ERS,

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Method of and Apparatus for Extinguishing Fires.

No. 205,942. Patented July 9, 1878.

Fig. 1.

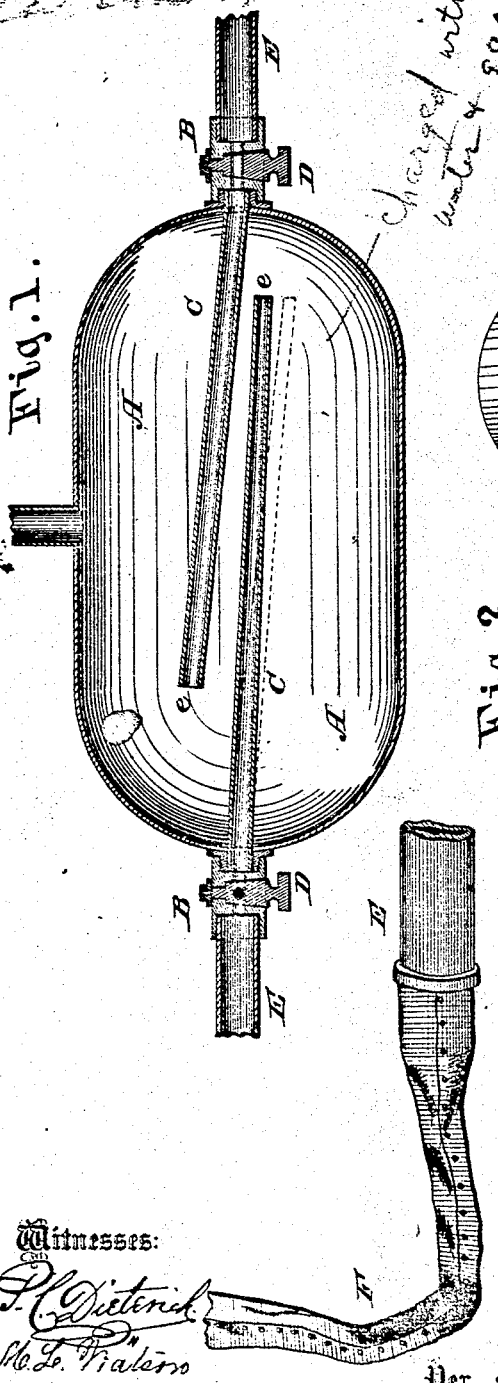

Fig. 2.

