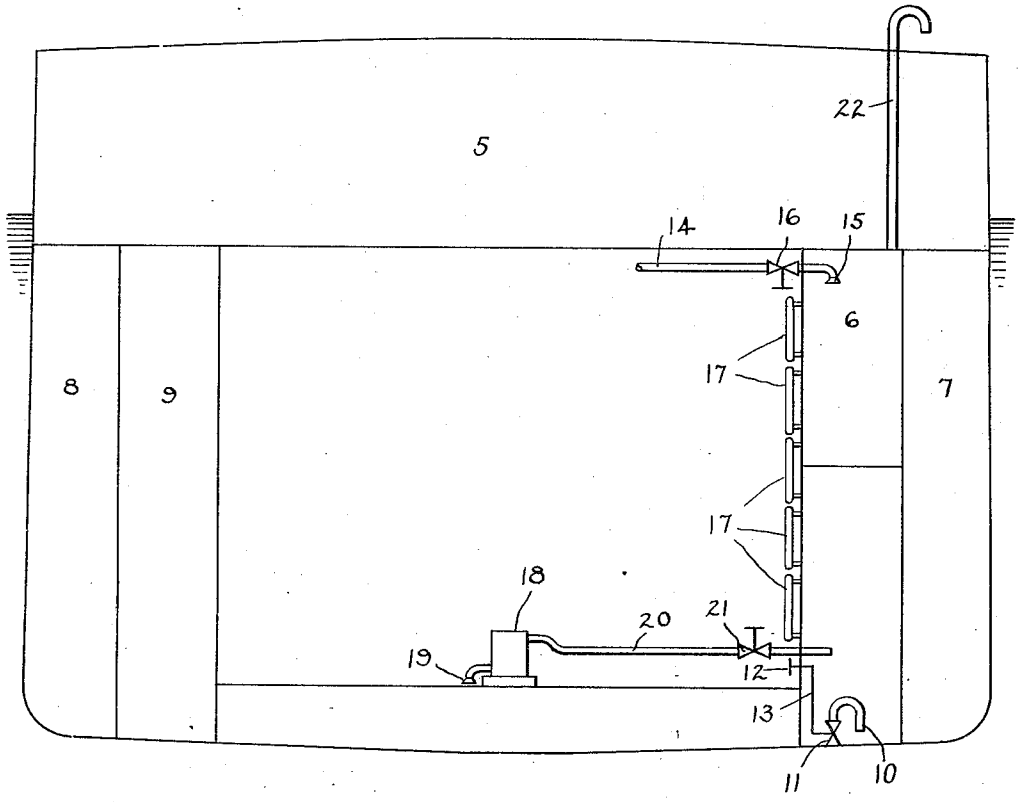
May 17, 1932. H. E. ROSSELL ET AL 1,859,246

ANTI OIL POLLUTION SYSTEM

Filed May 7, 1929 2 Sheets-Sheet 1

Fig. 1.



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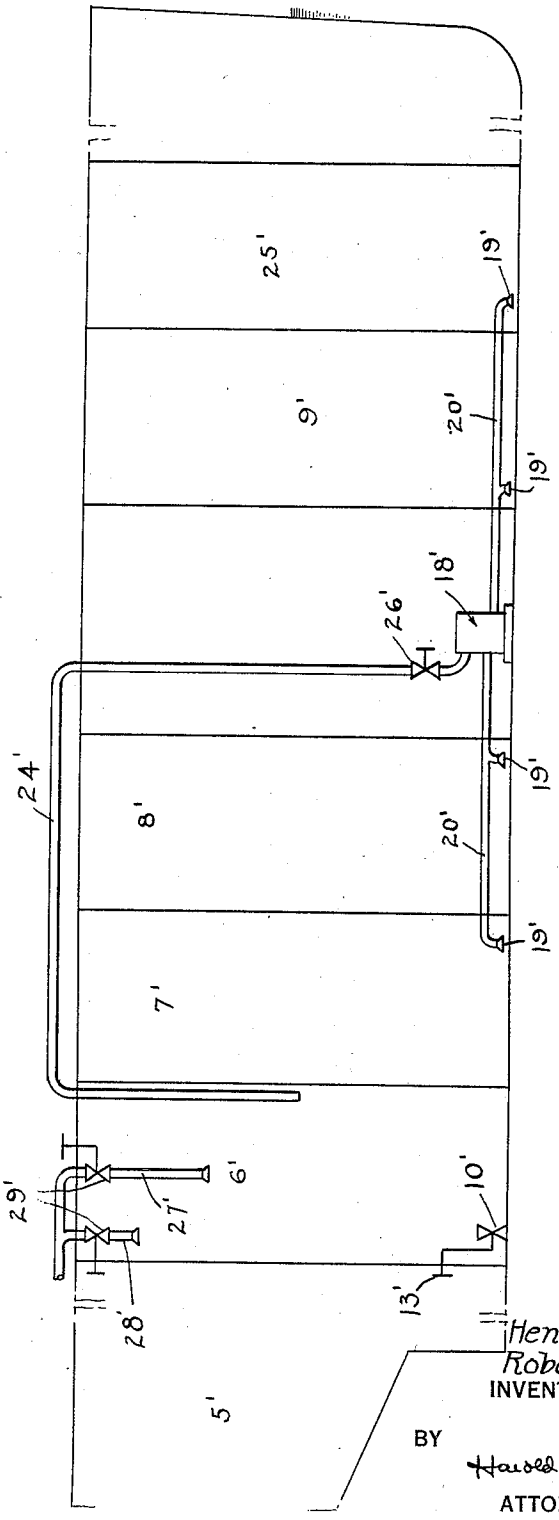
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Fig. 2.



