W. M. Parker.

Fire Extinguisher.

No. 88,583. Patented Apr. 6, 1869.

Fig. 1.

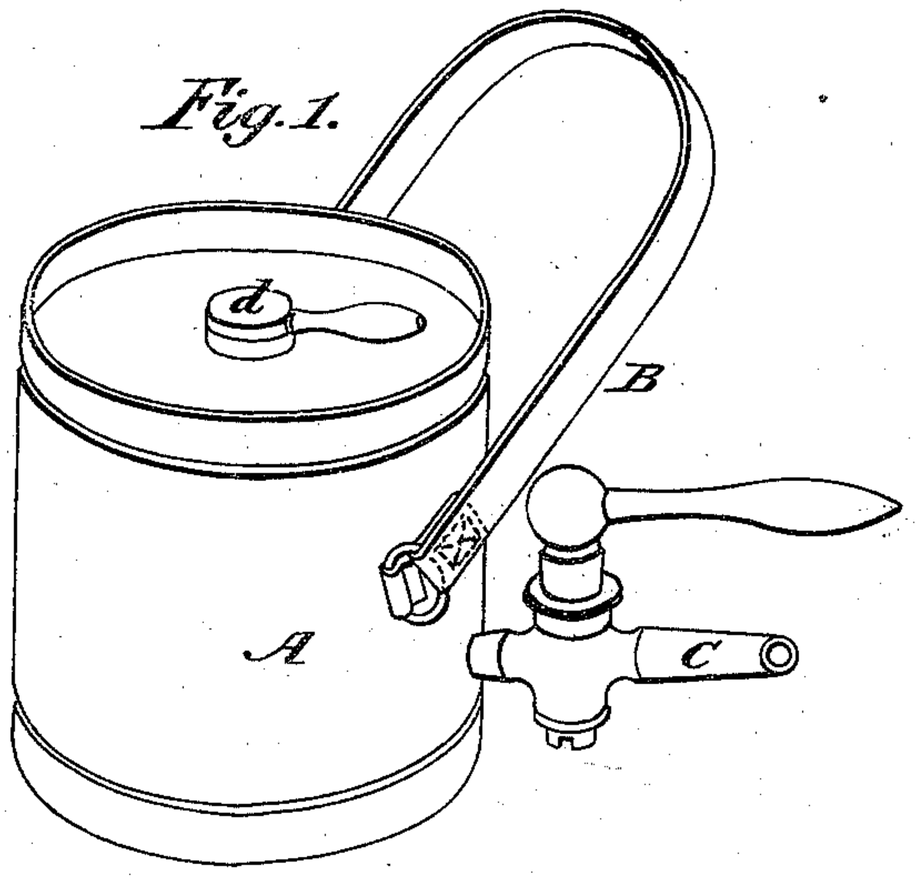
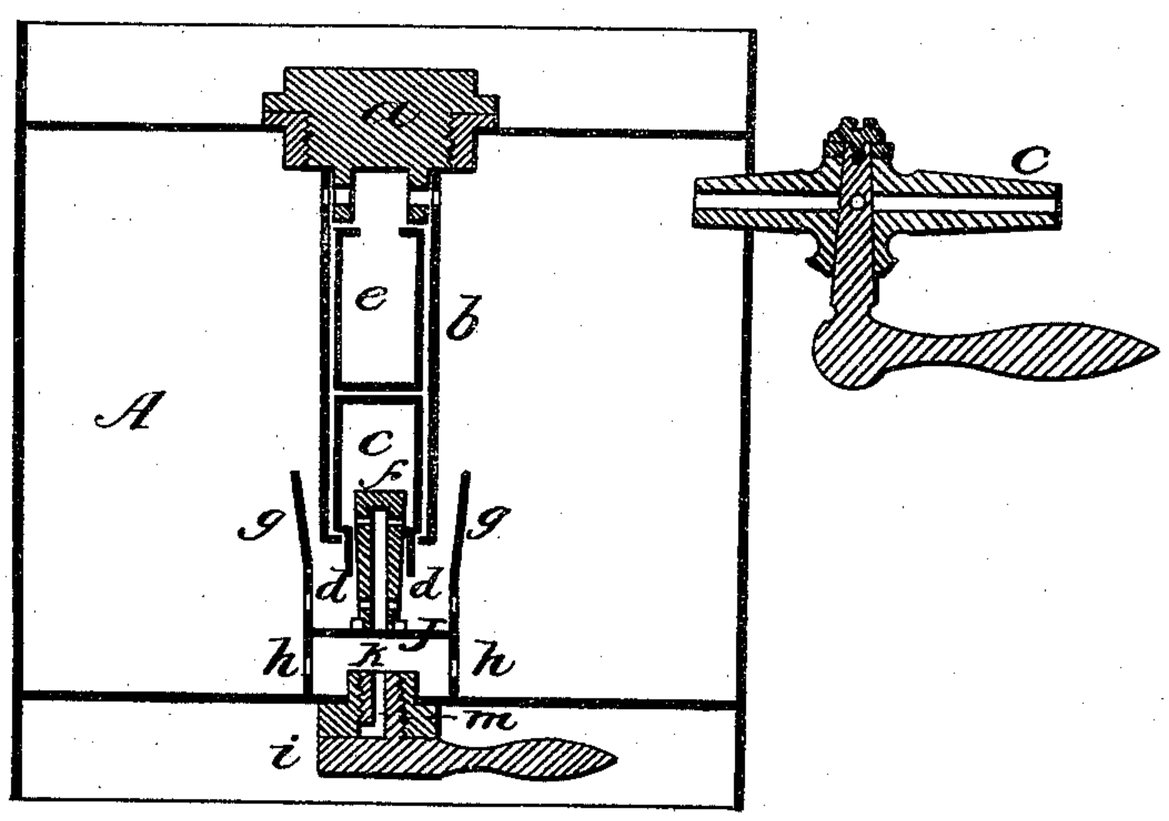


