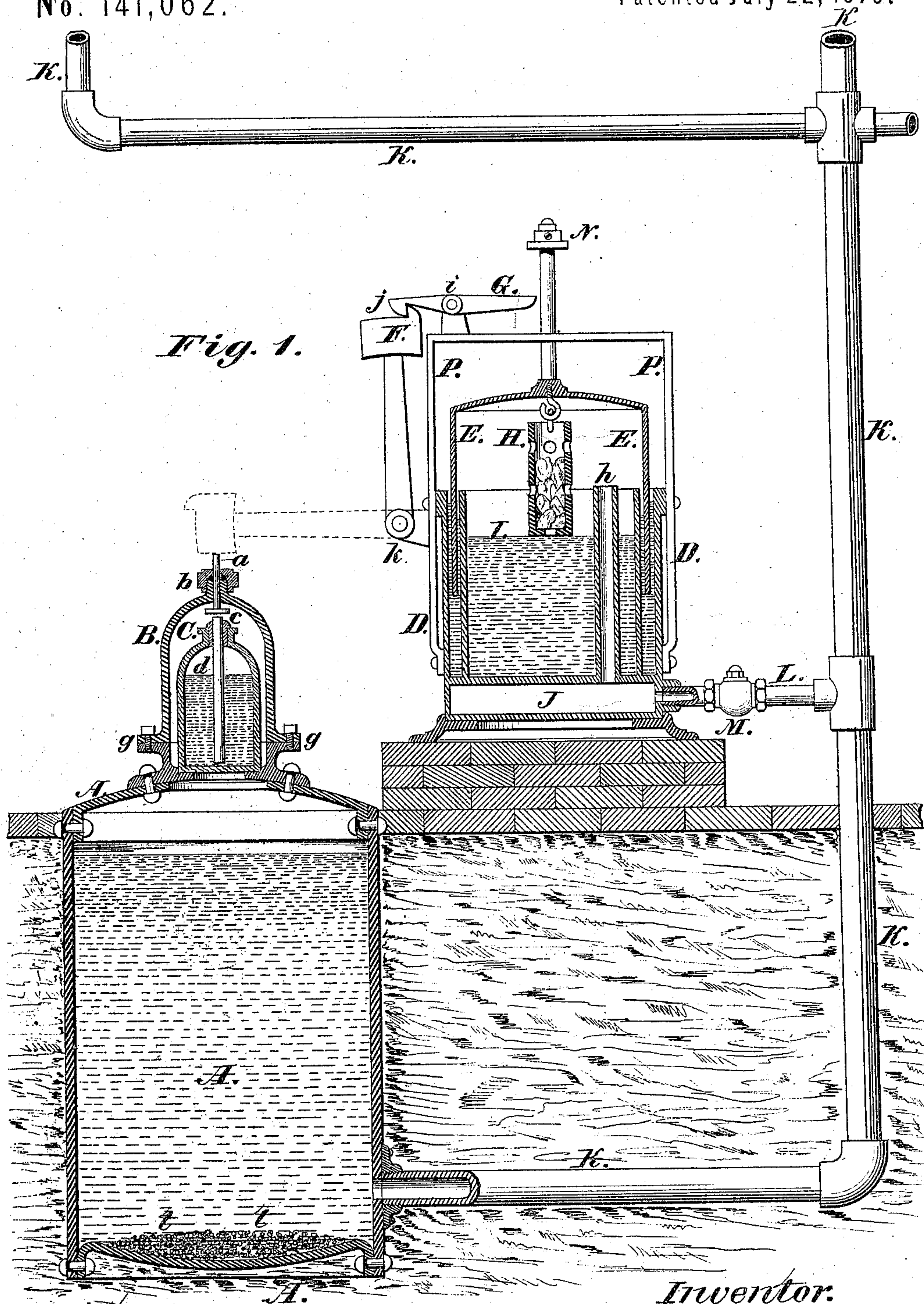


H. S. MAXIM.  
Fire-Extinguishers.

No. 141,062.

Patented July 22, 1873.



Witnesses.

A. T. Welch  
G. A. Bagley

Inventor.