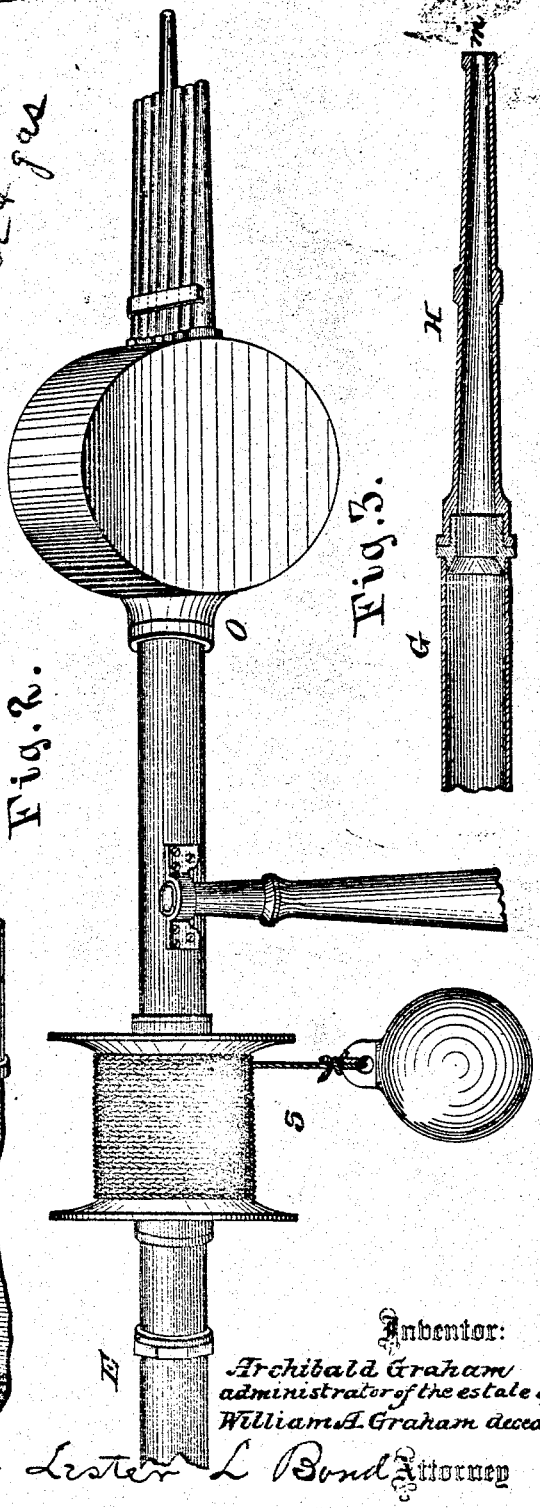

Fig. 3.

Witnesses:

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UNITED STATES PATENT OFFICE.

WM. A. GRAHAM, OF LEXINGTON, VIRGINIA; ARCHIBALD GRAHAM ADMINISTRATOR.

IMPROVEMENT IN METHOD OF AND APPARATUS FOR EXTINGUISHING FIRES.

Specification forming part of Letters Patent No. **205,942**, dated July 9, 1878; application filed December 27, 1851.

To all whom it may concern:

Be it known that I, WILLIAM A. GRAHAM, of Lexington, in the county of Rockbridge and State of Virginia, have made a new invention or discovery, by the application of which carbonic-acid gas, either alone or condensed in water or other fluid, or water highly impregnated or charged with the gas, with the use of suitable apparatus, becomes a new agent for the useful purpose of extinguishing destructive fires, such as houses, ships, boats, railroad-cars, and other combustible property; and that the following is a full, clear, and exact description thereof.

This invention has for its object the extinguishing of fires in a more expeditious and effectual manner than has been attained by means heretofore used; and it consists in the process or method of extinguishing fires by means of a stream or jet of mingled carbonic-acid gas and water; in combining the gas with water under pressure, so that the elastic force of the gas will eject the mixture with a pressure and force sufficient to enable the operator to stand at a distance and direct the stream upon the fire; in so improving the quality of the extinguishing mixture or fluid that a sufficient quantity for service can be stored in a portable shell or case; in combining the improved mixture with a suitable apparatus to make it efficient in its application to the extinguishment of fires, which apparatus may be stationary, mounted on wheels, or be made small and portable; in providing a stationary reservoir or tank with fixed pipes leading through the building; and the application or use of carbonis-acid gas for extinguishing fires under proper circumstances, such as on steamboats, ships, and where goods liable to be injured by water are stored, or where rooms or compartments are so constructed that the gas may be used to expel or vitiate the air.

I will proceed to describe the construction and operation of a machine by which the carbonic-acid gas may be generated, and one among the various modes by which it may be applied to extinguish flame or fires.

In the drawings hereto attached, Figure 1 is a longitudinal section. Fig. 2 is a side elevation of a modified form, and Fig. 3 is a section of a discharging-nozzle.

A indicates the fountain or extinguisher; B, couplings, provided with stop cocks or valves D; C, interior tubes; E, metal tubes for attaching the hose; F, flexible hose; G, metal tube for attaching the nozzle H to the hose; *m*, contracted discharging-orifice, and O fountain-tube. The fountain A, as shown, is a strong cylindrical copper vessel, with hemispherical extremities, and is tinned on the inside; and it is provided with a coupling, B, at each end, with stop-cocks, so that either end or both ends may be used, or it may be made so that it may be used with one, several, or a bundle of hose-tubes. The interior tubes are arranged so that the main body of the water or mixture, when in use, may be discharged from either end, and also to drop down at their udsupported ends *e* when the fountain is used on its side, so that the discharge will continue until the fountain is nearly exhausted. The hose F is made of strong flexible material and of any desired length. The nozzle H has its interior made tapering and smooth, and its discharge-opening *m* is quite small, one twentieth of an inch being sufficient for an eighteen or twenty gallon reservoir. For charging the reservoir shown, the gas is generated in a tub somewhat resembling a churn, in which diluted sulphuric or muriatic acid is placed. On this is luted a small vessel having a stirrer, in which is placed marble powder or dust, or some other carbonate, which is made to pass through the bottom and to gradually fall into the diluted acid, thus generating or liberating carbonic-acid gas. The gas thus generated is conducted to a gasometer, which is an open-mouthed cylinder inverted, set in water, and suspended by a pulley. The gas is taken from the gasometer, and by a condensing-pump is forced into the fountain or reservoir, which has been previously nearly filled with water, until the desired pressure is obtained, which will depend on the strength of the fountain. From five or six to twelve volumes of gas for one of water will, in a strong vessel, give sufficient pressure. The fountains thus charged can be kept for an indefinite length of time, and after remaining charged for some time they will receive an additional charge of gas. When detached the fountain is ready for use

