June 25, 1946. E. R. VORENKAMP 2,402,790

MARINE OIL TANK

Filed Nov. 21, 1944

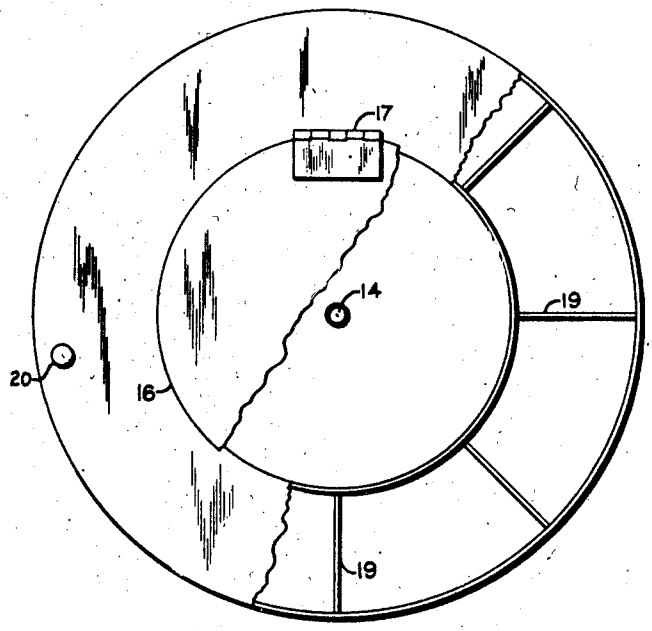


FIG. 2

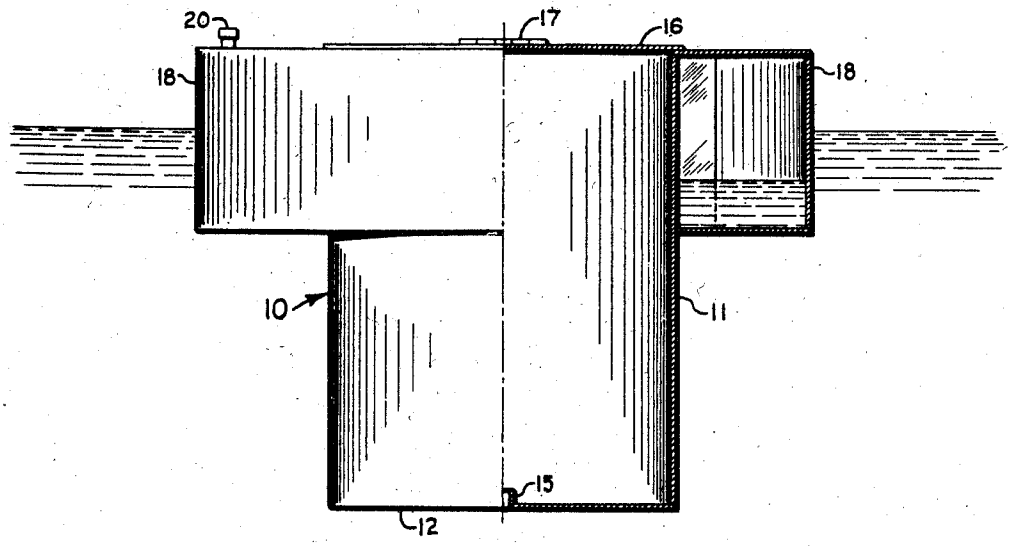


FIG. 1

INVENTOR.
EGBERT R. VORENKAMP
BY
Oscar A. Mellin
HIS ATTY.

Patented June 25, 1946 2,402,790

UNITED STATES PATENT OFFICE

2,402,790

MARINE OIL TANK

Egbert R. Vorenkamp, Berkeley, Calif.

Application November 21, 1944, Serial No. 564,510

2 Claims. (Cl. 114—74)

1

This invention relates to marine oil tanks of a transportable nature.

It is the principal object of my present invention to provide an improved marine storage tank which is capable of being transported from place to place, and which is highly useful in receiving oil contaminated water ballast from ships and automatically separate and retain the oil therein while discharging the water.

It is a further object of my present invention to provide a tank of the character referred to for the storage of volatile fuels, which tank is of a construction eliminating the necessity of venting the gases, which construction is such that extreme tank strength is not required to take care of the expansion and contraction of contained fuel due to temperature variations.

It is a further object of my present invention to provide an improved tank of the character referred to which may be anchored in such a submerged position that while ready access to its contents is permitted, it is practically concealed and is a negligible target.

One form which the invention may assume is exemplified in the following description and illustrated by way of example in the accompanying drawing, in which:

Fig. 1 is a view partially in side elevation and partially in vertical section disclosing a tank embodying the preferred form of my invention.

Fig. 2 is a partial plan view thereof with parts broken away to show certain features of construction.

