

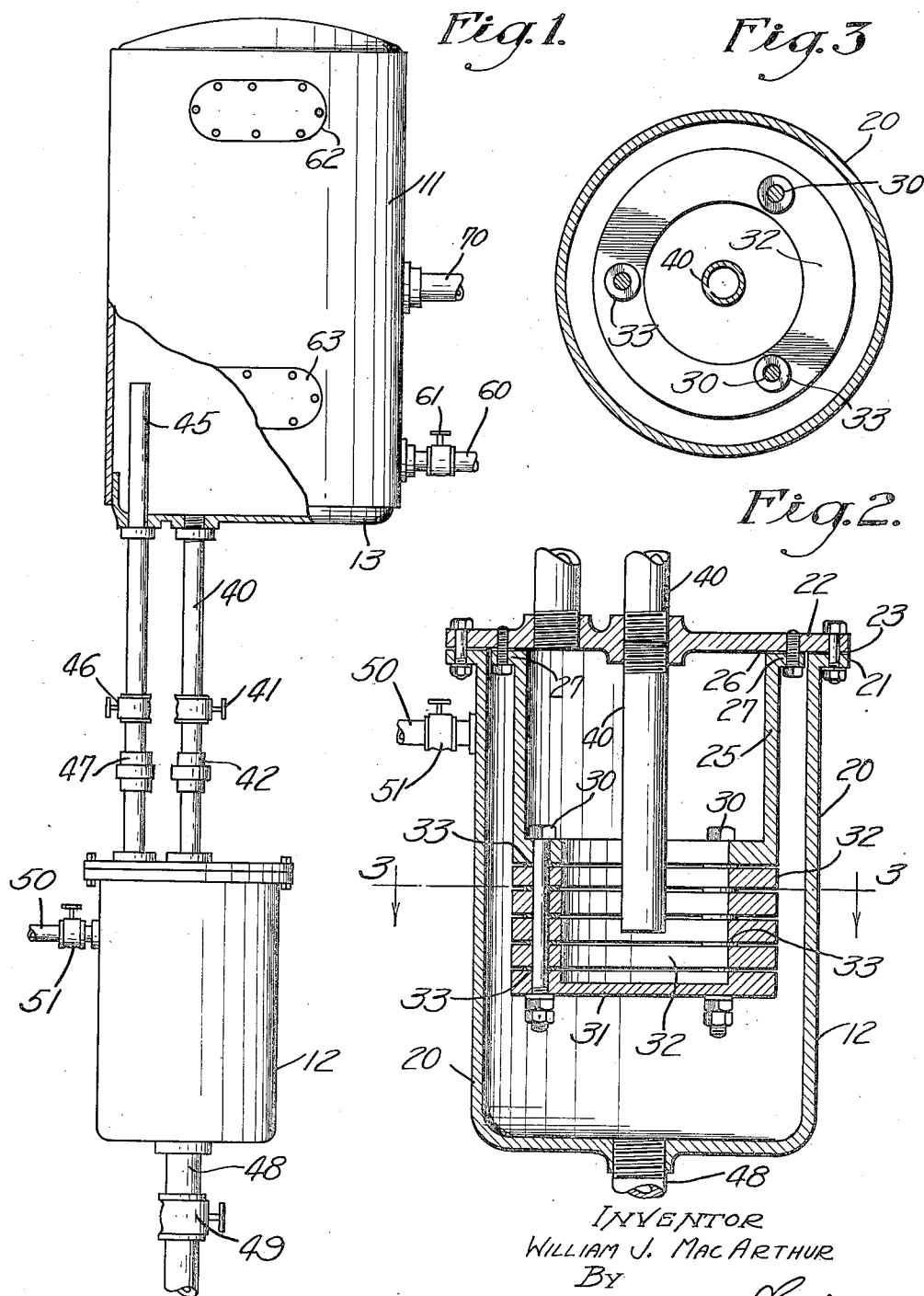
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BILGE TREATING PLANT FOR SHIPS

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BILGE-TREATING PLANT FOR SHIPS.

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My invention relates to ships and more particularly to the treatment of the bilge water of said ships for the purpose of removing oil therefrom. It is particularly applicable to tankers. In all kinds of ships, bilge water accumulates in the bottom of the ship from time to time, the bilge water being derived from small leaks and seepages from the seams, this water being mixed with other waste matter which drains down to the lowest portions of the hull. In all kinds of steamships the bilge water contains considerable oil and in ships using oil as fuel or carrying oil as a cargo, the amount of oil may be very considerable. It is necessary for the safety of the ship to pump the bilge water from time to time and it is common practice on all sorts of ocean carriers to pump the bilge water into the ocean, even where the ship is tied up at the dock or at anchor in the harbor. The presence of oil waste in the waters of a harbor or any other confined bodies of water is a public nuisance, and various laws have been proposed and enacted for preventing the continuance of this practice. It is extremely difficult to prevent the practice as there are few practical methods known at present by which the bilge or ballast water can be disposed of. It is an object of my invention to provide means for separating oil and foreign material from the bilge water of ships, allowing the water to be discharged from the ship practically free from oil. Further objects and advantages will be made evident hereinafter.

