

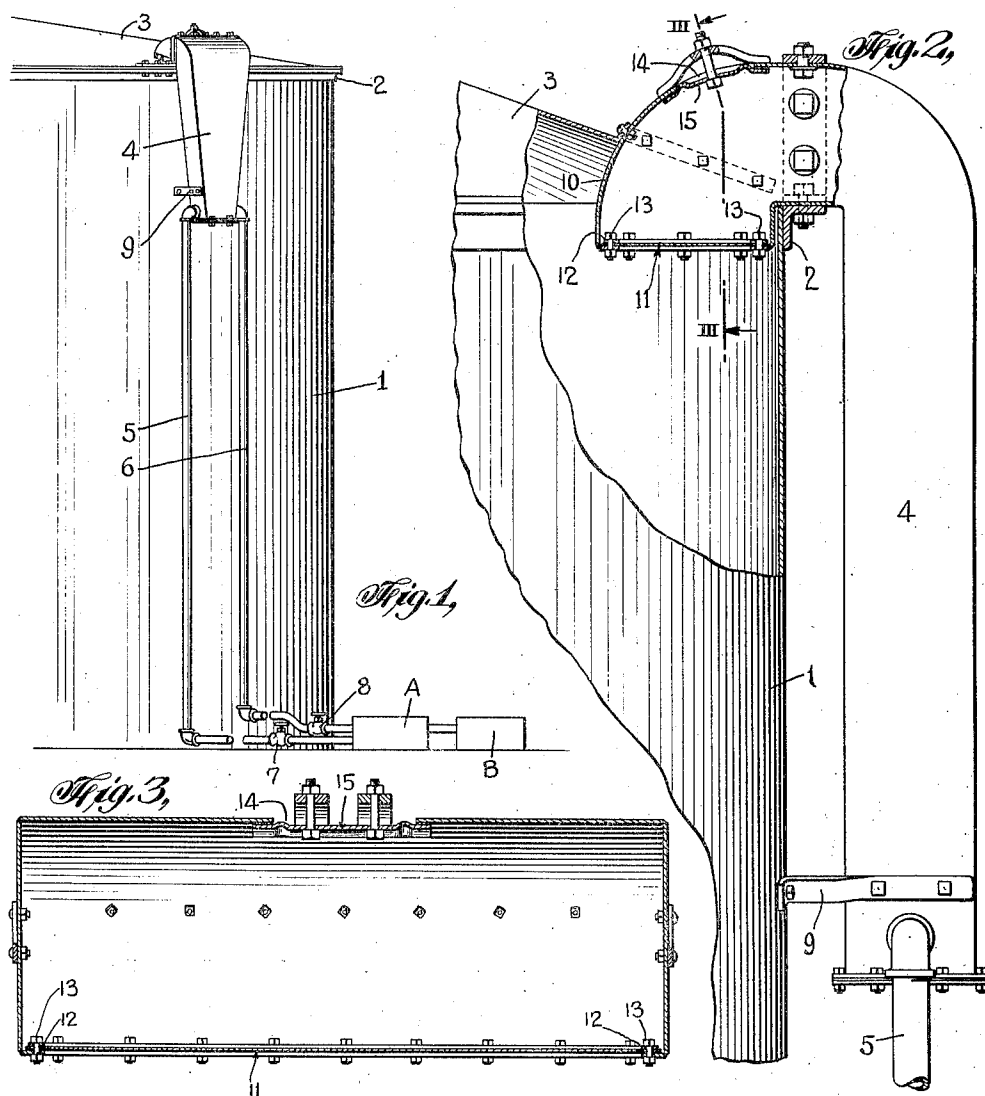
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OIL TANK FIRE PROTECTION

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## UNITED STATES PATENT OFFICE

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## OIL-TANK FIRE PROTECTION

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This invention relates to foam type fire extinguishing systems as applied to oil tank and other containers of volatile inflammable fluid.

It is customary, in such systems, to install on the tank wall a foam conduit, sometimes referred to as a mixing head, the purpose of which is to conduct and deliver foam from an exterior source or place of mixing and deposit it on the surface of the oil inside the tank. Such systems are subject to failure or faulty action due to the entrance and gradual condensation in the head or foam conduit of oily vapors producing a waxy deposit therein, or in the supply pipe or pipes connected thereto, so that the system is likely to become clogged by the stoppage of its passages by such material or its initial operation is to discharge such condensed or inflammable material on the fire which, of course, is not desirable. This invention provides an organization of foam conduit and vapor excluding means suited to prevent such intrusion of oily vapor and capable of use to this end in a most practical manner. The exclusion of vapors is accomplished by the use of a suitable diaphragm normally subject to atmospheric or equal pressures on its opposite sides but so constituted as to become ruptured or broken down or otherwise displaced by the mere pressure of the foam thereupon when the system is put in operation, and such diaphragm is so mounted and related to the other parts as to be easily renewable, after rupture, wholly from the outside and not requiring the workmen to enter the oil tank beyond thrusting his arm through a suitable opening provided for the purpose.

