

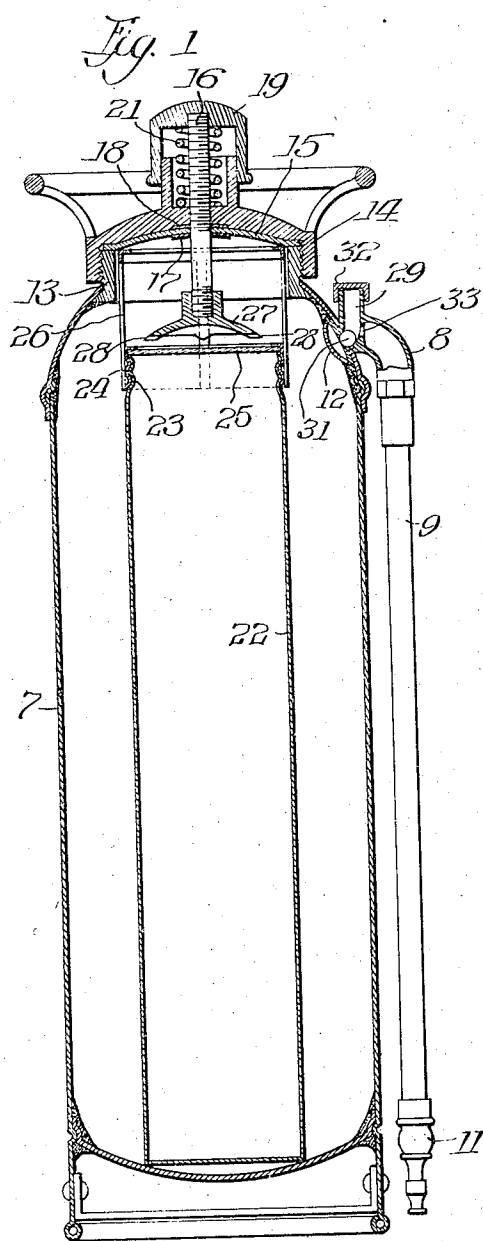
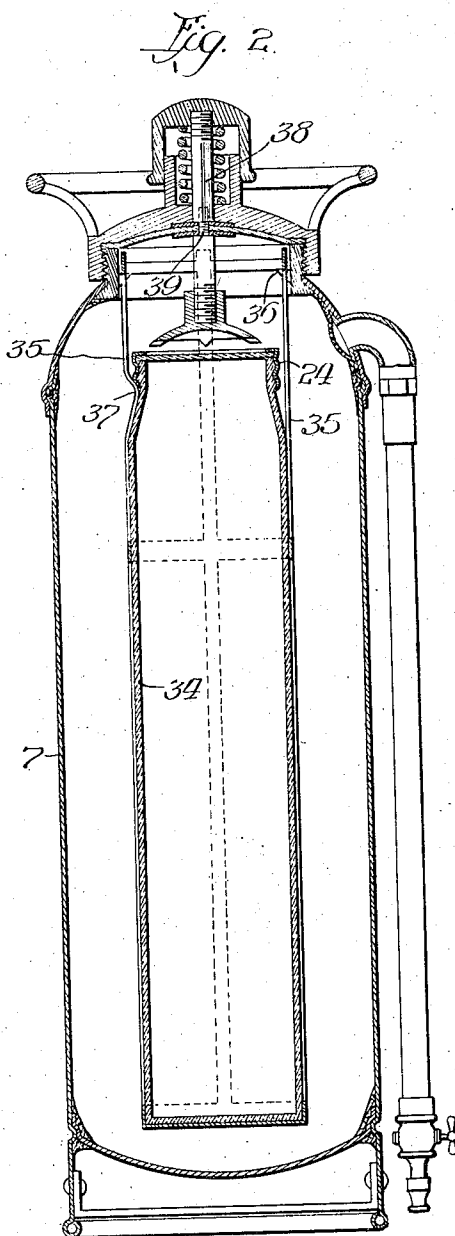
May 8, 1923.

