(No Model.)

J. W. BISHOP.

FIRE EXTINGUISHER.

No. 302,682. Patented July 29, 1884.

Fig 1

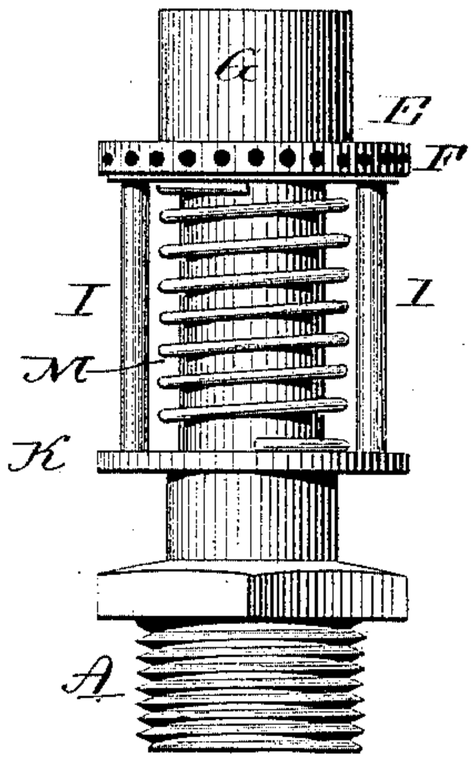


Fig 2

Fig 3

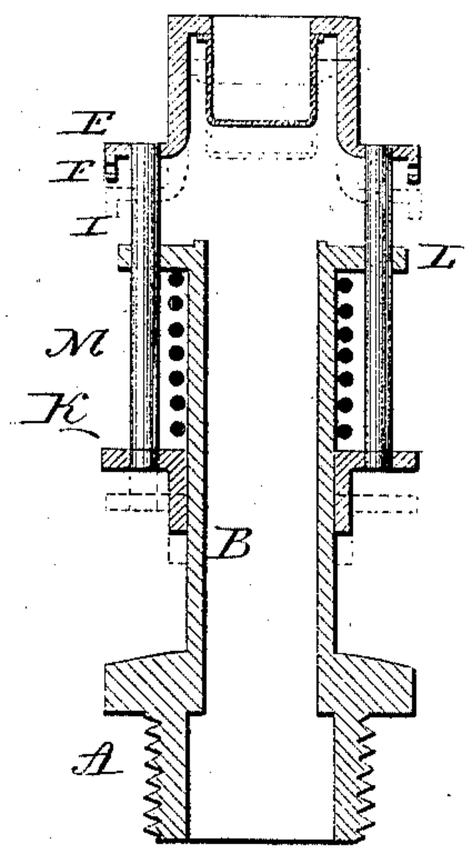


Fig 4

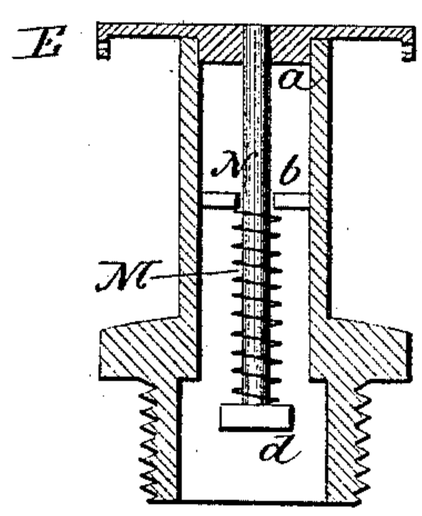


Fig 5

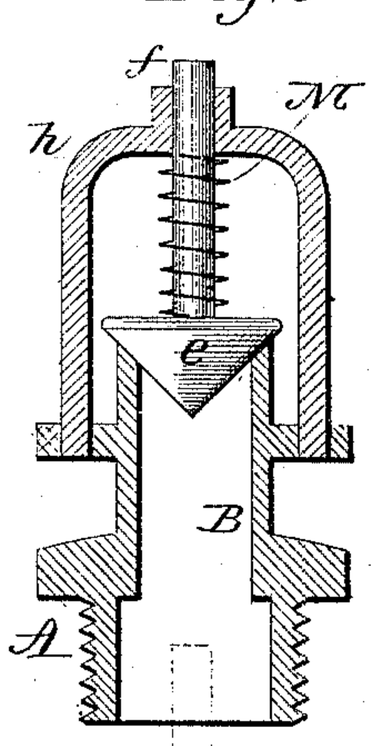
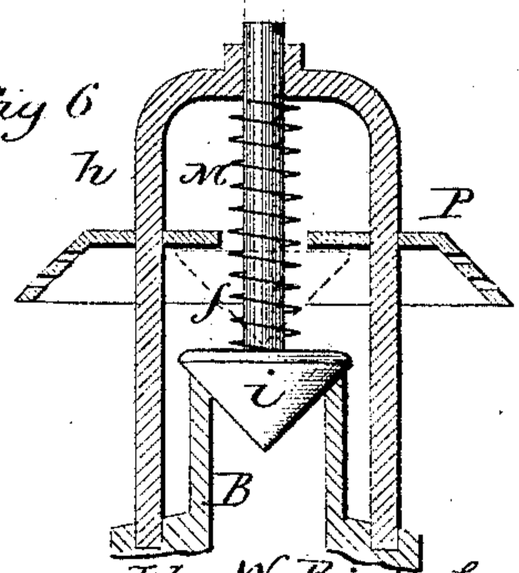


Fig 6



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JOHN W. BISHOP, OF NEW HAVEN, CONNECTICUT.

FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 302,682, dated July 29, 1884.

Application filed October 15, 1883. (No model.)

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 a new Improvement 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; Fig. 2, longitudinal central section in its closed condition; Fig. 3, longitudinal central section showing the condition when the water is liberated and under full pressure, broken lines indicating the action of the spring as the pressure is reduced; Figs. 4, 5, and 6, longitudinal sections of modifications.

This invention relates to an improvement in nozzles for that class of fire-extinguishers in which a tube is arranged in or around the apartment to be protected, conducting a forced supply of water, the tube provided with nozzles, each nozzle fitted with a seal to hold back the flow of water, the seal secured by some device which will be liberated by a comparatively low degree of heat, so that should an accidental fire occur in the apartment the heat therefrom will release the seal and permit the flow of water to extinguish the fire. These nozzles 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 the fire spreading rapidly or continuing, more or less, all of the nozzles will be opened; or, if the fire spread from one apartment to another, the nozzles in that apartment will in their turn be opened. If the supply of 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 when several are open 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, but if the opening be reduced the force will be concentrated upon the smaller opening, and the water thrown a correspondingly greater distance.

The object of my invention 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; and my invention consists in a fire-extinguisher nozzle having a distributer held against the flow of water under a spring-pressure, and so that when the flow of water is permitted the spring will be compressed according to the extent of pressure and opening, and as the pressure is reduced the spring will act automatically to reduce the opening, as more fully hereinafter described.

The best construction of nozzle embodying my invention known to me I illustrate in Figs. 1, 2, and 3.

