

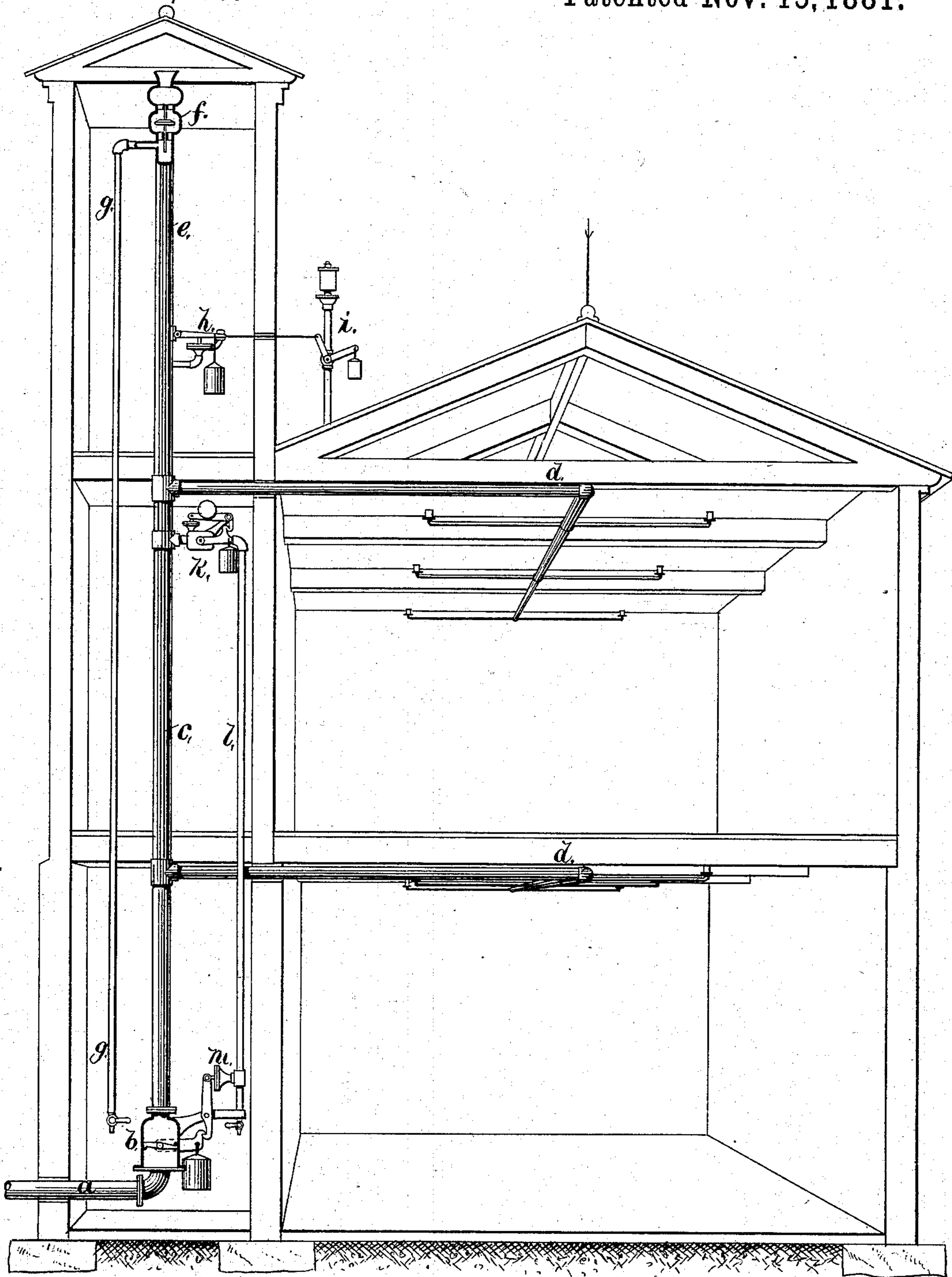
(No Model.)

F. GRINNELL.

AUTOMATIC FIRE EXTINGUISHER.

No. 249,466.

Patented Nov. 15, 1881.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

FREDERICK GRINNELL, OF PROVIDENCE, RHODE ISLAND.

## AUTOMATIC FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 249,466, dated November 15, 1881.

Application filed March 9, 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 drawing, forming part of this specification.

This invention has reference to an improvement in a system of pipes distributed through a building and provided with distributors constructed to be opened, so as to discharge water or other fluids automatically on the breaking out of a fire.

In a system for protecting a building against accidental fires by means of pipes connected with a water - supply and distributors, which are opened automatically on the breaking out of the fire, it is of the highest importance to give timely notice by an alarm that a fire has broken out, and also that such an alarm shall be absolutely reliable. It is also important to have the whole system of pipes at all times filled with water, so as to have every distributor ready for action at any time. To prevent wear, strains, and leakage, it is important that the system of pipes shall not be subjected to varying pressure and not to any pressure higher than that due to the height of the column of water in the pipes.

