

(Model.)

F. GRINNELL.

AUTOMATIC FIRE EXTINGUISHER.

No. 248,829.

Patented Oct. 25, 1881.

Fig. 1.

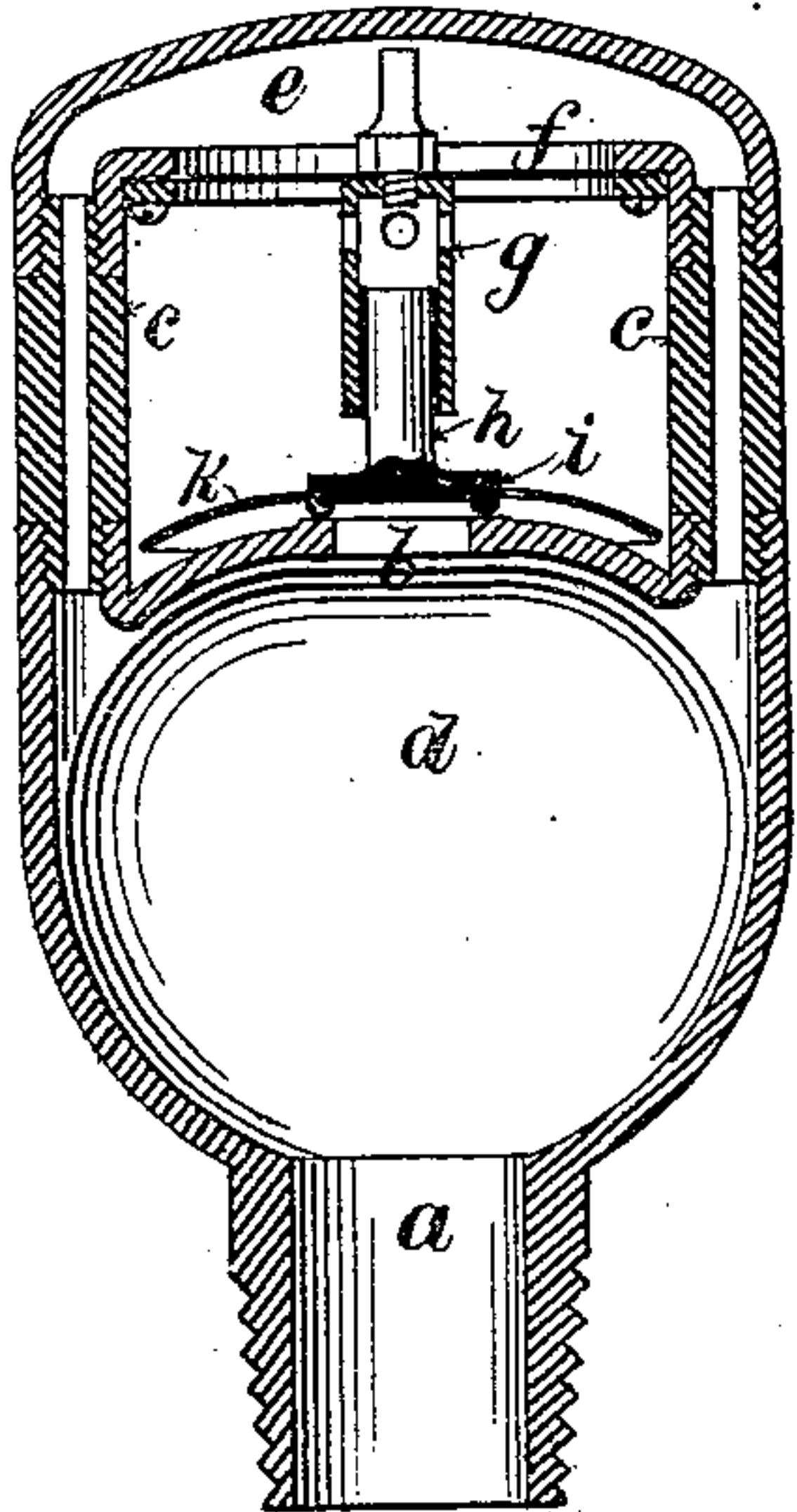


Fig. 2.

