Oct. 31, 1950 C. H. LINDSAY 2,527,831

FOAM TYPE FIRE EXTINGUISHER

Filed Aug. 2, 1945

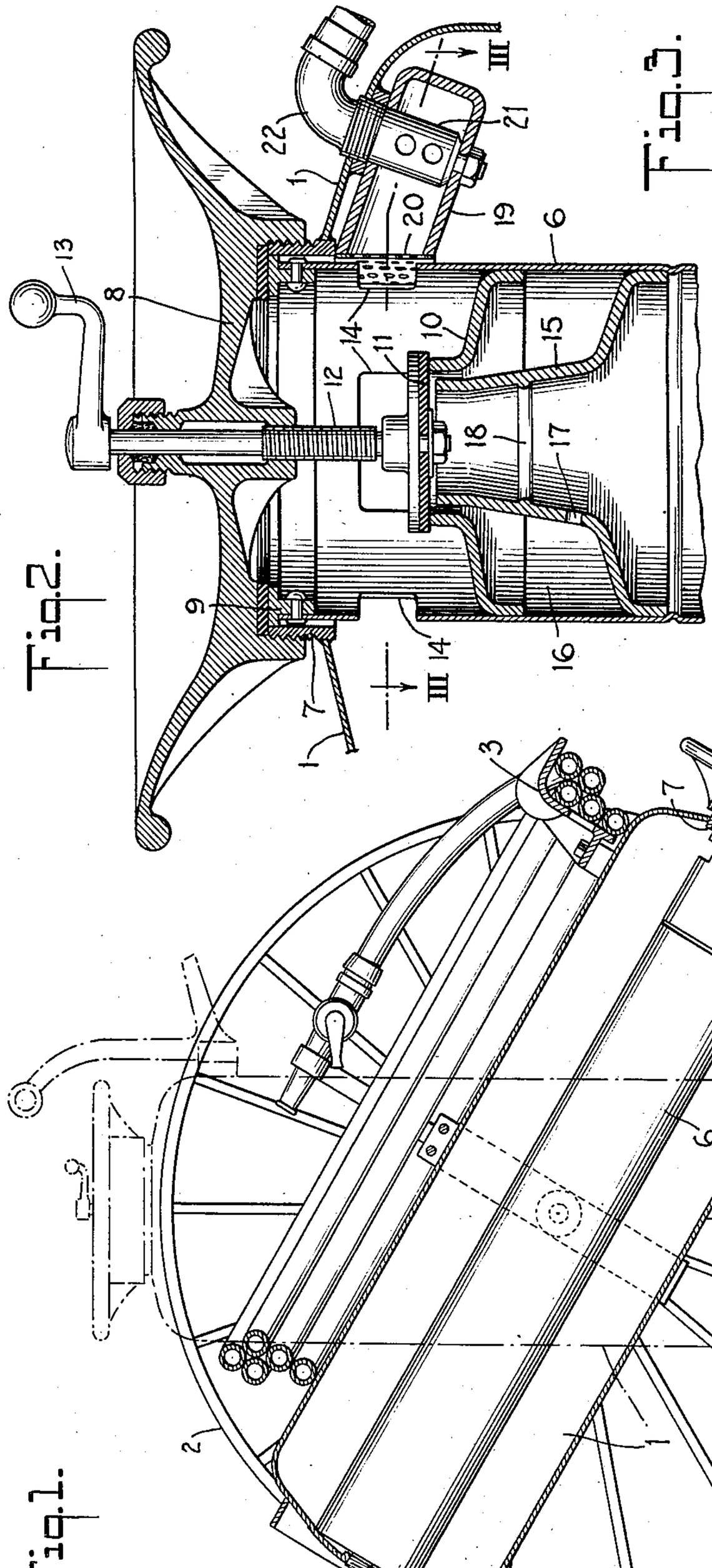

Fig. 2.

