P. L. WILBUR.

CHEMICAL FIRE EXTINGUISHER.

APPLICATION FILED NOV. 11, 1907.

903,527. **Patented Nov. 10, 1908.**

2 SHEETS—SHEET 1.

Fig. 2

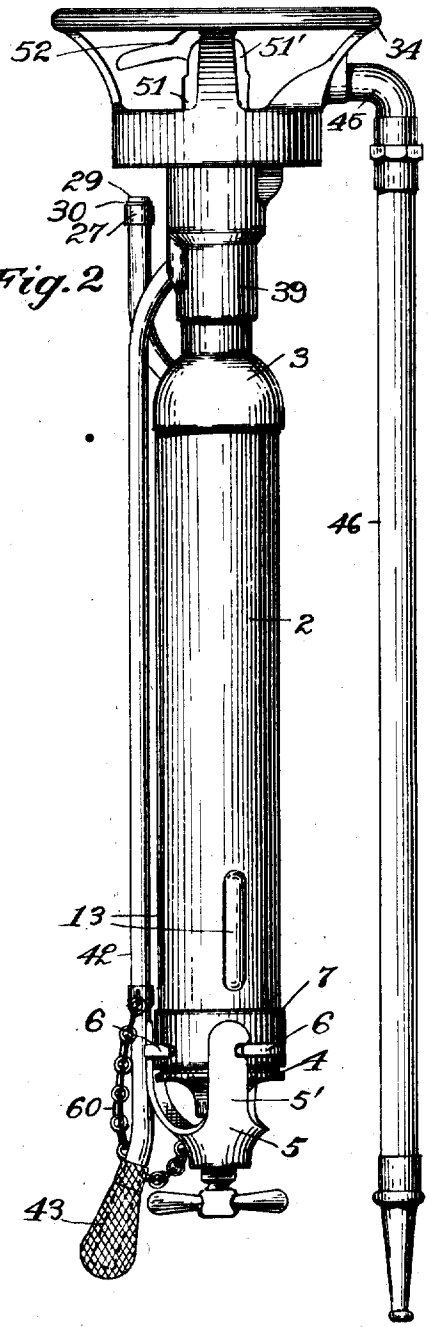
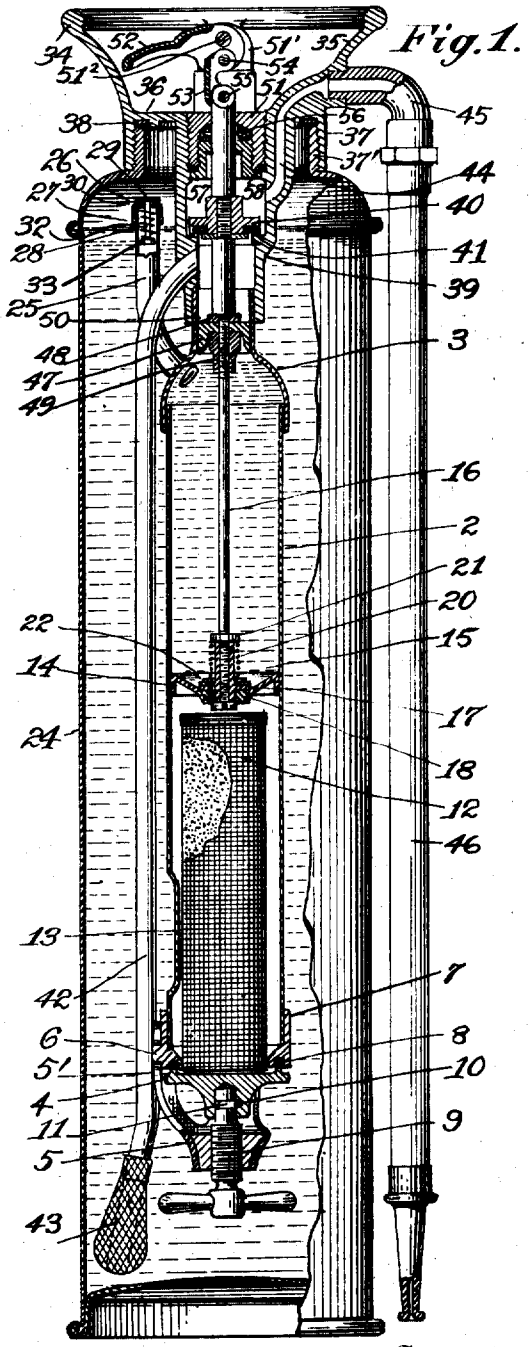


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 3.

