(No Model.)

J. W. BISHOP.

FIRE EXTINGUISHER.

No. 332,041. Patented Dec. 8, 1885.

Fig. 1

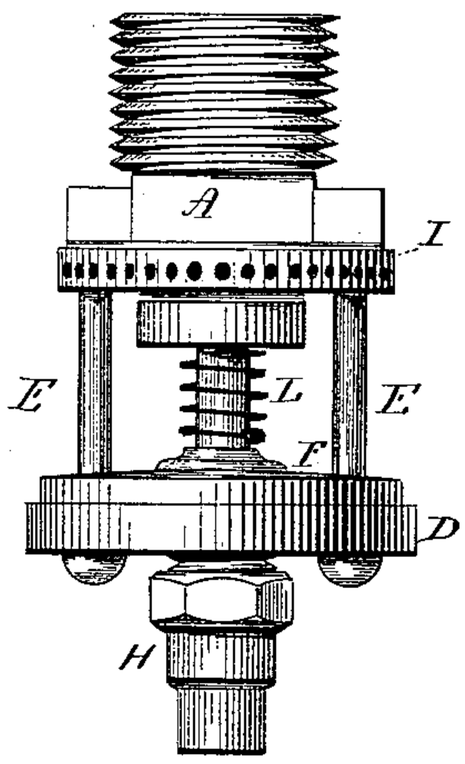


Fig. 2

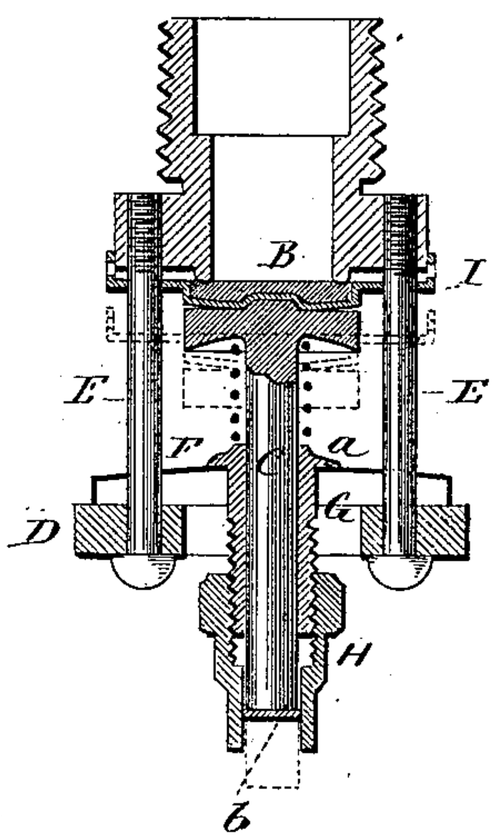
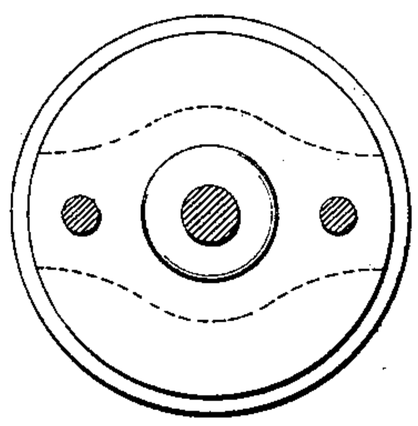


Fig. 3



Witnesses.
C. F. Shumway.
Thos. C. Earle

John W. Bishop.
Inventor
By Atty
Thos. C. Earle.

UNITED STATES PATENT OFFICE.

JOHN W. BISHOP, OF NEW HAVEN, CONNECTICUT.

FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 332,041, dated December 8, 1885.

Application filed February 24, 1885. Serial No. 156,801. (No model.) Patented in England September 23, 1884, No. 12,722, and in France September 30, 1884, No. 251,969.