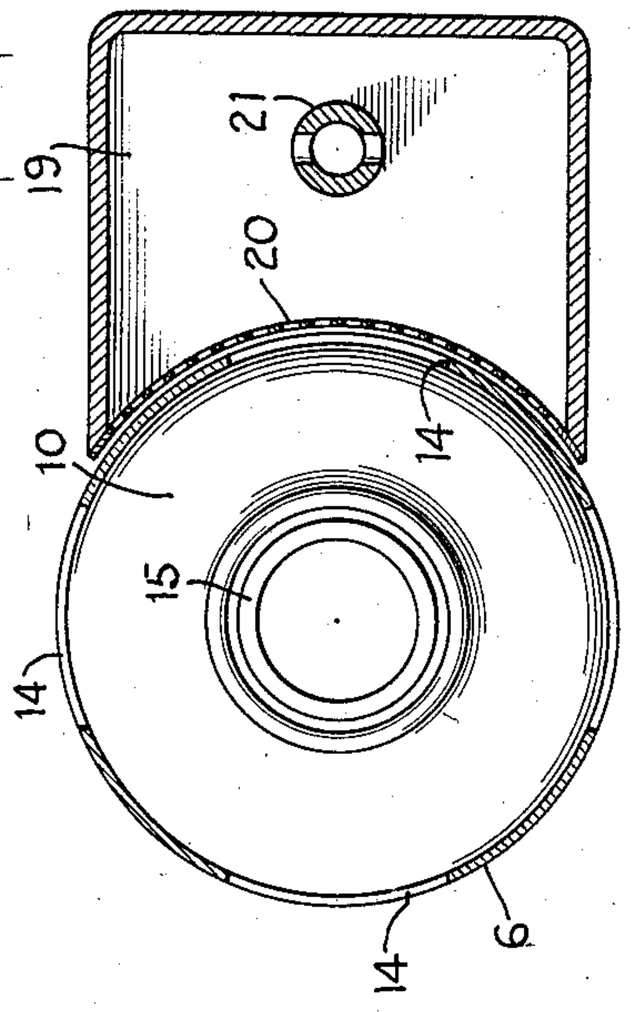

Fig. 3.

Fig. 1.

INVENTOR
Charles H. Lindsay
BY Jeffrey Kimball Vaughan
ATTORNEYS

Patented Oct. 31, 1950 2,527,831

UNITED STATES PATENT OFFICE

2,527,831

FOAM TYPE FIRE EXTINGUISHER

Charles H. Lindsay, Elmira, N. Y., assignor to American-La France-Foamite Corporation, Elmira, N. Y., a corporation of New York

Application August 2, 1945, Serial No. 608,434

5 Claims. (Cl. 169—27)

1

The invention is a foam-type fire extinguisher, more particularly of the kind and size usually mounted on wheels so as to be readily taken to the fire, and adapted to be inverted for action, but without limitation to any particular type. The object is to improve the foam-producing efficiency of such apparatus which object is accomplished by a new organization of the internal solution compartments according to the principle illustrated in the accompanying drawing wherein

Fig. 1 is a side elevation of a so-called 40 gallon engine showing the invention applied;

Fig. 2 an axial section in larger scale illustrating the extinguisher compartments and the preferred arrangement thereof, and

Fig. 3 is a section on line III—III of Fig. 2.

The extinguisher shown in these figures comprises the usual main receptacle 1, mounted on wheels 2 in the usual or any suitable way, so that it can be tipped from its normal erect position, indicated in dotted lines, to its working position indicated by full lines. It carries the usual hose rack 3, customary for these engines, has a handlebar 4 and a foot 5, by which it rests on the floor when in tipped position.

The main receptacle 1 is for holding the usual basic foam-making solution which is compounded of sodium bicarbonate in water with an added foam stabilizer according to standard formula. The companion acid solution, compounded of aluminum sulfate and water, also according to standard formula, is held in an inner receptacle 6, which in the present case is concentrically mounted in the main receptacle and so as to be removable from it through the neck structure 7 of the main receptacle, after the screw-cap or cover 8 on the latter has been removed, this being conventional arrangement. The space in the main receptacle around the inner receptacle constitutes the basic solution compartment.

The inner receptacle is a cylindrical tube provided with a flange or rim 9 at its top, whereby it is seated and held in place by the cover, and it contains or is provided with an outlet member 10 built into the tube and adapted to be closed by a stopple 11 mounted on the end of a screw-shaft 12 having an external operating crank 13. This stopple is for closing the outlet 10 to prevent escape of acid solution while the extinguisher is being trundled to the fire, regardless of the attitude of the main receptacle at the time. The end of the tube 6, between the outlet member 10 and the cover 8 constitutes the mixing chamber or reaction space. It is fenestrated

2

with four openings as indicated at 14 so as to admit the basic solution into it.

The structure includes also a second outlet member 15 fixed to or built into tube 6 somewhat below or back of the valved outlet 10. Both of these outlet members may be castings or they may be constituted of a single casting if desired. The second member 15 forms with the body of tube 6 a solution compartment which holds the bulk of the acid solution. The solution in this compartment flows through outlet 15 more or less directly into the mixing chamber, when the apparatus is tipped and the stopple open, and the size of the outlet is especially calibrated so that the flow through it will match the rate of entry of the basic solution into the mixing space through the open windows 14 and so as to produce a constant and substantially stoichiometric combination of the two flows. It is referred to on this account as a metered outlet.