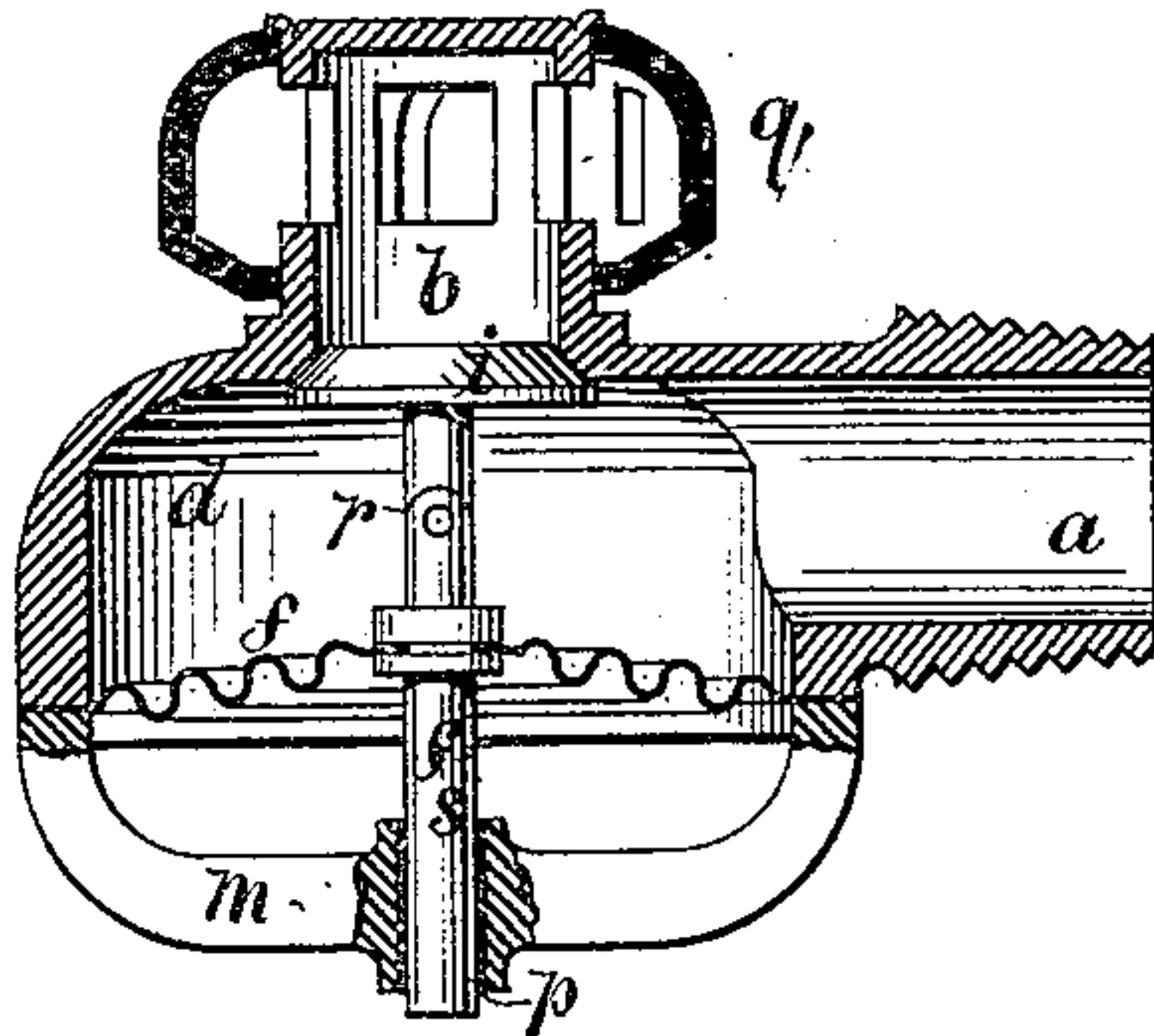