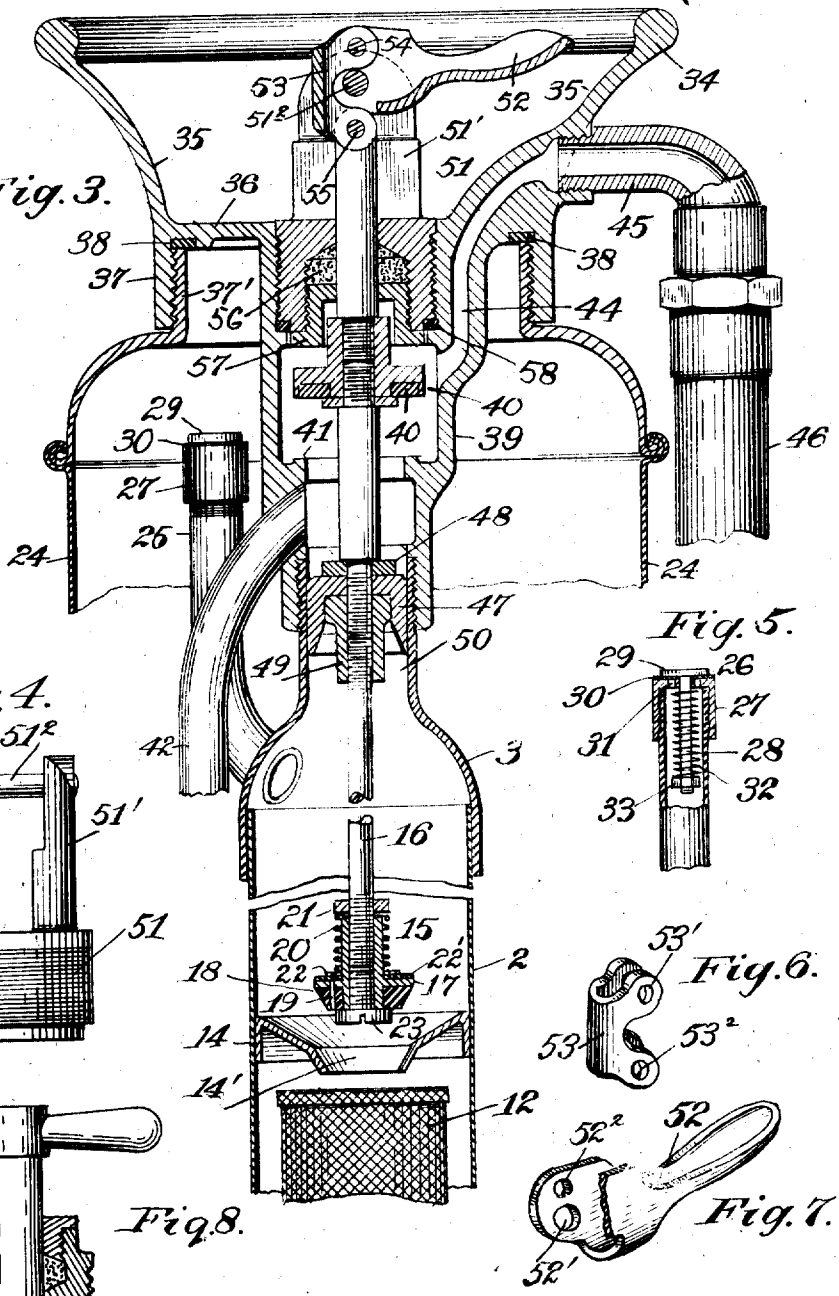


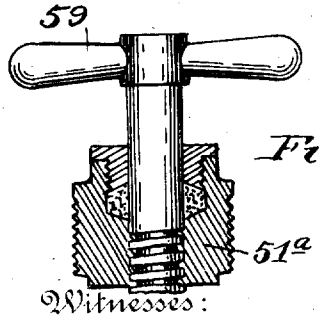
Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.