In the drawings which are for illustrative purposes only,

Fig. 1 is a side elevation of the apparatus embodying my invention.

Fig. 2 is a vertical section through the separating means; and

Fig. 3 is a section on a plane represented by the line 3—3 of Fig. 2.

In the form of my invention illustrated in these drawings I provide a settling tank 11 and a separator 12. The settling tank 11 consists of a sheet metal tank or drum having a tight bottom 13. The separator 12 consists of an outer shell or casing 20 having a flange 21 on the top against which a cover 22 is bolted, a gasket 23 being provided for making a tight joint. Bolted to the under side of the cover 22 is a casting 25, a gasket 26 being provided between the

cover 22 and a flange 27 on the casting 25. Secured by means of three bolts 30 and a cover plate 31 to the casting 25 are a plurality of rings 32. These rings are flat disks having parallel sides which are very accurately ground to form flat surfaces. Placed between the disks 32 about the bolts 30 are thin metal washers 33, these washers acting as shims to give an accurate spacing between the plates 32. The rings 32 should be of such proportions as to present annular surfaces of considerable relative width, so that when placed in their contiguous relationship a water film of great width relative to its vertical extension or direction of capillary affinity may be maintained. The rings should be so spaced that the distance of separation is but a fractional part of the width of the contiguous surfaces. As operating conditions may differ, the exact amount of separation can be most satisfactorily determined by adjusting the shims 33 until the desired result is obtained. Where the radial length of the film is two inches or more in the form of the invention shown in the drawings, the distance between the plates should preferably be not over $3/100$ of an inch and preferably considerably less, this distance depending somewhat upon the viscosity of the oil employed. The thinner the film, the greater its resistance to the infiltration of oil but the less capacity the separator will have. An outlet pipe 40 leads from the bottom of the tank 11 extending down into the interior of the rings 32, as shown in Fig. 2, this pipe being provided with a valve 41 and a union 42. A return pipe 45 extends from the cover 22 up into the tank 11, as shown in Fig. 1, this pipe being provided with a valve 46 and a union 47. A water outlet pipe 48 having a valve 49 leads from the bottom of the shell 20. A pressure pipe 50 having a valve 51 connects into the side of the shell 20. An oil outlet pipe 60 having a valve 61 is provided in the tank 11. This tank is also provided with handholes 62 and 63, closed by suitable covers. The tank 11 also has an inlet pipe 70. The method of operation of my invention is as follows:

The bilge or ballast water which contains considerable oil is pumped through the pipe 70 into the tank 11, where a certain initial separation takes place, the water tending to fall to the bottom of the tank and the oil

floating on the top. The valves 41 and 46 being open, and the valve 50 being closed, the mixture of oil and water is free to pass downwardly from the pipe 40 into the space 5 inside the casting 25 and the rings 32. The separation of the rings 32 is such that water will pass readily therebetween, but the oil refuses to enter the narrow openings formed between the plates, the holes of which have 10 previously been wet by water. The separation of the rings 32 can be readily determined by substituting washers 33 of different thickness.

I am not certain as to the principle upon 15 which my invention works but I believe that it depends upon the principle of capillary action or upon surface tension, the thin film of water between the plates 32 resisting the entrance of oil therein. In any event I have 20 found that water will readily pass between the plates 32 and that oil will be prevented from passing therein. Any oil which may be carried down into the interior of the casting 25 therefore remains inside the casting 25 until it is displaced by further 25 water, in which event the oil is free to rise through the pipe 45 into the tank 11. The water discharged through the spaces between the ring 32 passes off through the pipe 30 48 and is free from oil or other foreign matter, being in such a form that it can be readily discharged from the ship without being objectionable in any way. The oil gradually collects in the tank 11 and may be 35 readily discharged therefrom by means of the pipe 60 to the ship's boilers where it is burned. It is desirable from time to time to flush out the apparatus which can readily be accomplished by closing the valve 49 and

opening the valve 50, and admitting water 40 or steam under pressure to the interior of the casing 20, the water and steam then blowing out the small openings between the plates 32 and flushing out the pipes 40 and 45. 45

I claim as my invention:

1. A ship bilge treating plant for separating oil from bilge water comprising: a casing; a separator rigidly secured within said casing, said separator comprising a cylindrical casting secured to the under side 50 of the casing cover and a plurality of ring shaped members spaced apart and rigidly secured to the bottom of said casting; a pipe extending through said casing cover to a 55 point adjacent said ring shaped members for supplying bilge water to said separator; a pipe secured to said casing cover opening into said separator for withdrawing oil therefrom; and means for withdrawing the 60 separated water from said casing.

2. A ship bilge treating plant for separating oil from bilge water comprising: a casing; a separator rigidly secured within said casing, said separator comprising a 65 chamber bounded by a plurality of spaced flat rings, the distance between the flat surfaces of the adjacent rings being so small as to retain oil but permit water to pass through; means for conducting bilge water 70 to said chamber; means for withdrawing the separated water from said casing; and means for withdrawing oil from the upper end of said separating chamber.

In testimony whereof, I have hereunto set 75 my hand at Los Angeles, California, this 9th day of May, 1923.

WILLIAM J. MACARTHUR.