

J. A. MILLER, Jr.
Automatic Fire-Extinguisher.
No. 209,910. Patented Nov. 12, 1878.

Fig. 1.

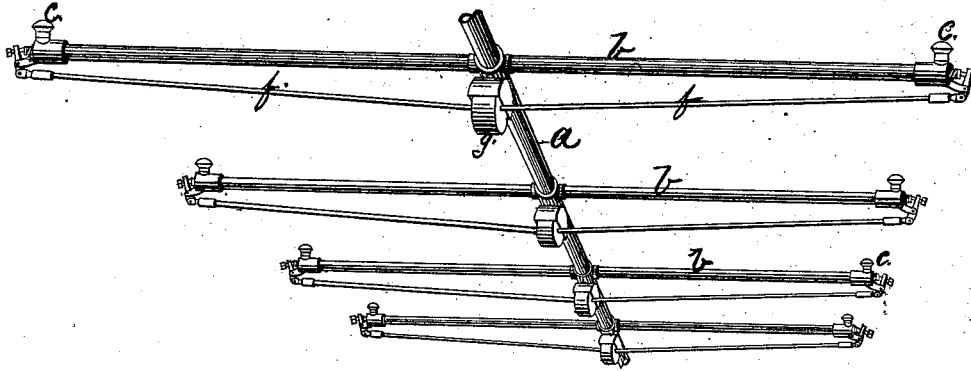
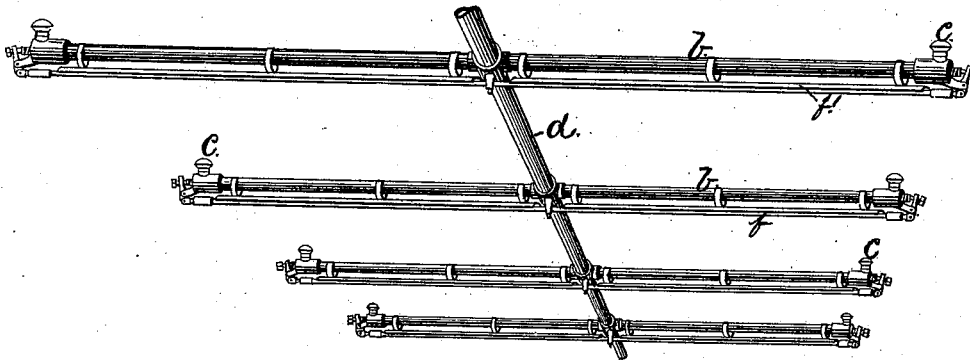


Fig. 2.



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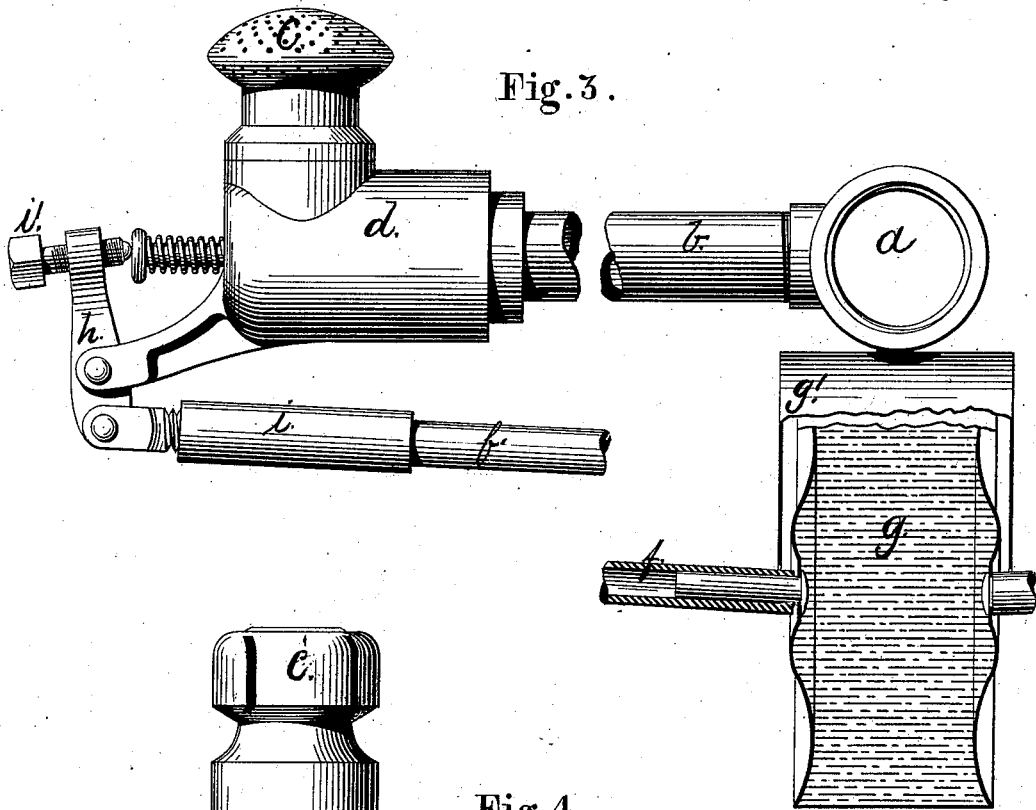


Fig. 3.