A is the screw-collar, which fits the socket in the supply-pipe, by which the nozzle is held in place. From this socket a tube, B, projects, its outer end filled by a plug, C, of material fusible at a low degree of heat, or secured in the tube by a material fusible at a low degree of heat, and so as to hold back the supply of water. Inside this plug is a disk, D, of leather or any suitable flexible but non-fusable material a little larger in diameter than the tube B, and so as to stand against the plug C with the pressure of water upon it, and because of its greater diameter completely filling the passage water is prevented from contact with the plug C; hence, when heat comes upon that part of the nozzle sufficient to fuse the connection, the water will be prevented from passing out around the plug until it be entirely liberated; then the force of water will drive both the plug C and the disk D from the passage to leave a clear run for the water. This plug overcomes a difficulty which is experienced in this class of extinguishers arising from the fact that the securing material will fuse at one point quicker than another, and so soon as the passage is opened around the plug for the water the water will follow that opening, and tend to cool the plug and prevent the action of heat upon the remainder of the fusible material, and thus defeat the object of the extinguisher.

E is a cup-shaped disk set over the end of

the tube B, the side F of the disk toward the tube. The disk may be perforated, as shown, if desired. Upon the outside of this disk is a projection forming a chamber, G, a little larger in diameter than the plug C, and so that when liberated the plug C will be forced directly into the chamber G and there remain. This chamber has an opening, H, at its outer end, which will be closed by the plug C when it enters the chamber, as seen in Fig. 3. The disk E forms the distributer. It is connected by rods I I to a collar, K, around the tube and between the collar K, and a flange, L, which surrounds the end of the tube. A helical or other suitable spring, M, is arranged, taking its seat at one end upon the flange L, the other bearing upon the collar K. The force of the spring serves to hold the disk down upon the end of the tube, as seen in Figs. 1 and 2. The power of this spring is adjusted according to the pressure of water, and so that when the plug shall have been released, as in Fig. 3, and the water liberated, the flow of water under the pressure will compress the spring to its full extent and force the distributer or disk E away from the end of the tube to its fullest extent. The water then striking the disk is deflected in all directions and distributed in the form of spray. Now, suppose a second distributer 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 M, so soon as the second distributer is opened the spring reacts on the reduced pressure and draws the disk proportionately nearer the end of the tube—say as seen in broken lines, Fig. 3—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 opened will be correspondingly reduced in opening. Each successive opening reducing the pressure will cause the previously-opened distributers to correspondingly and automatically contract their openings or delivering capacity, but without reducing the area covered.