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UNITED STATES PATENT OFFICE.

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CHEMICAL FIRE-EXTINGUISHER.

No. 903,527. Specification of Letters Patent. Patented Nov. 10, 1908.

Application filed November 11, 1907. Serial No. 401,710.

To all whom it may concern:

Be it known that I, PETER L. WILBUR, of the borough of Bronx, city and State of New York, have invented a new and useful Improvement in Chemical Fire-Extinguishers, of which the following is a specification.

The present invention embraces a construction for a chemical fire extinguisher in accordance with which gas generating materials are held within the body of the extinguisher separate from each other and from the mass of the fire extinguishing liquid until such time as it is desired to eject liquid under gas pressure.

Moreover, the present invention embodies means for rendering the separation aforesaid a practically hermetical one with the result that there is no gradual evolution of gas or vapor which in course of time tends to materially affect the gas yielding capacity of the apparatus.

A further important feature of the invention relates to means for shutting off the flow of the extinguishing stream at the will of the user of the apparatus.

In the drawings accompanying the present specification, Figure 1 is mainly a longitudinal section of a portable fire extinguisher embodying the present invention. Fig. 2 is an elevation of the generator together with the handle of the apparatus and certain accessory parts showing the same removed from the extinguisher tank. Fig. 3 is a longitudinal section upon a somewhat enlarged scale of the upper portion of the extinguisher, showing in section certain parts of the generator. Fig. 4 is a similar view upon a similar scale of the mounting for the valve operating lever. Fig. 5 is a view on an enlarged scale, showing in section the outlet valve on the pipe leading from the generator into the upper end of the tank. Figs. 6 and 7 are perspective views upon an enlarged scale of the valve operating lever and the stem-to-lever connecting link. Fig. 8 shows on a scale similar to the immediately preceding figures a modified construction for actuating the valve.

Similar letters of reference designate corresponding parts in all figures.

The present invention comprises a gas generator adapted to hold gas generating materials separated from each other until such time as an evolution of gas is desired whereupon the materials are permitted to come in contact and react in the contemplated manner, this reaction, moreover, taking place in the generator and not in the liquid in the main tank of the extinguisher. That is to say, as here constructed, the generator comprises a cylindrical shell 2 fitted at one end with a head 3 and at the other end with a removable closure 4. The means here adopted for hermetically fastening this end closure in place and at the same time leaving it free to be removed for the purpose of recharging the generator consists of a coupling 5 whose notched fingers 5′ may be readily engaged with and disengaged from ears 6 on the shell reinforce 7. When so engaged, the closure may be firmly pressed against the packing 8 by a hand screw 9 which enters a tapped hole in the coupling and is seated in a socket in the closure, its withdrawal from which is precluded by a pin 10 projecting into an annular groove 11 of the screw.

A reaction which may be utilized for the production of gas is that between tartaric acid, bicarbonate of soda and water. With these materials the soda and acid may be mixed and no gas will be evolved until the water is brought in contact with the mixture. The powdered mixture of the two components of the gas evolving material are held separated from each other by placing one in this instance the mixed soda and acid (conveniently in the form of a cartridge 12 held by depressed portions 13 of the wall of the shell) in the lower part of the generator shell while the water charge is retained in the upper portion of the latter by a diaphragm 14 having a valve controlled passage 14′ for the descent of the water. It may be premised that this controlling valve 15 is operable from the exterior of the apparatus through its stem 16. Structurally, this valve may be as desired and appropriate, it, as illustrated, however, comprising a skeleton part 17 to which a proper valve forming part 18 is fastened. Preferably when shifted onto its seat in the diaphragm 14, it is spring pressed thereagainst as by interposing a spring 20 between a collar 21 on the valve stem and a washer 22 on the valve. Obviously under such circumstances the valve is slidably mounted on its stem, while a shoulder 23 on the stem prevents the spring from forcing the valve off the end of the stem.