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1,859,246

UNITED STATES PATENT OFFICE

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ANTIOIL-POLLUTION SYSTEM

Application filed May 7, 1929. Serial No. 361,220.

(GRANTED UNDER THE ACT OF MARCH 3, 1883, AS AMENDED APRIL 30, 1928; 370 O. G. 757)

Our invention relates broadly to an anti-oil pollution system and more particularly to a system for eliminating the pollution of navigable waters by fuel or lubricating oil discharged from a vessel.

An object of the invention is to provide a means to eliminate the pollution of navigable waters by oil discharged overboard from vessels.

Another object of the invention is to the provision of a means to permit the removal of fuel or lubricating oil from a tank in which it and bilge or ballast water are simultaneously stored, such removal being made without taking water into the oil pumping system of the vessel.

A further object of the invention is the provision of a means to permit the discharge of bilge or ballast water overboard from an oil tank of a vessel, which tank is used for simultaneous storage of fuel or lubricating oil and bilge or ballast water, without at the same time discharging an appreciable amount of oil overboard from the tank.

A still further object of the invention is to provide a means for the salvage of fuel or lubricating oil that has become mixed with bilge or ballast water.

A further object of the invention resides in a means whereby oil in a storage tank may be maintained at a predetermined level without changing the volume of oil in the tank.

With the above and other objects in view the invention consists in the construction, combination and arrangement of parts as will be described more fully hereinafter.

Reference is to be had to the accompanying drawings forming a part of this specification, in which like reference characters indicate corresponding parts throughout the several views, and in which

Figure 1 is a cross sectional view of an oil burning vessel taken abeam, and

Figure 2 is a longitudinal sectional view showing the application of the invention to an oil carrying vessel.

Referring more particularly to Figure 1 of the drawings, 5 indicates the hull of an oil burning vessel wherein may be seen a plurality of oil storage tanks or reservoirs 6, 7, 8 and 9. Although we have illustrated a certain number of tanks for the purpose outlined, it is not to be implied that the invention is necessarily limited to any specific number of tanks, nor that they be arranged in the hull in the precise manner disclosed. In fact, for the purpose of clarity, we will describe the arrangement and combination of parts of the system of the present invention with respect to but one tank—6.

This tank has communication with the sea at or near its lower portion through any conventional connection 10, which is opened and closed by any suitable valve 11, the valve being operated by a conveniently located hand-wheel 12 through a suitable mechanism 13. As the particular construction of this valve and operating mechanism does not form an essential part of the invention, we do not believe it necessary to give a full description of their details of construction, other than to say that if the valve is so placed that it is readily accessible from within the vessel no operating gear is required.

The tank is also connected to the pumping system of the vessel by a pipe line 14, which terminates in a nozzle 15 within the tank at or near its top, if the level of the water outside the vessel is always above the top of the tank. If, however, the level of the water outside the vessel may be expected to fall below the top of the tank at times, it is desirable that the terminal of the pipe line should be slightly above the lowest level the outside water is expected to reach. A valve 16 is placed in the pipe line to control the flow through the pipe. Instead of the single nozzle just described, it may be desired that a number of terminals be arranged within the tank at various heights so that the contents of the tank may be withdrawn regardless of its height therein. Should a plurality of nozzles be used they are all connected to the pipe line 14 in any desirable manner, and each is provided with a valve so that any one of the nozzles may be caused to function to the exclusion of the others. As a means for ascertaining the amount of oil and the amount of

water there is in the tank at any one time, a number of gauges 17 are provided. The gauges may be of the type illustrated, or any other suitable measuring device may be used.

