

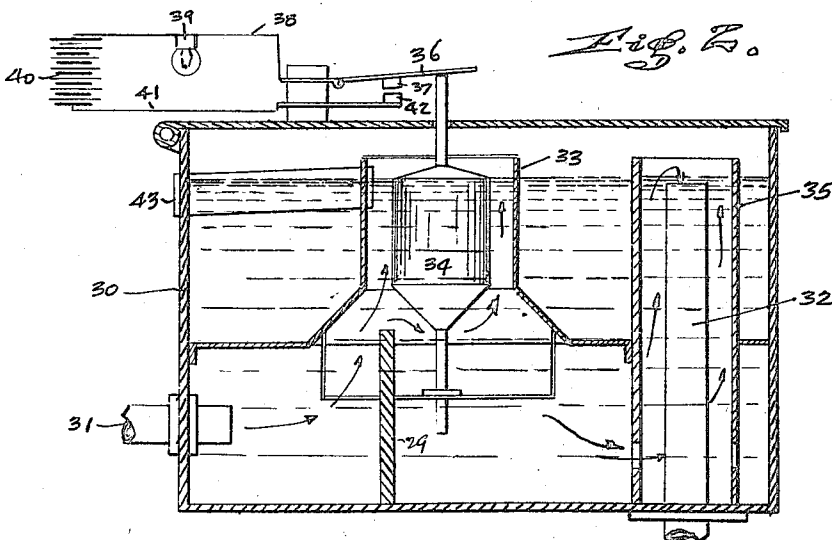
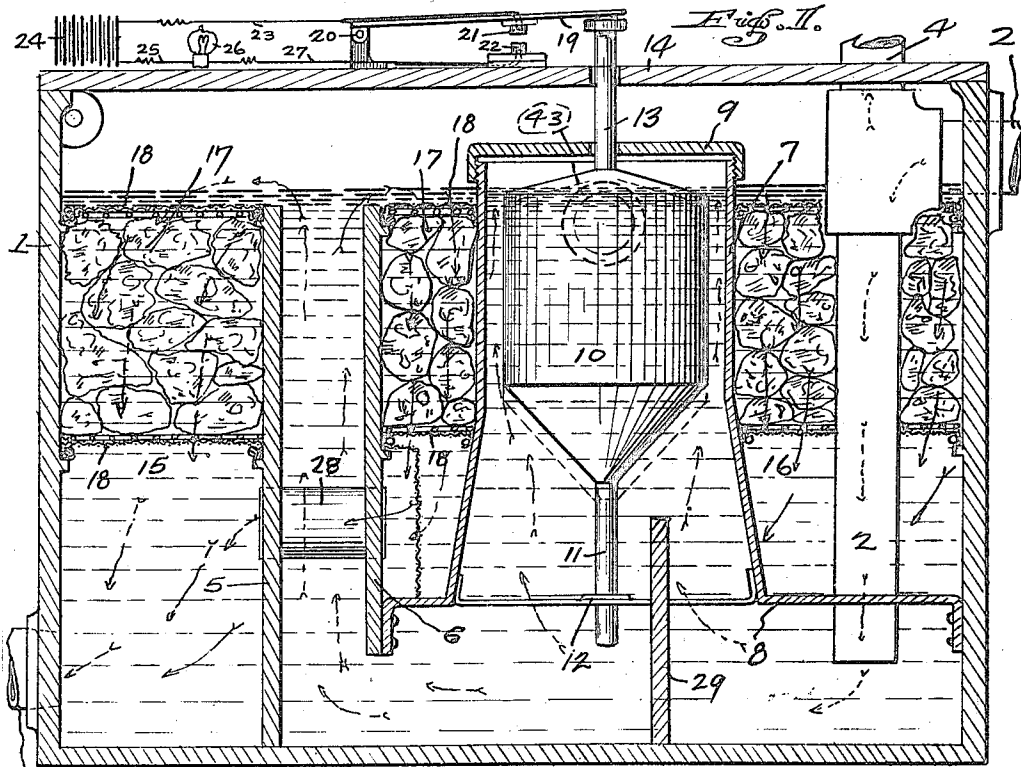
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SIGNAL FOR DETECTING OIL IN WATER TANKS

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SIGNAL FOR DETECTING OIL IN WATER TANKS.

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This invention relates particularly to an apparatus capable of detecting a volume of oil in a water tank, and indicating the detection by an appropriate signal or alarm.

5 An object of the invention is to provide a device for detecting oil in water tanks, (from which the water is to be passed into a boiler and heated) to prevent the oil mixed in the water entering the boiler and collecting there-
10 in in a scale formation, or otherwise to ultimately cause a consequent breakdown of the boiler.

A further object of the invention is to provide a float in a fluid of a determined specific
15 gravity, connected to an alarm signal which is adapted to operate said signal when fluid of a different specific gravity, in either relatively large or small proportions, displaces the first named fluid, and causes said float
20 to assume a floating position below its normal and predetermined position.

