

J. H. CONNELLY.
FIRE-EXTINGUISHER.

No. 181,414.

Patented Aug. 22, 1876.

Fig. 1.

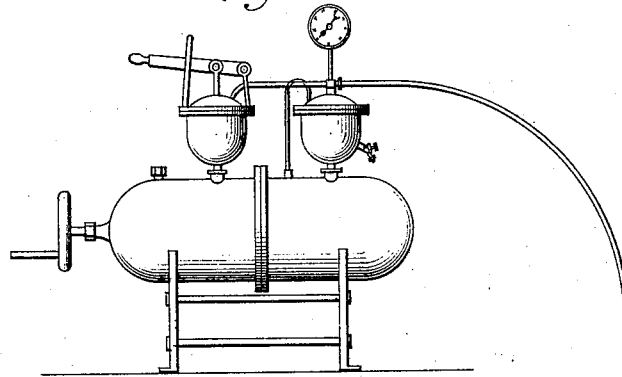


Fig. 2.

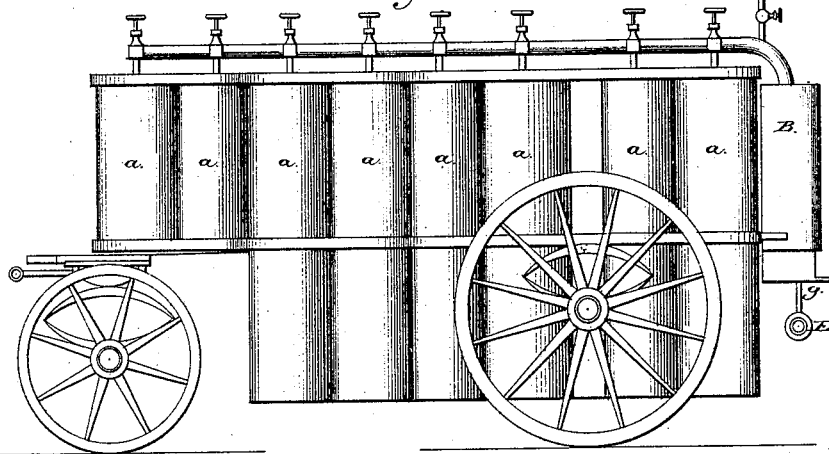
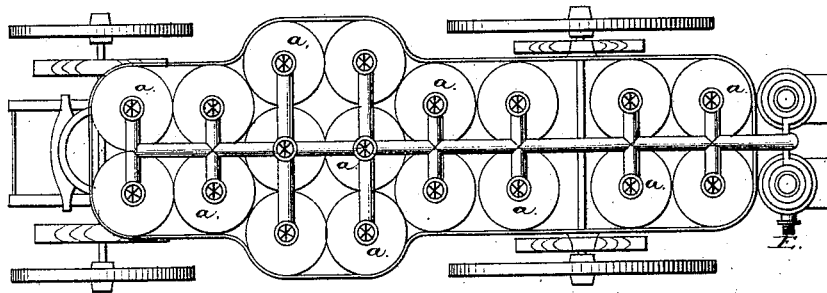


Fig. 3.



Attest:

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Fig. 4.

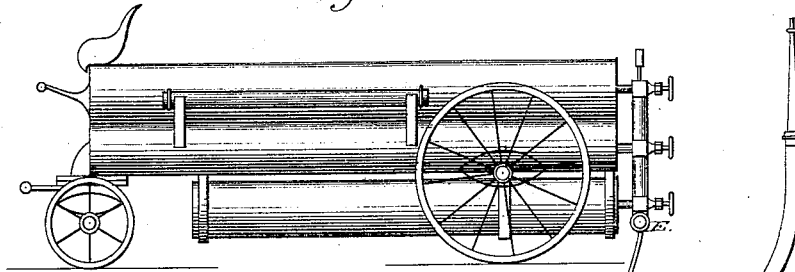


Fig. 5.

