Sept. 3, 1929. F. C. J. MOORE 1,727,111

METHOD AND APPARATUS FOR EXTINGUISHING FIRES

Filed Dec. 15, 1924

Fig. 1.

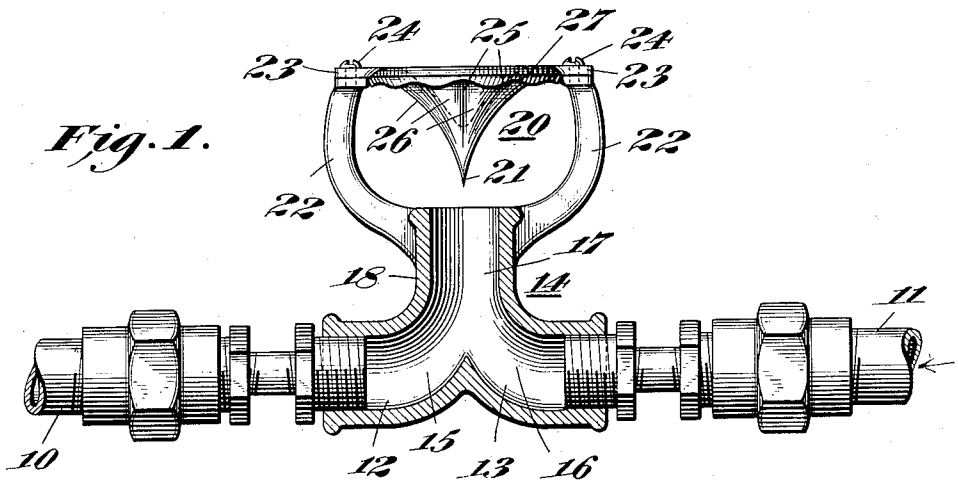


Fig. 2.

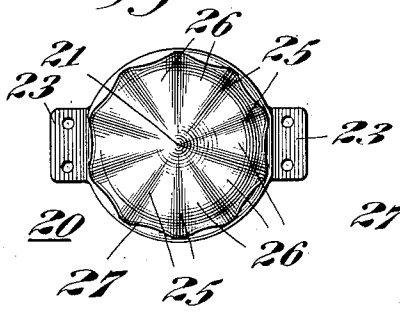


Fig. 3.

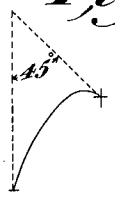


Fig. 5.

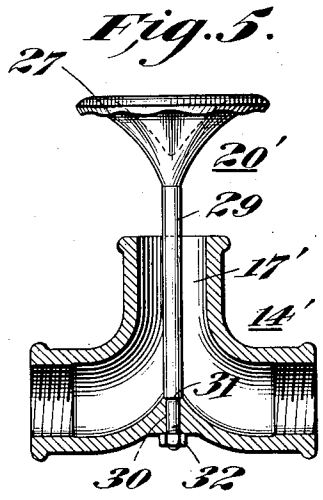
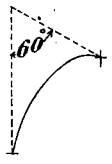


Fig. 4.



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UNITED STATES PATENT OFFICE.

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METHOD AND APPARATUS FOR EXTINGUISHING FIRES.

Application filed December 15, 1924. Serial No. 755,868.

My invention relates to means and to a method for fighting fires and it has for an object to provide apparatus of this character which shall operate to effectively develop and spread a blanket of non-inflammable material over a fire or an inflammable substance.

The principle of generating a heavy non-inflammable gas, such as CO_2, from suitable ingredients, one of which carries a viscous medium to hold the gas in bubble form in a blanket of foam is well known in the art. My invention relates to a method and to apparatus of this general character and it has for an object to obtain better mixing of the ingredients and more effective distribution of the foam.

A further object of my invention is to provide a mixing device for the development of foam which consists of opposed and converging passages which converge and empty into a discharge passage so that admixture of the ingredients may be secured and the velocity energy of the ingredients utilized in discharging the foam.

A further object of my invention is to provide a conoidal deflector for a discharge outlet with its apical portion arranged adjacent to the outlet and having its discharge rim fluted radially in order to spread and to secure effective distribution of material passing from the outlet.

These and other objects are accomplished by apparatus made in accordance with my invention and which, by way of example, is illustrated in the accompanying drawings, forming a part of this application and wherein similar parts are referred to by similar reference character, in which:

Fig. 1 is a view, partly in section, showing my improved foam-producing and spreading device;

Fig. 2 is an inverted plan view of the conical deflector shown in Fig. 1;

Figs. 3 and 4 are diagrammatic views showing variations in curvature of the radially fluted portions; and,

Fig. 5 shows a modified form of my ininvention.

Referring now to the drawings for a better understanding of my invention, in Fig. 1, I show conduits 10 and 11, which lead, respectively, to sources of chemically reactive ingredients and which are arranged to discharge, respectively, into the arms 12 and 13 of the hollow, substantially T-shaped member, at 14. The arms 12 and 13 preferably define upwardly-curved passages 15 and 16 which converge and discharge into the discharge passage 17 of an arm 18 of the T-shaped member.