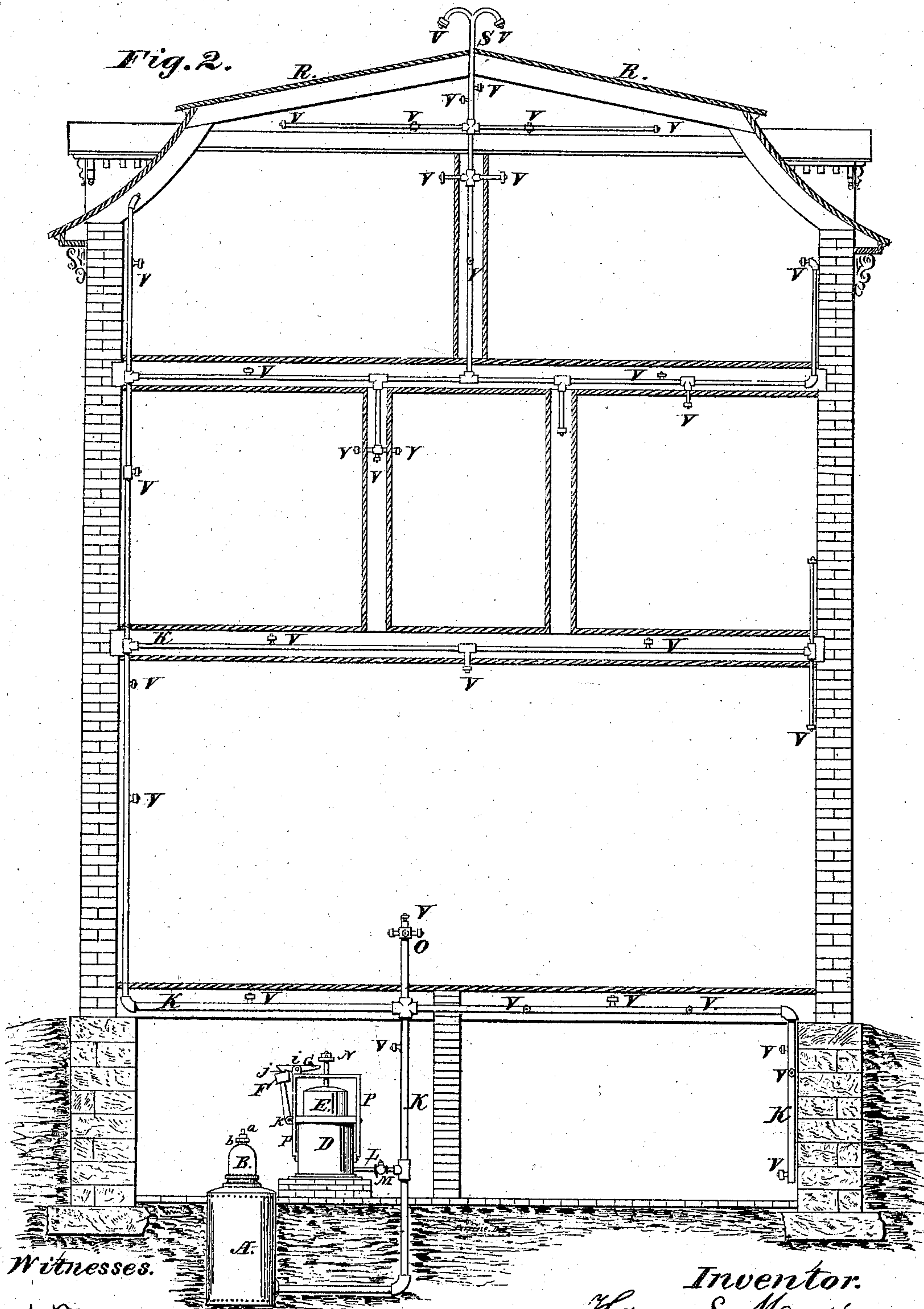
Sam S. Maxim.



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# UNITED STATES PATENT OFFICE.

HIRAM S. MAXIM, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN FIRE-EXTINGUISHERS.

Specification forming part of Letters Patent No. **141,062**, dated July 22, 1873; application filed March 14, 1873.