The invention consists in providing a system of automatic fire - extinguishers with a stand-pipe extending above the distributors of the upper story, and connecting with the same a device for operating an alarm, as also a device for opening the water - supply, as will be more fully set forth hereinafter.

The drawing represents the interior of a building, in perspective, showing the water-supply main, a balance - valve for closing the water-supply, the stand - pipe, the devices for operating the supply-valve and the alarm; also showing the distributing-pipes and automatic extinguishers.

In the drawing, *a* is the water - supply pipe; *b*, a balance-valve, controlling the water-supply; *c*, the rising main; *d d*, the distributing-pipes; *f*, a check-valve; *g*, an overflow - pipe; *h*, a device consisting of a chamber the interior of which is connected with the stand-pipe,

and which is provided with a diaphragm on which rests a weighted lever, the end of which retains a button, from which a wire extends to the valve of the steam-whistle *i*. As soon as the pressure in the stand - pipe is reduced the lever will sink with the diaphragm, the button will be released, and the alarm will be sounded.

The device *h* may be connected with a striking mechanism or any other alarm which can be operated by the release of the button or the motion of the lever.

*k* is a device consisting of a small butterfly-valve similar to valve *b*, having a weighted lever, which rests in a catch forming the short end of the lever, the long end of which is secured to a diaphragm supported by the pressure of water in the pipe *c*. As soon as the pressure diminishes, the arm of the butterfly-valve is released, the valve opened by the weight, and water enters the pipe *l*, the weight of which, operating on the diaphragm *m*, releases the main valve and turns on the water supply in the same manner as is more fully shown and described in Patent No. 231,711, granted to me August 31, 1880, for improvement in automatic fire-extinguishers, to which reference is made here.

The operations of this device are as follows: Water is let into the system of pipes until it flows over by the overflow-pipe *g*, and, as it is necessary to maintain the water in the stand-pipe on a level with the overflow, a small by-pass pipe should connect the supply - main *a* with the rising main *c*. This by-pass pipe should be provided with a cock or valve, so that a small quantity of water can be supplied from time to time or a very small stream be allowed to flow constantly through the same to maintain the level in the stand-pipe and the small surplus be allowed to waste through the overflow-pipe *g*. By maintaining a constant level or head of water in the stand-pipe—say ten feet above the diaphragm of the device *h*—a pressure of nearly five pounds per square inch is maintained on the diaphragm, and, if the diaphragm is loaded with a weight nearly balancing the column of water, any diminution of the column will allow the diaphragm to sink or yield, and allow the lever to release the alarm. The stand-pipe materially contributes to the prompt action of this alarm, for when only one



of the distributors is opened the quantity of water discharged will be drawn from the stand-pipe so rapidly that the pressure on the diaphragm will be reduced several pounds per square inch in a second or two and the operation of the alarm secured. The same rapid reduction of the head in the stand-pipe, and consequent rapid diminution of the pressure, operates on the whole length of the rising main, and, in fact, on the whole system, and no matter where the device *k* is located, it will be quickly and certainly operated by this great decrease in pressure, as the alarm device, and therefore the main valve, will be as promptly released, and the full supply of water turned on. When the main valve is opened the rush of water under the higher pressure will close the check-valve *f*, and the full pressure will be maintained on the pipes.

By this improvement a small quantity of water produces a fixed and high pressure, which is almost instantly reduced when one or more distributors are opened, and the alarm, as well as the supply-valve, is opened by a greater change in pressure than was heretofore possible. The open outlet of the stand-pipe allows of the discharge of most of the air from the system of pipes when they are filled with water. As the same water is maintained in the pipes, any reliable anti-freezing mixture can be mixed with the water and the freezing of the pipes prevented in winter. The water-supply being shut off by means of the main valve *b*, and the stand-pipe being open on the top, the pressure in the pipes is only that due to the head in the stand-pipe, which is always a constant quantity until the same is rapidly diminished by the discharge of any one or more of the distributors. The pipes are not subjected to any sudden variation in pressure caused by water-

hammer, or other causes outside of the system. In a system of automatic fire-extinguishers where large values depend for protection on the prompt and reliable action of the alarm and the water supply these advantages are of the highest importance.

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 a system of pipes supplied with automatic fire-extinguishers normally filled with water, but shut off from the pressure of the main, and a stand-pipe above the upper system of extinguishers to maintain a uniform pressure of water in the pipes as long as no extinguisher opens.

2. The combination, substantially as before set forth, of a system of pipes supplied with automatic fire-extinguishers normally filled with water, but shut off from the pressure of the main, a stand-pipe above the upper system of extinguishers to maintain a uniform pressure of water in the pipes as long as no extinguisher opens, and a check-valve at the top of the stand-pipe.

3. The combination, with a system of automatic fire-extinguishers, of the stand-pipe *e*, provided with the check-valve *f* and overflow *g*, as described.

4. The combination, with a system of automatic fire-extinguishers, of an alarm operated by a device releasing the alarm by the diminution of pressure, and a stand-pipe extending above the system, constructed to rapidly diminish the pressure and operate the alarm, as described.

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Witnesses:

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