

(No Model.)

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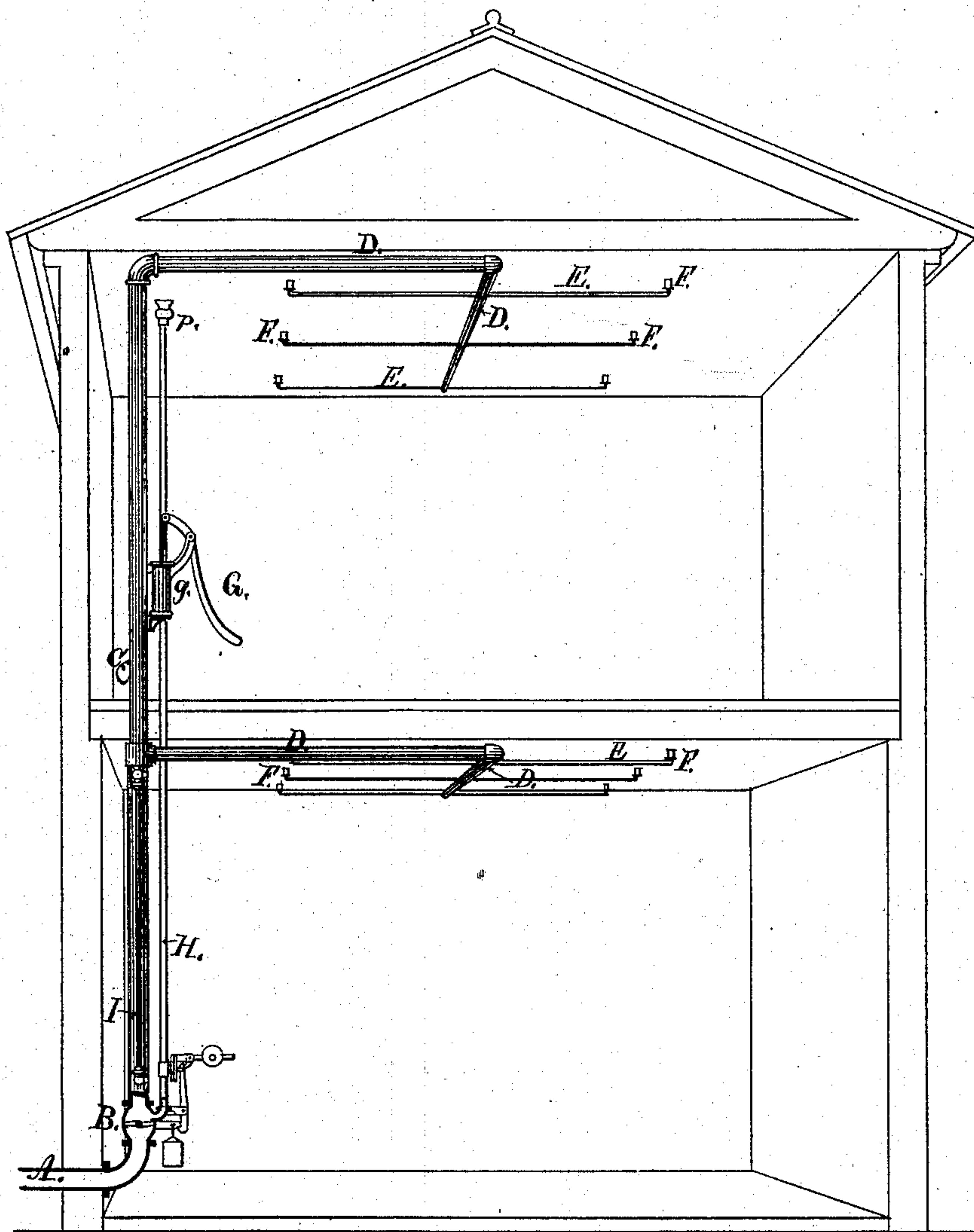
F. GRINNELL.

AUTOMATIC FIRE EXTINGUISHER.

No. 249,171.

Patented Nov. 8, 1881.

Fig. 1 .



WITNESSES:

Joseph A. Miller Jr
Wm. L. Coops.

