

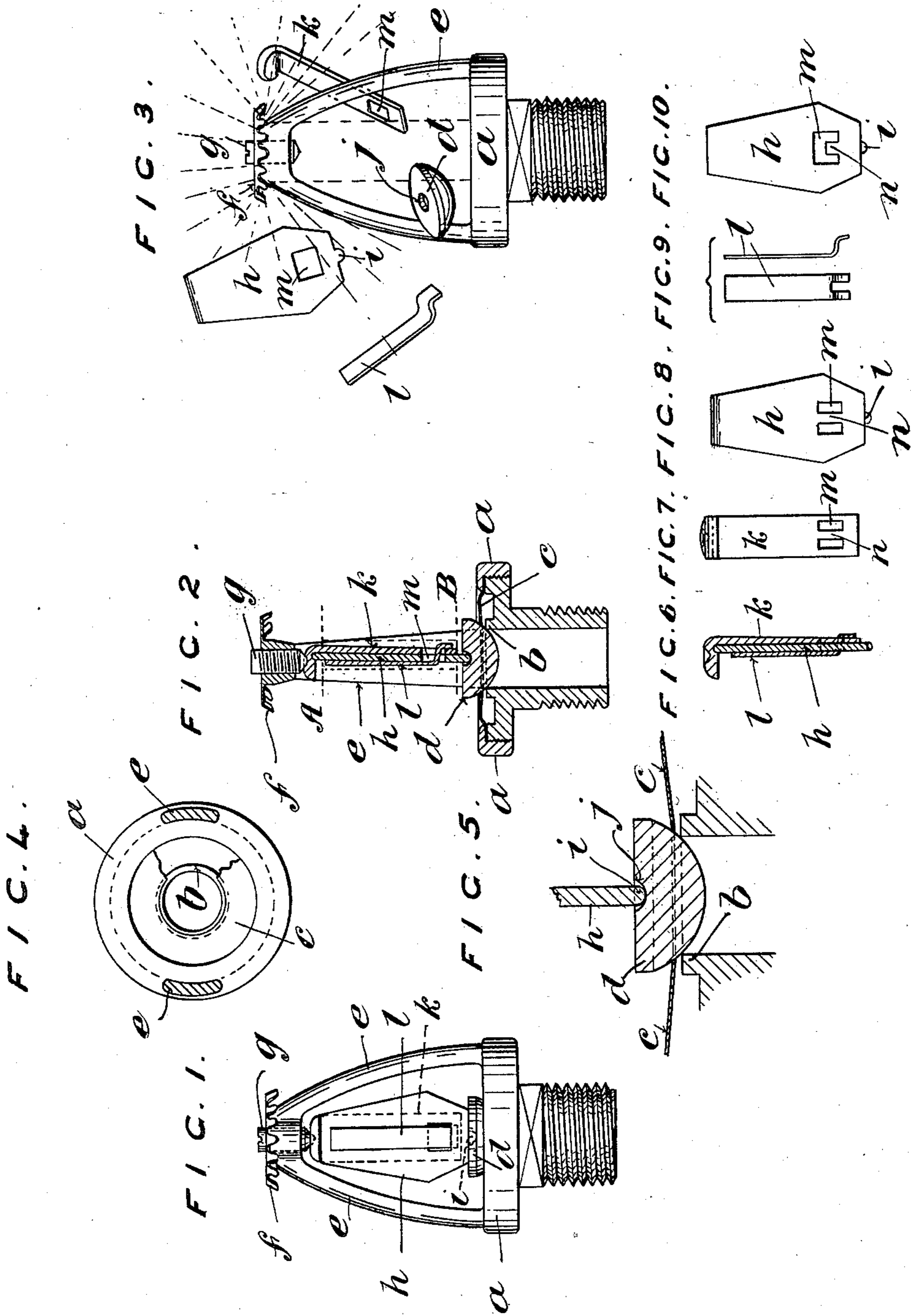
No. 704,682.

Patented July 15, 1902.

O. HOFFMANN.
AUTOMATIC FIRE EXTINGUISHER.

(Application filed July 18, 1901.)

(No Model.)



WITNESSES.
Isabella Kaldron
Adelaide Gleason

INVENTOR.
Otto Hoffmann
By his Attorneys *Richards & Co.*

UNITED STATES PATENT OFFICE.

OTTO HOFFMANN, OF WITHINGTON, ENGLAND.

AUTOMATIC FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 704,682, dated July 15, 1902.

Application filed July 18, 1901. Serial No. 68,780. (No model.)

To all whom it may concern:

Be it known that I, OTTO HOFFMANN, engineer, a subject of the Emperor of Germany, residing at West View, 18 Wellington road, Withington, near Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Automatic Fire-Extinguishers, (for which I have made application in Great Britain, No. 12,742, dated June 22, 1901,) of which the following is a specification.

My said invention has reference to improvements in automatic fire-extinguishers of the type known as "sprinklers," and relates particularly to the valves of such sprinklers and to the heat-actuated device for maintaining the valve on its seat. These sprinklers are commonly formed with a sunk diaphragm, having an orifice which constitutes a flexible valve-seat and against which the valve is pressed by a form of heat-actuated device or system of levers. Sprinklers of this type are subject to disadvantages in that leakage is liable to occur between the valve and its flexible seat, the diaphragm being also unfavorably affected by the pressure of the water thereon due to its relatively extensive area.

According to my invention I no longer employ the yielding diaphragm to act as a valve-seat, but merely as a spring or flipping device fixed between the valve and the valve-seat to eject the valve when the heat-actuated parts are dispersed, the valve-seat proper being specially formed below the diaphragm. In addition my invention further relates to a system of levers to maintain the valve upon its seat.

The accompanying sheet of drawings, to which I will now refer, clearly illustrates my invention.

