D. W. PATTERSON AND F. A. EPPS.

FIRE EXTINGUISHING APPARATUS.

APPLICATION FILED OCT. 31, 1918.

1,364,799. Patented Jan. 4, 1921

Fig. 1.

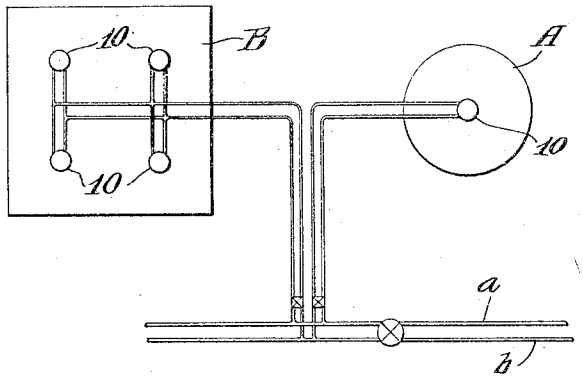


Fig. 2.

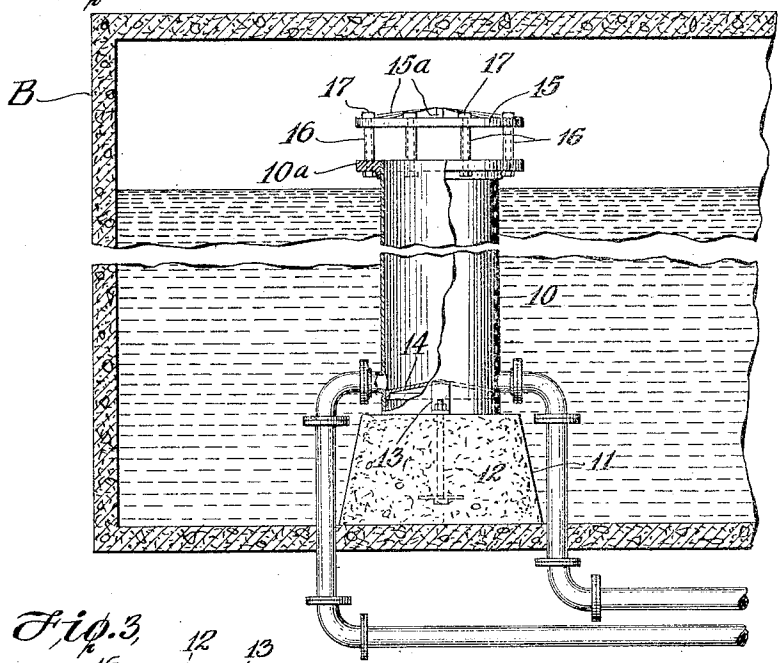
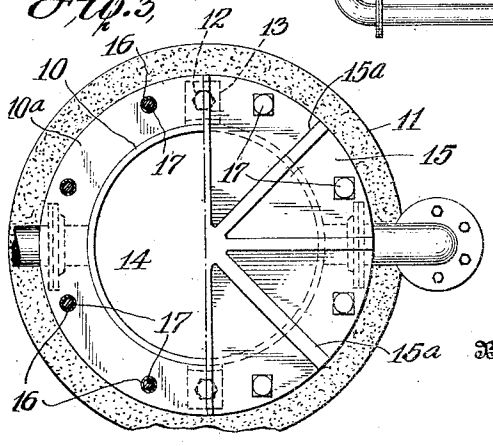


Fig. 3.



Inventor

Duncan W. Patterson and

Frank A. Epps.

By their Attorneys

Meyer, Cushman & Rea

UNITED STATES PATENT OFFICE.

DUNCAN W. PATTERSON, OF CRANFORD, NEW JERSEY, AND FRANK A. EPPS, OF NEW YORK, N. Y., ASSIGNORS, BY MESNE ASSIGNMENTS, TO FOAMITE FIREFOAM COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

FIRE-EXTINGUISHING APPARATUS.

1,364,799. Specification of Letters Patent. Patented Jan. 4, 1921.

Application filed October 31, 1918. Serial No. 260,423.

To all whom it may concern:

Be it known that we, DUNCAN W. PATTERSON and FRANK A. EPPS, citizens of the United States, residing at Cranford and New York, in the counties of Union and New York and States of New Jersey and New York, respectively, have invented new and useful Improvements in Fire-Extinguishing Apparatus, of which the following is a specification.

This invention relates to improvements in first-extinguishing apparatus operating under foam-extinguishing conditions, pertaining more particularly to apparatus designed to meet the problems of introduction of the medium to the surface of inflammable materials contained in tanks or reservoirs.