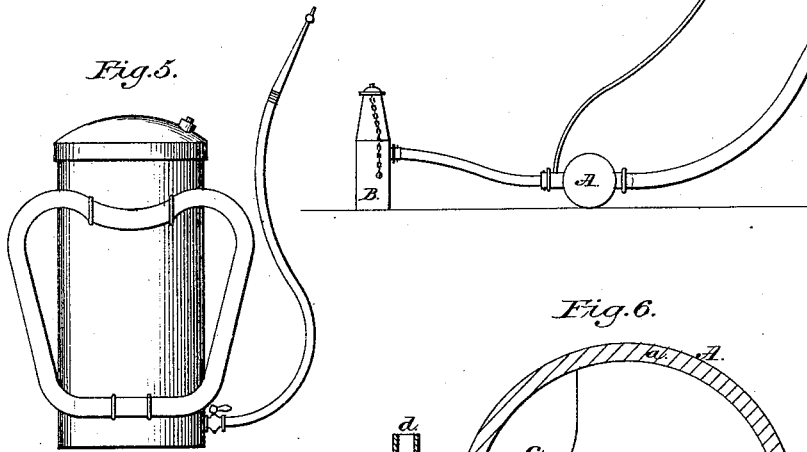
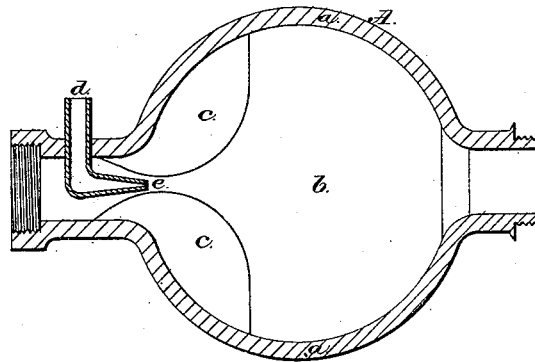


Fig. 6.