INVENTOR:

Frederick Grinnell
by Joseph A. Miller
atty

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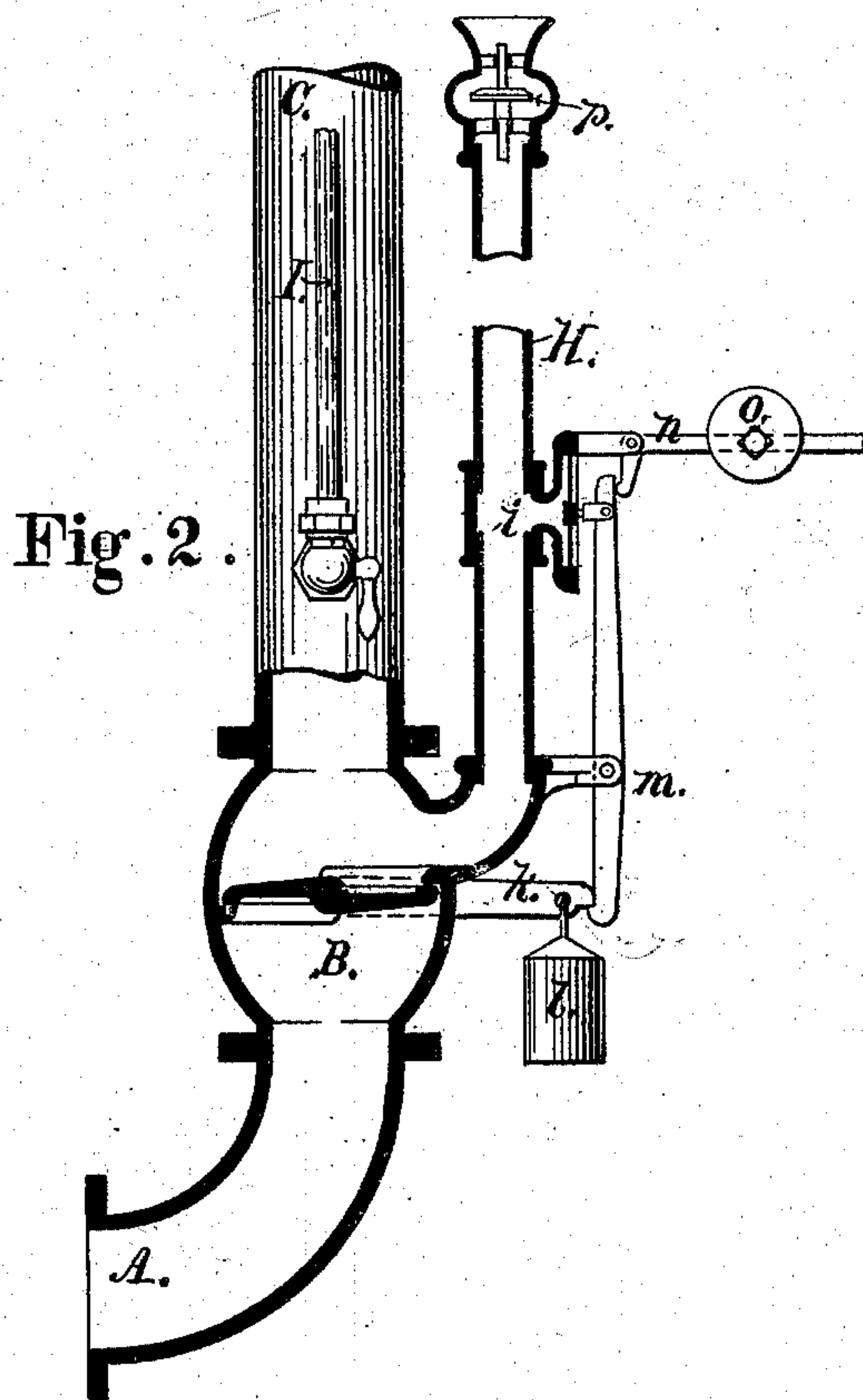
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