the sump is a line 50 which also connects into longitudinally running line 53 and is controlled by a valve 52. A reach rod 43 operably connects valve 52 to a valve control means 44 enclosed in a covered access means 45 on the deck 12.

Extending downwardly into tank 14 from a control means 54 in covered access means 45 is a conduit 46 which is provided with at least one nozzle means 47; line 46 is closed on its lower end adjacent floor 20 and connects to floor 20 by a support means 48 which also acts as an electrical ground. One or more conduits such as 46 may be provided in each tank 14 and may also be adapted to rotate if desired. During tank washing operations, liquids are drawn off by way of the sump, line 50 and line 53, the combination of which also provides means for loading or unloading of the tank 14. Tank vents 55 lead from oil hatches 56 which are provided with viewing ports 57 within the covered access means 45.

Tanks 23 and 15 are also provided with means to load and unload liquids, such as line 41 which connects in a longitudinal line 40 and is controlled by valve 42. Valve 42 is also connected by a reach rod to a control means 44 in covered access means 45. Although not illustrated, wing tanks 16 are also provided with means for loading or unloading liquids. Tank vents 55 lead from oil hatches 56 which are provided with viewing ports 57 in the covered access means 45.

The top of the covered access means 45 is provided with guard rail 58, while the main deck 13 is also provided with guard rails 59. The wing tanks 16 are also provided with Butterworth hatches 60 through which well known Butterworth cleaning means may be inserted and employed to clean the tanks 16 as required.

As also shown in FIG. 3, there is an upper vertical portion 21a of the sides of shell 21 which slopes outwardly above a connecting vertical portion 21b which slopes inwardly.

It will be seen from the foregoing description taken with the drawing that unobvious and useful results are obtained in that tanks are provided which are substantially free of inner structural means providing minimum

exposure of metal to corrosive liquids such as sea water used as ballast and crude petroleum fractions thereof and other corrosive liquids which may be carried by tanker ship.

The present invention is, therefore, quite desirable, unobvious and useful and presents advantages over the prior art.

The nature and objects of the present invention having been completely described and illustrated, what I wish to claim as new and useful and secure by Letters Patent is:

1. A tanker vessel having a shell, main deck, and cargo area for carrying liquid material which comprises:

- a. a plurality of spaced apart longitudinal bulkheads and a plurality of spaced apart parallel transverse bulkheads in said cargo area intersecting said longitudinal bulkheads, said bulkheads extending from the main deck to the vessel shell and forming a plurality of wing tanks and central tanks;
- b. said longitudinal bulkheads forming an angle greater than 90° at least with the main deck;
- c. selected of said central tanks having double bottoms with internal structural stiffening means below the selected central tanks;
- d. bulkhead stiffeners arranged only on the outside of said longitudinal and transverse bulkheads forming said wing tanks and said selected central tanks; and
- e. an upper vertical portion of the sides of said shell sloping outwardly above a connecting vertical portion of the sides which slopes inwardly.

2. A tanker vessel in accordance with claim 1 in which the selected first central tanks are provided with fixed vertical washing means depending from the main deck.

3. A tanker vessel in accordance with claim 1 in which the selected tanks are provided with rotatable vertical washing means depending from the main deck.

4. A tanker vessel in accordance with claim 3 in which the double bottom of each central tank provided with washing means is composed of an inner and outer bottom, the inner double bottom sloping toward the center of the vessel and the outer double bottom being formed by the vessel shell.

5. A tanker vessel in accordance with claim 4 in which each of the inner double bottoms is provided with a ballast line and an oil line for filling and draining the selected central tanks.

6. A tanker vessel in accordance with claim 1 in which the selected first central tanks alternate with other first central tanks having bulkhead stiffeners.

* * * * *

55

60

65