Referring more particularly to the accompanying drawing, 10 indicates a marine storage tank which is intended, when in use, to be practically submerged. It can, however, when in this condition, either be anchored or it can be towed from place to place.

The tank 10 comprises a main cylindrical shell 11 having a vertical axis. The shell 11 is formed with a bottom 12 having a central opening 14 formed therein. An upstanding cylindrical collar 15, which is open-ended, surrounds the opening 14. I have found in actual practice that by providing the collar 15 about the opening 14, suction through the opening 14 is eliminated by the drag of the external water when the tank is being towed through the sea. I have also found that without this collar 15, the suction drag occasioned by towing or movement of the tank through the water will empty the tank of its contents.

The upper end of the tank is fitted with a hinged cover 16 hinged at one side of the tank as at 17. Suitable latching means may be provided for this cover, if desired, in any conventional fashion, but as it is not a part of my present invention, it is not illustrated.

2

Circumscribing the upper end of the cylindrical shell 11 is an annular shell 18 relatively fixed to the main shell 11. The annular shell 18 is in effect a buoyancy tank. The capacity of this buoyancy tank is relative to the load capacity of the storage shell 11. The buoyancy tank 18 is divided by radial swash plates or bulkheads 19 into a plurality of compartments. In the present instance I have intended that the compartments intercommunicate so that one filling fitting 20 can be employed to inject or remove water from all of the compartments. However, if desired, the bulkheads 19 can be water-tight and a separate filling fitting 20 can be provided for each compartment.

It is intended, however, that only sufficient water ballast be employed in the tanks 18 to maintain the free-board between the external water line and the top of the tank a desired dimension. There will still be sufficient buoyancy, however, provided by the tank 18 to prevent the entire tank from completely submerging.

As an example, when gasoline or other highly volatile fuel is stored in the shell 11, it may be desired to have approximately a three-foot free-board. In other circumstances, it may be desired that that free-board be reduced to a matter of inches. Manifestly, by regulating the volume of ballast water in the buoyancy shell 18 to conform to the gravity of the contents of the shell 11, the free-board may be such as desired.

I wish to point out here that the opening 14 in the bottom of the shell 11 is always open. Therefore, when storing gasoline or other highly volatile fuel in the tank, the tank may be filled to the very top and the lid closed, leaving no gas space and providing no vent for the gases. The reason that this can be accomplished is that if the fuel expands in the shell 11, it will expand against the water through the opening 14, and if the fuel contracts, the water will rise in the opening 14 and take its place, thus maintaining the fuel to the top of the tank at all times and eliminating any gas problem.

Due to this automatic provision for expansion and contraction of the fuel in the shell 11, the tank need not be made excessively strong and need not have sufficient inherent strength to take care of the expansion of the fuel as it would have to have if the opening 14 was not provided.

Obviously, my present tank is of use in stor-

ing gasoline and other fuel in a marine location. It can be towed to a desired position and then anchored. In that it has a removable cover plate, access can be readily had to the contents of the shell for removal. It is also to be pointed out that due to the low free-board, in that the tank is practically submerged, it presents a very poor target.

My tank has various uses in addition to that just set forth and one of its uses is to take care of the removal of oil contaminated ballast water from ships in harbor. In such instances, it is highly desirable that the oil be not pumped from the ballast tanks of the ship into the harbor. By the use of my present tank, the contaminated ballast water may be pumped directly into the top of my tank. The oil will continue to rise to the top of the shell, while the continued inflow into the shell will cause the water lowering to the bottom of the tank to discharge through the opening 14. When the tank becomes full of oil, it may be towed to a convenient spot for the discharge of the oil. In so doing, as previously described, the drag will not cause a suction to remove the oil from the shell 11 due to the provision of the collar 15.

From the foregoing it is obvious that I have provided a very efficient and highly efficient marine tank which has the desirable characteristic of enabling volatile fuel to be stored without necessitating making the tank of such strength to overcome expansion of the fuel due

to temperature variations. The tank has the additional characteristic that it can be used for fuel storage in marine locations without being conspicuous and without presenting but a very poor target.

While I have shown the preferred form of my invention, it is to be understood that various changes may be made in its construction by those skilled in the art without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A marine tank comprising a main shell for containing oil, a bottom in said main shell, said bottom having an opening formed therein, an upstanding collar fixed at its lower end to the bottom of the shell at the periphery of said opening, said collar being open-ended, a buoyancy tank relatively fixed to the shell and circumscribing its upper end, and a removable cover plate for the upper end of the shell.

2. A marine tank comprising a cylindrical main shell having a bottom, said bottom having an opening formed centrally therein, an open-ended cylindrical collar fixed at its lower end to the bottom of the shell at the periphery of its opening and extending upwardly into the shell, an annular buoyancy tank relatively fixed to the shell and circumscribing its upper end, and a hinged cover for the upper end of the shell.

EGBERT R. VORENKAMP.