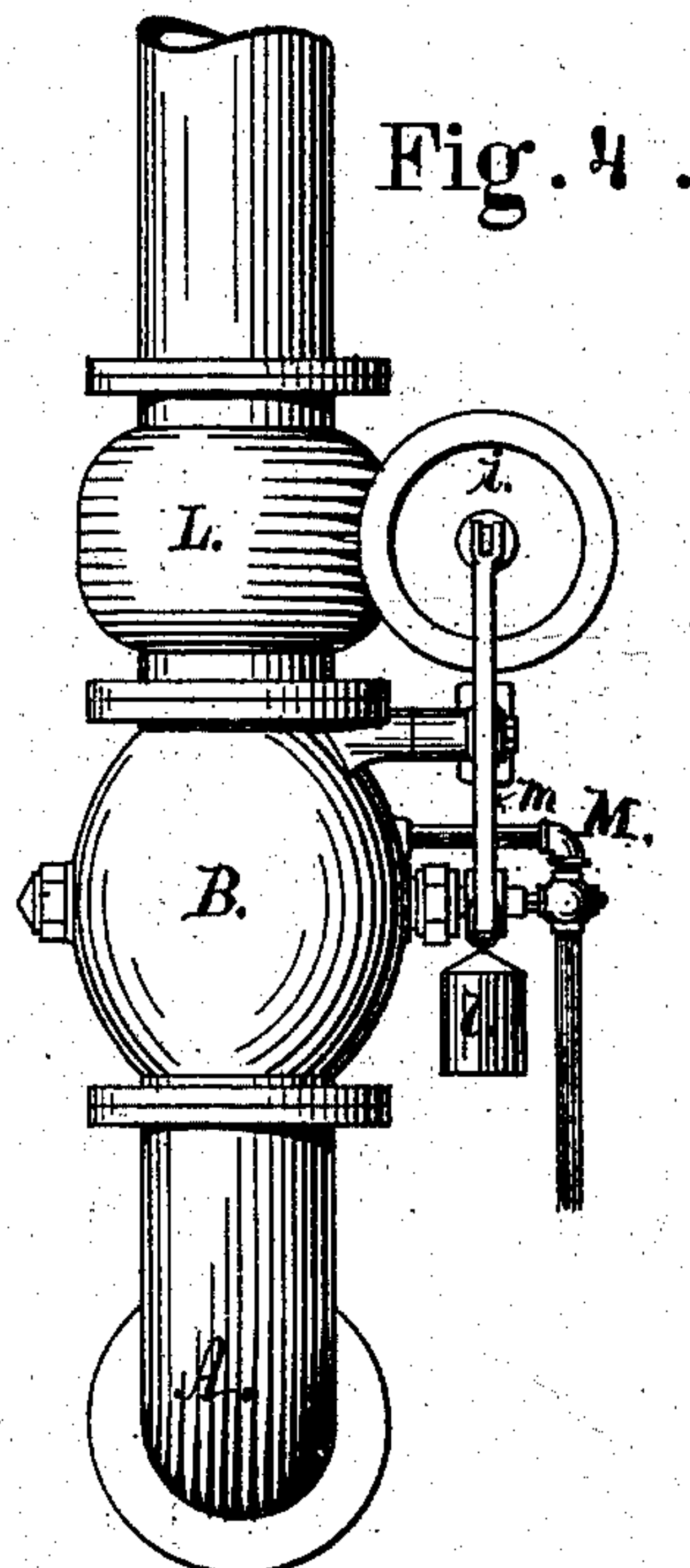
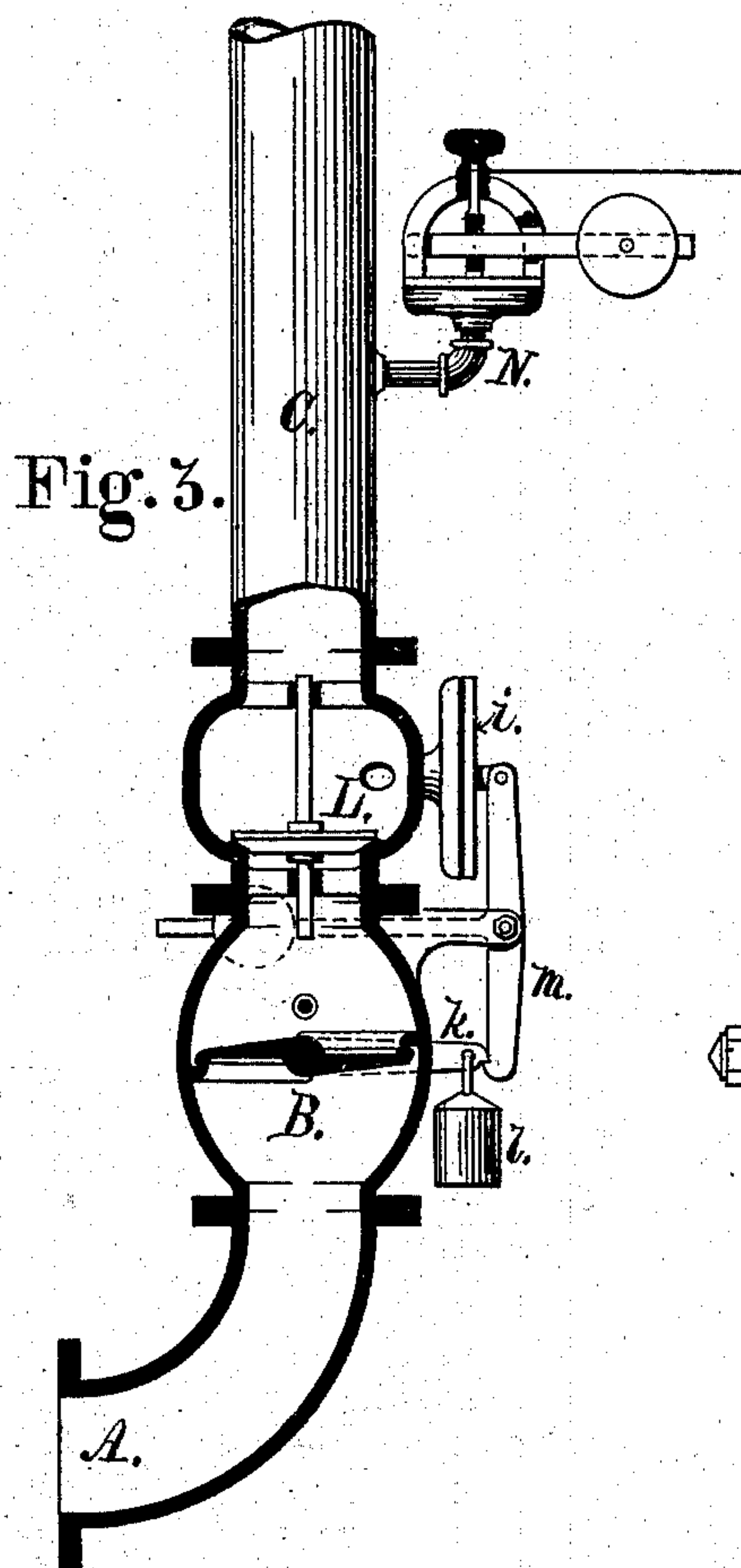
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UNITED STATES PATENT OFFICE.