Figure 1 shows my improved sprinkler in outside elevation. Fig. 2 is a sectional view taken at a right angle to Fig. 1. Fig. 3 shows the sprinkler at the moment of dispersal of the valve and the system of levers used to maintain the valve on its seat. Fig. 4 is a plan showing the ejecting-diaphragm and the valve-seat. Fig. 5 shows in sectional elevation, on an enlarged scale, the valve, the valve-seat, and the ejecting-diaphragm. The remaining figures show a modification in the construction of the system of levers.

In constructing a sprinkler in accordance with my invention I form the head *a* with a valve-seating *b*. Above this valve-seating I secure permanently a suitable flexible diaphragm *c*, preferably flush with the level of the sprinkler-head *a*. The diaphragm *c* is formed with a central orifice of a diameter larger than the valve-opening in the valve-seating *b*. The valve, which is preferably of metal, but may be of other suitable material, is superimposed on the said diaphragm *c*, which yields as the valve is forced against the valve-seat by means of the heat-actuated device or system of levers. The valve *d* may be semicircular or spherical, as shown, or conical, or of any other convenient formation. The sprinkler-head *a* has the usual arch or yoke *e*, serrated disperser *f*, and lever-adjusting screw *g*. With this arrangement leakage is no longer liable to take place, owing to the fact that the valve *d* may be forced against its rigid metallic seat *b* with any required degree of pressure. The arrangement also relieves the diaphragm *c* of the effects of pulsation and pressure in the pipes, the purpose served by the diaphragm, which, as has been stated, is secured to the sprinkler-head between the valve *d* and its seating *b*, being to rid the sprinkler of the valve on dispersal of the levers.

By relieving the diaphragm of excessive pressure I provide a most reliable and effective flipping device or flipper for insuring removal of the valve on failure of the levers.

By disposing the diaphragm flush with the face of the sprinkler-head a flat or practically flat surface is presented and no annular recess or depression is formed for the accumulation of dirt or foreign matter likely to objectionably affect the action of the parts.

I may employ any suitable heat-actuated device for maintaining the valve *d* on its seat; but a further part of my invention consists of a novel system of levers, (shown in the drawings,) which I will now describe.

Referring in the first place to Figs. 1 to 3, I employ a strut *h*, a ball or extension *i* on the end of the strut being disposed within a socket *j*, formed in the valve *d*. The other end of the strut *h* is rounded and is arranged in a correspondingly-shaped socket formed in a lever *k*. The rounded end of the strut

5 *h* turns easily in the socket formed in the lever *k* and is not liable to be distorted by pressure, as would be the case if a knife-edge were employed. The adjusting-screw *g* fits into
 10 a recess formed in the end of the lever *k*. It will be noted from an inspection of Fig. 2 that the strut *h* engages with the lever *k* out of the vertical center, so that when pressure is brought to bear upon the lever *k* by means
 15 of the adjusting-screw *g* the strut *h* forms a fulcrum upon which the lever *k* tends to turn. To resist this tendency, I employ a key *l*, the end of which is bent and is passed through an aperture *m*, formed in the strut *h* and lever *k*, as more clearly shown in Fig. 2. The
 20 key *l* and the lever *k* are both secured by means of fusible metal to the strut *h*, and when thus connected considerable pressure may be brought to bear upon the valve *d* by means of the screw *g*, so that not only is the valve *d* thus thrust securely upon its seat, but also the flexible diaphragm is subjected to pressure and caused to yield. This will be
 25 more readily seen from an inspection of the enlarged view, Fig. 5. The area of the fusible metal which secures the lever *k* and key *l* to the strut *h* is practically the same at each side of the strut *h* and extends from A to B, Fig. 2, or thereabout. This arrangement is very
 30 important, as the heat will act equally upon the fusible metal, securing the lever *k* and the key *l*, and as the metal is melted the limit of resistance of each limb *k* and *l* synchronizes, and the dispersal is effected simultaneously.
 35 Fig. 3 shows the parts at the moment of dispersal.

40 Figs. 6 to 10 show a slight modification of the system of levers. In this arrangement the key *l* is formed with a forked end, as shown in the front and side view, respectively, Fig. 9. The lever *k*, Fig. 7, and the strut *h*, Fig. 8, are provided with corresponding apertures *m*, through which the forked end of the key *l*

passes. The tongue *n* thus forms a fulcrum on which the key *l* turns at the moment of dispersal of the parts, so as to insure the disengagement of the key *l* from the strut *h* and lever *k*. The tongue *n* may be formed as shown in Fig. 10, if desired.

It will be noticed that the lever *k* and key *l* are soldered by their inner faces to the strut *h* on either side lengthwise of said strut for about the same distance. This is an important point, as by this construction the heat acts equally on either side and melts the solder simultaneously on both sides, thus insuring the simultaneous dispersal of all the elements.

I declare that what I claim is—

In a strut for automatic sprinklers for fire extinguishers to be placed between the valve and yoke of such sprinkler, the combination with a bar adapted to engage at one end one of said parts of the sprinkler, of a lever fulcrumed upon the other end of the bar and adapted to engage the other of said parts, said bar and lever being soldered to each other along their sides and having registering apertures near their ends opposite the fulcrum, a portion of the bar projecting into the aperture therein to form a fulcrum for a key, the key soldered to the face of the bar opposite the lever, the soldered portions of said lever and key extending substantially the same distances lengthwise of the bar and directly opposite each other, said key engaging said fulcrum therefor and having a forked and bent end passing through the apertures and engaging the outer surface of the lever.

In witness whereof I have hereunto set my hand in presence of two witnesses.

OTTO HOFFMANN.

Witnesses:

W. T. BAINES,
JOSHUA ENTWISLE.