Spring 20 will preclude the accumulation

of an undue pressure in the generator should valve 15 be closed before gas evolution ceases therein, valve flap 22′ rising somewhat to permit gas to escape through vent 19. The evolved gas passes from the generator into the tank 24 of the apparatus through exit pipe 25, which is preferably capped by an outwardly opening and an inwardly closing valve 26 (to prevent entrance of liquid from the tank) which may comprise a cap 27 on the end of the pipe in an opening in which is slidably mounted a valve stem 28 extending from a head 29 in juxtaposition to which is a valve proper 30 adapted to open or close ports 31 in the cap. Valve head 29 is urged to its seat by a spring 32 interposed between the cap and a collar 33 on the stem.

The handle for manipulating the tank may be of the usual form, designated by 34 here connected by arms 35 with the tank closure 36 which latter has an internally threaded cylindrical extension 37 adapted to engage with an externally threaded cylindrical extension 37′ of tank 24 and form a gas tight joint when screwed down against washer 38. For the purpose of facilitating the removal of the generator and its subsequent association with the tank, the former may be fixed to the tank closure. For instance it may be screwed to an axial tubular extension 39 of such closure, this construction permitting the assembling of a valve now to be described.

As before stated, the present invention includes the provision of means for shutting off the stream of fluid issuing from the apparatus at the will of the person manipulating the latter. This is conveniently done through the medium of a valve which may be mounted in the aforesaid tubular extension 39. Proceeding with a description of the illustrated application of this feature of the invention, the interior of said extension forms a valve chamber in which works a valve 40 affixed to stem 16 and coöperative with a seat 41, the space below which is open to pipe 42 terminating in a strainer 43, if desired and close to the bottom of tank 24 for the ascent of liquid therein. Above valve seat 41, the valve chamber communicates via port 44 with a fitting 45 for the attachment of the usual flexible nozzle-tipped hose 46. This valve chamber is shut off from the interior space of the generator by packing 47 forced to place against a collar 48 by a nut 49 engaging with a threaded portion of valve stem 16, the packing making a tight sliding joint with the bore of the upward extension 50 of the generator head.

Means for effecting the operation of valve 15 may be of various constructions. For instance, that illustrated in Figs. 1, 2, 3, 4, 6 and 7 may be used in which a threaded plug 51 is screwed into the top of tubular extension 39 and is provided with uprights 51′, 51′, extending between which is a cross pin 51^2 on which is mounted a hand lever 52, one of the openings in the lever for the passage of the pin being indicated in Fig. 7 and designated by 52′. Link 53 connects lever 52 and valve stem 16, opening 53′ in the link and 52^2 in the lever for the passage of lever-to-link connecting pin 54 being shown as well as openings 53^2 in the link for the passage of the stem-to-link connecting pin 55.

Plug 51 constitutes part of a stuffing box for stem 16 the latter being packed by packing 56 interposed between the bottom of the hollowed-out interiorly threaded plug 51 and a nut 57. Packing 58 may be interposed between the end of the plug and the bottom of its threaded receiving socket. If the axis of pins 51^2, 54 and 55 are all substantially in line with the axis of the valve stem when the hand lever is in a position corresponding to the closed condition of valve 40, see Fig. 1, and are similarly related when the lever is swung through a semi-circle to open the valve, see Fig. 3, it is apparent that means are provided for opening and closing both the valves 15 and 40 by an axial movement of the stem and automatically retaining them in both of these positions.

Instead of a hand lever for operating the valve, a screw may be employed as in Fig. 8, in which a hand screw 59 is shown, this engaging with a threaded opening in a plug 51^a analogous to plug 51. The turning of this screw to the right or left serves to raise and depress the valves as desired. The misplacing and loss of coupling 5 may be avoided by connecting it with a chain 60 to a part rigid with the generator.

