

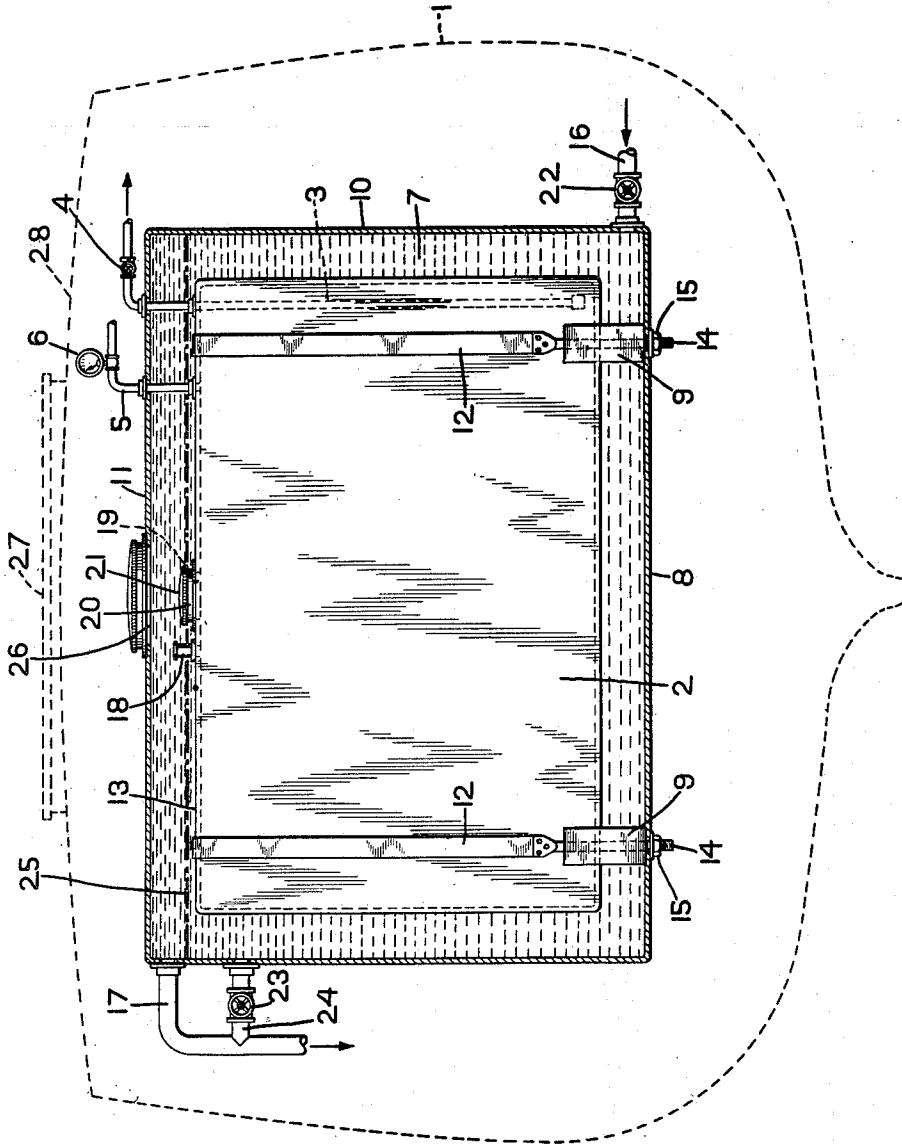
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SAFETY TANK

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SAFETY TANK

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This invention relates to containers particularly adapted for fluids which are inflammable or explosive, such as gasoline, fuel oils and the like.

5 When inflammable fluids, such as liquid fuels, are contained within tanks, the leakage or escape of the fuel in either liquid or gaseous form is a constant source of danger through ignition from carelessly thrown
10 matches or cigarettes or from sparks resulting say from short circuits and in the vicinity of engines and furthermore in confined spaces, such as in the holds of vessels, the fumes are poisonous and lethal to human beings in the vicinity.

15 One object of the invention is to promptly remove and render innocuous the fluids, either liquid or gaseous, escaping from the container. Accordingly, constantly flowing
20 non-inflammable or inert fluid is maintained in contact with the entire surface of the container into which the escaping fluid may flow, be dispersed and rendered harmless and in which it may be conveyed away from the vicinity of the container.

25 A further object of the invention is the insulation of the container to maintain its temperature below the point of combustion of the contents and also to shield the container from flames. To this end, the container is
30 completely immersed within an insulating fluid which surrounds the container on all sides, top and bottom and provision is made for conducting such insulating fluid into contact with the container and leading the same therefrom.