*To all whom it may concern:*

Be it known that I, HIRAM S. MAXIM, of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Fire-Extinguishers, of which the following is a specification:

My invention relates to a new and improved apparatus for detecting and extinguishing fires, especially adapted for protecting large buildings, ships, and steamboats. My invention relates to a system of pipes for conveying carbonic-acid gas or other fluid that will act to extinguish fire. My invention consists in a tell-tale apparatus that maintains a given pressure in the system of pipes, under ordinary circumstances, compensating for slight leaks, &c., but which, when the pressure is suddenly lessened by a cap or cover being opened by the action of the heat, sets in motion the carbonic-acid generator, or gives an alarm, or both. The second feature of my improvement consists in a peculiarly-constructed generator for producing carbonic-acid gas.

This invention becomes an automatic fire-detector and extinguisher, arranged and constructed in such a manner that on the breaking out or commencement of a fire it detects its existence and locality and instantly applies the extinguishing agent to the exact spot, thus quenching the fire in its incipency and causing no damage in rooms or places where the heat of the fire does not reach.

Figure 1 is a vertical central section of an apparatus embodying and exhibiting a part of my invention. Fig. 2 is a side elevation of the same, showing the apparatus as placed in the cellar of a house; also, exhibiting the pipes for conveying the gas and water into the various parts of the house and onto the roof, to protect said roof from neighboring fires.

A A is a tank constructed of metal and of sufficient strength to resist the internal pressure. It is filled nearly full of a solution of bicarbonate or supercarbonate of soda in water; and I prefer, also, to place marble dust (carbonate of lime) in the bottom, as shown at *l l*, Fig. 1. B is a dome, which can be removed from its place to charge the tank A and replace the bottle C, screw-bolts *g g* being provided for that purpose. C is a glass bottle containing sulphuric acid sufficient in quantity to set

free the carbonic-acid gas contained in the solution in tank A A. D is a tank, shown sectionally in Fig. 1, having an outer annulus filled with any non-freezing and non-evaporating liquid, like oil or glycerine, while the space in the center is filled with dilute sulphuric acid. E E is a gas-holder, provided with a guide to keep it central and also allow it to rise up or fall down freely. It is also provided with a shell or basket, H, which is suspended from a hook in the center or otherwise supported. This shell or basket contains chips or pieces of carbonate of lime or similar material. F is a hammer, working freely on pivot *k* and sustained in nearly a vertical position by the hook *j*. G is a lever, its fulcrum being at *i*. It is provided with a hook, *j*, which holds the hammer, as shown in Fig. 1. J is a space under the tank D, communicating with the gas-holder E E through the tube *h* and with the pipes K K K through the tube L and check-valve M. K K K are the distributing-pipes for conveying the gas and water from tank A A to the various parts of the building or buildings to be protected. N is an adjustable flange secured to the central guide or rod of gas-holder E E with a set-screw, as shown in Fig. 1. P P is a frame secured strongly to the sides of the tank D. It is provided with lugs, upon which are pivoted the lever G and hammer F. It is also the support to the guide-rod of gas-holder E E. R R, Fig. 2, is the roof of the building protected. S is a sprinkler for sprinkling gas and water on roof R R. The ends of pipes K are fitted with nozzles or plugs having easily-fusible caps V on their ends, and, if desired, a cord of gun-cotton may be interposed between the caps and nozzles to aid in removing said caps when subjected to heat.

The operation of this apparatus is as follows: The tank A A being filled nearly full of an aqueous solution of carbonate of soda, a bottle or carboy of sulphuric acid is placed in the dome B with the rod *d* projecting from the neck through the rubber stopper *c*, its lower end resting on the glass bottom of bottle C, as shown in Fig. 1, and the dome B bolted or screwed firmly down and made air-tight at the joint *g g*. The sliding rod *a* will now rest on the rod *d*. The tank D being charged with



dilute sulphuric acid and some chips of carbonate of lime being placed in the shell H, the hammer F being raised and secured in nearly an upright position by the hook j, and all the plugs and caps properly adjusted, the whole apparatus is now ready for use.