Clear water is permitted to enter tank 6 through connection 10 by opening valve 11. As this water flows into the tank it displaces air previously contained therein, the latter escaping through vent pipe 22. Bilge or ballast water is drawn through nozzle 19 by pump 18 and delivered into tank 6 through pipe line 20 when valve 21 therein is open, the pipe line 20 terminating higher in the tank than shown, or else at a considerable longitudinal distance from the connection 10, so that the mixture of oil and water entering through pipe line 20 will not flow directly to the overboard connection 10 and pass overboard before separation of the oil from the water could be effected. After the pumping of the bilge or ballast water into tank 6 has been accomplished valve 21 is closed. As the bilge or ballast water, which may be contaminated with fuel or lubricating oil, enters tank 6 it displaces a corresponding amount of clear water which flows out of tank 6 through connection 10, valve 11 being kept open. Any oil contained in the bilge or ballast water which has been pumped into tank 6 will gradually separate from the water in the tank and will collect at the top of the tank. As bilge or ballast water is pumped into tank 6 from time to time as described above, the lower level of the oil which accumulates in the tank will gradually approach the bottom of the tank.

When the tank is entirely filled with oil, bilge or ballast water should not be pumped into it. When it is desired to withdraw the oil from the tank, valve 16 is opened and the oil is either pumped out through pipe line 14 by the pumping system of the vessel, or it flows out through the line as a result of the difference in pressure heads outside and inside the tank. When a portion of the oil has been pumped or otherwise removed from the tank, bilge or ballast water may again be pumped into the tank at will through the line 20. As the oily water enters the tank it will displace clear water from the lower portion thereof, forcing it overboard through connection 10, the clear water being obtained as a result of the oil that is mixed therein while in the bilge rising to the surface and also as a result of the initial admittance of clear water to the tank. The oil that has settled on top of the water is pumped off or drained off as above explained. It will thus be seen that through the medium of this system oil that would ordinarily be wasted is salvaged to be used, and at the same time a minimum amount of oil is ejected into the water surrounding the vessel.

Of course clear oil may be placed in tank 6 through any suitable filling connection; and as this oil enters the tank it will displace clear water which will flow out of connection 10, valve 11 being kept open. The use of tank 6 for the separation of oil from bilge or ballast water need not interfere, therefore, with the use of the tank for the storage of clear oil. Bilge or ballast water should be pumped into the tank, however, only when the tank contains partly oil and partly water, or when the tank is filled only with water up to the level corresponding to the draft of the ship.

When the tank is used for storage purposes, as above stated, and when a portion of the oil therein has been withdrawn through the nozzle 15, thus lowering the level of the oil, valve 11 may be opened, allowing clear sea water to enter the tank to again bring the oil level within reach of the suction of the nozzle. It will thus be seen that the oil may be maintained at any desired level without changing the amount of oil in the tank. This is particularly advantageous for an oil burning ship at sea, as it is not necessary to locate the nozzle at or near the bottom of the tank where such sediment and foreign matter as usually accumulates may be withdrawn with the oil. By this arrangement the nozzle may be placed near the top of the tank, greatly reducing the possibility of the passage of contaminated oil into the ship's oil lines.

To empty the tank completely for any purpose, the valve 11 can be closed and the contents of the tank removed through a pipe or hose led from a low point in the tank to the suction side of pump 18, or some other suitable pump.

In Figure 2 the invention is shown applied to one of a series of oil storage tanks of an ordinary oil-carrying vessel, but it will be understood that the invention may be applied to any desired number of or to all of the tanks. As in Figure 1, one of the series of tanks, tank 6′ being the one illustrated in the drawings, is in communication with the sea through a connection 10′ positioned at or near the lower portion of the tank, which connection is fitted with a suitable valve controlled by an operating mechanism 13′ of any appropriate type. In each of the remaining tanks, 7′, 8′, 9′ and 25′ there is a suction nozzle 19′ in communication with a pipe line 20′ leading to a pump 18′, on the other side of which is a pipe line 24′ leading to tank 6′, this pipe line 24′ terminating in tank 6′ far enough from the overboard connection 10′ to avoid direct flow from 24′ to 10′. The contents of tanks 7′ to 9′ and 25′, whether it be oil, ballast, or bilge water, is pumped therefrom by pump 18′ and discharged into tank 6′, from whence the removal of the oil is performed as in the system illustrated in Figure 1. The flow through the pipe line 24′ is controlled by a valve 26′, and if desired a valve may be

placed in the line 20′ adjacent to each of the nozzles for independent control of the suction in each of the tanks. Two suction outlets are arranged in tank 6′ to remove the oil therefrom, one extending more deeply into the tank than the other. Outlet 27′ is just above the lowest level the outside water line may be expected to reach, while the other outlet 28′ is just above the highest level the water line may be expected to reach. Although two such outlets are shown, additional ones may be used if preferred, or a suction whose position is adjustable may be employed instead.