In the drawings:—

Fig. 1 is a view in perspective of an oil tank provided with a fire extinguishing system embodying this invention. Fig. 2 is a fragmentary detail view upon a larger scale, partly in elevation and partly in vertical section, of the mixing head and associated parts of the aforesaid system. Fig. 3 is a sectional view on the line III—III of Fig. 2.

In the illustrated embodiment, 1 is a container for inflammable fluid, shown as an oil tank with a rim 2 on which rests a roof 3 having an opening for the introduction of

fire extinguishing foam, and at 4 I have shown a mixing head or chamber to which foam or foam-producing materials are supplied as by supply pipes 5 and 6 which are extended from pumps A and B indicated conventionally as suitable sources for supplying foam-making solutions.

Valves are shown at 7 and 8 respectively to control the flow of the solutions, and these valves and the pumps are installed at a suitable distance from the oil tank to permit their operation safely in the event of a fire in the tank, the conduits 5 and 6 being respectively shown as broken away to indicate the fact that they are longer than would otherwise appear from the drawing.

The mixing head or chamber 4 may be of any suitable form and material. It is illustrated as tapered in elevation, with the conduits 5 and 6 entering oppositely near the bottom, where the head and its connected conduits are carried by the supports 9.

The mouth or spout 10 of the mixing head projects downward through the roof, in position to discharge the foam onto the oil in the tank and in accordance with the invention a closure 11 is provided to prevent tank vapors from entering the mixing head. In the embodiment illustrated in Figs. 1 to 3 this closure is formed of very weak sheet metal or foil or a sheet of asbestos or paper, as its purpose is only to prevent the intrusion of vapor into the mixing chamber and system from the tank and it is not normally subject to static pressure. The closure is placed against the upper face of an inward flange on the spout part of the head, as shown in the drawings, and preferably fastened to it by a clamp ring or frame 12 and a series of bolts 13, the heads of which will be seen to be on the inner or foam side of the spout flange.

To permit access to the closure and its securing means without dismantling the mixing head or removing the tank roof I provide the hand-hole 14 through which the closure may be inserted after the apparatus has been installed or in operation, the hand-hole being normally closed by the hand-hole plate 15.

In operation the closure or diaphragm 11 is broken by the incoming foam. The appa-

ratus is brought into action by the simple operation of injecting the foam or pumping the component solutions through a pipe or pipes into the mixing chamber and at all other times merely atmospheric pressure exists in the mixing chamber or pipe system, this being an important factor inasmuch as thereby a weaker closure can be used, so weak as to be certain to yield instantly to the pressure of the foam when the apparatus is called into action.

I claim:

1. In oil tank fire protection systems, the combination of the oil tank, a foam conduit secured to the wall thereof for conducting foam from the outside to the oil inside of said tank, a vapor-excluding diaphragm extending across the path of the foam through said conduit at a point inside of the oil tank, said diaphragm being normally subject to equal pressures on its opposite sides but adapted to break down and permit foam flow merely by the pressure of the foam thereagainst, a seat provided on the conduit and with which said diaphragm makes a vapor-proof joint, and an access opening and removable cover plate adjacent said seat and through which a person outside of the tank may adjust or renew said diaphragm.

2. In oil tank fire protection systems, the combination of the oil tank, a foam conduit arranged to conduct foam from the outside of the tank onto the oil inside of it, a vapor-excluding diaphragm extending across the path of the foam through said conduit, at a point inside of the oil tank, said diaphragm being normally subject to equal pressures on its opposite sides but adapted to break down merely by the pressure of the foam thereagainst, a seating flange provided on the conduit, means for clamping said diaphragm thereon in a vapor-proof manner, and an access opening and removable cover plate above said diaphragm and through which a person outside of the tank may manipulate said clamping means.

3. In oil tank fire protection systems, the combination of the oil tank, a foam conduit for conducting foam from the outside to the inside of said tank, an inwardly projecting flange provided on said conduit, a vapor-excluding diaphragm supported on the side of said flange facing counter to the foam-flow and extending entirely across the path of such flow, said diaphragm being adapted to break down by the pressure of the foam thereagainst, and an access-opening and removable cover plate provided in the wall of said conduit on the pressure side of said diaphragm and through which a person outside of the oil tank may renew said diaphragm if it has been displaced.

In testimony whereof, I have signed this specification.

WILLIS D. WITTER.