35 A further object of the invention is the filling of the container without affecting its fluid insulation. Accordingly, an inlet is
40 provided which extends above the surface of the container so that the level of the insulating fluid may be temporarily reduced to expose the inlet while still maintaining a layer of insulating fluid over the top of the
45 container.

50 The invention also seeks a practical manner of positioning the container within a chamber containing the insulating fluid, to overcome the buoyancy of the container and to prevent displacement thereof upon move-

ment of the support with which the chamber is carried. To this end the container may be mounted upon blocks or cradles in the chamber and adjustable straps extending over the top of the container may be removably secured to the bottom of the chamber or base upon which it rests.

These and other objects of the invention and the means for their attainment will be more apparent from the following detailed description of a preferred embodiment of the invention taken in connection with the accompanying drawing showing a fluid container in accordance with this invention disposed by way of example within the hold of a ship.

The hull of the ship is indicated in outline at 1 and a container of suitable material for combustible fluid, such as fuel oil, is shown at 2 from which the fuel may be conducted by the pipe 3 controlled, as is usual, by a suitable valve 4, to the fuel consuming device, say, of the vessel. While the container is illustrated as associated with a pressure feed system including the fluid pressure inlet pipe 5 and pressure gauge 6, it will be obvious that any desired manner of fluid withdrawal from the tank 2 may be availed of.

Tank 2 is contained within a chamber 7 supported in any convenient manner, not shown, within the ship's hull and supporting the fuel container 2, in elevated position, from its bottom 8 preferably by means of non-metallic blocks, such as the fibre beds or cradles 9, and the tank 2 is positioned on these beds 9 and in spaced relation with respect to the side walls 10 and top 11 of the chamber 7 by means of straps 12, preferably of metal or other suitable material, which pass over the top 13 of the container 2 and down its sides and terminate in threaded bolts 14 which may, if desired, pass through the beds 9 and through the bottom 8 of the chamber to be secured thereto by the nuts 15 or secured to a support on which the chamber rests. The tank 2 is thus prevented from displacement despite the movement or rolling of the ship or other conveyance with which it is carried and is, moreover, held upon the beds 9 at all times regardless of the buoyancy of the tank

within the chamber full of insulating fluid at such times as the tank is partially or completely empty of fuel.

It is proposed to completely surround the container 2 with an insulating or inert fluid such as water upon all sides, top and bottom which is contained within the chamber and which is preferably in constant circulation so that any liquid or gaseous combustible leaking from the tank 2 will be immediately entrapped, say in the form of bubbles, in the water, dispersed and rendered inactive and innocuous. A constant flow of water may be maintained in the chamber 7 entering through the water inlet pipe 16 at the bottom of the casing 7 from say a pump, not shown, and evacuating through the water outlet pipe 17 at the top of the casing 7, so that the escaping fuel, either liquid or gaseous, is immediately conducted away from the vicinity of the tank 2 and discharged or wasted outside of the boat and all lethal fumes are entrapped in the water and none escape into the vessel to the discomfort or danger of the occupants. This constant flow of water whereof the temperature may be controlled in any well known manner, also serves as an effective insulation for the container contents and prevents the temperature thereof being raised to a point where the fuel would be vaporized or the contents ignited. Furthermore, the insulating liquid envelope serves to isolate the container 2 against any flames which would otherwise raise the temperature of the container contents and ignite it or cause it to explode.

As an added precaution, a safety valve 18, of any well known construction, may be disposed in the top 13 of the container 2 to permit the escape, into the insulating fluid, of vapors generated within container 2, or other fluids, liquid or gaseous, after the pressure thereof has risen to a predetermined maximum, the vapor being entrapped in the water and carried off, as previously described.

In the top 13 of the container 2 it will be noted that there is disposed an inlet port 19 defined by a neck 20 extending for a short distance above the top 13 and closed by a cover 21. When the tank 2 is to be refueled, the valve 22 in the water inlet pipe 16 is first closed and the level of the water in the chamber is lowered by opening the valve 23 in the bypass 24 communicating with the outlet pipe 17 and, since no water may now enter the chamber due to the closing of the valve 22, the water level may be permitted to fall by the opening of the valve 23 until closure 21 is uncovered say to the line indicated at 25, although a layer of water up to the line 25 is still present over the top of the container 2 so that the water insulation still entirely surrounds the tank 2 and its shielding effect is maintained.

Access to the inlet port 19 is, of course, had through the port 26 in the chamber top

11 which is accessible through the hatch 27 in the deck 28.