FREDERICK GRINNELL, OF PROVIDENCE, RHODE ISLAND.

AUTOMATIC FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 249,171, dated November 8, 1881.

Application filed April 18, 1881. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK GRINNELL, of the city and county of Providence and State of Rhode Island, have invented a new and useful Improvement in Automatic Fire-Extinguishers; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to an improvement in systems for the protection of buildings against accidental fires, in which pipes are distributed over the building, connected with a water-supply under pressure, and provided with distributors constructed to be opened by the action of heat on a metal fusible at a low temperature, so that when a fire breaks out the water-supply will be let onto the building and the water thrown on the fire.

The invention consists in devices by means of which the water is let into the pipes only when one or more of the distributors have been opened by a fire, so that an air-pressure less than the water-pressure is maintained in the system of pipes, and the straining on the pipes is prevented, as will be more fully set forth hereinafter.

Figure 1 is a perspective view of a building protected by my improved system of automatic fire-extinguishers. Fig. 2 is a view, partly in section, of the main water-supply pipe, the valve controlling the water-supply, the stand-pipe, and the device by means of which the water-supply is opened when a fire breaks out. Fig. 3 is a view, partly in section, of the main water-supply pipe, the valve controlling the water-supply, a check-valve above the main valve, and the device by means of which the water-supply is opened when a fire breaks out and the alarm is released. Fig. 4 is a view of the water-main, the valve controlling the water-supply, the check-valve and device for operating the water-supply valve. A drip-pipe is also shown connected with the main between the main valve and check-valve, so that any water leaking through the main valve may be drawn off without disturbing the air-pressure in the system of pipes.

Similar letters of reference indicate corresponding parts.

In the application of automatic fire-extinguishers to buildings it becomes desirable to exclude the water from the system of pipes, as they are liable to leak, and when exposed to cold liable to freeze. In most cases it is desirable, and in some cases necessary, to fill the system with air under pressure, but is difficult to maintain a high air-pressure in the pipes, and when the water-supply is furnished from a high head or is maintained at a high pressure the difficulty to counterbalance this high water-pressure by a higher air-pressure in an extended system of pipes becomes very great. By my present invention this difficulty is overcome, and the pressure in the system of pipes may be very much less than the water-pressure.

In the drawings, A is the water-supply main. B represents a balanced or other valve constructed to control the water-supply and to be opened automatically by means substantially such as described hereinafter.

C is the rising main. D D are the horizontal mains.

E are the branch pipes, on the ends of which the distributors F F are secured. These distributors are constructed on any of the various forms which open the water-supply automatically when by a fire the temperature of the room rises beyond a fixed degree.

G is the air-pump, by which, when the valve B is closed, the air is pumped into the system of pipes until the desired pressure is reached.

