J. H. CONNELLY.

Fire-Extinguishing Apparatus.

No. 196,632 Patented Oct. 30, 1877.

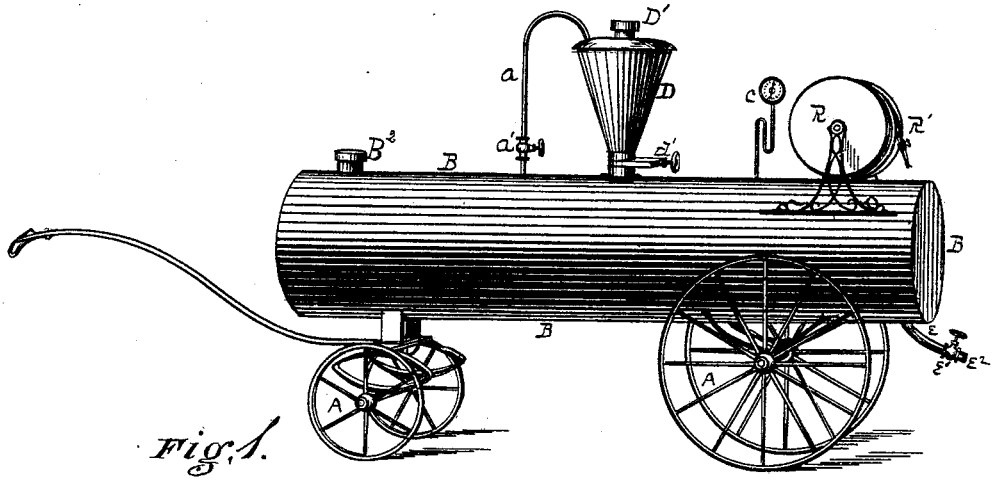

Fig. 1.

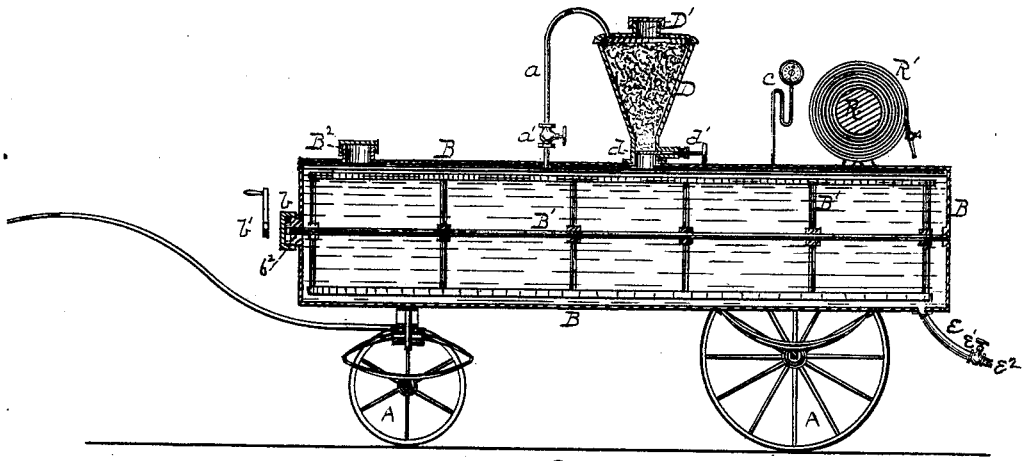

Fig. 2.

Witnesses
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JOSEPH H. CONNELLY, OF NEW BRIGHTON, PENNSYLVANIA.

IMPROVEMENT IN FIRE-EXTINGUISHING APPARATUS.

Specification forming part of Letters Patent No. **196,632**, dated October 30, 1877; application filed May 9, 1877.

To all whom it may concern:

Be it known that I, JOSEPH H. CONNELLY, of New Brighton, county of Beaver, State of Pennsylvania, have invented or discovered a new and useful Improvement in Fire-Extinguishing Apparatus; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a perspective view of my improved apparatus, and Fig. 2 shows a longitudinal vertical section thereof.

My present improvement is designed for use in extinguishing fires by means of a mixture of carbonic-acid gas and water, though other ingredients may be added, such gas being generated within the apparatus itself by the chemical reaction of its contents.

The apparatus employed is more particularly designed to be portable, but may be used in connection with, or as a part of, a stationary apparatus in or near houses or other structures. When used as a part of a portable apparatus, it may be mounted on any suitable truck or carriage, A, or, in its smaller or lighter forms of embodiment, may be carried by the fireman.

It has a water cylinder or chamber, B, made of some considerable capacity and strength, inside of which is a revolving dasher, B^1, properly constructed with reference to being used for agitating the water in the chamber. The dasher-stem projects through a stuffing-nut, *b*, and is covered by the cap b^2, to prevent all leakage, which, however, is removed when the dasher is operated. A crank, b^1, may be provided for working the dasher, as hereinafter described, when it is removed and the cap replaced.

A hole, through which to fill the chamber B with water, is provided, which may be separate, as at B^2, or connect with the opening through D. If a separate opening be used, it is provided with a screw-cap, plug, or valve, for securely closing it.

