May 17, 1927. 1,629,027

O. R. ERWIN

APPARATUS FOR EXTINGUISHING FIRES

Filed Nov. 4. 1920 2 Sheets-Sheet 1

Fig. 1.

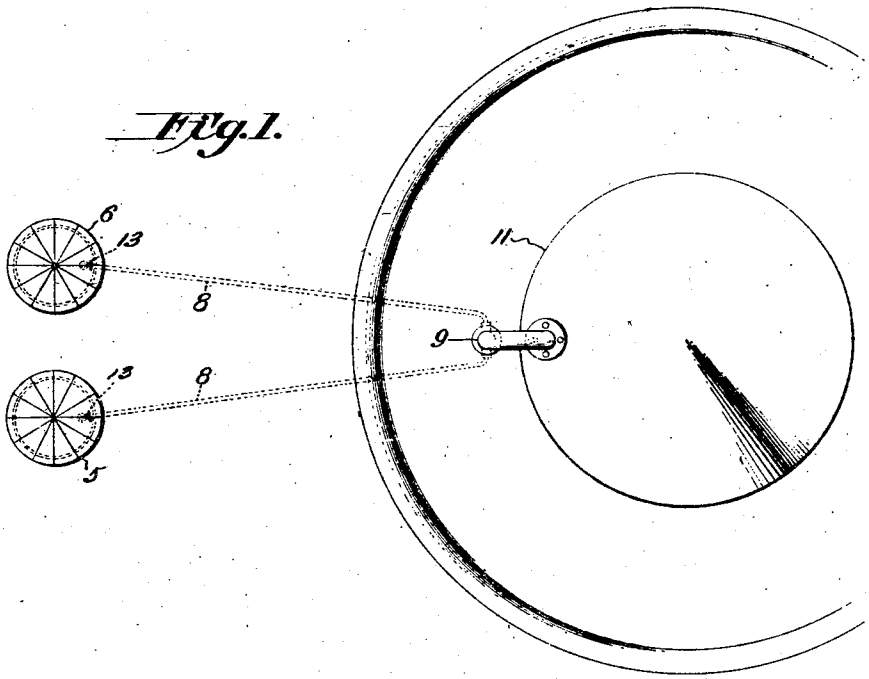
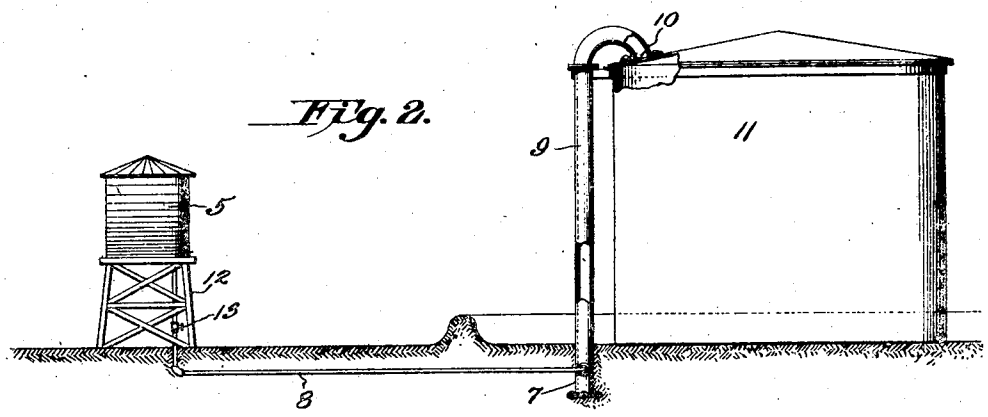



Fig. 2.