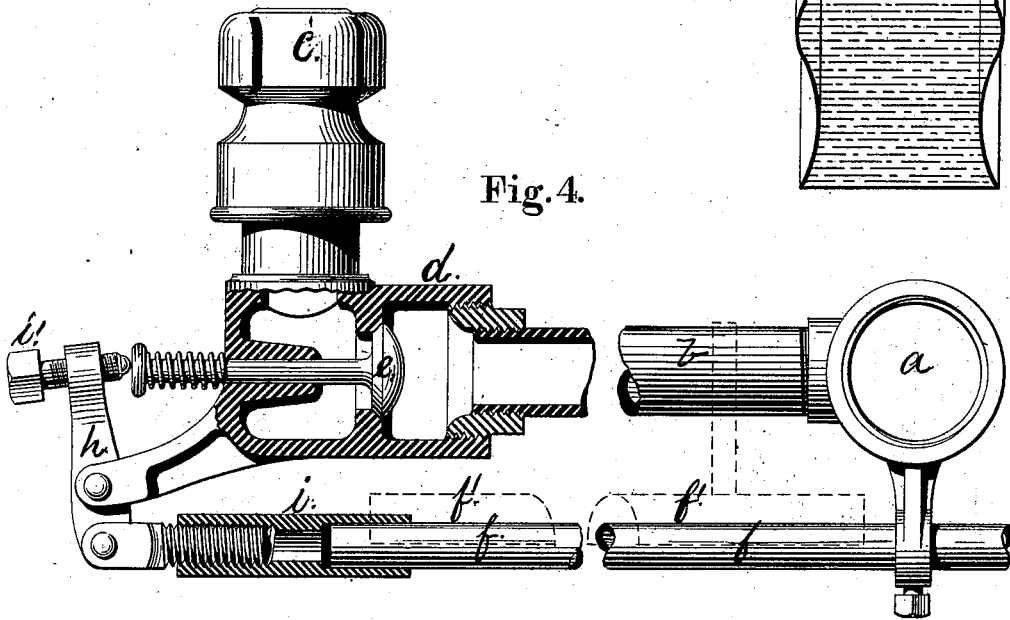


Fig. 4.

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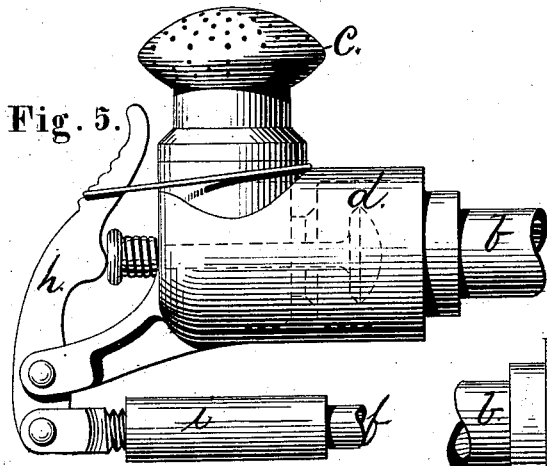


Fig. 5.

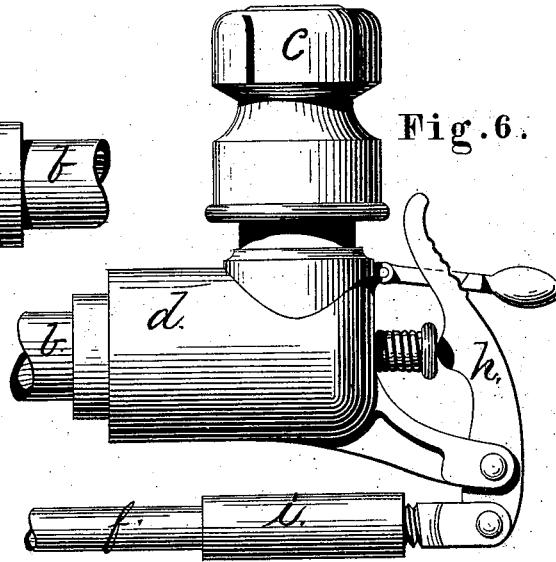


Fig. 6.