1,454,825

W. S. TIFFANY
FIRE EXTINGUISHER

Filed Dec. 21, 1917

2 Sheets-Sheet 1



Witness:

Ed. Wilson

Inventor:

William S. Tiffany
By *Rondel Wilson* Atty.

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2 Sheets-Sheet 2

Fig. 3

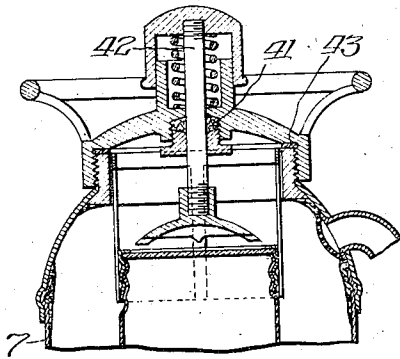


Fig. 4

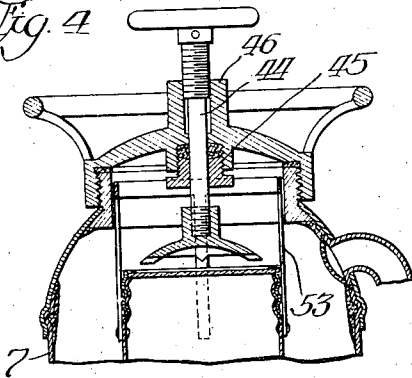


Fig. 5

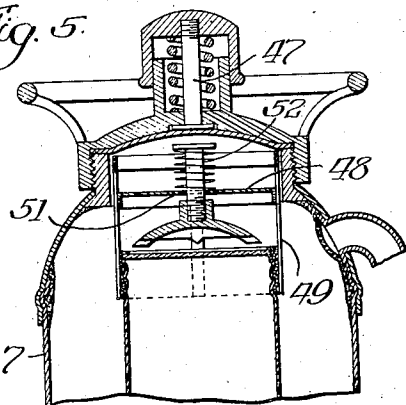
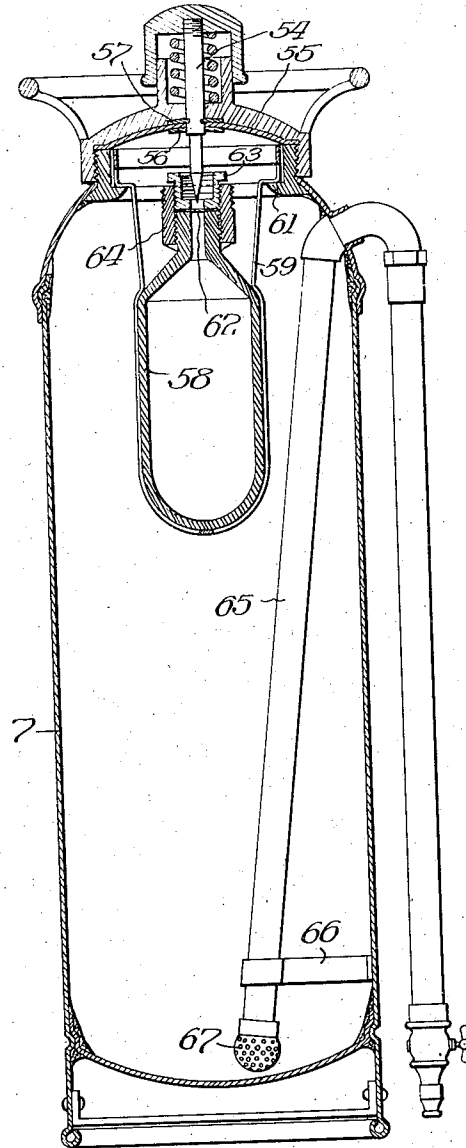


Fig. 6



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Patented May 8, 1923.

1,454,825

UNITED STATES PATENT OFFICE.

WILLIAM S. TIFFANY, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO E. E. McMORRAN, OF CHICAGO, ILLINOIS.

FIRE EXTINGUISHER.

Application filed December 21, 1917. Serial No. 208,240.