To control the water-supply valve, and also to give an alarm in case of fire, the stand-pipe H is connected with the rising main C, the height of the stand-pipe H being such that a column of water in the stand-pipe will counterbalance the pressure of air in the system of pipes. The stand-pipe is therefore filled, or partially filled, with water. Connected with the stand-pipe H is the chamber I, provided with a diaphragm, and connected with the valve B is the arm K, on the end of which is the weight L. The size of the weight L depends on the construction of the valve and the pressure of the water; but it must be sufficient to open the valve with certainty when it is released, so as to act by gravitation.

M is a lever, hinged to a fixed pivot, and provided at its lower end with a catch or hook, by

means of which it supports the end of the lever *k* and with it the weight *l*. The upper end bears against the diaphragm of the chamber *i*, and is pressed outward by the pressure of the column of water above the diaphragm.

Supported on a pivot is the bell-crank lever *n*, the longer arm of which is provided with the adjustable weight *o*, and the short arm bears against the upper end of the lever *m*, pressing against the diaphragm. If, now, the pressure of the air in the system of pipes is equal to a column of water twenty feet high, and the weight *o* will counterbalance a column of water ten feet high, the pressure of air may vary fifty per cent. without affecting the devices. The column of water will sink in the stand-pipe *H* and rise in the main *C*. To show that such a change has taken place the glass water-gage *I* is attached to the rising main *C*, and as soon as the water is shown above the desired point more air must be pumped into the system of pipes, so as to re-establish the desired pressure. When, however, one or more of the distributors are opened, the pressure is at once released, the water in the stand-pipe *H* is lowered beyond the limit to which the weight *o* is set, and forces the upper end of the lever *m* inward and the lower end outward, disengaging the lever *k*. The weight *l* now descends and opens the valve *B*, allowing the water to enter the system of pipes and be discharged from the open distributors only on the fire.

To prevent the discharge of water from the stand-pipe *H* a check-valve, *p*, is placed into the upper end of the pipe.

Any kind of alarm may be connected with the weight *l* to be set in motion. When the weight descends a bell-ringing device may be disengaged, the valve of a steam or air whistle may be opened, or an electric alarm may be operated to make or break a circuit.

Figs. 3 and 4 represent a modification of the system heretofore described, the stand-pipe being dispensed with, and a check-valve, *L*, placed above or beyond the main valve, so that any desired air-pressure may be maintained in the system beyond the main valve, and to allow of the withdrawing from time to time of any water that may leak through the main valve. The drip-pipe *M* is connected with the main between the valve *B* and the check-valve *L*. This drip-pipe may be provided with a valve or cock; or, if small, it may be left open.

N is the device for releasing the alarm. It consists in a diaphragm which, by the pressure of air in the system supports a pin, on which a button is placed, from which a cord or wire extends to an alarm. A weighted arm or lever is connected with the pin, and when the

pressure in the system decreases the diaphragm is depressed, the pin withdrawn from the button, and the alarm released.

By either of the arrangements shown the air-pressure in the system of pipes may be much less than the pressure of the water in the supply-mains.

I do not wish to confine myself to these particular devices shown, as they may be modified or others substituted therefor to gain the same end of maintaining an air-pressure in the system less than the water-pressure in the mains and automatically open the water-supply when one or more of the distributors are opened.

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

1. The combination, substantially as before set forth, of the water-supply main, the distributing main or mains filled with compressed air at a pressure less than that of the water in the supply-main, a valve for cutting off the water from the distributing-mains, and substantially such means as described for controlling said valve by the air in the distributing-mains.

2. The combination, with a system of automatic fire-extinguishers, of the stand-pipe *H*, constructed to contain a column of water arranged to counterbalance the air in the system of pipes, as described.

3. The combination, with the main *A*, rising main *C*, pipes *D* and *E*, and distributors *F*, of the stand-pipe *H*, valve *B*, and means, substantially as described, by which the water-supply is controlled and the air maintained under a pressure less than the water-pressure, as described.

4. The combination, with the system of pipes, the water-supply pipe, and a valve interposed between the water and the air in the system, of the air-pump *G*, the stand-pipe *H*, and the water-gage *I*, constructed to maintain air in the system until a fire breaks out and automatically supply the water, as described.

5. In a system for extinguishing fire automatically, the combination, with the water-supply main and the distributing-mains provided with a distributor constructed to open automatically and filled with compressed air of less pressure than the water-pressure, of a valve interposed between the water and the air, as described.

In witness whereof I have hereunto set my hand.

FREDERICK GRINNELL.

Witnesses:

WM. L. COOK,

J. A. MILLER, Jr.