The efficiency of apparatus for this purpose is dependent to a considerable degree on the ability to place the "aqueous blanket", produced by the foam, on the burning surface as rapidly as possible by the rapid and continued discharge of the foam on to such surface. To provide this result certain inherent difficulties must be overcome.

For instance, one of the difficulties is the size and capacity of the tank or reservoir; another is the possibility of explosion in which the top or roof of the container is blown off. These difficulties have a bearing on each other through the fact that while the most rapid completion of the blanket can be provided by locating the discharging medium at a plurality of points within the tank or at a central point therein, and thus permit blanket development at the greater speed, such location places the delivery structure directly beneath the top or roof and at a point or points where the roof material, in falling after the explosion, may affect—as by closing—the delivery apparatus, thus making the latter useless for delivery purposes.

This condition has led to the practice of locating the delivery apparatus external of the tank or reservoir and so arranged that the medium is introduced into the tank adjacent the tank wall either at a single or a plurality of points, the medium introduced flowing inward toward the center of the tank. In the smaller capacity storage tanks this form of introduction will permit of sufficiently rapid development of the blanket, but where the capacity is largely increased, as by the use of the larger metallic tanks or in the case of the huge reservoirs used for storage, the large area of surface to be covered provides material delay in the completion of the blanket, it being understood that the flow of the medium is restricted to the inward direction—away from the walls. Since the reservoirs in general use may have dimensions as large as 200 feet square, the total area to be covered is such as to require a considerable length of time to complete the blanket.

Reservoirs of such large dimensions are generally of concrete formation, the roof—stationary in form—being of similar character. Where an explosion occurs in a reservoir of this type—generally preliminary to the beginning of the fire where lightning is the cause—the roof is forced off by tremendous pressure and oft times broken into fragments of different sizes. The falling fragments, when blown vertically fall back into the tank or reservoir, forming the damaging element which might affect the operations of apparatus installed within the reservoir itself.

The present invention is designed to meet these conditions by locating the delivery apparatus at a point or points where the delivered foam can rapidly spread in all directions, and by providing means which will prevent such fragments so damaging the apparatus as to discontinue the flow of the developed foam if the flow has begun, insuring that flow will begin and continue as long as may be desired regardless of the effects produced by an explosion.

To these and other ends, therefore, the nature of which will be readily understood as the invention is hereinafter disclosed, said invention consists in the improved construction and combination of parts hereinafter fully described, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the accompanying drawings, in which similar reference characters indicate similar parts in each of the views—

Figure 1 is a diagrammatic plan view showing two tanks or reservoirs and the connections between the component solution pipe lines and the several delivery apparatus.

Fig. 2 is a vertical section of a portion of a reservoir, the delivery apparatus being shown partly in section and partly in elevation.

Fig. 3 is a view partly in plan and partly in section of one form of delivery apparatus.

As shown in Fig. 1, the container may be of various configurations and sizes, A indicating the usual circular metallic tank, and B a reservoir of angular contour, the delivery apparatus being shown as located therein with connections leading from the supply lines *a* and *b*, these latter being connected up to a suitable source of supply for the different solutions and which may be arranged to provide the supply by pumping action. This latter construction is not shown being a well-known form of apparatus usable in connection with the supply of the solutions to mixing heads, etc., such for instance as is disclosed in the patent to Walker, No. 1,186,251, June 6, 1916.

The delivery apparatus, shown more particularly in Figs. 2 and 3, is shown as in the form of a vertically-extending stand-pipe 10, mounted on a suitable pedestal or base 11—shown as a concrete base to which the stand-pipe is secured by the use of suitable anchoring members 12 connected to angle plates 13 welded or otherwise secured at the lower end of the stand-pipe. The stand-pipe is provided with a bottom 14, preferably upwardly-dished, said bottom being secured in position in any preferred manner. The convex or conical form of the bottom plate 14 serves to give the incoming solutions a slight upward trend, and also spreads the solution streams somewhat upon their entrance into the interior of the stand pipe, thereby assuring a complete and rapid intermixture of the two solutions and a tendency to force the resulting foam upward, reducing to a minimum the possibility of congestion in the bottom of the stand pipe and a resultant damage to the quality of the foam produced.

The stand-pipe extends vertically, having a length to locate its upper end above the normal level of the container contents sufficient to prevent entry of the latter thereinto.

The upper end of the stand-pipe is permanently open, so that when the component solutions are introduced into the stand-pipe from the supply lines, and the foam is developed therein through the reaction of the several components, filling of the stand-pipe causes the foam to overflow the stand-pipe end and pass onto the surface of the oil or other contents of the reservoir. And as the stand-pipe is spaced from the walls of the reservoir, this overflow will extend in all directions from such open end permitting rapid development of the blanket.