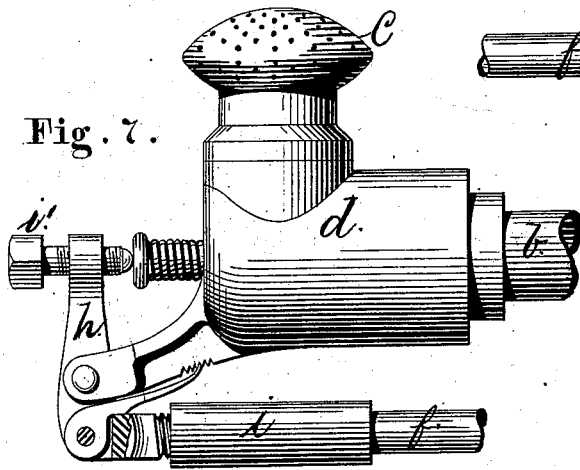


Fig. 7.

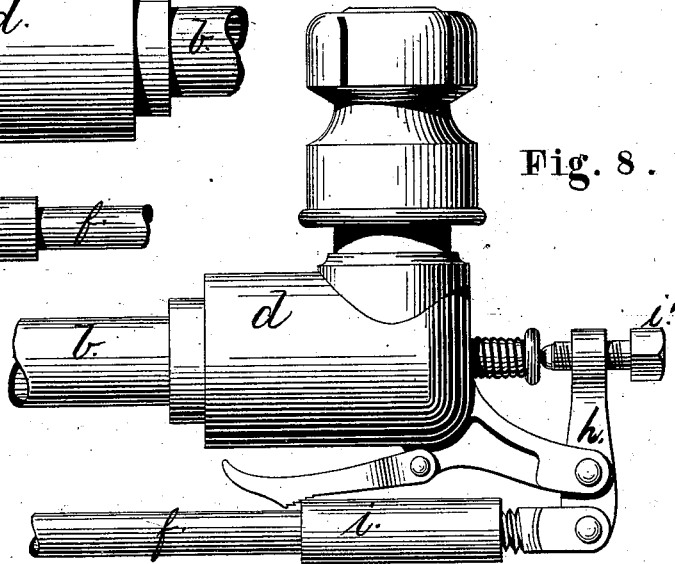


Fig. 8.

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UNITED STATES PATENT OFFICE

JOSEPH A. MILLER, JR., OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN AUTOMATIC FIRE-EXTINGUISHERS.

Specification forming part of Letters Patent No. 209,910, dated November 12, 1878; application filed October 1, 1878.

To all whom it may concern:

Be it known that I, JOSEPH A. MILLER, JR., of the city and county of Providence, and State of Rhode Island, have invented new and useful Improvements 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 improvements in automatic fire-extinguishers operated by the action of the heat.

The object of the invention is, first, to automatically open a supply of water by the heat of the fire, and force the water on the fire; second, to automatically shut off the water when the fire is extinguished, so as to prevent damage by water, which is frequently greater than the damage by fire; third, to so arrange an automatic fire-extinguisher that the same can be readily adjusted to operate at any desired temperature; fourth, to so arrange an automatic fire-extinguisher that it can be readily tested and its efficiency ascertained without injury to the extinguisher or the building; and, fifth, to so arrange a fire-extinguisher that it can or cannot close itself automatically when the fire is extinguished.

The invention consists in opening a fire-extinguisher or water-distributor by the expansion of metal or fluid, or both, and connecting the same, so that when the temperature rises beyond a certain fixed point, the water-supply will be opened, and when the temperature falls below this point the water-supply will be shut off.

It further consists in the novel arrangements for adjusting the apparatus so that it can be made to operate at any temperature desired, and in other details, which will be more fully described hereinafter, and pointed out in the claims.

Figure 1 is a perspective view of a water-main and branch pipes, the ends being provided with distributors and valves, operated by the expansion of oil or other liquid, and metallic rods, which expand when a fire breaks out and the temperature of the room is raised and open the water-supply, and again contract when the temperature falls and close the wa-

ter-supply. Fig. 2 is a perspective view of a main and branches, operated by the expansion of metallic rods, so as to automatically let on and shut off the water. Fig. 3 is an enlarged view of the device for turning on the water by the expansion of liquid and the metallic rod, showing the arrangement for adjusting the same. Fig. 4 is an enlarged view, partly in section, of the automatic fire-extinguisher, operated by the expansion of metal only. Figs. 5, 6, 7, and 8 are views of the automatic devices by which the water-supply is opened and kept open until it is desired to close the same.

Similar letters of reference indicate corresponding parts.

