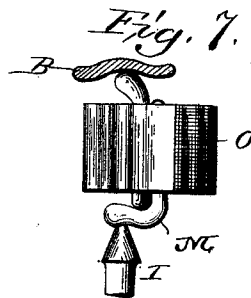
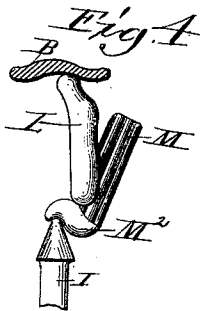
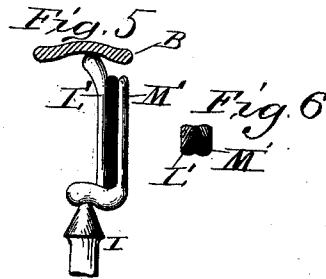
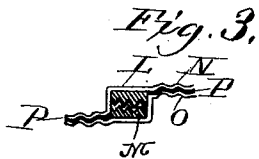
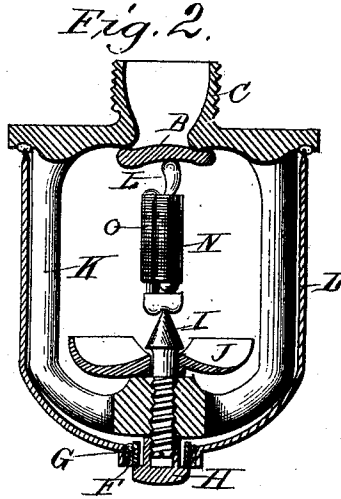
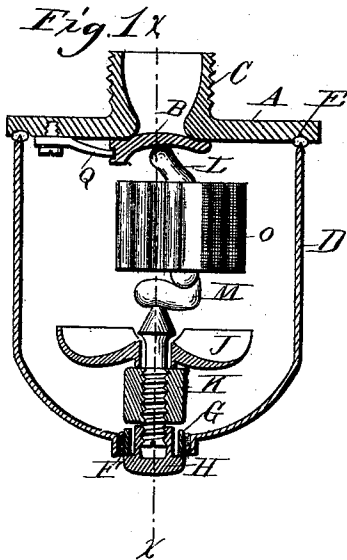


(No Model.)

J. R. FREEMAN.  
AUTOMATIC FIRE EXTINGUISHER.

No. 415,166.

Patented Nov. 12, 1889.



Witnesses:  
*E. D. Smith*  
*John L. Edwards*

Inventor  
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*Attys*

# UNITED STATES PATENT OFFICE.

JOHN R. FREEMAN, OF BOSTON, MASSACHUSETTS.

## AUTOMATIC FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 415,166, dated November 12, 1889.

Application filed August 25, 1888. Serial No. 283,809. (No model.)

### *To all whom it may concern:*

Be it known that I, JOHN R. FREEMAN, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Automatic Fire-Extinguishers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to construct an automatic sprinkler to be used for the extinction of fires by sprinkling with water or other appropriate liquid which, prior to the occurrence of the fire, is retained in appropriate conduits or reservoirs, the said sprinkler comprising a valve normally held closed by connections or supports, which are in part composed of easily-fusible material, and which under the action of undue heat will permit the said valve to open.

The object of my present invention is to provide means for protecting the sprinkler against the action of corrosive vapors and to prevent accumulation of dust or lint upon the working parts; also, to provide improved mechanism for holding the valve closed, which shall, while acting upon the valve with great force, yet exert but slight strain upon the fusible material; also, to provide convenient means for the renewal of the protector for the sprinkler; also, to provide simple means for assisting the valve in its movement from its seat; also, to provide other details of construction, to be hereinafter pointed out.

Figure 1 shows in vertical section an automatic sprinkler embodying this invention, the yoke holding the operating parts being broken off; Fig. 2, a vertical section of the automatic sprinkler shown in Fig. 1, taken on the dotted line *xx*; Fig. 3, a horizontal section of the fusibly-united valve-support; Fig. 4, a side elevation of the fusibly-united valve-support, the parts being shown as separating to permit the valve to leave its seat; Figs. 5 and 6, details of a modified form of valve-support; and Fig. 7, a detail of the valve-support shown in Fig. 5, provided with fusibly-united clamping-plates.

The top plate A is provided centrally with an externally screw-threaded nipple C.

The top plate A has formed upon its under

side at the nipple C a valve-seat, against which is normally pressed a valve B, (shown as a flat plate,) loosely connected to the outer or free end of a flat spring Q, attached to the under side of the top plate A. The tendency of the spring Q is to move the valve away from its seat, so that after the said valve has been held closed against its seat for a long period of time the spring Q will assist in its removal. Attached to or formed integral with the top plate is a yoke K, which serves as a support for the operating parts. The yoke K is tapped to receive the screw-threaded plug I, having the conical end portion I', the shank of said plug I between the conical end portion and its screw-threaded portion being made smooth and adapted to receive upon it the distributor J, said distributor bearing upon the yoke K, but rotating upon the plug I. This valve-support is composed of a post L and a bent lever M, the point where the lower end of the post L thrusts against the bent lever M being out of line with the point where the lever M bears on its fulcrum I, so that the lever M is practically a lever of the second order, the thrust of L and reaction of I tending to cause L and M to separate, as shown in Fig. 4, the contacting faces also being offset from the supporting-points of the post and lever; but the greater the length of that arm of the bent lever M which is united to the post L by the fusible solder the less will be the strain on the uniting-solder, making the strain small in proportion to direct pressure exerted against the valve. Each bar L M is grooved or corrugated vertically upon its contacting side, so that when held together movement of one upon the other is prevented. The post and bar are held together by fusible material placed between them, and also by two clamping-plates N O, embracing them and extending a short distance beyond them at each side to present large contacting surfaces for the said clamping-plates, and the said clamping-plates are also joined by fusible material—such, for instance, as solder—as best shown in Fig. 3. The valve-support is placed beneath the valve B, the upper end of the post L bearing against the under side of

the valve and the step or offset of the bar M resting on the end of the plug I. An internally-screw-threaded cap H, having a ring G placed loosely upon the shank thereof, is