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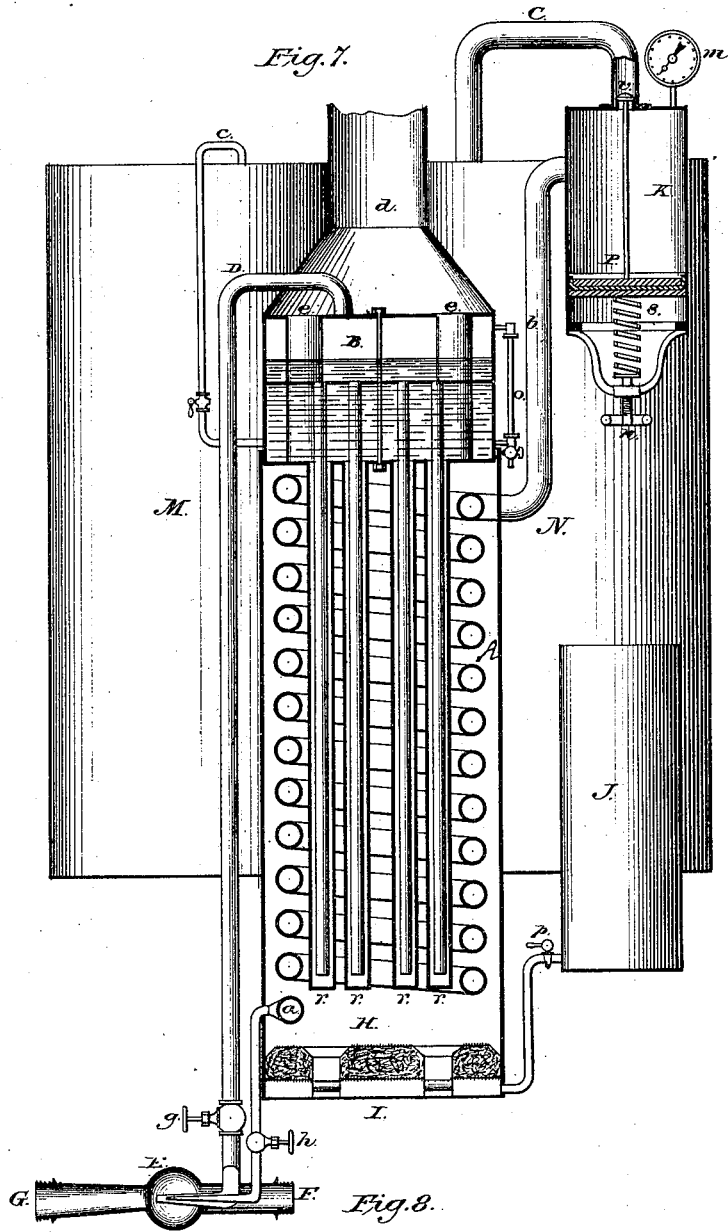
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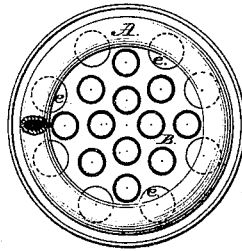
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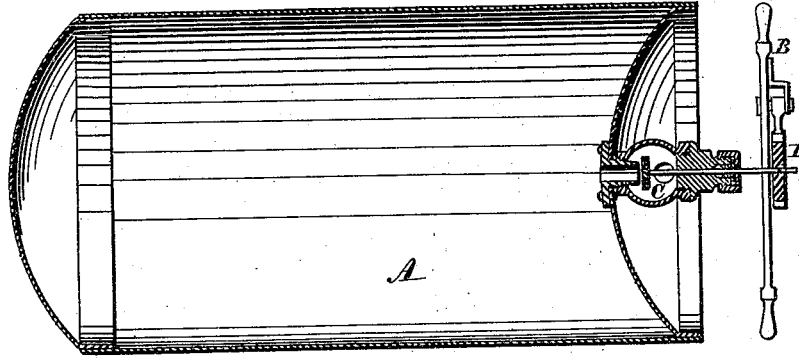


Fig. 9.