While I have illustrated the disk as guided by the collar outside the tube and the spring arranged to bear on the collar, the spring may be otherwise arranged—say as seen in Fig. 4—in which the disk E rests upon the end of the tube B in the same manner, the tube sealed either by the disk itself or a plug, *a*, from which plug or disk a spindle, N, extends concentrically into the tube through a bridge, *b*, the end of the spindle beyond the bridge provided with a head, *d*, and between the head and the bridge the spring M, arranged so as to act against the pressure of water, as in the first illustration; or the tube B may be closed by a valve-like plug, *e*, from which a spindle, *f*, extends forward through a yoke, *h*, and between the yoke and the back of the valve a spring, M, is arranged, acting against the pressure of the water, as in the first illustration. In this case the valve or plug becomes the distributer. Again, while I prefer to make the distributer movable, so as to contract the opening, the distributer may be fixed, as in Fig. 6, in which P represents the distributer fixed with relation to the end of the tube B. The end of the tube is closed, by, say, a conical plug, *i*, from which a spindle, *f*, extends outward, as in Fig. 5, passing through the distributer P, and into the yoke *h*, with the spring M arranged to bear the plug toward the end of the tube. When the supply is let on, the conical plug is thrown out against the distributer, as in broken lines. The water strikes the plug, turns it against the distributer, where it is deflected in the form of spray. Then as the pressure is reduced the plug turns toward the tube, and so as to reduce the discharge-opening. The discharge still striking the distributer under substantially the same force as before, but less in quantity, will be in like manner thrown out in the form of spray, and over substantially the same area. These illustrations are sufficient to show the numerous modifications to which my invention may be applied, and to show that my invention is not limited to any particular arrangement of the spring, it only being essential to my invention that there shall be a spring or its equivalent arranged to automatically reduce the flow-opening as the pressure at the flow is reduced, and so that as the pressure of water is applied it will compress the spring and open the flow, and then as the pressure of the water is diminished the spring will operate to correspondingly reduce the discharge-opening.

The plug and disk D may be employed in other extinguishing devices.

I claim—

1. In a fire-extinguisher, a nozzle at which the water is held in suspense by a plug or valve secured by a material fusible at a low degree of heat, a device, substantially such as described, movable under the pressure of the water when liberated to increase the flow-opening, combined with a spring acting upon said device and against the pressure of the water, whereby said device will be automatically forced to reduce the flow-opening as the pressure of the water on the said device is reduced after having been liberated through the opening of said securing material, substantially as described.

2. In a fire-extinguisher, a nozzle provided with a seal against the flow of water fusible at a low degree of heat, a distributer arranged with relation to the nozzle to receive the flow of water when liberated, and movable to open a passage for the escape of the water when it is liberated, combined with a spring arranged to bear the distributer against the pressure of

water when liberated, and so as to act automatically upon the distributer to reduce the outlet as the pressure from the flowing water is reduced, substantially as described.

3. The combination of the tube B, sealed with a connection fusible at a low degree of heat, the disk E, arranged over the end of the tube, a collar, K, around the tube, and connected with the disk, and the spring M around the tube between the collar and a flange on the tube, the tendency of the said spring being to hold the disk upon the end of the tube, but yield under pressure of water when liberated, substantially as described.

4. The combination of the tube B, the plug C, secured in the tube by a connection fusible at a low degree of heat, the disk E, constructed with the chamber G, into which the plug C will pass when liberated, the collar K around the tube and connected to the disk E, and the spring M, between the collar K and a corresponding flange on the tube, substantially as described.

5. In a fire-extinguisher, the tube B, the plug C, secured therein by a connection fusible at a low degree of heat, and the disk D, of flexible non-fusible material, and of larger diameter than the internal diameter of the tube in the tube against the plug, substantially as and for the purpose described.

JOHN W. BISHOP.

Witnesses:
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