Fig. 2.



Witnesses.

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WILLIAM M. PARKER, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN FIRE-EXTINGUISHERS.

Specification forming part of Letters Patent No. **88,583,** dated April 6, 1869.

Be it known that I, WILLIAM M. PARKER, of the city of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Fire-Extinguisher, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of my apparatus, and Fig. 2 is a vertical central section of the same.

My invention relates to portable chemical fire-extinguishers, in which the expansive force of carbonic-acid gas is employed for expelling aerated water from a closed vessel and throwing it upon the fire.

That water charged with carbonic-acid gas is more effective in extinguishing fire than water not so charged is a well-known chemical fact, which has been practically illustrated and established in this and other countries, mainly by the use of a portable apparatus called a "fire-extinguisher."

In the only apparatus of this kind heretofore manufactured for public sale and use, the ingredients which are relied upon for the production of the carbonic-acid gas employed are brought into contact when the vessel is charged, and the full volume of gas is soon eliminated, creating a pressure of sixty to eighty pounds or more to the square inch.

The apparatus must remain absolutely gas-tight under this pressure until the occasion arises for using it, as the least escape would soon so reduce the small volume required to charge a portable vessel of suitable capacity as to entirely defeat the object of charging it.

It being impracticable to construct apparatus which, especially in the hands of inexperienced persons, can be relied upon to hold gas under such a pressure for a great length of time, the practice is resorted to of constantly watching these charged receptacles and testing them with the pressure-gage, and recharging them more less frequently, according to the amount of leakage, involving a good deal of care, trouble, and expense, and rendering the apparatus of questionable utility.

To obiate the difficulty above named, it has been proposed to keep the ingredients entirely separate until the occasion for using the machine occurs, and then bring them together at once and quickly eliminate the full volume of gas and play upon the fire; but by this plan the great advantage of using aerated water in extinguishing fire is nearly lost. The gas in such a case, by its great buoyancy, is forced into the upper part of the vessel, and but a small proportion of it passes out with the water, and what does pass out is only in a forced mechanical mixture with the water, except a very small volume, which may be quickly dissolved under such circumstances, and it escapes from the stream with great rapidity, so that but a little of it gets more than a few yards from the hose-pipe.

