J. S. HALSEY.

Carbonic Acid Generating Attachment to Fire-Engine Hose.

No. 199,436. Patented Jan. 22, 1878.

Fig. 2.

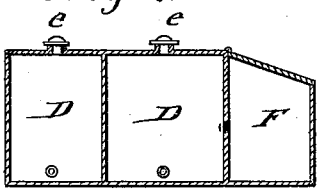


Fig. 1.

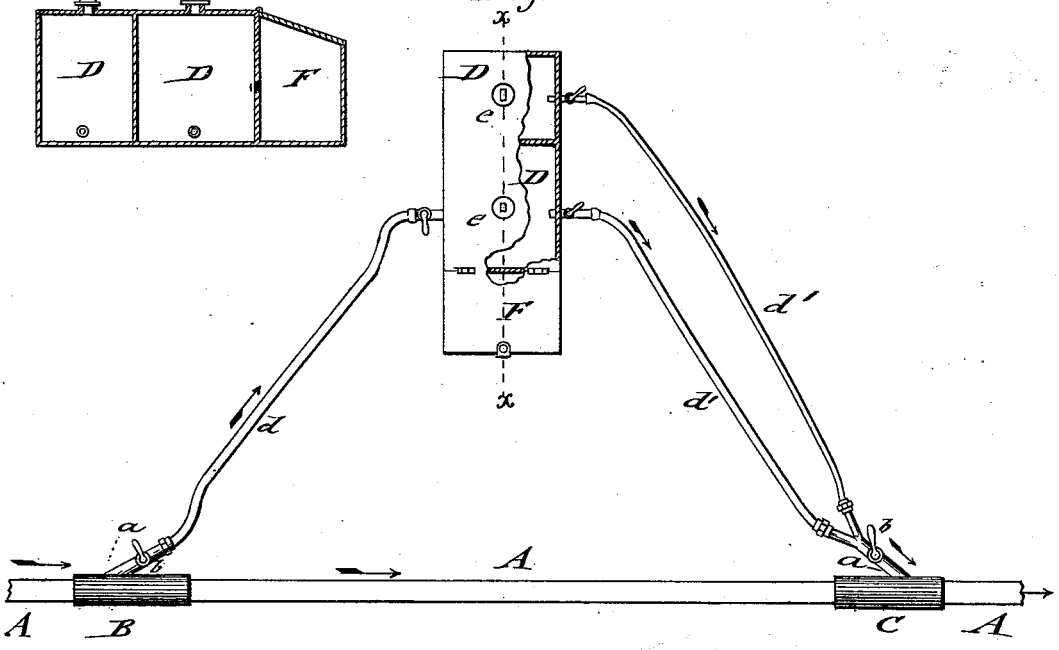
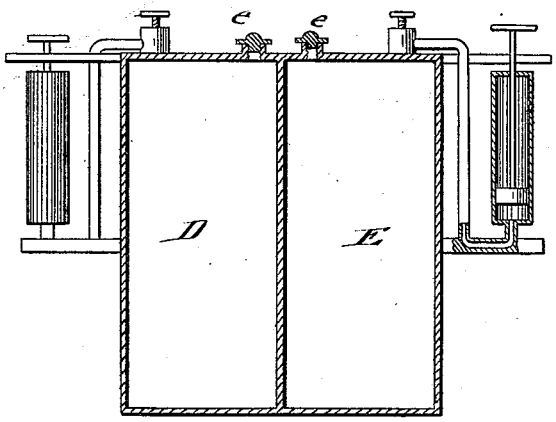


Fig. 3.



WITNESSES:

Henry N. Miller

J. H. Scarborough.

INVENTOR:

J. S. Halsey.

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOSEPH S. HALSEY, OF LEBANON, OHIO.

IMPROVEMENT IN CARBONIC-ACID-GENERATING ATTACHMENTS TO FIRE-ENGINE HOSE.

Specification forming part of Letters Patent No. **199,436**, dated January 22, 1878; application filed November 21, 1877.

To all whom it may concern:

Be it known that I, JOSEPH S. HALSEY, of Lebanon, in the county of Warren and State of Ohio, have invented a new and Improved Carbonic-Acid-Generating Attachment to Fire-Engine Hose, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a plan view of my improved carbonic-acid-generating attachment to the hose of common fire-engines or pumps. Fig. 2 is a vertical transverse section on line *x x*, Fig. 1, of the vessels containing the carbonic-acid-generating chemicals; and Fig. 3 is a vertical section of the vessels on enlarged scale, shown with air-pumps attached thereto.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved attachment for the hose of steam or other fire-engines and pumps, for generating carbonic-acid gas and injecting it into the stream of water in its passage from the engine to the fire.

