2 Sheets—Sheet 1.

S. S. NEWTON.

EXTINGUISHING FIRES IN BUILDINGS.

No. 171,305. Patented Dec. 21, 1875.

Fig. 2.

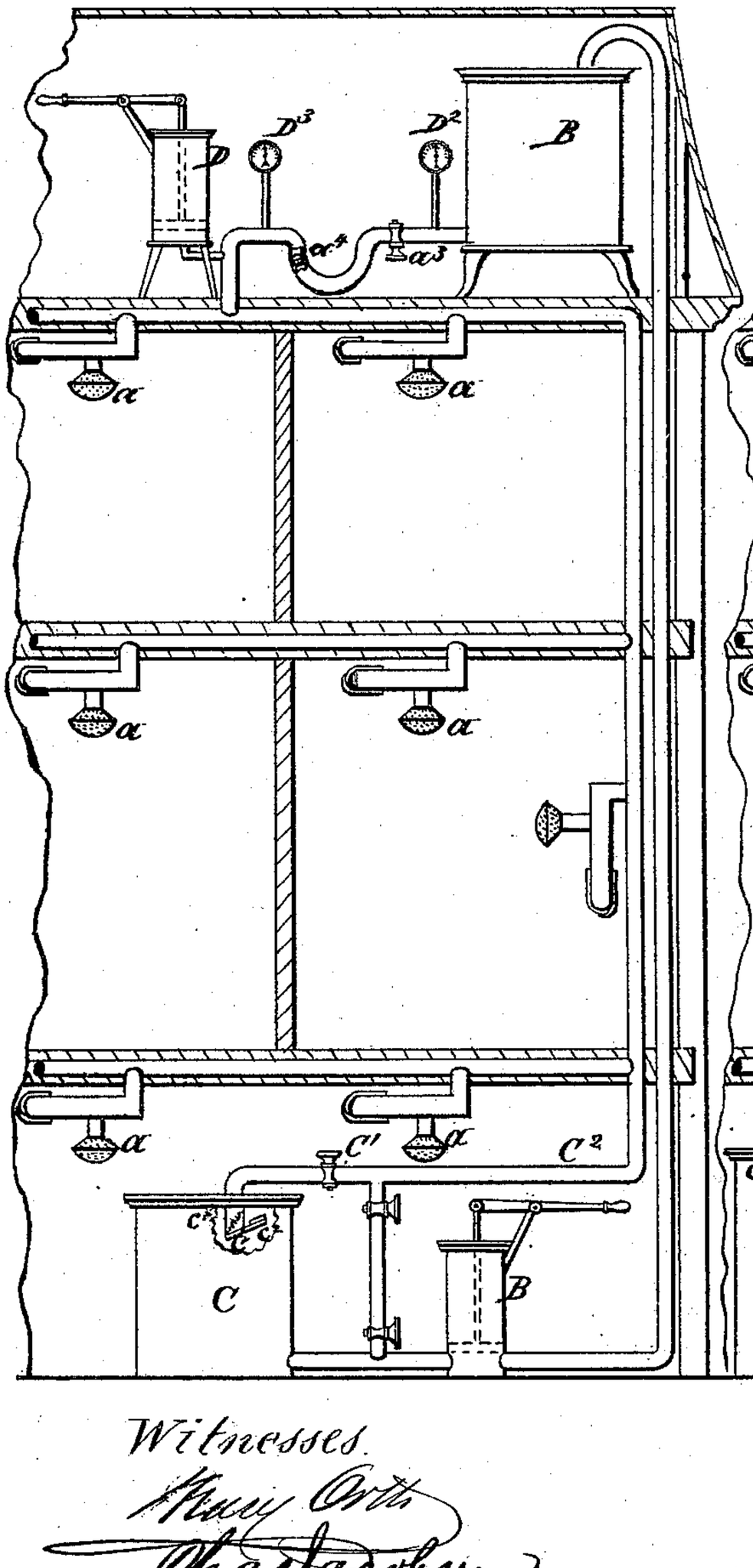
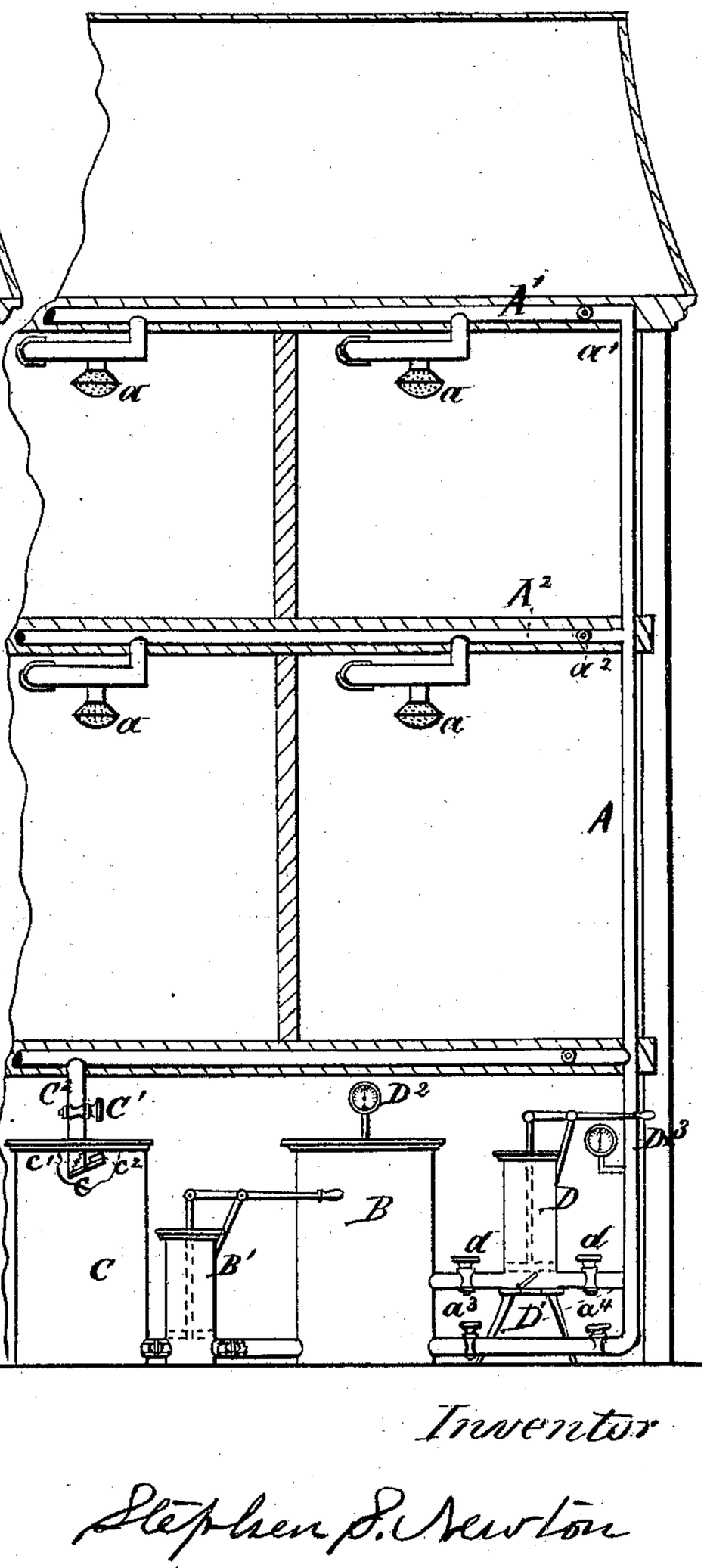