Water chemically dissolves carbonic-acid gas, and will hold in solution more than its own volume at the temperature of 60° Fahrenheit without exerting any pressure upon a closed vessel filled with it. This gas, so dissolved in water, will pass with it any practicable distance without escaping from the stream, and when carried onto a fire it is quickly expanded into several times its previous volume, and, escaping from the water or mingling with its vapor, envelops the burning material with an atmosphere fatal to combustion. But carbonic-acid gas is not at once dissolved by water, except to a very limited extent, even when they are forced into contact in a closed vessel. Several hours' time is required, unless the water is a good deal agitated, as in charging a soda-fountain. Hence the great advantage of this chemical union of the gas with the water in a chemical fire-extinguisher is nearly lost if none of the gas be eliminated until the occasion arises for using the apparatus.

The plan of my invention is, so far as it relates to the above-named points, to eliminate as much gas, or thereabout, when the vessel is first charged, as the water will hold in solution at the lowest temperature to which it is liable to be subjected, and under such slight pressure as can always be controlled with well-made apparatus for any length of time or without any pressure after the gas is dissolved at ordinary temperatures, and allow the apparatus to remain in this condition until it is used, and then, when the occasion occurs, by a simple operation, bring the remaining portions of the ingredients suddenly and

rapidly into contact, and in a few seconds produce whatever pressure is required to throw the water upon the fire, carrying with it the gas previously held by it, and about as much in addition as would be carried if none had been previously eliminated and dissolved.

A, Fig. 1, is a perspective view of the main receptacle, which is made of sheet metal, and of sufficient strength to sustain a pressure of at least one hundred and fifty pounds to the square inch. C is the outlet-cock, to which a suitable hose, terminating in a small jet-pipe, is to be attached. B is a strap, by which the apparatus is suspended upon the left breast and side of the operator, the strap being passed over the head and under the left arm and obliquely across the breast, the main weight being supported upon the right shoulder. The main opening in this vessel is in the center of the bottom end, into which is soldered upon the inside a flanged ring or bush, into which the screw-plug *a*, Fig. 2, is screwed.

The tube *b*, Fig. 2, is open at one end, with a hole in the center of the opposite end. Into this tube is first dropped the acid-vessel *c*, Fig. 2, bottom up, the neck or projection *d d* passing through the hole in the end of the tube. Then into the same tube is put the acid-vessel *e*, the open end up and the bottom resting upon the bottom of acid-vessel *c*. Tube *b* is then attached to an inner extension of screw-plug *a* in such a manner as to be readily detachable.

To the neck of acid-vessel *c* is fitted the tube-plug *f*, which, when drawn out so as to bring up on the inside, serves as a solid stopper to the vessel, but when pushed in allows any liquid contents to flow out, the vessel being bottom up. The collar on the outer end of the stopper is attached after the vessel is passed into the tube.

The socket *g g*, Fig. 2, is attached to the center of the inside of the top end of the main vessel. Between the bottom of this socket and the head of the vessel, to which it is attached, a small space is left to allow the gas, when the machine is used, free access through the holes *h h* to the escape-cock *d*, Fig. 1. The primary object of this socket is to receive and support in position the inner end of the tube *b*.

Sulphuric acid is the cheapest, most abundant, and most reliable acid suitable to be employed in eliminating carbonic-acid gas from the common carbonates.

The acid-vessel in a portable fire-extinguisher should be nearly the length of the main vessel, that it may be as small as possible in diameter, because the smaller the opening in the main vessel the more readily it can be made gas-tight under pressure.

If sulphuric acid or strong solutions of tartaric, oxalic, or other solid acids are used, and are kept unneutralized any great length of time, lead vessels should be employed for holding them. The sides of a lead vessel for such use should be as thin as possible to avoid weight; but a long vessel or tube of thin lead is easily bent out of shape and position.

One object of my invention is to provide for the convenient use of such vessels in a portable fire-extinguisher, which I accomplish by means of the tube *b* and socket *g g*, Fig. 2.

It is obvious that one acid-vessel, with two compartments, may be employed, instead of the two vessels above named, or that the two may be attached to each other at their closed ends.

By means of the bottom or partition *j* of the socket *g g*, the tube-plug in acid-vessel C is pushed in as the screw-plug *a* is screwed down, that the contents of the vessel may flow out.

When a portable chemical fire-extinguisher is charged it is not known whether its use will be required in cold or hot weather, or what will be the temperature of the place in which it will be used, in consequence of the heat of the fire to be extinguished.