To all whom it may concern:

Be it known that I, JOHN W. BISHOP, of New Haven, in the county of New Haven and State of Connecticut, have invented new Improvements in Fire-Extinguishers; and I do hereby declare the following, when taken in connection with accompanying drawings, and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view of the extinguisher, the parts in the closed condition; Fig. 2, a vertical central sectional view of the same, broken lines showing the valve open for the escape of water; Fig. 3, a horizontal section looking down upon the disk F.

This invention relates to an improvement in that class of fire-extinguishers in which the water-way is stopped by a valve held against the pressure of the water by a support, which is liberated by heat arising from a fire in the vicinity of the extinguisher. In the employment of this class of extinguishers, and especially where the pressure of water is very great, the force of the water-hammer sometimes breaks the fusible connection which holds or supports the valve against the pressure of the water.

The object of my invention is principally to obviate this difficulty; and the invention consists in the construction as hereinafter described, and more particularly recited in the claims.

A is the nozzle, which is secured to the supply-pipe; B, the valve which closes the open end of the plug. From this valve a spindle, C, extends outward. D is a ring supported by rods E E, more or less in number, at a distance from the opening in the plug, but parallel therewith. Supported against the ring D is a disk, F. This disk is made from elastic metal. Centrally through the disk is a sleeve, G, through which the spindle C passes, the said sleeve attached to or arranged to take a bearing upon the inner side of the disk F, and as seen in Fig. 2, the connection here represented as being an annular flange, *a*, around the sleeve to rest upon the inner surface of the disk. The outer end of the sleeve G is screw-threaded, and upon this sleeve a cap, H, is screwed, the spindle C extending into the said cap H. At the outer end of the cap H the fusible material B is introduced, or a plug secured by material fusible at a low degree of heat. The valve is placed against the end of the nozzle, the cap H is screwed down upon the sleeve G until the plug *b* bears against the end of the spindle, and, resisted by the elastic disk F, applies a force to the end of the spindle sufficient to resist the pressure of the water against the valve, and there will stand. Under water-hammer the blow against the valve will be received by the disk F through the sleeve G, and that disk yielding will permit a corresponding yielding of the valve, and so that the strain which would otherwise come upon the plug *b* will be relieved by such yielding of the disk F. The blow upon the valve under water-hammer is seldom sufficient to throw it so far from its seat as to permit any practical escape of water. The blow is sudden and instantly released, so that while the disk may yield under the blow the time of such yielding will be too short to permit any practical escape of water. Another advantage of this construction is that it permits the examination of the apparatus at any time to ascertain whether or not the supply of water is present, for by simply unscrewing the cap H to relieve its pressure upon the valve, the valve will open to permit the escape of water if it be present, and when this presence is ascertained the cap may be returned to set the valve. Again, the pressure upon the valve under this arrangement may be made only such as to little more than balance the pressure of the water—that is, the cap is screwed onto the sleeve G until the elasticity of the disk F is sufficient to hold the valve to its seat; hence the disk will yield under a slight force beyond this pressure, so that the displacement of the plug under water-hammer or increased force is avoided.

In this extinguisher I show the distributer as a cup-shaped disk, I, provided with a series of perforations around its edge, and which is attached to the valve or valve-spindle, so