In the drawings, *a* is the water-main. *b b* are branch pipes. *c c* are suitable distributors, arranged to spread the water. *d d* are valve-chambers; *e*, a valve, provided with a stem extending through the valve-case, and provided with a coiled spring, to assist in the closing of the valve *e*, which is held closed by the pressure of the water. *f f* are metallic rods or tubes, of brass or other metals that expand more when exposed to heat than the metal of which the pipes are made. One end of these rods *f* is fixed at a suitable place, and the other end hinged to the lever *h*, in such a manner that the expansion of the rod *f* will act upon the valve *e*, but preferably so that the valve will be moved through a greater distance than the increase in length of the rod *f*, as it is desirable that the rod should be free to contract, and that the amount of expansion before the valve is opened should be regulated to suit the circumstances. The rod *f* is provided with the sleeve *i*, one end of which can be regulated by a screw-thread, and in the other end the rod or tube *f* is free to slide, so that it is free to expand and contract within fixed limits, but when, by an excess of heat, the expansion is greater, the rod *f* will open the valve *e* by the force exerted against the shoulder in the sleeve *i*, and transmitted through the lever *f*. The sleeve *i* may be dispensed with, and the screw *i'* at the end of the lever may be used to regulate the device so that the valve will be opened when the temperature rises to the degree at which it is desired that the water should be turned on.

To prevent the cooling of the rods *f* by the

water before the average temperature has fallen and the fire is out, the rods are protected by suitable shields, *f'*. (Shown in broken lines in Fig. 4 and indicated in Fig. 2.)

g is a hermetically-sealed vessel, containing oil or other fluids that expand rapidly under an increase of temperature. It is preferably provided with corrugated sides, so as to allow of free expansion, and is connected with the automatic valve by suitable connections, which may also be of such metal as will expand more than the pipes, and thus increase the efficiency. The vessel *g* is protected by a suitable shield, to prevent the water from cooling the same. *g'* represents the shield.

In some cases the nature of the material stored in buildings requires that the water shall be kept on the fire for a considerable time after the fire is out and the temperature has been reduced.

Fig. 5 shows the lever *h* extended upward, and a loop of wire hanging loosely on the same extending around the neck of the distributor, arranged so that as the lever pushes the valve inward the loop of wire retains the same until it is released. Fig. 6 shows a hinged and weighted pawl, operating on the lever *h* in the same manner as the wire loop in Fig. 5. In Fig. 7 a spring-pawl is shown, arranged to hold the lever *h*, and so keep the valve open; and in Fig. 8 a hinged pawl engages with and holds the sleeve *i*, and so keeps the valve open.

Automatic fire-extinguishers, as heretofore constructed, were arranged to open when a fire took place, and continue open after the fire was extinguished until the water was turned off. In many instances this is desirable, but in many others more damage is caused by the water than the fire.

It is important to test the working of automatic extinguishers, and ascertain whether the pipes are open. This can be readily done with my improved extinguisher by removing the distributor and securing a hose, and then either heat the rod or otherwise open the valve, and allow the water to flow through the hose. The amount of water, the pressure, and the action of the valve can thus be readily ascertained.

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

1. In an automatic fire-extinguisher, the combination, with a distributor, of a valve held to its seat by the pressure of the water in the pipes, and opened by the expansion of metal or fluid, or both, substantially as and for the purpose set forth.

2. The combination, with the pipe *b* and distributor *c*, of the valve *e* and lever *h*, arranged to open the water-supply by the expansion of metallic rods or tubes, or the expansion of fluids, substantially as described.

3. The combination, in an automatic fire-extinguisher, with the valve, of the rod or tube *f* and lever *h*, substantially as and for the purpose set forth.

4. In an automatic fire-extinguisher, operated by the expansion of metal by heat, the shield *f'*, arranged to protect the metal from the water.

5. The combination, with a supply-valve and a rod or tube, *f*, arranged and adapted to open the valve by the expansion of metal, fluids, or both, of means for adjusting the rod to the temperature at which it is desired the valve shall be automatically opened, substantially as set forth.

6. In an automatic fire-extinguisher, the combination, with the valve for regulating the supply of water to the distributor, of a rod connected with the valve by a set-screw or equivalent adjusting device, said rod arranged and adapted to actuate the valve by the expansion and contraction of metal or fluids, and a pawl or equivalent device for retaining the valve in an open position, substantially as set forth.

7. The combination, with the valve *e* and metal rod *f*, of the lever *h* and adjusting-screw *v*, arranged to open the valve, substantially as and for the purpose set forth.

8. In an automatic fire-extinguisher, the combination, with the main pipe *a* and branches *b b*, of the distributor *c* and suitable valves, operated by the expansion of metal or fluids, protected by shields, the whole secured to the branch pipes and under the same, as and for the purpose set forth.

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