5 turned upon the screw-threaded end of the plug I, and the loose ring G is surrounded by a ring of paraffine, stearine, or other equivalent material, which is adapted to melt at a low temperature.

10 A glass case or shell D incloses all the operating parts, it having at its lower end a neck M<sup>3</sup>, which snugly fits and adheres to the paraffine ring F, and having its upper edge slightly tapered and adapted to enter a recess or groove E, which has been previously

15 filled with paraffine or equivalent material. The shell D prevents access of dust and corrosive vapors to the operating parts, so that they cannot deteriorate or become injured in any way. The shell is made, preferably, of

20 transparent glass, so as to permit the internal parts to be readily examined, and, moreover, being diathermous, it permits radiant heat to pass through it and begin to act on the fusibly-united valve-support L M; also, the

25 external shell D retains any leakage which may possibly occur.

On the occurrence of a dangerous rise of temperature the ring of easily-fusible material F loses its sustaining power, and the material in the groove E, also being softened, loses what little adhesiveness it possesses, thereby permitting the shell D to fall. The action of the heat next causes the easily-fusible

35 solder or like material uniting the thin metallic clamping-plates N O, and also uniting the post and bar L M, to lose its strength, whereupon these parts separate and permit the valve B to fall, assisted, as above described, by the spring Q, and the water or other liquid issuing from the nipple C strikes the distributor J, revolving it by force, and thereby distributing the water.

I preferably use paraffine or stearine for making the ring F, such material being non-corrosive and fusible at a temperature a little lower than that of ordinary fusible solder, such as is used in holding the valve-support L M; but it is obvious that the ring F might

50 be made of ordinary fusible metal.

In lieu of the paraffine or like material placed in the groove E, an elastic ring or washer may be used. I make the upper edge of the glass shell sharp in order that when

55 this shell is forced into place by a slight pressure of the screw H the edge may cut into the material in the groove to a small extent, and thus make the sealing of the joint more secure.

60 The proportions of the posts forming the valve-support may be materially varied, and also the grooves or corrugations on the contacting faces or sides of the parts of the valve-support may be omitted, if desired; but by

65 their employment the strain on the solder is reduced. I also preferably groove or corru-

gate the clamping-plates N O, as best shown in Fig. 3, the corrugations varying in width, so that the plates cannot be misplaced.

By making the plates N O thin and of large area, as shown in Fig. 7, heat is quickly absorbed.

I preferably cover the outer surface of the plates N O with a thin coating of lamp-black to thereby increase the rapidity with which it will absorb heat.

It is obvious that the glass shell or case may be employed as an inclosing-case for automatic sprinklers of various kinds now on the market, and I therefore do not desire to limit my invention to the combination therewith of the particular form of sprinkler herein shown.

In practice it may be found that the fusibly-united plates N O, embracing the post and bar L M, may be in themselves sufficient to hold in place the valve, thereby omitting the fusible material between the contacting faces of the said post and bar.

The object of the screw-threaded cap is to permit substituting a new glass case or cover for a broken one without displacing the valve.

I claim—

1. In an automatic fire-extinguisher, the valve and valve-support, combined with the cap H, ring G, and the inclosing shell or case to which said ring G is fusibly attached, substantially as described.

2. In an automatic fire-extinguisher, the valve and two-part separable valve controller or support having their contacting faces fusibly united, combined with clamping-plates to embrace and hold the independent parts of said valve-support between their supporting-points, substantially as described.

3. In an automatic fire-extinguisher, the valve and separable valve-support, combined with the separable clamping-plates to hold the parts of the valve-support in contact, said plates extending laterally and being fusibly connected beyond the said support, substantially as described.

4. In an automatic fire-extinguisher, the valve, the separable valve-support, and the distributor, combined with the yoke or frame K, conical-ended screw-plug I extended there-through, an inclosing shell or case, loose ring G, and screw-cap H, substantially as described.

5. The combination, with the valve of an automatic fire-extinguisher, of the fulcrum I and the fusibly-united independent valve-support consisting of a post L and a bent lever M, one end of the post bearing against the valve, the other against the bent lever, the direction of thrust of said post against the lever being at one side of the fulcrum I, at a point lying between said fulcrum and the outer end of said lever, so as to tend to pull said outer end of lever M away from post L, substantially as described.

6. In an automatic fire-extinguisher, the  
valve and valve-support, combined with the  
inclosing shell or case having at its lower end  
a neck M<sup>3</sup>, the screw-cap H, loose ring G  
5 thereon, and the fusible ring F, tightly closing  
the space between the loose ring and neck,  
substantially as described.

In testimony whereof I have signed my name  
to this specification in the presence of two sub-  
scribing witnesses.

JOHN R. FREEMAN.

Witnesses:

BERNICE J. NOYES,  
B. DEWAR.