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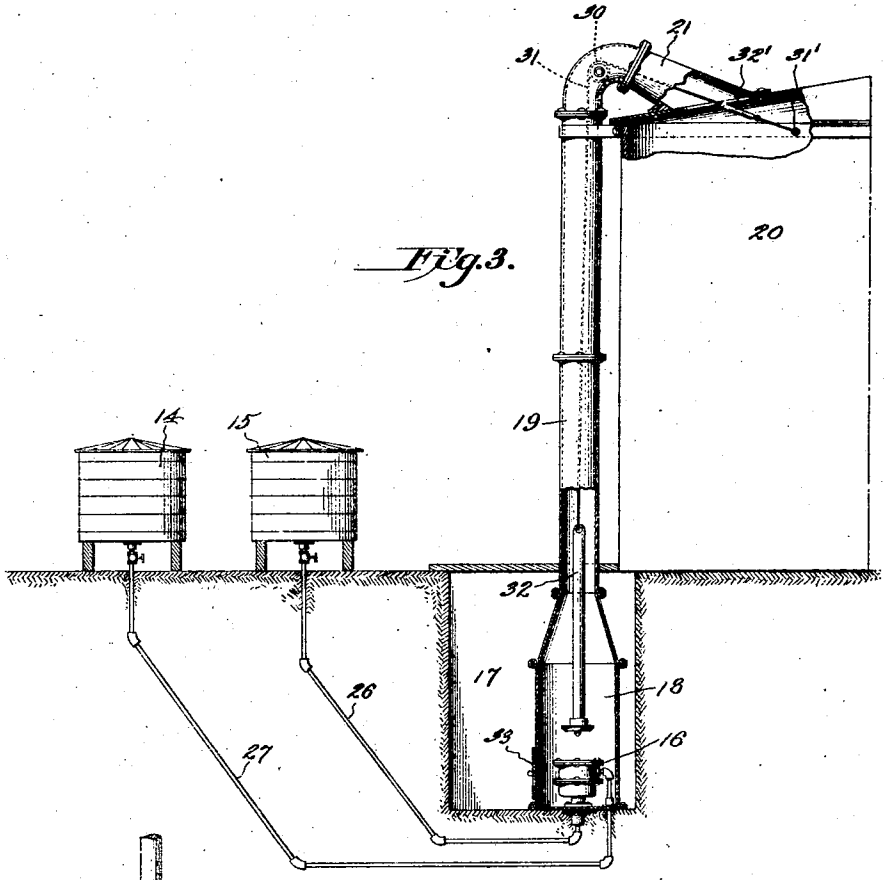



Fig. 3.

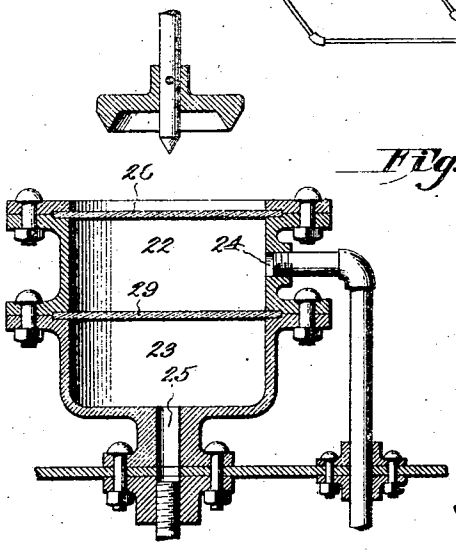



Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR EXTINGUISHING FIRES.

Application filed November 4, 1920. Serial No. 421,634.

My invention relates to fire extinguishing apparatus, and more particularly to apparatus for extinguishing fires occurring on the surface of inflammable liquids, such as contained in oil tanks and has special reference to the provision of a gravity distribution system operating upon the difference in specific gravities between chemical solutions and a fire extinguishing foam produced by their admixture and functioning to deliver the foam to the surface of the burning liquid.

It has been the practice in apparatus of the kind referred to, to provide two reservoirs; one containing a solution of a base and a foam producing substance, and the other containing a solution of an acid or acid salt, which solutions are conducted through separate means to a mixing chamber and there upon admixture generate a foam and a gas noxious to fire, which foam and gas are conducted to a delivery mouth of the mixing head and there discharged over the burning surface of the liquid in the oil tank, the foam forming a blanket over the liquid which will not support combustion and which will smother the fire.

In use of apparatus of this kind it has been the practice to provide means for placing the solutions under pressure either by the provision of a chamber containing air under pressure or by the provision of a pumping system associated with the reservoirs in order to obtain sufficient force to raise the mixing solutions and the generated foam to the top of the tank, which in many instances may be as high as 30 feet. One of the problems in connection with the extinguishing of fires of this nature has been the protection of isolated tanks for small properties where the cost of a pumping system is prohibitive. My present invention has for its main object the provision of a system for effectively protecting such isolated tanks without the expense attached to a pumping system.

It has been found that the reservoirs, mixing head and delivery mouth may be so constructed and arranged that distribution of the noxious foam may be effected without the use of any pressure system and may be effected simply by a gravity system operating upon the difference in specific gravity between the solutions and the resulting foam.

The primary object of the present invention is, therefore, to provide such a system operating in this manner. A further object of my invention is to provide a system of the nature referred to which will operate automatically in the event of a fire. A still further object is to provide a novel solution delivery head applicable in an automatic system of the type referred to.

To the accomplishment of the foregoing and such other objects as may hereinafter appear, the invention consists in the elements and their relation one to the other as hereinafter particularly described and then sought to be defined in the claims, reference being had to the accompanying drawings showing preferred embodiments of my invention and in which

Figure 1 is a plan view of the gravity distribution system,

Figure 2 is an elevational view of the same,

Figure 3 is an elevational view of a modified form of the system with parts in section to disclose the interior construction thereof, and

Figure 4 is a sectional view of a novel solution delivery head and a breaker weight used therewith.