My object in having sulphuric acid and carbonate of lime in the tank D and holder E E, as shown in Fig. 1, is to keep the pipes constantly filled with carbonic-acid gas, and to keep the holder E E full and ready for use. This part of the apparatus is not designed so much to aid in extinguishing the fire as it is to be the agent or tell-tale, which, on the occurrence of a fire, and a vent being made in any of the pipes K K K, to fall and unhook the hammer, which breaks the bottle C, and so precipitates the acid contained therein into the solution of carbonate of soda contained in the tank A A.

When the whole apparatus is set and adjusted properly, should a fire occur in any part of the building or buildings protected, the heat of such fire will soon soften or melt the nearest cap or its retaining material, explode the gun-cotton, if that also is used, and thus open a clear vent. The carbonic-acid gas will now flow out of the pipes K K K faster than the small amount of carbonate of lime in the gas-holder can supply it. The gas-holder E E will fall until the flange N reaches the lever G and presses it down, disengaging the hammer F. When the hammer falls it strikes the rod a, which is driven down through the air-tight packing-nut b with sufficient force to drive the rod d through the bottom of the acid-bottle C, when the contents of said bottle will fall into the solution in tank A A. This instantly disengages carbonic-acid gas and forces the water and gas into the pipes K K K, and discharges it, in a spray of great extinguishing power, into the room where the fire itself has opened the vent. Thus the fire is made to be the agent which sets this extinguisher in operation.

The many advantages of this arrangement are obvious.

I have shown at O, Fig. 2, a suitable connection to attach hose to. When hose are used with this apparatus all that has to be done to set it in operation is to open a cock or valve, and as soon as the pressure in the pipes is relieved the water and gas issue at once much quicker than any fire-pump could be put in operation.

When this apparatus is used on shipboard a flexible diaphragm, and not a gas-holder, should be used; or the automatic attachment might be dispensed with altogether, using only the tank A A.

With the pipes, plugs, and caps, a blow with a hand-hammer on the rod d will break the acid-bottle and precipitate the acid into the tank A A instantly.

The check-valve M in pipe L opens from the tank D into the pipe K, thus allowing the

gas to flow freely out of the space J into said pipe; but when the pressure is greater in pipe K than in space J said valve closes, and no gas or water can escape from pipe K into space J.

I do not confine myself to any particular style or kind of a carbonic-acid-gas generator. Any of the well-known devices will operate in connection with my other devices.

If preferred, a tipping or dumping sulphuric-acid vessel may be used instead of a glass bottle, and the hammer F be employed to upset, tip over, or dump the acid in said vessel.

When the tank A A is made of iron, or any other substance acted on by sulphuric acid, it should have a small quantity of (carbonate of lime) marble-dust placed in the bottom, as shown at l l, Fig. 1. Thus, when the acid, by its greater specific gravity, descends in a body through the solution in tank A A, it falls, and is neutralized by the lime after disengaging the carbonic-acid gas in said lime.

This invention may be used to protect a large number of buildings when said buildings are situated near together, each building having its own internal protecting-pipes, and all connected, with suitable mains, to a single extinguisher.

An alarm may be actuated by the hammer F, either alone or in connection with the carbonic-acid-gas generator.

When the buildings comprising a town, city, or village are protected from fire with extinguishers of this kind a suitable electric telegraph may be attached to each extinguisher, and connected with wires in such a manner that, on the occurrence of a fire and the falling of the hammer F, it would set a suitable apparatus in motion, which would telegraph or signal the locality of such fire to the police head-quarters or elsewhere.

I claim as my invention—

1. The combination, with a system of pipes, of a generator of gas to keep the pipes constantly filled, and automatic mechanism to produce an alarm or set in operation the extinguishing apparatus when one of the nozzles is opened, substantially as set forth.

2. The combination of tank D and gas-holder E, in which gas is generated and retained, with the main generator A and pipes K, substantially as described.

3. The combination of acid-vessel C, hammer F, and hook j, tripping-lever G, operating in connection with holder E E and flange N, substantially as and for the purpose hereinbefore set forth.

4. The combination of foraminous shell H, or its equivalent, tank D, check-valve M, chamber J, gas-holder, and distributing-pipes, substantially as and for the purpose described.

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Witnesses:

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