It will thus be seen that a safety container has been provided for combustible fluid, either liquid or gaseous by which the danger of combustion or explosion is obviated in that the container 2 is disposed within a chamber adapted to contain an inert or non-explosive fluid, either gaseous or liquid, which may be in constant circulation so that any of the container contents leaking out of the container may be entrapped within the insulating fluid, rendered harmless, and conveyed away and disposed of. The insulating fluid entirely surrounding the container serves as a water jacket to maintain the temperature thereof below a predetermined maximum, if desired, and to shield the container against fire breaking out in the vicinity. Even while the tank 2 is being filled the insulating fluid may be maintained effective by temporarily stopping the circulation and reducing the level of the insulating fluid to uncover an elevated inlet fuel port.

Although the container according to this invention has been illustrated as disposed within the hull of a ship, it is to be understood that it is equally applicable in any situation where combustible or explosive fluid, either liquid, or gaseous, or a pulverized combustible, or the equivalent, is to be stored, or used whether on shipboard, on land conveyances, gasoline stations or the like. Furthermore, while the insulating medium is described as a fluid, such as water, it will be obvious that in many situations liquids other than water may be utilized or where the tank contains a suitable liquid or a gas, a fluid such as an inert gas or air or a vacuum may be used and any leakage of liquid will be readily evaporated and drawn off by the vacuum or carried off by the flowing gas or air.

Various modifications will occur to those skilled in the art in the composition and configuration of the component elements going to make up this safety tank as a whole as well as in the uses to which it may be put. Also, certain of the features thereof are capable of use independent of others all within the spirit and scope of the invention as set forth in the appended claims.

What I claim is:

1. A safety container for combustible fluids comprising a container, a chamber in which the container is disposed and spaced from the walls thereof, an inlet port for the fluid in the top of the container, an inlet port in the top of the chamber in register therewith, an inlet for inert fluid in the bottom of the chamber, a valve to control said inlet, an outlet for said inert fluid near the top of the chamber, a second outlet below the first named outlet and a valve to control said last named outlet to permit the lowering of the

inert fluid to uncover the combustible fluid inlet port.

2. A device of the character described comprising a combustible fluid container, an inlet therefor, an outer container surrounding the same and forming an enclosure therefor, means to space the inner container from the outer container, means to direct a continuous scavenging flow of inert fluid between all portions of the space between the containers, said last named means including an inlet and an outlet for the outer container, and means to limit the flow of the inert fluid within the space to that portion thereof below the inlet for the fuel container.

3. A device of the character described comprising a combustible fluid container, an outer container surrounding the same and forming an enclosure therefor, means to space the inner container from the outer container, an inlet for introducing an inert fluid into the outer container adjacent the bottom thereof, an overflow outlet therefor adjacent the top of the outer container, and a by-pass valve and passage in the outer container for reducing the level of the inert fluid therein.

4. A device of the character described comprising a combustible fluid container, an outer container surrounding the same and forming an enclosure therefor, means to space the inner container from the outer container, an inlet for introducing an inert fluid into the outer container adjacent the bottom thereof, an overflow outlet therefor adjacent the top of the outer container, an inlet for the inner container normally covered by the inert fluid, and a second outlet manually operable for reducing the level of the inert fluid below the inner container inlet level.

5. A safety container for combustible fluids comprising an inner container, an outer chamber within which the inner container is disposed and spaced from the outer chamber walls to afford a jacket for the inner container, said jacket adapted to hold a body of inert fluid passing through all portions of the same, an inlet and an outlet in the said chamber at opposite ends thereof to admit and to expel, respectively, the said inert fluid and a safety valve on the container and within the chamber and adapted to be covered by said inert circulating fluid.

6. A safety container for combustible fluid comprising, in combination, an inner container enclosed within and held in spaced relation with respect to an outer chamber and forming with the latter an insulating jacket surrounding said inner container, the said inner container being adapted to be sealed from communication with said jacket, means to circulate inert fluid through said jacket, filling means for said inner container and a closure for the same, said closure being adapted to be covered by said circulating inert fluid.

7. A safety container for combustible fluid comprising, in combination, an inner container enclosed within and held in spaced relation with respect to an outer chamber and forming with the latter an insulating jacket surrounding said inner container, the said inner container being adapted to be sealed from communication with said jacket, means to circulate inert fluid through said jacket, filling means for said inner container and a closure for the same, and a safety valve for said inner container, said closure and safety valve being adapted to be covered by said circulating inert fluid.

In testimony whereof I affix my signature.

MARTIN DE ALZAGA UNZUE.