Fig. 1.



Witnesses.

Henry Orth

Chas Jacobsen

Inventor.

Stephen S. Newton

by H. A. Doubleday

atty.

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Fig. 3.

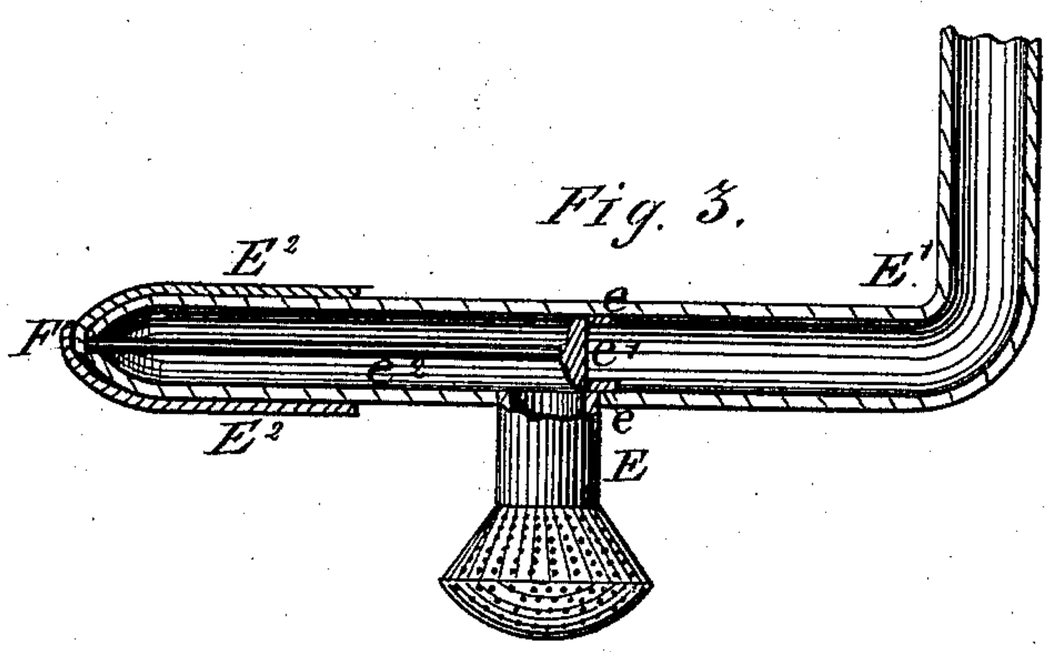
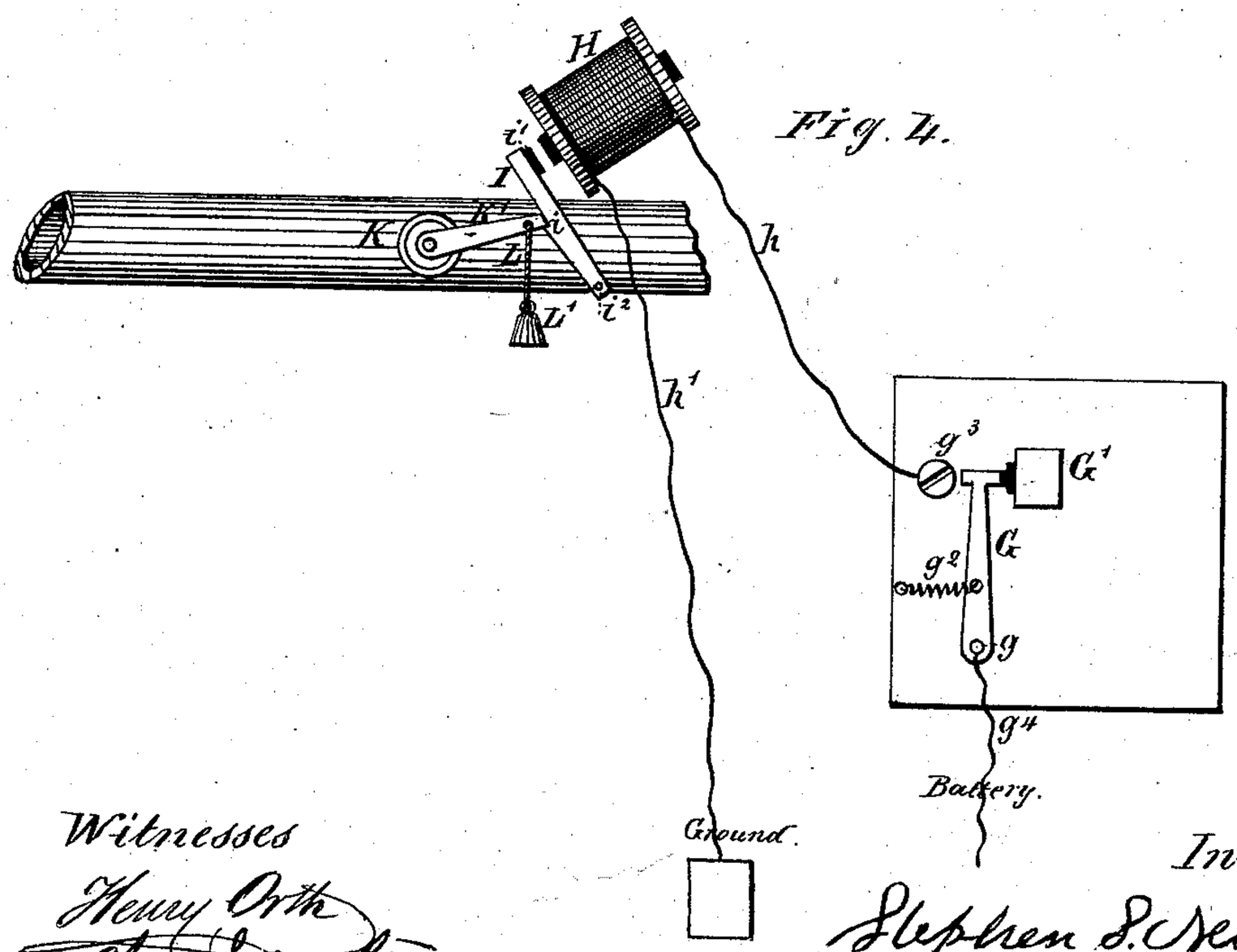