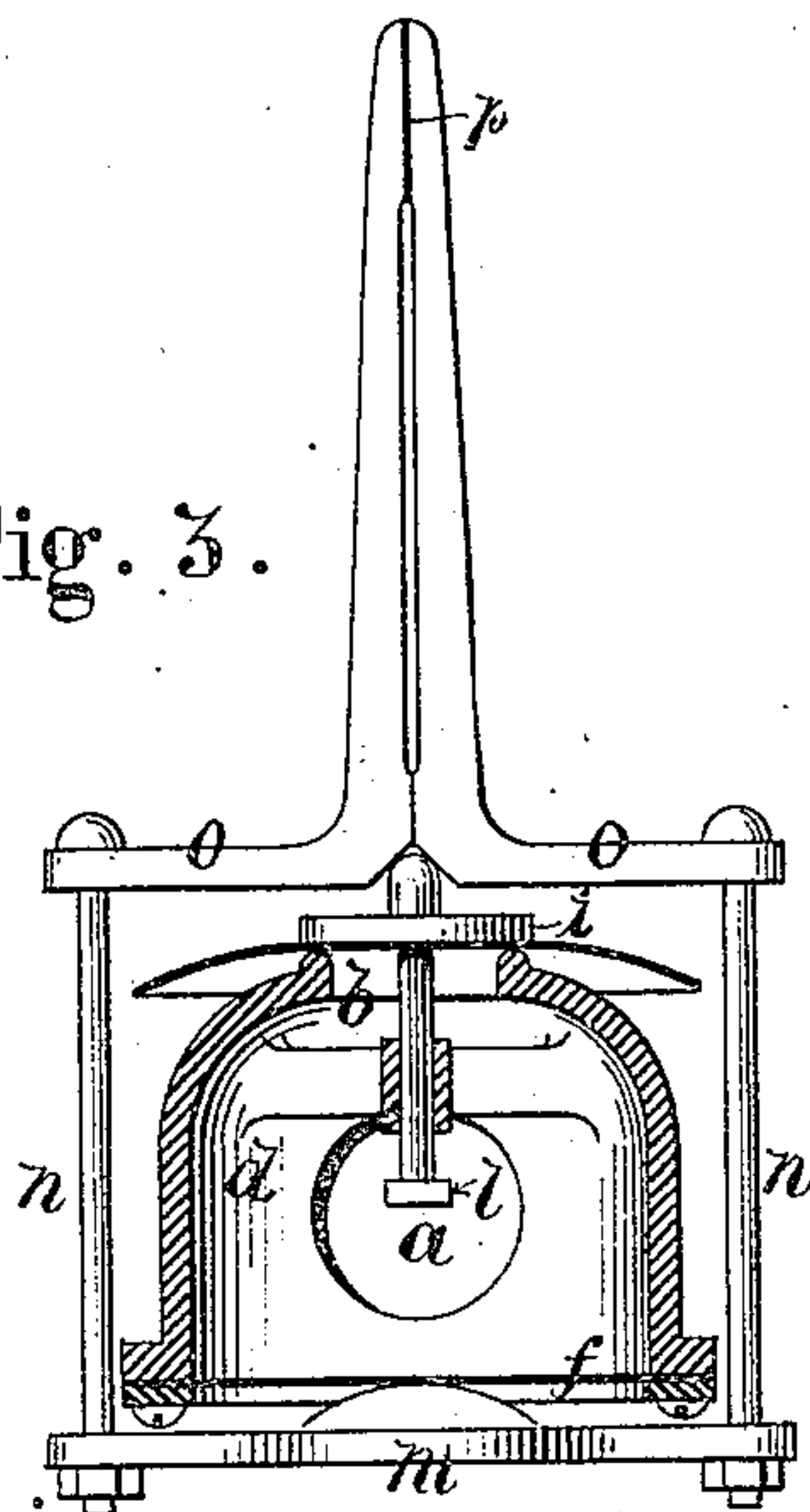