The annular space 16 between the two outlet members 10 and 15 forms an extra or third solution compartment, in this case coaxial with the others. It is designed to contain a relatively small and predetermined amount of the same acid solution as is contained in the main acid compartment. It is important that it opens directly into the mixing chamber and through an adequately large outlet orifice so that it will instantly supplement the flow of acid solution from the main acid compartment when the latter flow begins, thus establishing a double flow of acid solution into the mixing chamber at the start of the operation. This flow continues only until the limited quantity of solution in compartment 16 has passed out.

When the extinguisher is tipped for action, the mixing space is filled, or fills, with basic solution via windows 14, before the arrival of any acid solution. The effect of the initial double flow of acid solution, into this body of basic solution, is to produce a substantially complete neutralization of the whole of such body, instantly making foam which passes out under its own expansion through the foam outlet presently described. Except for the amount of acid from the third compartment, the mixing chamber would not receive enough acid, from outlet 15, to make a complete reaction with the chamber contents and the acid charge placed in compartment 16 is predetermined with this object in view.

As soon as this initial action has taken place the remainders of the two reagent solutions flow into the mixing space, the basic through the windows 14 and the acid through the metered outlet

15 and at the relative rates above referred to which produce a constantly neutral or in any event a desired quality of foam in the mixing space and until the two solutions are (simultaneously) exhausted.

The practical effect of thus initially and instantly neutralizing the basic contents of the mixing space is to eliminate the slug of solid, unreacted basic solution which otherwise would issue from the hose nozzle before the appearance of any foam, and it is due, in part at least, to this saving that this extinguisher produces some 50% more foam from given quantities of solutions than has been derivable from this class of apparatus as heretofore designed.

The foam outlet from the mixing space is located on the main receptacle close to the neck structure thereof and partially surrounds the tube 6 at the mixing space. It comprises a box 19 with an arcuate perforated wall 20, to serve as a screen located close to the tube 6 and concentric therewith and so as to overlap or register with at least one of the window openings 14 therein. This box is held in position on the main receptacle by means of the hollow and perforated shank 21 of the elbow-fitting 22 to which the hose is attached. Foam made in the mixing space thus passes directly therefrom into the box and through the elbow to the hose. With this arrangement the foam enters the hose practically while it is being formed; also the screen 20 is exposed to plain view for inspection or cleaning when the inner receptacle has been removed.

The starting compartment 16 ordinarily receives its portion of the acid solution at the time of charging the extinguisher. For convenience in this connection, the outlet casting 15 is perforated at 17 so that when the main acid receptacle is properly filled, that is to say, up to the level mark 18 therein, a proper amount of the solution flows through the hole and is thereafter held in the starting compartment; and even if the liquid level should be lower than the filling mark, such flow will in any event take place when the extinguisher is tipped for action before the stopple is opened, thus in any case charging the starting compartment with the proper quantity of the acid solution for the initial double flow into the mixing space.

It will be apparent that the principle of action above described is quite independent of the physical structure whereby the compartments are formed. Their concentric arrangement as illustrated is preferred because of its simplicity and servicing convenience.

Also it will be apparent that so long as the supplemental charge in the third compartment is sufficient to cause such complete reaction it is not important whether flow from that compartment thereupon ceases abruptly or continues at a reduced rate so long as the relative proportions of acid and basic entering the mixing chamber at the start of the operation are such as to produce a more or less stoichiometric combination of the reagents and the continuing flows also are in such constant proportion.

I claim:

1. A foam-type fire extinguisher comprising a basic solution compartment, a mixing chamber in open communication therewith, and a foam-outlet leading from the mixing chamber, in combination with two acid solution compartments, both having direct access to the mixing chamber, one of said acid solution compartments being of a capacity to contain a supply of acid solution adequate to react with the basic solution throughout the normal solution mixing period, and the other of said acid solution compartments being of a capacity to contain a limited quantity of acid solution, to react with the basic solution initially in the mixing chamber.

2. The combination of claim 1 in which said two acid solution compartments have communication with each other whereby the charging of one with solution suffices to charge the other.

3. The combination of claim 1 in which said two compartments have a single externally operated stopple for excluding the acid solution from the mixing chamber.

4. The combination of claim 1 in which said two compartments are coaxial with each other and with the basic compartment.

5. The combination of claim 1 in which said two acid compartments and the mixing chamber are all comprehended in a tubular structure removably housed in the compartment holding the basic solution.

CHARLES H. LINDSAY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
168,627	Doughty	Oct. 11, 1875
662,786	Harris	Nov. 27, 1900
858,188	Laurent	June 25, 1907