If the vessel is coming into port with ballast water in its storage tanks and it is contemplated to refill these tanks with oil, the ballast is pumped overboard through the usual connections low in the tanks, but the tanks should not be entirely emptied of the ballast water because some residue oil usually remains from the previous filling, which rising to the top pollutes the surface of the ballast water, and if all of the ballast water is pumped overboard it will carry with it this residue oil. When all the clear water has been pumped overboard from the tanks, the remaining mixture of oil and water is pumped into tank 6′ by pump 18′, as above explained.

Clear water has previously been permitted to flow into tank 6′ by opening the valve in connection 10′. The surface of the water in tank 6′ will correspond to that of the water in which the vessel is floating. As the mixture of oil and water enters tank 6′ through pipe line 24′ clear water is displaced and flows out of connection 10′. The oil gradually separates from the water in tank 6′ and floats on its surface when it may be removed from the tank by pumping through one of the connections 27′ or 28′ or through an adjustable suction substituted therefor.

Oily bilge water may also be pumped from any part of the vessel into tank 6′ where the oil will separate gradually from the water and rise to the surface.

Clear oil may be placed in tank 6′ by means of a suitable filling connection. Such clear oil will displace clear water which will flow out of tank 6′ through connection 10′, the valve in this connection being kept open. When the level of the bottom of the oil in tank 6′ is only slightly above connection 10′, it will be necessary to close the valve in connection 10′ before additional oil is admitted, otherwise clear oil will flow out of connection 10′ and be lost.

It will thus be seen that the use of tank 6′ for the separation of oil from bilge or ballast water need not interfere with the use of the tank for the storage of oil when desired. Bilge or ballast water should not be pumped into the tank, however, unless the bottom surface of the oil in the tank is several feet above connection 10′.

When the oil storage tanks 7′, 8′, 9′, and 25′ have been freed of oil and water as described above, these tanks may be filled with oil through the customary filling connections which extend into each of the tanks. These connections, obviously being not a part of the invention, are not shown.

Tank 6′ is fitted with a suitable gauge for determining the position of the bottom surface of the oil in the tank. This gauge, obviously not being a part of the invention, is not shown.

It will thus be seen that we have provided a system that will permit of the transfer of oily water from storage tanks or the bilge to a separating tank where the oil is salvaged from the water, and that permits of the automatic discharge of bilge or ballast water overboard without simultaneously discharging an appreciable amount of oil therewith. The system is easy and economical to install, economical to operate, and eliminates the annoyance of pollution of harbor waters when a vessel is in port.

It will be understood that the above description and accompanying drawings comprehend only the general and preferred embodiment of our invention and that various changes in details of construction, proportion and arrangement of parts may be made within the scope of the appended claims and without sacrificing any of the advantages of our invention.

The term "receptacle for the simultaneous storage of oil and water" as used in the appended claims, is intended to cover the bilge of the vessel as well as the storage tanks, and in that case the normal pollution of the bilge water with oil renders the bilge a receptacle for the simultaneous storage of oil and water. While the term "receptacle" is used in the singular in the claims, it is intended to cover both a unitary receptacle and one comprising a plurality of separate sections or tanks.

Having described our invention what we claim is:

1. A system for the prevention of pollution of harbor waters by the discharge of oily bilge water from a vessel afloat in port, including a receptacle on said vessel into which oily bilge water is delivered near its bottom, suction means within the receptacle and adjacent its upper portion for the removal of accumulated oil from the surface of the bilge water, and means permitting the ingress of a portion of the water on which the vessel is afloat into the receptacle to raise the level of the contents thereof without increasing the amount of oil therein, and which means also permits the discharge of said water, free of oil, from the receptacle.

2. In a ship's fuel oil supply, a combined oil storage and separating receptacle having

a vent therein, means located adjacent the bottom of said receptacle permitting either the ingress or egress of a portion of the water on which the ship is afloat when and as desired, means for supplying oily bilge water to said receptacle, said second means being remote from said first means to eliminate the direct discharge of the bilge water to the sea, and means within the receptacle and substantially at the water level of the sea for removing the oil free of water.

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