To all whom it may concern:

Be it known that I, WILLIAM S. TIFFANY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fire Extinguishers, of which the following is a specification.

This invention relates to fire extinguishers of the type adapted to be operated by inverting the extinguisher, and particularly to that class adapted to generate a large quantity of lingering foam, and to discharge the same upon the fire upon inversion of the extinguisher.

Extinguishers of this general character have heretofore been employed in which an inner receptacle containing one of the foam and pressure producing constituents was located within the tank and provided with a loose stopper adapted to drop by gravity from the receptacle when the extinguisher was inverted, thus permitting the contents of the receptacle to mingle with the contents of the tank. These extinguishers, however, have been subject to severe criticism because of the tendency of the liquid in the inner receptacle to slop over and mingle with the tank contents whenever the extinguisher is moved, even if it is not inverted, and this objection is particularly forcible where the extinguishers are subject to shocks and quick movements as on ship-board, for instance.

One of the primary objects of my present invention is to provide an extinguisher in which the contents of the inner receptacle will be effectually and permanently sealed so that no movement of the extinguisher, no matter how violent, will cause a commingling of the liquids contained in the receptacle and the tank respectively.

Another feature of my invention resides in the provision of simple and effective means for breaking the seal of the inner receptacle whenever it may be desirable to use the extinguisher, but my invention is so designed that the breaking of the seal does not destroy the receptacle itself, with the result that the receptacle may be repeatedly used by simply applying a new seal after each use of the extinguisher.

A further feature consists in the provision of an effective seal for the extinguisher tank itself which will preclude leakage of the tank contents and will also preclude corrosion of

the seal-breaking instrumentality and its surrounding parts which might cause the seal-breaking device to stick or become inoperative even if the device were not entirely destroyed by the acid.

Still another object of my invention is to provide a seal for the discharge opening of the tank which will prevent slopping over of the tank contents when the receptacle is moved or transported, this sealing device, however, being automatic and gravity-actuated, so that when the tank is inverted an unobstructed opening for the discharge of the tank contents will be permitted.

Other objects and many of the attendant advantages of this invention should be readily appreciated by those skilled in the art as the same becomes better understood by reference to the following description when considered in connection with the accompanying drawings. Referring to the drawings,

Fig. 1 is a longitudinal sectional view through an extinguisher embodying my invention;

Fig. 2 is a similar view, showing another form of the invention;

Figs. 3, 4 and 5 are fragmentary sectional views illustrating other embodiments of the invention; and

Fig. 6 is a sectional view showing still another form of the invention.

Referring to the drawings, the extinguisher comprises the usual tank 7 which, in the present instance, is shown in the form of a cylinder provided with a hose connection 8, a hose 9, equipped with a nozzle 11, the discharge opening in the hose connection being protected by a strainer 12. The top of the tank is provided with a collar 13 exteriorly threaded to receive the closing cap 14, which closes the tank except at such times as it is removed for purposes of re-charging the extinguisher.

Referring now more particularly to Fig. 1, it will be observed that the flexible diaphragm 15 is disposed between the upper end of the collar 13 and the cap 14, so that it is firmly clamped in position around its margin to provide an effectual seal for the tank. A plunger 16 projects through a central aperture in the diaphragm, this plunger being provided with a flange or washer 17, soldered or otherwise fixedly secured thereon, and an upper washer 18 which is threaded

onto the plunger from its upper end, so that the diaphragm 15 is firmly clamped between these washers 17 and 18 to provide an effectual seal around the plunger. The upper
5 end of the plunger is equipped with a cap 19, and the plunger is normally held in the elevated position shown in Fig. 1 by a spiral expansion spring 21 disposed between the tank top and the cap 19.