in any emergency as an extinguisher. Its discharge is regulated and controlled by means of a stop-cock, and the stream is directed by means of a flexible tube. Instead of charging the fountain by the means described, the gas may be formed by having a generator in which the materials duly apportioned are placed and connected with a fountain by tubes and stop-cocks.

I have thus described what I deem to be the best arrangement for carrying the principle upon which I proceed into effect; but other arrangements may be resorted to by which the same end may be obtained.

Besides this portable apparatus, there are other ways or methods by which my invention or discovery may be carried into useful operation. Several fountains may be arranged so as to throw their contents into one conduit-pipe. Charged fountains may be mounted on wheels similar to those of common fire-engines. To these may be attached a hose-pipe of a suitable length to carry the extinguishing-fluid to the interior of a building or to any elevator, and there may be a shorter hose-tube and nozzle attached for throwing the mixture upon the outside of the building or in any other direction. Another mode is to have large permanent or fixed reservoirs, with which gas tubes or pipes of any length may be connected, as the extinguishing-fluid may, by its elasticity, be conveyed to any necessary distance by having the hose-tubes or gas-pipes passing by or through each house connected with flexible discharge-pipes. The fluid, when liberated from the great fountain, can be applied at any moment and in any direction. In extinguishing fires, time is money; time is life. Carbonic-acid gas is heavier than air, and when combined with water the mixture has a gravity finely adapted for passing through the air, even when discharged from a fountain small in size, and by the elasticity of the gas it is projected with force and efficiency to a distance, and with a velocity approaching uniformity, and striking the fire or flame with energy and elasticity, the fire or flame is extinguished. The water serves the double purpose of conveying the gas and reducing the temperature, so as to prevent rekindling. The chemical agents or substances which may be employed in generating carbonic-acid gas are numerous, and substances furnishing sulphuric and muriatic acids abound. The application of carbonic-acid gas to the purposes stated gives a new and powerful agent, which may always be at hand for any emergency in the upper story of a house, nor the deck of steamboats, ships, railroad-cars, &c. It has a self-moving power or energy, which, by the elasticity and expansion (when the stop-cock is turned) of the condensed or generating gas, passes rapidly along the hose, whereby a new and useful agent for extinguishing fires is brought into active operation and use. By dissolving salt with the water congelation may be retarded or prevented.

I do not claim to have discovered a new element in nature, nor do I claim to have discovered the abstract principle that carbonic-acid gas will not keep up combustion.

What I claim as new, and desire to secure by Letters Patent, is—

1. The method or process of extinguishing fires by means of a properly-directed stream of mingled carbonic-acid gas and water projected by the pressure or expansive force of the mingled mass from which the stream is derived.

2. The combination of a strong vessel for containing the mixture of carbonic-acid gas and water under pressure with a stop-cock, flexible hose-tube, and a nozzle, substantially as and for the purpose specified.

3. The combination of fixed pipes or tubes, arranged by or through a building, with a stationary or fixed fountain or tank, for forcing mingled carbonic-acid gas and water, by its own elasticity, through such pipes, substantially as specified.

4. An improved method of extinguishing fires, consisting, first, in condensing carbonic-acid gas by artificial pressure or in generation; second, controlling it by a suitable vessel, and, finally, in directing its flow to the desired place, substantially as specified.

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