A still further object of the invention is to provide a signal for detecting oil in water tanks that will be superior in point of simplicity, inexpensiveness of construction, posi-
25 tiveness of operation, and facility and convenience in used and general efficiency.

Other objects and advantages will appear as this description progresses.

30 In this specification and the annexed drawings, the invention is illustrated in the form considered to be the best, but it is to be understood that the invention is not limited to such form, because it may be embodied in other
35 forms, and it is also to be understood that in and by the claim following the description, it is desired to cover the invention in whatsoever form it may be embodied.

In the accompanying one sheet of drawings,
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Fig. 1 represents a vertical cross-section through a device for detecting oil in water tanks, constructed in accordance with my invention.

45 Fig. 2 is a modified form of oil detecting apparatus.

The use of oil for combustion purposes in boilers, furnaces and the like, while productive of high efficiency, is not without a
50 certain element of danger by its use, in the event a quantity, or quantities, of oil should intermingle with the water that passes into the boiler and in time to cause the boiler tubes, furnaces or crown sheets to become
55 scaled, or internally coated. Tubes, furnaces

or crown sheets so scaled or coated prevent the heat of combustion being transmitted to the water, and eventually the scaled or coated parts fail to withstand the heat of combustion, rupture, and break-down. When boiler
60 or furnace surfaces thus become coated the heat from the furnace fire is not radiated to the water and causes the boiler parts to cave in and to become defective and to require replacement. Where a boiler requires re-
65 pairing the cost thereof as well as the loss caused by the inability to use the boiler is an expense that runs into a large amount of money.

In steam vessels, where oil is burned under
70 the boilers, or in instances where the boilers are heated by gas or coal flame on oil carrying vessels, there is always a certain amount of oil from the engine room auxiliaries and main engine that mixes with the boiler feed water
75 and which gets into the boilers. Part of the oil that works its way into the boilers is absorbed or otherwise rendered harmless by "boiler compound", but where the volume of oil comes from breakage in some one of the
80 oil supply reservoirs and is excessively large and can not be handled by the "boiler compound", the boiler parts become scaled or coated, and in time are weakened and break
85 down. The water that is used in the boilers of the present day steam vessel is initially supplied from water storage tanks or from the steam condensed after passed through the main engine and auxiliaries. A
90 tank known as a feed and filter tank is interposed between the boiler and condenser. The feed and filter tank acts as a trap or catch basin through which all water entering the boiler must pass. The feed and filter tank
95 is connected to the condenser, and in addition has connections to all other drains and tanks which discharge or contain water that may be used in the boiler. The feed and filter tank gives the operator in charge of the boiler an
100 opportunity to see the character of the water, prior to it passing into the boiler, and to visually detect any appreciable quantity of oil contained therein.

My invention relates particularly to a device or apparatus constructed integrally with
105 a feed and filter tank or constructed independently thereof, and placed in communication with any fluid conduit from which water is to be supplied to a boiler for steam
110 purposes.

In detail the construction illustrated in the drawings comprises a tank 1, formed from sheet steel, or in any other manner, having an inlet pipe 2 and outlet pipe 3 therein. The inlet pipe 2 may be connected to the discharge side of an air pump, (for pumping water from a steam condenser) or other source of supply of water. The inlet pipe 2 extends adjacent to the bottom of the water tank 1, and said tank is provided with a vent pipe 4 to ventilate the interior of the tank 1 and to maintain the interior thereof at substantially atmospheric pressure. A pair of baffle plates 5 and 6 are arranged between the sides of the tank 1, and adjacent the bottom thereof between the inlet and outlet ports, so that the water discharged from the inlet pipe 2 into said tank must pass over the top of said baffle plates before escaping through the outlet port 3. The baffle plates 5 and 6 thus determine the water level of the fluid in the tank, although it would be clearly within the purview of the invention to regulate the water level by the location of the outlet 3 in the said tank.

Between the inlet 2 and outlet 3, I have provided a column, which consists of a tubular member 7 secured at the exterior of its open end 8, to the tank 1, so that the lower end of said column 7 is open to receive any and all fluids discharged from the inlet pipe 2. A baffle plate 29 extends inside of the open end of the column 7 to direct the water from the inlet pipe 2 up into the closed end of said column. The upper end of the column 7 extends above the water level in the tank, and is closed by a screw threaded cap 9. A cylindrical float 10 is confined within the column 7. The opposite ends of the float 10 are cone shaped, and said float is supported on a guide rod extending vertically therethrough. The lower end 11 of the guide rod is slidably confined in a spider 12 mounted across the open lower end 8 of the column 7, while the upper end 13 of the guide rod extends through a guide bearing in the column cap 9, and outwardly through a similar opening provided in the hinged cover 14 of the tank 1. A compartment 15 is formed between the outlet 3, of the tank 1, and the baffle plate 5, and a compartment 16 is formed between the baffle plate 6 and the opposite end of the fluid tank, and the respective compartments 15 and 16 communicate with each other by means of pipes 28 positioned through the baffle plates 5 and 6.