The attachment is of cheap and simple construction, readily connected to any hose, and is very useful, as it throws with the water a fire-extinguishing gas, that tends to lessen the ravages of fires and to cheapen the means of extinguishing them, the attachment dispensing, to a certain extent, with the expensive chemical fire-engines in use.

The invention consists of the combination, with the hose of a common fire engine or pump, of vessels or receptacles for the carbonic-acid-generating chemicals, and of suitable tubes or pipes, of proportionate cross-sections, that connect the receptacles with sections of the hose, having suitable branch pipes and stop-cocks, so that the gas may be generated at or near the stream of water, and injected into the same, and thrown out therewith under considerable pressure.

In the drawing, A represents the hose, leading from the engine or pump, for conducting the stream of water, and B and C are sections of the hose, having branch pipes *a*, with stop-cocks *b* arranged at acute angles thereto.

D is a vessel or receptacle for sulphuric or other acid, and E a vessel for the solution of bicarbonate of soda or any other carbonic-acid-generating salt. F is an additional receptacle for storing the bicarbonate of soda in bulk, so as to be available in case the supply in the vessel E is exhausted.

The bicarbonate-of-soda vessel E is connected, by a tube or pipe *d*, to the branch pipe *a* of the hose-section B, and also both the acid and solution vessels connected at the opposite side, by separate tubes or hose-connections *d'*, with the branch pipe *a* of the second hose-section, C, which branch pipe is forked again to apply the tubes *d'*.

The hose-connections *d d'* are provided at the points of attachment to the vessels with stop-cocks, to shut off the chemicals until they are required for use. The vessels are also provided with screw-plugs *e*, for inserting the chemicals into each vessel, and arranged either separated from each other or connected and supported at any suitable point on the frame of the engine or other wheeled support.

The attachment is worked as follows: The different hose-sections are first coupled to the branch pipes of the sections B and C, and the stop-cock of the branch pipe *a* of section B turned, so that the water is allowed to pass from the hose A, through the connecting hose or pipe *d*, into the soda-vessel E, into which the soda is poured for being dissolved by the water, the solution being then ready to be acted on by the acid. When the soda-vessel is full the stop-cocks of hose-section *d* are closed.

The proportion of soda should be about one ounce to each gallon of water, and that of sulphuric acid about one gallon to forty-five or fifty gallons of water.

The acid and soda supply is designed to be injected into the stream of water in the main hose, and the hose-connections, with the soda and acid vessels, are therefore made of such cross-sections that the required proportions of acid and soda are obtained. The tube leading from the acid-chamber to the hose is therefore made quite small, the soda-tube or hose-connection larger, and the water-supply or hose to the soda-vessel still larger. When the soda-vessel is filled, as described, the stop-cocks of the vessels and of the forked branch pipe *a* of section C are opened, and the acid and soda solutions are, by hydrostatic pressure—being elevated above the hose—forced through the

connecting tubes or prpes into the short stem of the branch pipe, where their union generates carbonic-acid gas, which, having a great expansive power, will immediately force itself into the passing stream, and, adding to the propelling power, will eject the water under greater pressure than by that of the engine alone. It will also cause more water to be thrown in the same time, for the greater the propelling power the greater the quantity of water thrown. On account of this increase of propelling power the stop-cocks should be only partially opened at first until the whole stream shall have partaken of it, when they may be more fully opened, as desired.

The soda-vessel has to be replenished from time to time by throwing in soda from the storage-receptacle. The quantity required per gallon will be readily ascertained by the firemen, a sufficient quantity of soda and acid being provided to last for a fire of medium duration.

The acid and soda vessels may be arranged with air-pumps, as shown in Fig. 3, for forcing a sufficient quantity of compressed air into each vessel, and secure thereby the injection of a sufficient quantity of carbonic-acid gas into the stream of water.

If the generation of the gas in the short stem of the forked branch pipe of hose-section C cause any back action, so as to lessen the desired flow of acid and soda into the stem, then the pumps may be advantageously used, as the compressed air will unite with the hydraulic pressure and force the gas into the stream.

The apparatus may be readily applied to the hose of any common fire-engine, so as to increase its efficacy, rendering the fire less destructive, and also saving much property from damage by water, as so much less water would be required.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The combination, with hose A, whose sections B C have branches *a*, provided with stop-cocks *b*, arranged at an acute angle thereto, of the vessels D E F and tubes *d d'*, the latter provided with stop-cocks, all substantially as shown and described.

JOSEPH S. HALSEY.

Witnesses:
T. J. HELM,
JONATHAN HARRIS.