A charging-hopper is shown at D, which communicates with the chamber B, such communication being opened and closed at pleasure by means of a gate, or other suitable form of valve represented at *d*, the same being operated by a stem, *d'*, or in other convenient way. A supply-hole, D', at the top of the hopper, is opened and closed by means of a screw-cap, as shown, or other equivalent device.

A pipe, *a*, having in the course of its length a stop-cock, *a'*, leads from the top or near the top of the chamber B to a point at or near the top of the hopper D.

A pressure-gage may be added, as shown at *c*; also, a reel, R, on which is rolled the hose R'. A pipe, *e*, leads from the chamber B, for leading off the water and gas to be applied to the fire, and a stop-cock, e^1, and half-coupling or union e^2 are added for the usual purposes.

When charging this apparatus for use, the chamber B is filled nearly full, or to the desired extent, with water through the hole B^2, or equivalent opening, which is then closed securely, as against internal pressure. I then charge into the same chamber, through the hopper D, or in any convenient way, a certain quantity of porous sulphate of aluminum, free from water of crystallization, the quantity used varying, as hereinafter described. The water in the chamber is then agitated by the dasher B^1, as described, until the sulphate of aluminum is wholly or nearly dissolved, or held in solution, which very readily takes place with the ingredient named.

The valve or gate *d* and cock *a'* being closed, so as to cut off all communication with the chamber B, the hopper D is charged with the desired amount of granulated bicarbonate of soda, say about one-half the amount, by measure, of the sulphate of aluminum charged into the chamber B. The cap D' being screwed on, the apparatus is ready for use when required.

On opening the gate *d*, a portion of the bicarbonate of soda in the hopper D will fall into the chamber B, and, uniting chemically with the sulphate of aluminum held in solution, carbonic-acid gas will be rapidly given off. As the quantity of such gas increases, it will, being confined, exert a powerful pressure within the inclosing-chamber. The cock *a'* being opened, such pressure will be communicated to the hopper D on the upper side of its contents, which will not only balance the upward pressure through the gate *d*, but will

also assist in forcing such contents into the chamber B by reason of the increased area of its upper surface.

I prefer, in practice, to use such an amount of the ingredients named as will furnish carbonic-acid gas in sufficient quantity to mix with the water in the chamber B, and give a pressure therein of about one hundred and fifty pounds to the square inch, more or less. The amount required for this purpose will, of course, vary with the size of the chamber and the amount of water contained therein. I prefer, however, to use the ingredients named in about the proportions given—that is, two parts, by measure of sulphate of aluminum to one part, by measure, of bicarbonate of soda; but such proportions may be varied somewhat, and still obtain useful results.

The degree of pressure in the chamber B can, of course, be varied at pleasure; but under ordinary conditions I consider the pressure named desirable.

If, at any time, the gage *c* should indicate the required pressure before all the contents of the hopper D have passed to the chamber B, further increase may, in a measure, be prevented by closing the gate *d* and cock *a'*.

The hose R' being attached to the pipe *e* by means of suitable coupling e^2, and the cock e^1 opened, the pressure within the chamber will force the mingled gas and water out through the hose, by which it may be directed as desired.

This mixture of water and carbonic-acid gas is well known to be very effectual in extinguishing fires, and to possess marked advantages over either used alone, and such mixture is effectually and economically secured by the apparatus and ingredients described. The porous sulphate charged into the chamber B with the water is easily held in solution, and the granulated bicarbonate in the hopper D is well adapted to chemically combine with the sulphate and rapidly give off carbonic-acid gas. The chemical reaction between these ingredients leaves no acid products to injure either the apparatus or articles coming in contact therewith, and this feature I consider a great advantage in favor of the ingredients named.

Other alkaline and effervescing compounds, the chemical equivalents of those given, may be substituted with useful results; but those described I consider the best for the purpose.

Under certain conditions it may be desirable to add to the water in the chamber B muriate of ammonium, or chloride of sodium, or both, in such quantities as to be readily soluble in the water employed. Such salts are not intended to aid in generating gas; but, being held in solution by the water, they coat, as it were, the object upon which the water and gas are thrown, and render such object less inflammable.

When the described apparatus is used for extinguishing fires in closed apartments, as in the holds of ships, oil-tanks, or like places where suffocation is not likely to follow, compounds of sulphur, which, when ignited, form sulphurous fumes, may be thrown onto or into the fire, together with the mingled gas and water; but I make no claim to the use of such compounds alone, nor to the use of mingled gas and water for extinguishing fires, such uses being old in the art.

The ingredients and compounds herein described, as used in my improved apparatus, will form the subject-matter of a separate application.

I claim herein as my invention—

1. In a fire-extinguishing apparatus, the combination of chamber B, having suitable inlet and outlet ports, with dasher B^1, and hopper D opening into such chamber by means of a gate or valve, *d*, substantially as set forth.

2. The combination of chamber B, hopper D, valve *d*, pipe *a*, and cock *a'*, substantially as set forth.

3. The combination of chamber B, dasher B^1, hopper D, valve *d*, pipe *a*, and cock *a'*, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JOSEPH H. CONNELLY.

Witnesses:
J. J. McCORMICK,
CLAUDIUS L. PARKER.