A conoidal deflector, at 20, is arranged with its apical portion 21 disposed adjacent to the outlet end of the passage 17 and serves to core a stream discharged from the passage 17 into annular form and to gradually change the direction of flow of the annulus outwardly in order to effectively spread material discharged from the T-shaped member. The deflector, at 20, may be supported in any suitable manner. For example, in Fig. 1, I show the deflector carried by arms 22 which are connected to the vertical arm 18 and to lips 23 carried by the deflector. The arms 22 and the lips 23 are secured together in any suitable manner, as by the screws 24.

In order that the annular stream of material provided by the apical portion of the deflector may be effectively and more evenly distributed over a given area, I preferably flute the deflector along radial lines, from which it will be apparent that the concavities of the flutings will define a smaller angle with respect to the axis of the deflector, as indicated in Fig. 3, than will be defined by the convex portions of the flutings, as will be seen from Fig. 4. Referring to Figs. 1 and 2, it will be seen that the fluting starts beyond the apical portion 21 and extends radially, the fluting being made up of concave portions 25 and convex portions 26.

The conoidal deflector, at 20, is in general preferably defined by a surface which curves outwardly from its axis and then reversely with respect to the axis so as to impart a downwardly directive effect upon material discharged from the deflector, the outwardly and downwardly curved discharge surface being indicated generally at 27 in the drawings.

In Fig. 5, I show a conical deflector 20′ which is suported by a stem 29 which extends axially with respect to the discharge passage 17′ and passes through an opening 30 in the T-shaped member at 14′, the stem being preferably provided with a shoulder 31 so that it may be clamped in place with respect to the T-shaped member by screwing up the nut 32.

In placing the apparatus described in practice, the conduits 10 and 11 are connected to sources of chemically reactive ingredients such as a base solution, for example, sodium bicarbonate, and a salt solution, such for example, as alum or aluminum sulphate. A viscous material, such as dye wood extract, is mixed with the base solution. When these solutions are admixed in the vertical passage or mixing chamber 17 chemical reaction ensues and carbon dioxide is evolved. The purpose of the viscous material is to form filmy envelopes for the evolved gas which shall coalesce to constitute a froth or foam. The foam mixture discharged from the passage 17 is deflected outwardly by the conical deflector, at 20, and the downwardly directed rim 27 of the deflector serves to impart a slight downward directive effect to the foam mixture. The radial flutings constituted by the concave and convex surface portions 25 and 26, respectively, serve to define varying discharge angles for the material leaving the deflector, thereby making possible a more effective distribution of material over a given area.

The upward curvature of the passages 15 and 16 serves to change the direction of the streams so that when the latter meet, not only is a thorough and prolonged admixture secured, but also the velocity energy of the moving streams is effective to discharge the mixture from the passage 17. This permits of the development of foam and the discharge thereof without the development of pressure for this purpose as would be necessarily the case where the streams impacted in line with no component of velocity in the direction of the discharge passage.

In view of the fact that the deflector does not divide the material but discharges the stream more or less in the form of a sheet, the change in direction and the spreading of the foam takes place with a minimum disruptive effect and a stable and durable foam is secured. From a consideration of Figs. 1 and 5, it will be apparent that the streams of ingredients from the passages 15 and 16 empty into the discharge passage 17, velocity energy of the ingredient streams being effective to secure discharge from the passage 17 and the stream which is discharged from the passage 17 is cored out by the deflector into annular form. This annular stream has its direction gradually changed by the deflector and finally it is slightly reversed in the direction of the apical portion of the deflector so that a downward directive effect may be exerted upon the mixture leaving the discharge edge of the deflector rim. By fluting the deflector radially, particularly the discharge rim portion thereof, the sheet of material is discharged from the deflector with varying leaving or exit angles so that the foam may be more effectively distributed over a zone to be covered.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:

1. In a fire extinguisher, a deflector with its fluid engaging portion curving gradually upwardly and radially outward, and having a regularly undulating surface peripherally thereof.

2. In a fire extinguisher, a deflector with its fluid engaging portion first curving gradually upwardly and radially outwardly, then radially outwardly and somewhat downwardly, the surface near and at the periphery being regularly fluted, the fluted surface merging gradually into the unfluted surface.

3. A process for preparing a fire extinguishing spray, comprising the step of blending into a common stream two oppositely directed streams of foam producing solutions, while gradually changing the direction of flow of said two streams at their juncture to that of the common stream.

4. A process for preparing a fire extinguishing spray, comprising the step of blending into a common stream convergent streams of foam producing solutions whose paths of approach are along widely diverging lines from their point of intersection while gradually changing the direction of flow of said convergent streams at their juncture to that of the common stream.

5. A process for preparing a fire extinguishing spray, comprising the steps of blending into a common stream convergent streams of foam forming solutions while gradually changing the direction of flow of said convergent streams at their juncture to that of the common stream and then deflecting the resulting stream of the mixture gradually upwardly and outwardly and then somewhat downwardly to produce a hollow, somewhat conically shaped spray.

6. A process of preparing a fire extinguishing spray, comprising the steps of gradually blending streams of foam forming solution into a common stream and then gradually deflecting the said common stream gradually upwardly and outwardly to form a spray.

7. In a fire extinguisher, a mixing chamber including a discharge passageway, a plurality of inlet passages to said mixing chamber which gradually curve toward the discharge passageway within the mixing chamber and merge therein, and an inverted conoidal deflector above the discharge passageway curving gradually throughout its deflecting surface.

In testimony whereof I hereunto affix my signature this 11th day of December 1924.

FENNEL C. J. MOORE.