In the ordinary course of operation, water admitted from the inlet 2 will partially fill the column 7 and flow over the baffle plates 5 and 6 into the respective compartments 15 and 16 and thence outwardly through the discharge port 3. Any oil or other fluids of a specific gravity different from water, that is either higher or lower and intermingled therewith, flow with said water. In order

to strain the water of such substances, particularly oil, clarifying mediums such as lufus sponges 17 are confined within filtering cloth supports 18, arranged between the inlet and outlet ports. The sponges 17 effectively absorb the major portion of oil from water, so that when the water is discharged through the ports 3 into the feed suction line of the boiler it is practically free of oil. However the oil that passes the filtering medium 17 and enters the boiler, is absorbed or counteracted by the "boiler compound" to eliminate it as a dangerous element.

The float 10 is arranged to float in a submerged or immersed condition in the column 7, with the upper end 13 of the float substantially flush with the fluid level in the tank. The float 10 is accurately balanced to float with its upper end 18 out of the fluid, so that when a charge of oil, mixed with the water, enters the tank, the said oil immediately rises to the surface and being of a different specific gravity than the water has not the properties to sustain the float at its predetermined level, and causes the float to sink. A very small surface coating of oil above the water level will upset the floating balance of the float and cause it to sink.

The sinking movement of the float causes a lowering of the upper end 13 of the float guide rod, which supports an end of an arm 19, pivoted at 20, to the cover 14 of the tank 1, on which an electrical contact 21 is secured. A contact 22 is secured to the cover of the tank 1. A lead wire 23, from the battery 24 is connected to the contact 21, on the arm 19, while a connection 25, from the battery 24, is connected to an electric light 26, or other alarm signal, and from which a connection 27 extends to the contact 22 on the cover of the tank. Thus as the float lowers, the respective contacts 21 and 22 come into engagement, forming a circuit through the said contacts 21 and 22, battery 24 and electric light 26, to give a warning signal. A drain pipe 43 is passed through the tank 1 into communication with the column 7 to draw off the oil film that may collect on the water level therein.

In water or other fluid of a determined specific gravity the float will stay at a predetermined level, at which level the signal contacts 21 and 22 would be inoperative. When fluid of a specific gravity different from that of the water would displace the water, to upset the balance of the float to cause it to sink, the signal contacts 21 and 22 would become operative, and an alarm given. By the apparatus described, visible or other alarm signals might be automatically given when a dangerous quantity of oil would be mixed with the water, and its presence detected before said oil could be passed into a boiler with the water. Thus by my apparatus it becomes possible to warn a boiler op-

erator of the characteristics of the fluid being passed into the boiler, to bring about a prevention in boiler breakdowns, which may and do occur where the boiler operator is unable to watch all of the water that passes into the boiler.

In the modified form of the invention shown in Fig. 2, I provide a tank 30 having an inlet and outlet port 31 and 32 therein, and with a tubular float guide 33 having a float 34 therein interposed between the inlet and outlet ports. The float guide 33 is open at both ends whereby the fluid can pass entirely under and around the float and float guide, into the spill way tube 35, mounted around the outlet or suction feed pipe 32. The float 34 operates in the same manner as that described in Fig. 1, the upper end of said float resting in engagement with an arm 36 having a contact 37 thereon connected by a wire 38 to the electric light 39 which is connected to a battery 40 from which a connection 41 extends to a contact 42 registering with and adapted to make connection with the contact 37, on the float operated arm 36. The construction of this modification, while differing in some respects from that shown in Fig. 1, functions in the same manner as that of the preferred form of the invention.

Having thus described this invention,

what I claim and desire to secure by Letters Patent is:—

In an apparatus for separating oil from water, a tank having a fluid inlet and an outlet, a vertically disposed casing disposed within the tank and having an outwardly and downwardly flared bottom portion which terminates adjacent to the bottom of the tank, a float movable in said casing, a vertically disposed baffle in the tank extending upwardly from the tank bottom and having its upper end spaced from and terminating within the flared portion of the casing, said inlet having its discharge below the lower end of the casing and adjacent to the baffle whereby to direct the incoming fluid against the baffle and thence upwardly into the casing and around the float, a partition adjacent the outlet having its lower end seated upon the bottom of the tank and having its upper end terminating below the top of said tank, a deflecting plate disposed between the baffle and said partition for directing fluid over the latter and towards the outlet, and indicating means operable by the float.

In testimony whereof, I have hereunto set my hand at San Francisco, California, this 17th day of May, 1924.

THOMAS ARTHUR SHORT.