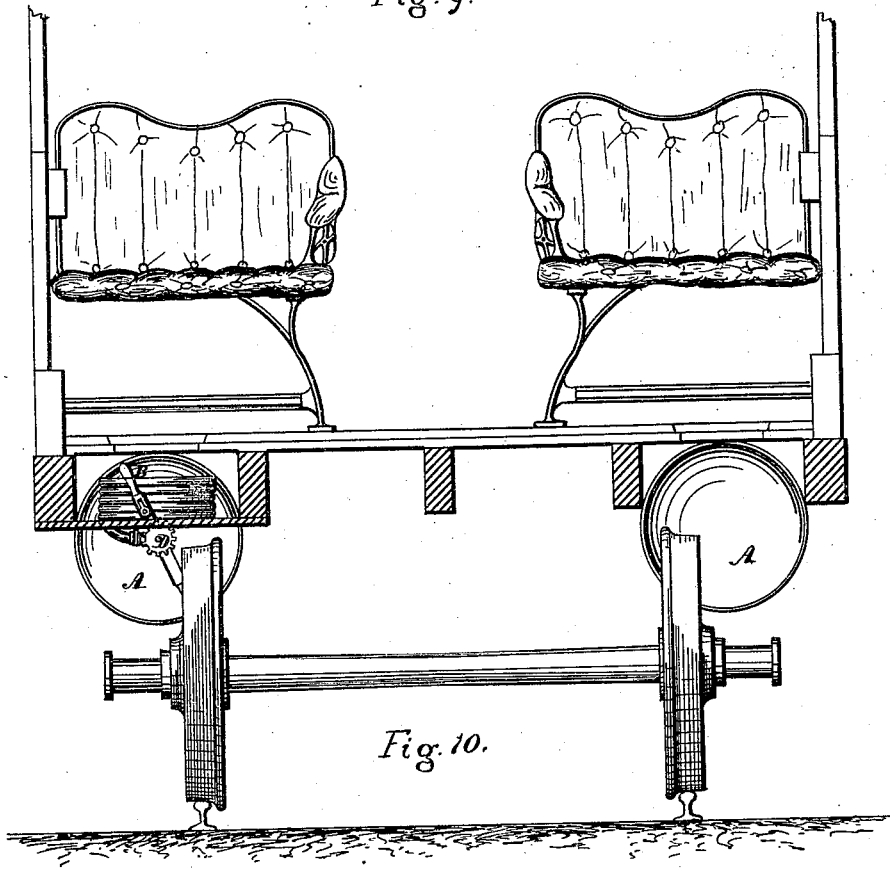


Fig. 10.

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UNITED STATES PATENT OFFICE.

JOSEPH H. CONNELLY, OF NEW BRIGHTON, ASSIGNOR TO JAMES L. HASTINGS AND WILLIAM H. HASTINGS, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN FIRE-EXTINGUISHERS.

Specification forming part of Letters Patent No. 181,414, dated August 22, 1876; application filed June 27, 1876.

To all whom it may concern:

Be it known that I, JOSEPH H. CONNELLY, of New Brighton, county of Beaver, and State of Pennsylvania, have invented a new and useful Improvement in Fire-Extinguishing Apparatus, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

This invention has for its object the instantaneous extinguishing of fire by the use of purified carbonic-acid gas, either by itself or in connection or combination with water. It is an auxiliary to the ordinary steam fire-engine or hydrant facilities now in use, acting not only as a fire-extinguisher, but as a pump for drawing water. It accomplishes the annihilation of fire without that injury to merchandise or other material which may be burning that is caused by the use of the ordinary chemical fire-extinguishing apparatus.

By my present invention the well-known extinguishing properties of carbonic-acid gas are brought into use more easily, more effectively, and on a scale of greater magnitude than has ever heretofore been obtained.

To readily understand the value of my invention, I will allude to the objections made to the use of the ordinary chemical fire-extinguishers, to overcome which will result in great good to the community at large, not only to owners of buildings and insurance companies, but to all persons living in daily fear of destruction of life and property by fire.

The extinguishers heretofore used are, from their manner of construction, necessarily of very limited capacity, and only of value in the incipient stages of a fire.

The materials used, when thrown onto a fire, cause great injury to merchandise, frequently more damage than is caused by water.

There is no existing form of fire-extinguishing apparatus that provides for a perfect commingling of gas and water, so that the extinguishers can be used as an adjunct to, and in connection with, the ordinary water facilities of villages, towns, and cities.

I overcome the objections made and obtain the advantages desired by constructing a fire-extinguishing apparatus, as will be particularly described in specification following, ref-

erence being had to the accompanying drawings.

Figure 1 is an ordinary carbonic-acid-gas generator, with purifier or washer attached, and showing the hose-connection by which the apparatus for fire-extinguishing is filled. This generator may be placed on wheels, and thus easily conveyed from point to point, and used to charge any number of extinguishers.

Fig. 2 represents a fire-engine, side view; Fig. 3, a top view of the same. *a a a*, &c., are vertical tubes or cylinders for holding the gas, made of steel or lap-welded iron, or other suitable material, and may be of any desired size, or any number required. The top view, Fig. 3, shows the connecting-headers, by which the gas may be turned on from any one or any number of the cylinders or reservoirs at one time. *B* is a heater and steam-generator. *B* contains a coil, as shown in top view, Fig. 3, the gas being heated while passing through the coil by a burner placed in the bottom of the heater at *g*, and the heated gas, or heated gas and steam, is brought in contact with the water from hydrant or steam-engine in the hose-coupling, the effect of which is to produce an instantaneous commingling of the gas and water.

Another form of this heating apparatus is more particularly described in Figs. 7 and 8.