Referring to Figures 1 and 2 of the drawings, 5 and 6 are the two reservoirs containing the acid and basic solutions; these solutions being conducted by gravity to the mixing chamber 7 through any suitable conducting means, such as pipes 8. These solutions admix in the mixing chamber 7 to form a fire extinguishing foam, which expands in said chamber and rises in the riser pipe 9 to a delivery mouth 10 situated at a relatively high elevation, the foam discharging through the delivery mouth into the oil tank 11. The reservoirs are located a few feet from the ground, being supported on platforms 12 which, in the form shown in Figures 1 and 2, are about 8 feet in height. The height of the liquid in the reservoirs will seldom be more than 20 feet, while the height of the oil tanks is in many instances as high as 30 feet. In the event of a fire manually operable valves 13 are opened, preferably by operation of a lever simultaneously controlling both valves, permitting the solutions to flow to the mixing head by gravity; the foam being there produced by the admixture of the solutions and expanding in the mixing head, rises to a relatively high elevation in the riser pipe, due to the difference in specific

gravity between the solutions and the generated foam.

Referring to the modification shown in Figures 3 and 4, the reservoirs 14 and 15 are located a few inches from the ground, the solutions in said reservoirs being conducted to a solution delivery head 16, located several feet below the surface of the ground in a pit 17. Surrounding this delivery head is a mixing chamber 18 communicating with a riser pipe 19, which in turn is connected at the top of the oil tank 20 with the delivery mouth 21. The delivery head 16 comprises two juxtaposed solution chambers 22 and 23 respectively, each having inlet openings 24 and 25 respectively, connected respectively to the reservoirs 15 and 14 by any appropriate means, such as pipes 26 and 27. These chambers are provided with outlet openings normally sealed by breakable diaphragms of any desirable material, as for example of glass, 28 and 29 respectively, these diaphragms normally preventing the acid and basic solutions in said chambers from comixing. Guided over a pulley 30, journalled at the top of the riser pipe, is a cord, for example a bronze cord, 31, to one end of which is connected a glass seal breaker 32, the other end of which is connected to any desirable part of the tank, as shown at 31′, a fusible link 32′ forming part of this cord. In order to permit easy access into the mixing chamber for renewing the glass diaphragms or for any other purpose, means is provided such as manhead 33, forming a part of the mixing chamber 18. In this form of the device, in the event of fire, upon the fusing of link 32, as will be apparent, the weight 32 will fall, breaking the glass diaphragms 28 and 29, permitting the solutions contained therein to flow in admixed relation into the mixing chamber 18. As in the form shown in Figures 1 and 2 the solutions will be conducted by gravity into the mixing chamber 18 and there the generated foam will expand, rising into the riser pipe 19 and being discharged at a relatively high elevation through the delivery mouth 21, the rising of the foam being effected by the difference in specific gravity of the chemical solutions in the reservoirs and the foam produced in the mixing chamber.

The operation of the device will be apparent from the above description thereof. The specific gravity of the foam is substantially about one-eighth to one-tenth the specific gravity of the solutions. A given column of solution will more than support a larger column of the expanded foam and thus by utilizing the difference in specific gravities between the solutions and the foam, the foam may be caused to rise to relatively high elevations while the solutions are kept at normally low elevations. It will be thus apparent that I have provided a fire extinguishing apparatus of relatively few and simple parts, which is adapted to extinguish fires at a relatively high level, doing away with the necessity of any pressure means in connection with such a system and doing away with any expensive structure for supporting the solution reservoirs, these reservoirs being mounted for easy access for charging and recharging, the reservoirs being located but a few feet from the ground. In this system, by opening the valves into the solution lines and allowing the chemicals to flow by gravity into the bottom of the riser pipe, I have been able to discharge a tremendous quantity of foam into the oil tanks and an amount which hitherto could only be discharged by a very large pump.

While I have shown specific embodiments of my invention, I do not intend to be limited to the exact constructions shown, as it will be evident that various modifications may be made without departing from the spirit of the invention, defined in the following claims.

I claim:

1. In a foam fire extinguishing apparatus, a delivery head, inlets thereinto for component foam making solutions, a frangible diaphragm dividing the head into compartments each having its individual supply inlet, a frangible diaphragm closing the outlet from the delivery head and a common breaker for said diaphragms adapted on release to break both diaphragms to permit the mixture of the solutions and escape of the mixture from the head.

2. A foam fire extinguishing installation comprising in combination with an oil tank to be protected, two solution chambers below the level of the top of the tank, a riser to the top of the tank, a delivery head in the riser having separate compartments in communication severally with the respective solution chambers and having frangible closure diaphragms and a releasable suspended common breaker for breaking both of said diaphragms to permit the solutions to mix.

Signed at New York, in the county of New York and State of New York, this 30th day of October, A. D. 1920.

ORLANDO R. ERWIN