As shown in Fig. 1, the tank may have a single stand-pipe arranged at suitable point—for instance centrally as shown in connection with tank A—or it may have a plurality of such stand-pipes as shown, for instance in connection with reservoir B. Each stand-pipe, however, is provided with the independent inlets connected up to the several lines, through which the solutions are introduced under pressure, the connections being provided in any desired manner, Fig. 2, for instance, showing them as entering from the bottom—the supply lines in such case being located in trenches or tunnels.

To maintain this discharging ability under the difficulties heretofore pointed out, we provide, in the present embodiment, a guard element positioned opposite the open end of the stand-pipe in such manner as to retain the substantially-free discharge of the foam, and yet place a barrier in the path of any falling materials sufficient to prevent the latter from entering the stand-pipe or closing its outlet.

The particular form of guard or barrier employed may be varied as may be found necessary, that shown being in the form of a metal plate or member 15, preferably carrying reinforcing formations such for instance as ribs 15^a, the member having an area not less than that of the stand-pipe open end, and preferably corresponding in contour to the general contour of the apparatus.

The guard or barrier is supported on the stand-pipe by suitable spacing members 16, these being located between the plate and a flange 10^a located at the upper end of the stand-pipe, the plate, spacers and flange being united into a substantially-rigid structure by suitable securing devices such, for instance, as bolts 17 connecting the plate and flange and extending through the spacers.

By this arrangement the upper end of the stand-pipe is protected in such manner as to prevent closing of the discharge portion of the stand-pipe, and at the same time the structure is of sufficient strength to withstand the shocks, etc., presented by falling bodies, this being aided by the fact that the axis of the stand-pipe extends vertically so that its walls provide assurance against damage to the structure.

While we have herein shown and described one form in which the invention may be embodied, it will be readily understood that changes or modifications therein may be found desirable or essential in meeting the various exigencies of use, and we desire to be understood as reserving the right to make any and all such changes or modifications as may be found desirable or necessary, in so far as the same may fall within the spirit and scope of the invention as expressed in the accompanying claims.

Having thus described our invention, what we claim as new is:

1. In apparatus for extinguishing fires in inflammable fluids stored in a tank or reservoir, a stand pipe permanently mounted in fixed vertical position in the tank and having an open upper end above the normal level of the fluid in said tank, means for generating a fire extinguishing foam in said stand pipe, and means mounted on the stand pipe and located within the tank above the open upper end of said pipe at a sufficient distance therefrom so as not to interfere with the flow of foam, adapted to guard said open end from heavy falling objects.

2. In apparatus for extinguishing fires in inflammable fluids stored in a tank or reservoir, a stand pipe permanently mounted in fixed vertical position in the tank and having an open upper end above the normal level of the fluid in said tank, means for generating a fire extinguishing foam in said stand pipe, and means mounted on the stand pipe, located within the tank above the open upper end of said pipe at a sufficient distance therefrom so as not to interfere with the flow of foam, and extending continuously over the entire open end of the pipe, adapted to guard said open end from heavy falling objects.

3. In apparatus for extinguishing fires in inflammable fluids stored in a tank or reservoir, a stand pipe permanently mounted in fixed vertical position in the tank and having an open upper end above the normal level of the fluid in said tank, means for generating a fire extinguishing foam in said stand pipe, means mounted on the stand pipe and located within the tank above the open upper end of said pipe at a sufficient distance therefrom so as not to interfere with the flow of foam, adapted to guard said open end from heavy falling objects, and relatively narrow vertical connecting elements located about the open end of the pipe for holding said guard means in fixed spaced relation thereto.

4. In apparatus for extinguishing fires in inflammable fluids stored in a tank or reservoir, a stand pipe permanently mounted in fixed vertical position in the tank and having an open upper end above the normal level of the fluid in said tank, means for generating a fire extinguishing foam in said stand pipe, an outstanding flange about said open end over which the foam flows, narrow vertical spacing elements carried by said flange, and a guard covering said entire open end detachably mounted on said elements and adapted to shield said end and pipe from heavy falling objects.

5. The combination with a container for inflammable materials, of apparatus for introducing a fire extinguishing medium onto the surface of the tank contents, said apparatus including an open top stand pipe extending vertically within the container and having a convex bottom plate, said fire extinguishing medium being introduced to the stand pipe immediately above the bottom plate.

6. The combination with a container for inflammable materials, of apparatus for introducing a fire extinguishing medium onto the surface of the tank contents, said apparatus including an open top stand pipe extending vertically within the container to a plane above the normal level of the contents, said stand pipe having a flat guard plate lying above and parallel to its open end.

In testimony whereof we have hereunto set our hands.

DUNCAN W. PATTERSON.
FRANK A. EPPS.