Fig. 4 represents an engine with a series of cylindrical reservoirs placed horizontally instead of vertically, as in Fig. 2, with the "header" at the rear end of the machine. Any number of tubes and of any desired capacity may be used. They may be placed in a building in a stationary form, as well as used for street-engines. All these tubes are stored with gas from the generator, Fig. 1. I also show the application of the agitator or coupling, of which a transverse sectional view is shown in Fig. 6.

Fig. 5 represents a small extinguisher easily carried by hand, which may readily be filled from the generator, Fig. 1, the pure gas being stored under pressure, and the extinguisher then placed in some convenient spot ready for instant use on alarm of fire being given.

Fig. 6 represents a transverse sectional view of a coupling and agitator combined, in-

tended to be inserted between any two sections of the delivery-hose of a steam fire-engine and my apparatus, or between the hydrant and my engine, for the purpose of perfectly commingling the gas with the water from the engine. This consists of a shell, *A*, having an enlarged chamber, *b*, and provided with a series of wings, *c*, placed spirally around the interior of the entrance to the enlarged chamber *b*, for the purpose of dividing the water into small particles. *d* represents a pipe for conducting gas into the hose-coupling from the gas-holders. Its operation is shown by reference to Fig. 4. *A* represents the agitator or coupling. *B* is the hydrant, or may be the steam-engine. The water passing through the hose is met at the entrance to the agitating-chamber *b* by a stream of gas issuing from the nozzle *e*. At this point the water is divided by the spiral wings into minute particles, and the gas is perfectly incorporated and commingled with the water.

Fig. 7 represents another form of gas-heater and steam-generator attached to the engine than that shown in Fig. 2.

Fig. 8 is a bottom view of same and coil *A*, the use of which is as hereafter described. This device makes a perfect and instantaneous commingling of gas and water, and also operates as a siphon-pump, by which water may be drawn from hydrants, wells, or any source where the hydrant-pressure is not in use.

M, Fig. 7, represents a reservoir of water under a gas-pressure. *N* is a reservoir of gas. *K* is an equalizer; *A*, a coil for heating the gas; *B*, a steam-generator with tubes *r r r r*; *H*, a furnace; *I*, burner for burning oil or other fuel; *J*, reservoir for oil; *E*, siphon-pump, *F* being suction, and *G* discharge.

The action is as follows: The boiler *B* is about two-thirds full of water. Fire is ignited in the furnace, which generates steam in the tubes *r r r r*, and also expands the gas in the coil *A*. When a sufficient pressure of steam is generated, the valve *g* is opened, which admits steam, by means of the pipe *D*, to the siphon-pump *E*, causing a vacuum. This being connected with a water-supply, the water rushes in to fill the vacuum, and the inertia of the water carries it on past the opening of the steam-nozzle. The valve *h* is opened, which admits a supply of gas from the coil *A* by means of pipe *a*. This gas also contracts on coming in contact with the water, and adds additional force to the stream, and mingles with it, and the commingled water and gas pass out together at the discharge *G* into the delivery-hose.

The object of the equalizer *K* is to keep the gas in the coil below a certain pressure. For instance, if it is desired to carry (100) one hundred pounds pressure, the spring *s* may be set, by means of the screw and handle *n*, so that as soon as the pressure in *K* reaches one hundred pounds the valve *v* will close, on account of the pressure on the piston *P*, which is connected with the valve *v* by means of the

stem or rod *n*. When the pressure in *K* goes below one hundred pounds, the spring raises the valve, and admits a fresh supply through the pipe *C*, and thus the pressure is kept practically uniform. *b* shows the pipe connecting equalizer *K* with coil *A*. *o* represents a glass water-gage, to show the height of water in *B*. *d* represents uptake and smoke-pipe. *c* represents a pipe leading from water-reservoir *M* to water-space in steam-generator. When it is desired to feed water into generator, the cock in pipe *c* is opened, and the pressure in reservoir *M* being greater than pressure in *B*, the water is forced into *B*. *m* represents a pressure-gage on equalizer, and there is also supposed to be one on steam-generator.