The chemical ingredients must be sufficient to produce an ample volume of gas at the lowest temperature to which the contents of the vessel are liable to be reduced when the machine is used; yet a suitable volume of gas at a temperature near the freezing-point of water would be so increased in expansive force in very hot weather, or in a heated room, or in the neighborhood of a hot fire, that the very small jet of water necessarily used would be liable to be broken into spray and mist within a few feet of the jet-pipe.

The expansive force of carbonic-acid gas is more increased by the same increase of temperature than that of atmospheric air or any other permanent gas.

To insure the usefulness of such an apparatus under widely-varying temperatures, with a uniform charge of chemical ingredients, it is essential that the operator should have a ready means of reducing excessive pressure. To meet this requirement the device marked *d*, Fig. 1, is provided. By unscrewing the screw-plug *i k*, Fig. 2, the gas escapes through the passage *m*.

To charge the machine, place it bottom up, unscrew the screw-plug *a*, with the tube and acid-vessels attached. Fill the vessel so full with a solution of the bicarbonate of soda or other carbonate that when the tube and acid-vessels are returned the water will not be quite up to the open end of the upper acid-vessel. If the bicarbonate of soda be used, put in about two and a half ounces to every gallon of water. Without detaching the tube from the screw-plug, hold it upright, with the screw-plug down. Push in the tube-plug of the acid-vessel, now uppermost, until the collar on the end rests on the neck of the vessel. Pour the acid into the tube end of the plug, and it will pass into the vessel through the lateral holes at the bottom of the tube part of the plug. Draw the plug out until it brings up on the inside, for the purpose of tempora-

rily stopping the mouth of the vessel. Insert the tube and detach it from the screw-plug, and pour into the other acid-vessel, now uppermost, the requisite quantity of acid. Attach the tube to the screw-plug and pass it into the vessel, and screw in the screw-plug. When the screw is nearly home the end of the stopper of the lower acid-vessel will strike the bottom of the socket and be pushed in, so that the acid will flow out, and, mingling with the alkaline solution, will eliminate a volume of carbonic-acid gas in exact proportion to the quantity and strength of the acid in the vessel.

The apparatus is to remain bottom up until the occasion for using it occurs, when it is to be inverted, which will allow the acid in the larger vessel to flow out, and produce, with great rapidity, the requisite volume of gas to expel with sufficient force the contents of the vessel. This last charge of acid should be ordinarily about double the amount of the first, and both together should never exceed the amount required to neutralize the carbonate dissolved in the water.

It is obvious that a solid acid can be used in lieu of the liquid acid in the smaller vessel, as herein contemplated, in which case the smaller vessel can be dispensed with, and, a suitable device being provided to keep the larger vessel in position, the solid acid can be put into the lower part of the tube *b* and confined there until dissolved out by contact with the solution through holes made in the body of the tube. A larger tube would be required to meet the case.

Solid acids are more bulky, less reliable, and require more time to effect the same results.

1. I claim so introducing, managing, and controlling the acid employed in charging a portable chemical fire-extinguisher that any required portion of the carbonic-acid gas due to the union of the ingredients used may be eliminated at or about the time of charging, and the remaining portion at any time thereafter, in the manner and by the means herein described, substantially as and for the purpose set forth.

2. I claim introducing the acid employed in charging a portable chemical fire-extinguisher in two separate portions by means of two acid vessels or compartments, so that one portion shall be brought into chemical union with the alkaline solution contained in the main receptacle at the time of charging, automatically, or, by reason of the peculiar construction of the apparatus and the other portion, brought into such union at any time thereafter by the voluntary agency of the operator, substantially as herein described, and for the purposes set forth.

3. I claim, in a portable chemical fire-extinguisher, the use of the socket *g g*, Fig. 2, or its mechanical equivalent, to aid in sustaining in position the acid vessel or vessels employed in the construction and use of the apparatus, and regardless of its use, as herein described, in liberating the contents of the smaller acid-vessel.

4. I claim controlling the pressure of gas in a portable chemical fire-extinguisher by the means herein described, substantially as and for the purposes set forth.

In testimony whereof I have hereunto subscribed my name.

WM. M. PARKER.

Witnesses:

A. B. ELY,

JAS. M. WHITTEMORE.