10 Within the tank there is disposed a receptacle 22 adapted to contain one of the liquids which is mixed with the liquid in the tank proper when the extinguisher is to be used. This receptacle 22, preferably constructed of metal, rests at its lower end in
15 the form shown in Fig. 1, upon the bottom of the tank and extends upwardly centrally within the tank. The upper end of the receptacle is threaded exteriorly, as indicated at 23, to receive the seal-holding device 24, adapted to be threaded onto the upper
20 end of the receptacle. This device has an inwardly extending marginal flange adapted to overlie the margin of a frangible seal 25 made of glass, celluloid or other frangible material, so that this seal is firmly
25 clamped against the upper end of the receptacle to effectually seal the same and prevent the liquid in the receptacle from slopping over or mixing with the liquid in the
30 tank so long as the seal remains unbroken.

Secured to the seal-holding device 24 is a frame 26 which extends upwardly above the
35 receptacle into the throat of the tank and serves to retain the receptacle in proper position in the tank. When the seal 25 is to be renewed the frame 26, being rigidly secured to the seal-holding device 24, turns there-
40 with relatively to the receptacle when the seal-holding device is unscrewed from and again screwed onto the receptacle. The lower end of the plunger 16 is equipped with a seal-breaking device 27, preferably
45 comprising a plurality of breaking points 28, which are adapted to pierce and break the seal 25 when the plunger is forced downwardly against the seal by pressure exerted upon the outer cap 19.

50 In order to prevent slopping and overflowing of the liquid in the tank when the extinguisher is moved about, the hose coupling 8 is shaped, as shown in Fig. 1, to provide a vertically extending portion 29
55 adapted to receive a ball 31 which is slightly larger than the discharge opening from the tank so that when the extinguisher is in the upright position shown in Fig. 1 this ball will seat against and close the discharge
60 opening, thereby preventing slopping or overflowing of the liquid. The vertical portion 29 is preferably open at its upper end and provided with a closing cap 32 which retains the ball in place but may be removed
65 in order to permit the insertion of the ball when the device is assembled. A lateral

port 33 between the vertical portion 29 and the hose connection proper permits the discharge of the tank contents into the hose 9 when the extinguisher is inverted; and when in inverted position the ball 31 drops by
70 gravity into the tank, whereupon a suitable quantity of a desired solution may be poured into the tank. This tank solution preferably consists of proper proportions of water, sodium bicarbonate, and soapwort or saponaria, adapted to produce a foam. The inner
75 receptacle 22 is then charged either before or after being replaced in the tank with a solution consisting, preferably, of requisite proportions of water and aluminum sulphate. The seal 25 is then placed
80 over the top of the receptacle and clamped in position by screwing down the seal-holding device 24. The cap 14 carrying the diaphragm and the seal-breaking plunger, is then threaded onto the upper end of the
85 tank whereupon the apparatus is ready for use, and when required may be set in operation by simply manipulating the plunger so as to break the seal and then inverting the
90 extinguisher. In actual practice, the placing of the extinguisher on the floor in inverted position will cause the seal to be broken so that the contents of the receptacle
95 22 are permitted to mix with the contents of the tank, thereby producing the fire-extinguishing foam compound.

100 In the form of the invention shown in Fig. 2 the inner receptacle consists of a glass jar 34 which is suspended in a cage 35, suspended at its upper end in the mouth of the tank upon inwardly projecting lugs 36. The cage and its contained receptacle 34 may be
105 removed longitudinally through the mouth of the outer receptacle between the lugs 36. In this instance the seal-clamping device 24 is not attached to the cage or frame but simply threads onto the upper end of the recep-
110 tacle. In the form shown in Fig. 1 the frame or cage 26 serves to support the receptacle 22 when the apparatus is inverted and, likewise, in the form shown in Fig. 2 the cage 35 performs the same function, and in order
115 to prevent the receptacle 34 from longitudinal movement upon inversion of the apparatus one or more of the side members of the cage 35 is bent inwardly as indicated at 37
120 near the top of the receptacle to closely embrace the same and thereby hold the receptacle against longitudinal movement. In Fig. 2 the plunger 38 is made in two parts, one of which has a tapped bore to receive a
125 threaded extension 39 of the other part, and
130

this extension is inserted through the diaphragm and the two clamping washers whereupon the other portion of the plunger is screwed onto the extension, thereby firmly clamping the washers and the diaphragm between the two parts of the plunger so as to produce an effective seal.