Fig. 4.



Witnesses
Henry Orth
Chas. J. Goodwin

Inventor:
Stephen S. Newton
by H. H. Doubleday
atty.

UNITED STATES PATENT OFFICE.

STEPHEN S. NEWTON, OF BINGHAMTON, NEW YORK.

IMPROVEMENT IN EXTINGUISHING FIRES IN BUILDINGS.

Specification forming part of Letters Patent No. **171,305**, dated December 21, 1875; application filed September 17, 1875.

To all whom it may concern:

Be it known that I, STEPHEN S. NEWTON, of Binghamton, in the county of Broome and State of New York, have invented certain new and useful Improvements in Extinguishing Fires in Buildings; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

One of the objections to the system of automatically introducing water into a room to extinguish a fire in case any combustion should take place to such an extent as to raise the temperature above about a certain point is, that the pipes through which the water is carried are liable to freeze and burst during cold weather.

A second objection is, that the pipes are liable to become leaky in consequence of the settling of buildings, or from corrosion; and this latter defect would be greatly increased by the use of a solution of common salt, or other similar compound, which might otherwise be advantageously used.

In order to remedy the above-recited difficulties I have made this invention; the first part of which consists in excluding the water from the delivery-pipes by means of a valve or stop-cock, which valve or cock shall be opened automatically in consequence of an increase in the temperature of the building.

The second part of the invention consists in the combination, with the distributing-pipes, of a receiving tank or reservoir, into which the contents of said pipes and the supply-reservoir can be discharged, either at the will of the operator, or in case the water should be accidentally turned on when there was no fire.

The third part of the invention relates to a novel combination of devices, by means of which water may be turned into the distributing-pipes of an entire building, or into the pipes of any portion of the building, by an increase of the heat.

The fourth part of the invention relates to a novel construction of devices, whereby the water may be delivered or discharged from each nozzle or sprinkler.

The invention further consists in certain details of construction, which will be hereinafter fully explained.