Figs. 9 and 10 show the application of my apparatus to passenger or freight cars.

Frequently great loss of life and property occurs by the destruction of cars by fire, especially in case of accident by which the cars are overturned, and ready access cannot be had.

A, Figs. 9 and 10, represents receivers for gas and water, placed beneath the floor of a car; *B*, handle to turn on contents of *A*; *C*, valve; *D*, wheel on valve.

Two gas and water receivers are applied to each car in the most convenient positions, preferably at the inside end of each truck, and on opposite sides. Each of these receivers is fitted with a valve and coil of hose. The valve may be opened from above through a trap in the floor of the car, or from underneath the car. The coil of hose is placed on a shelf between the bottom of the floor-timbers and the car-floor, and immediately under the trap-door, so that it may be reached either from above or below. The receivers are fitted inside with a short piece of flexible tube, which is weighted on the loose end, and the other communicates with the valves, so that no matter what position the car may be in, the hose and valve will discharge the entire contents of the receiver, or such portion of the contents as may be required, by simply opening or shutting the valve.

These receivers may be made twenty inches in diameter and three feet long, or, if preferable, of a smaller diameter, and a suitably-increased length, to enable them to carry about thirty gallons of water when about one-half full. This amount of water will admit of putting over one hundred and fifty cubic feet of gas into the receiver, besides the water itself.

The pressure of the gas discharges the water, and at the same time commingles with it, and both are conveyed to the fire together. These receivers can be made of any suitable material; but I prefer homogeneous steel, staggered, double-riveted, and soldered. They are to be suspended under the car to the floor-timbers by means of iron straps and bolts. They weigh complete, when charged ready for use, about three hundred and seventy-five pounds. They can be charged at any designated station by means of a generator similar

to Fig. 1, one of which will be sufficient to charge all the cars on a road. The capacity of these receivers is equal in effectiveness to about twenty times the same volume of water, which is absolute protection. It can also be used effectively for the cooling of hot boxes on railroads, it being in this respect an entirely novel application. This apparatus of mine can also be applied to steamships, sailing-vessels, canal-boats, and other river and ocean craft. A generator, Fig. 1, and a set of receivers of any form or plan desired, can be placed in some locality easy of access, and by hose-connections at convenient intervals the gas, in case of fire, can be used on any part of the ship, or can be applied by any mechanical device at every point. Pipes may be placed between each deck, running around the sides of the ship, which pipes should be perforated, so as to admit of the gas being injected into the hold, and when a fire occurs in the hold of a ship, gas can be thrown in from all sides and the fire instantly annihilated. This application of my apparatus is not only perfectly adapted to steamships carrying great numbers of passengers, but to all ships having valuable cargoes, particularly to vessels loaded with cotton and oil.

Having described the character of my invention, I wish it to be understood that I in no way limit myself to the precise arrangement and form of apparatus; nor do I limit

myself exclusively to the use of carbonic-acid gas, my apparatus being as well designed for the use of sulphurous-acid gas, which is also effectual in the annihilation of fire.

I claim as my invention—

1. The combination of generator, Fig. 1, with purifier, the series of mounted holders and the heating apparatus attached, substantially as and for the purposes described.

2. In a fire-extinguishing apparatus, an agitator or mixing-chamber and hose-coupling combined, Fig. 6, consisting of shell A, mixing-chamber *b*, spiral wings *c*, an ejector-nozzle, *e*, substantially as described, and for the purposes set forth.

3. The within-described method of expanding carbonic-acid gas by heat, and then contracting its volume by bringing it in contact with the water-supply, whereby a perfect commingling of gas and water is made more quickly and economically than by any other known method, and without the necessity of the agitation of the water and gas, as heretofore used.

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

JOSEPH H. CONNELLY.

Witnesses:

J. H. TAYLOR,
CHAS. E. BROOKS.