Fig. 3.



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# UNITED STATES PATENT OFFICE.

FREDERICK GRINNELL, OF PROVIDENCE, RHODE ISLAND.

## AUTOMATIC FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 248,829, dated October 25, 1881.

Application filed June 17, 1881. (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.

10 The object of this invention is to so construct an automatic fire-extinguisher that the pressure of the water shall hold the valve to its seat and prevent leakage until the heat of a fire shall release the valve and allow the water or  
15 other fluid to be discharged.

The invention consists in providing an automatic fire-extinguisher with a diaphragm which is held against the internal pressure by a device made in part of or secured by a material  
20 fusible at a low temperature, so as to be released by the action of heat, as will be more fully set forth hereinafter.

In automatic fire-extinguishers which are to be placed into buildings, and in which water  
25 under pressure is to be maintained, the first and most important requirement is the prevention of leaks, as these would in time cause more loss than any accidental fire, that may never take place.

30 In my present invention I secure immunity from leakage by utilizing the internal pressure to keep the valve against the seat either by the direct pressure of the water on the valve or by means of a diaphragm.

35 Figure 1 is a sectional view of an automatic fire-extinguisher, in which the valve is held to a fixed seat by the pressure of water on a diaphragm. Fig. 2 is an automatic fire-extinguisher, in which the valve is held to its seat  
40 by the pressure of the water, and is opened by the pressure on a diaphragm when the device by which the diaphragm is held is released by the action of heat. Fig. 3 is an automatic fire-extinguisher, in which the valve is held to its  
45 fixed seat by a device acted upon by a yielding diaphragm, so that the pressure of water on the diaphragm holds the valve to its seat until it is released by the action of heat on the frame or device.

50 In the drawings, (referring to Fig. 1,) *a* is the

water-inlet; *b*, the outlet. *c c* are two pipes or by-ways connecting the chamber *d* with the chamber *e*. *f* is a diaphragm of much larger area than the water-outlet *b*. *g* is a tube secured to the diaphragm *f*. *h* is the valve-stem  
55 of the valve *i*. It is secured in the tube *g* by a solder. *k* is a deflector secured to the valve *i*.

When this device is secured to a system of pipes the internal pressure acting on the valve *i* would open the valve; but the very much  
60 greater area of the diaphragm *f*, being under the same pressure as the valve, causes the valve to be held tightly against the outlet *b* and prevents any leak of water as long as the valve-stem *h* is held by the solder in the tube *g*. As  
65 soon as the solder melts the valve will be forced off its seat, and the discharging water, by impinging against the deflector *k*, will be distributed over a large area.

Referring to Fig. 3, the action is similar to  
70 Fig. 1. *a* is again the inlet; *b*, the outlet; *i*, the valve, the valve-stem of which is provided with the stop *l*. *f* is the yielding diaphragm acted upon by the internal pressure. *m* is a yoke resting against the diaphragm *f*. *n n* are two  
75 rods by which the two angular pieces *o o* are connected with the yoke *m*. The two pieces *o o* are secured together at *p* by a fusible solder and rest on the valve *i*. The internal pressure on the large area of the diaphragm *f* holds the  
80 valve to its seat by transmitting the pressure through the device *m n o* on the valve *i*. As soon, however, as the solder at *p* melts the two pieces *o o* will separate, and the valve *i* will be forced open by the internal pressure. The stop  
85 *l* will hold the valve so that the valve-disk will form a deflector and will spread the water, although an annular rim may be secured to the valve-disk, to more completely secure the distribution of the water.  
90

Referring now to Fig. 2, *a* is the water-inlet; *b*, the water-outlet to the revolving ring *q* or any other form of distributor. *i* is a valve held to its seat by the internal pressure and secured to the diaphragm *f* by a stem having a  
95 loose connection at *v*, so that the pressure can firmly seat the valve to its seat. The area of the diaphragm is very much greater than the area of the valve, and the internal pressure would keep the valve open, if the diaphragm  
100



were allowed to act. To prevent the opening of the valve the diaphragm *f* is provided with the stem *s*, which passes through the yoke *m* and is secured at *p* by a fusible solder.

5 The device will therefore be kept close, and leakage is prevented by the internal pressure acting directly on the valve until the action of heat melts the solder and releases the diaphragm, when the pressure on the much larger  
10 area of the diaphragm opens the valve and allows the water to flow through the distributor on the fire.

Various other devices may be constructed embodying the use of a diaphragm in automatic  
15 fire-extinguishers; and I do not wish to confine myself to the particular forms of the devices shown for holding the valve to a fixed seat or releasing the valve, nor do I wish to confine myself to the devices shown for distributing water, as other devices may be used.  
20

I have in an application for another patent, filed of even date with the application for this patent, described and broadly claimed in auto-

matic fire-extinguishers the use of a diaphragm and devices for holding a valve to be released 25 by the action of heat, and therefore do not claim this broad subject-matter in this patent.

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

1. In an automatic fire-extinguisher, the 30 valve held to its seat by the pressure of the water and released by the action of heat on a fusible solder, as described.

2. In an automatic fire-extinguisher, a diaphragm held against the internal pressure by 35 a device released by the action of heat, as described.

3. In an automatic fire-extinguisher, the combination, with a valve held to its seat by the pressure of the water, of a diaphragm held 40 against the internal pressure by a device released by the action of heat, as described.

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Witnesses:

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