Having thus set forth the nature of my invention, I will proceed to describe apparatus adapted for carrying it into operation.

Figure 1 is an elevation, partly in section. Fig. 2 shows a modification of the same. Fig. 3 is a detached view of a device adapted to be applied to a sprinkler for shutting the water off from such sprinkler. Fig. 4 is a detached view of a device adapted to be used for actuating the stop-cocks or valves in the distributing-pipes.

In the drawings, A represents a vertical or main supply-pipe, with branches A^1 A^2 leading to the ceiling of each story in the building. Each branch has a stop-cock, (see a^1 a^2,) and a number, greater or less, as may be desired, of nozzles or sprinklers, *a*. B is a supply-tank connecting with pipe A. a^3 is a cock, and a^4 a valve, arranged in pipe A. B is a force-pump. C is a receiving reservoir or tank, connected with the outlet of the branch distributing-pipes A^1 A^2, and also with force-pump B′, and thence to tank B. C^1 is a stop-cock in pipe C^2, which connects the branch pipe with tank C. D is an air-pump connected with pipe A, and with tank B through pipe D^1, which is provided with cocks *d* and *d′*. D^2 is a pressure-gage on tank B. D^3 is a pressure-gage on pipe A.

Under one arrangement I propose to employ valves or stop-cocks in the pipe leading from the supply-tank to the discharging-nozzles, one valve or cock being used for each floor, or for each room, in the building, each cock or valve being actuated by a positive-acting mechanism, which is caused to operate by the melting of an easily-fusible solder.

Under one arrangement which I propose to employ, each nozzle or sprinkler is provided with a suitable check-valve, kept closed, except in case of fire, by a fusible solder; and for this purpose I may use any of the well-known constructions employed in automatic extinguishing-nozzles; but I prefer one of my own invention, which I will now describe.

E, Fig. 3, is the delivery-nozzle, attached to pipe E^1, which is provided internally with a valve-seat, *e*. e^1 is a valve mounted on a stem, e^2, and held in contact with the seat *e* by means of the closed overlapping ends of the spring E^2, held in this position and under tension by means of an easily-fusible solder, applied at the point of junction, as at F, Fig. 3.

It is apparent, from an inspection of the drawings, that when this solder has become so melted or softened by heat that the springs are released, they will separate, and the valve e^1 can be forced back from its seat, thus opening a passage from the pipe to the nozzle.

The operation of the devices just described is as follows: The cocks a^3 d' being closed, the tank B is partially filled with water by means of pump B'. Air is then forced into the tank B by pump D until such pressure is indicated by gage D^2 as shall insure that the water will, when not restrained, be discharged through the pipe A and its branch or branches. The check-valves in the nozzles and cocks C^1 and d' must be closed, cock *d* must be opened, and air must be forced by pump D into the pipes until the pressure within the supply-pipes is greater than that within tank B, which will be indicated by pressure-gage D^3. This will effectually close valve a^4, which opens from tank B. Cock a^3 is now opened, and it will readily be seen without further explanation that in case sufficient heat be applied to release the fusible solder which confines the check-valves to the seats in the nozzles, the air will escape from the pipes, thus removing the pressure from valve a^4, when the water within supply-tank B will be discharged through the pipes and such of the nozzles as have their check-valves opened.

My object in locating the supply-tank B at the point shown in Fig. 1 is to keep it out of the reach of frost, as in the basement or cellar of a building; but when it is desired to place it at the top of the building, as indicated in Fig. 2, there need be, of course, no pressure of air within the tank B, and much less pressure upon the pipes will be required to hold the valve a^4 closed to confine the water in the tank until the nozzles shall be opened. As the operation of the cock a^3, air-pump D, and gages D^2 D^3 is substantially the same as that just described for the corresponding devices shown in Fig. 1, it need not be given in detail.