It is obvious from the foregoing construction, that no part of the apparatus is subjected to the pressure of gas until there is immediate call for its use and valve stem 16 is lifted and that the flow may be shut off before the force of the gas is spent if the stem is depressed. Moreover, the parts are readily assembled, and the provision of a two-chambered generator in which all the reactive materials necessary for generating gas are held practically hermetically separate from each other as well as from the liquid in the tank and in which admixture and reaction take place permits the use of a non-freezing liquid in the latter. It also prevents a gradual deterioration in the gas yielding capacity oftentimes resulting when the usual extinguisher stands unused for some length of time. It is evident, furthermore, that the action of valves 15 and 40 due to a manipulation of their stem, is such as to open the discharge from the tank before the chemicals mix and react and that during the

closing movement, the descent of water to the lower part of the generator is shut off before the discharge from the tank is closed, these operations resulting from the continued movement of a single part, to wit, the valve stem. Any tendency to the accumulation of a dangerous pressure in the tank is therefore reduced to a minimum.

Having described my invention, I claim:

1. A chemical fire extinguisher comprising, in combination, a tank, a generator therein for holding the gas generating materials in a separated non-reactive condition and for holding the reacting mixture free from liquid in said tank, a valve for permitting the admixture of the materials and for shutting off access of the materials to each other, a valve stem operable from the exterior of the tank, a gas outlet leading from the generator into the tank, and a tank discharge.

2. A chemical fire extinguisher comprising in combination, a tank, a valve for controlling the admixture of the gas generating materials, a tank discharge, a valve therein, and means for insuring the opening of the tank discharge valve before said admixture-controlling valve is opened and the closing of the latter valve before the tank discharge valve is closed.

3. A chemical fire extinguisher comprising, in combination, a tank, a removable tank closure, a generator secured to said closure for holding the gas generating materials in a separated non-reactive condition and for holding the reacting mixture free from liquid in said tank, a valve for permitting the admixture of the materials and for shutting off access of the materials to each other, a valve stem operable from the exterior of the tank, a gas outlet leading from the generator into the tank, and a tank discharge leading from said closure.

4. In a chemical fire extinguisher, the combination of a tank for a fire extinguishing liquid provided with a removable head having a valve chamber depending therefrom, a liquid discharge tube terminating adjacent to the bottom of said tank and emptying into said valve chamber, a two-chambered generator rigid with the head and having a passage between its chambers, a valve controlling said passage, a valve in said valve chamber for controlling the discharge of liquid from the tank, and means for actuating said valves from the exterior of the extinguisher.

5. In a chemical fire extinguisher, the combination of a tank for a fire extinguishing liquid, a removable head for the tank having a tubular extension constituting a valve chamber, a liquid discharge tube terminating adjacent to the bottom of said tank and emptying into said valve chamber, a two-chambered generator depending from said tubular extension and having a passage between its two chambers, an exit tube from the generator into the tank, a valve controlling said passage between the chambers of the generator, a valve in said valve chamber for controlling the discharge of liquid from the tank, a stem to which said valves are secured, a stuffing box through which said stem passes a packing carried by said stem separating said valve chamber from the interior of said generator and means for actuating said stem from the exterior of the extinguisher.

6. A chemical fire extinguisher comprising in combination, a tank, a generator therein, for holding the gas generating materials in a separated non-reactive condition and for holding the reacting mixture free from liquid in said tank, a spring-pressed valve for controlling the admixture of the materials and which is operable from the exterior of the tank, a gas outlet leading from the generator into the tank, and a tank discharge.

7. A chemical fire extinguisher comprising, in combination, a tank, a generator therein for holding the gas generating materials in a separated non-reactive condition and for holding the reacting mixture free from liquid in said tank, a valve for controlling the admixture of the materials and which is operable from the exterior of the tank, a gas outlet leading from the generator into the tank, an outwardly opening and inwardly closing valve in said outlet, and a tank discharge.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PETER L. WILBUR.

Witnesses:
MARTIN COOK,
H. L. VAN SYCKEL.