as to move with it, and so that when the fusible connection is broken the valve will be forced outward, taking with it the distributer, as seen in broken lines, Fig. 2, and so that the water striking upon the distributer will be thrown in all directions. I also show in this illustration a spring, L, arranged to bear against the valve to resist the force of the water, and whereby as the force diminishes the valve will be forced toward the seat to contract the escape of the water, and which is the subject of Letters Patent of the United States granted to me July 29, 1884, No. 302,682, the object of which I will briefly describe. The nozzles of fire-extinguishers are arranged to cover by their spray a certain amount of territory within the apartment, and as many nozzles are provided as will completely cover the entire apartment, so that fire spreading rapidly or continuing, more or less or all of the nozzles will be opened, or as the fire spreads from one apartment to another the nozzles in that apartment will in their turn be opened. If the water be sufficient to throw the spray over a certain territory through one nozzle, the pressure will be reduced as each successive nozzle is opened, and as the pressure is thus reduced, the extent of area covered will be correspondingly reduced until, say, several are opened, the water will simply ooze out through the nozzle without any considerable extent of spray. It is a well-known fact that whereas under a given pressure a large discharge-opening will deliver the water with very little force, if the opening be reduced the force will be concentrated upon that smaller opening and the water thrown a correspondingly greater distance. The object of this spring L, arranged to bear against the valve, is to adapt this principle of reducing the discharge-opening in fire-extinguishers according as the pressure in the pipes is reduced, because of increased openings. The power of this spring L, together with the disk F, is adjusted according to the pressure of water, and so that when the plug shall have been released and the water liberated, as seen in broken lines, Fig. 2, the flow of water under the pressure will compress the spring to its full extent and force the distributer or disk away from the end of the plug to its full extent. The water thus striking the disk is deflected in all directions and distributed in the form of spray. Now, suppose a second distributer to be opened, the pressure of water, which before was on the single nozzle, will be divided between the two—that is, will be reduced—and such reduction will reduce the area which was covered by the distribution of water through the tube; but, because of the spring L, so soon as the second distributer is opened the spring reacts on the reduced pressure and forces the disk proportionately nearer the end of the tube, which will reduce the opening between the distributer and the end of the tube, so that while a less quantity of water will be discharged it will spread over the same area, and so when a third distributer is opened the two distributers previously open will be correspondingly reduced in opening. Each successive opening reducing the pressure will cause the previously-opened distributer to correspondingly and automatically contract their openings and their capacity, but without reducing the area covered.

In the arrangement of the spring L between the disk F and the valve, as I have shown and described, the disk may serve as auxiliary to the spring L in the action of contracting the outlet as the pressure is diminished.

While I prefer to make the disk F a full disk, as indicated in Figs. 1 and 2, a portion may be cut away, as indicated in broken lines, Fig. 3. I wish, therefore, by the term "disk" to be understood as embracing any suitable spring arranged to bear upon the spindle through the fusible support, and whereby the pressure of the water is resisted by the said spring through the fusible connection.

I have illustrated a common and well-known distributer as applied to the nozzle. My invention, however, is not to be understood as limited to any particular kind of distributer, as it may be employed with many known distributers.

I claim—

1. In a fire-extinguisher, the combination of a valve adapted to close the water-way, an elastic disk arranged outside of and in a plane substantially parallel with the said valve, the disk provided with a screw-threaded sleeve, G, the valve having a central spindle arranged to work through said sleeve, and a nut on said sleeve, with a bearing in said nut fusible at a low temperature, the said bearing adapted to support said valve in its closed position, and under the force of the elastic disk, substantially as described.

2. In a fire-extinguisher, the combination of the valve B, forming a water-deflector, an elastic disk arranged outside said deflector, and substantially parallel therewith, the said disk provided with a sleeve extending through it, the said valve provided with a spindle, C, corresponding to said sleeve, and so as to work through it as a guide, the said sleeve externally screw-threaded, and a nut upon said sleeve, provided with a fusible bearing adapted to bear upon the end of said spindle and support the valve in its closed position, substantially as described.

3. In a fire-extinguisher, the combination of the valve adapted to close the water-way, an elastic disk arranged outside of and in a plane substantially parallel with said valve, the disk provided with a sleeve extending through it, the said valve provided with a spindle corresponding to said sleeve, and so as to work through it as a guide, and a fusible bearing between said spindle and disk, substantially as described, and whereby said disk becomes

a support to hold the said valve in its closed position.

4. The combination of the spindle C, by which the flow of water is held in suspense, the elastic disk F, screw-threaded sleeve G, supported by said disk, and through which said spindle extends, the cup H, screw-threaded onto said sleeve and provided with a fusible support, *b*, against the end of the spindle, and the spring L, between said disk and spindle, substantially as described.

JOHN W. BISHOP.

Witnesses:
JOHN E. EARLE,
JOS. C. EARLE.