Of course, during these above-described operations cocks a^1 a^2 must remain open. Under the arrangement of parts shown in Fig. 2 the lower end of pipe C^2 may be closed by means of a valve, *c*, held up by a spring, c^1, or a counterpoise, c^2, with force enough to sustain the pressure which will be required to support valve a^4 against the pressure of the water in tank B, cock C^1 being left open, when, should any accident occur by which the air escaped from the supply-pipes otherwise than through the nozzles, the water will at once run into tank C, because the weight of the column of water thus thrown upon valve *c* will be great enough to overcome the upward pressure of spring c^1 or counter-balance c^2.

In Fig. 4, G is a lever, pivoted upon a binding-post at *g*, and drawn toward a binding-post, g^3, by means of a spring, g^2; or the lever may be made elastic and rigidly attached to binding-post *g*, and press against post g^3 when not forcibly removed therefrom. g^4 is a wire from an electric battery of any usual description. G' is a post or block, to which lever G is secured by some easily-fusible solder. *h* is a wire leading from the binding-post g^3 to a magnet, H. *h'* is a ground-wire from said magnet. I is a lever, pivoted at i^2, and carrying an armature, i^1. Near the center of lever I is an offset, forming a shoulder, *i*. K is a stop-cock, intended to be used either in place of those shown at a^1 a^2, Figs. 1 and 2, or in place of a^3, as it may be desired. L is a chain or link, connecting weight L' with the lever K' of cock K. The binding-posts *g* g^3, lever G, spring g^2, and block G' should be properly insulated. It will, of course, be understood that lever G and the immediate attachments are to be located at such points in each of the rooms which are to be protected as will insure that they shall be readily acted upon by any increase in the temperature within such rooms as the connecting-wires may permit, the battery and the stop-cocks, with their immediate actuating devices, to be located and arranged as the circumstances of the case shall render advisable.

I do not wish to be limited to the exact construction or arrangement of devices which I have shown and described for carrying my invention into effect, as many modifications might be made in the details without in any manner departing from the principles of operation which I have set forth; nor do I wish to be limited to the use of tanks for a water-supply, as, under some circumstances, the water may be taken directly from the street-main, connection being made at stop-cock a^3, or at valve a^4; or, where the electrical apparatus is employed for opening the cock, the supply can be brought to such cock without any interruption.

One of the advantages incident to the use of the tank C is, that when bicarbonate of soda, or some other of the well-known solutions, is employed, it can be drawn into this tank and saved in case it becomes necessary to empty the tank B or the pipes, or if a leak should occur, as above explained.

I do not claim, broadly, the employment of a fusible solder for sealing the valve of the sprinkler, that being old; but my construction possesses some advantages over any other with which I am acquainted, as the use of the springs E^2, overlapping each other, insures that the valve shall be released as soon as the solder is softened, without the aid of any spring within the chamber of the sprinkler.

Again, in my construction, the locking devices are rigidly attached to the sprinkler, so that there is no danger of their being lost. An advantage growing out of my method of closing the valve in the pipe leading from the supply-pipe, by means of compressed air instead of water, is, that the pipes are not corroded by the solution, and are not liable to freeze, as is the case when the pipes are kept filled with water.

What I claim is—

1. The herein-described method of restricting the discharge of water into the distributing-pipes by means of a valve, a^4, which is closed by compressed air, substantially as set forth.

2. The combination, with the distributing-pipes, of a receiving-tank, into which the water within such pipes may be discharged.

3. The combination of the valve e^1, its seat e, stem e^2, and springs E^2 E^2, secured to each other to support the valve-stem e^2, substantially as set forth.

4. In combination with the supply-tank B, the pumps B′ and D, and connecting-pipes, for filling the tank with liquid and compressed air, substantially as set forth.

5. In combination with the tank B and pipe A, and the check-valve a^4, the pressure-gages D^2 D^3, substantially as set forth.

6. In combination with the distributing-pipes and stop-cocks, an electric circuit, or a series of electric circuits, each provided with magnet and armature, and with a circuit-closer provided with easily-fusible solder, whereby, when such solder is fused, the water shall be discharged through the pipes, substantially as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

STEPHEN S. NEWTON.

Witnesses:

A. W. DAVIS,

ALEX. S. PATTEN.