In Fig. 3 I have shown, in lieu of the sealing diaphragm previously described, a stuffing box 41 which prevents leakage around the plunger 42, and leakage around the cap is prevented by a gasket 43 clamped between the upper end of the tank collar and the cap proper.

In Fig. 4 the plunger 44 also passes through a stuffing box 45 similar to the stuffing box 41, but in this instance the plunger is moved longitudinally by reason of the screw-threaded connection between the upper portion of the plunger and a boss 46 projecting upwardly from the cap. This construction is positive in operation, precludes accidental breaking of the seal, and eliminates the use of an upper cap and spring.

In Fig. 5 I have shown a construction in which the diaphragm is imperforate. A plunger 47 operates above the diaphragm in the manner previously described. Below the diaphragm in a guide 48 carried by the cage or frame 49, I have mounted a second plunger 51 carrying at its lower end the seal-breaking device and normally held in the upper position shown in Fig. 5 by an expansion spring 52. When the apparatus is to be operated downward pressure of the plunger 47, transmitted through the diaphragm to the plunger 51, will effect the breaking of the seal. It should be understood that the different embodiments shown in Figs. 3, 4 and 5 relate merely to the seal-breaking plunger and that the inner receptacles and their manner of support may be of any preferred form. For instance, in Figs. 3 and 5 I have shown a construction similar to that shown in Fig. 1 while in Fig. 4 the cage or frame 53 is connected to the inner receptacle just below the screw-threaded neck.

In Fig. 6 the plunger 54 passes through the diaphragm 55 and the diaphragm is clamped between the lower washer 56, which is soldered onto the plunger, and an upper washer 57 which is of the split ring type adapted, when moved into position, to snap into notches provided in the plunger, as shown. The receptacle 58 being designed in this instance to contain a liquefied gas under high pressure, is smaller in size than those previously shown and is supported in a cage 59 suspended at its upper end in the mouth of the tank upon an inwardly projecting flange or ledge 61. The receptacle 58 in this

instance is also provided with a frangible seal 62 which is clamped in position by a plug or nut 63 threaded into a collar 64 provided on the upper end of the receptacle. Instead of having the discharge opening at the top of the receptacle the discharge pipe in this instance is equipped with an extension 65 which projects substantially to the opposite end of the tank, where it is supported by a bracket 66 and is equipped with a screen 67, as will be readily understood.

It should be obvious from the foregoing that I have provided a fire extinguisher which is simple in construction, can be readily assembled and taken apart, that the tank is effectually-sealed against leakage and the seal-breaking mechanism is protected against the fumes from the liquid so that it will not corrode and stick in its guides, and that the inner receptacle is provided in all instances with a fixed seal which effectually prevents mingling of the contents of the inner receptacle and the tank when the extinguisher is moved about or subjected to violent shocks and jars. The apparatus furthermore, is positive in operation, the seal can be readily broken when desired and the breaking of the seal does not leave a quantity of glass in the extinguisher as the breaking of a glass bottle or vial, such as previously used does.

While I have shown and described those embodiments of my invention which at the present time seem preferable, it should be understood that various changes in the details of construction may be resorted to without departing from the spirit of the invention as set forth in the following claims.

I claim:

1. In a fire extinguisher, the combination of a tank, a cap therefor, a plunger projecting through said cap, means for preventing the escape of liquid around said plunger, a receptacle disposed within the tank, a frangible seal for the receptacle, means for detachably holding said seal in position, and means connected with said holding means and engaging the mouth of said tank for holding said receptacle in position.

2. In a fire extinguisher, the combination of a tank, a cap therefor, a plunger projecting through the cap, means for preventing the escape of liquid around the plunger, a receptacle disposed within the tank, a frangible seal for said receptacle, a holding device having threaded engagement with the receptacle for holding said seal in position, and means connected to said holding device and movable therewith and removable from the tank with said device for maintaining said receptacle in position in the tank.

WILLIAM S. TIFFANY.