(No Model.)

R. J. GILMORE.

AUTOMATIC FIRE EXTINGUISHER.

No. 488,003. Patented Dec. 13, 1892.

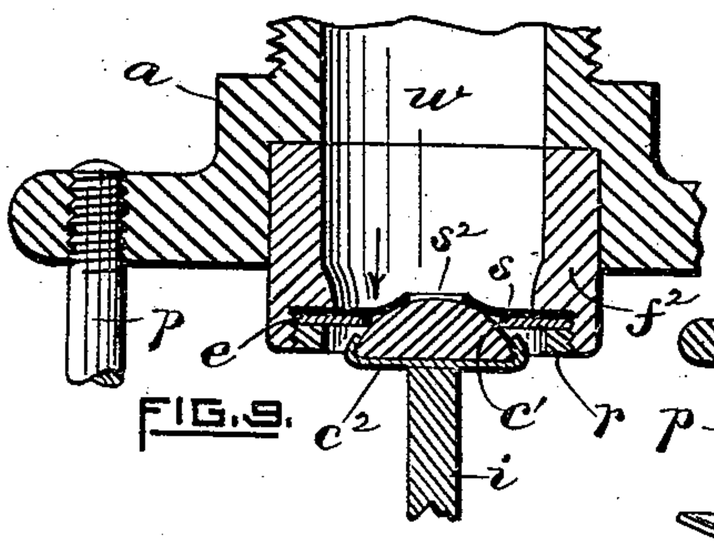
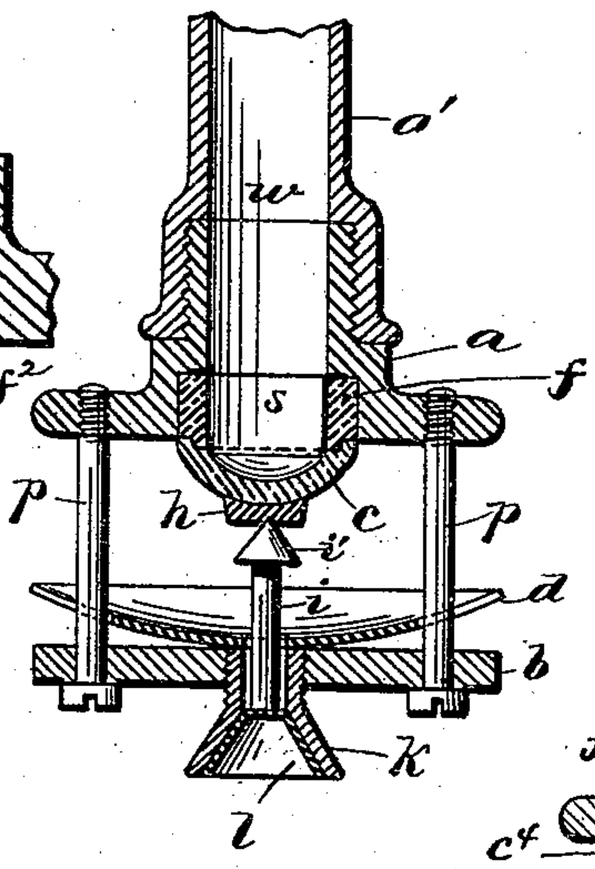


FIG. 9.



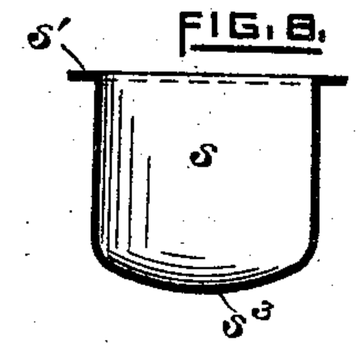


FIG. 8.

FIG. 1.

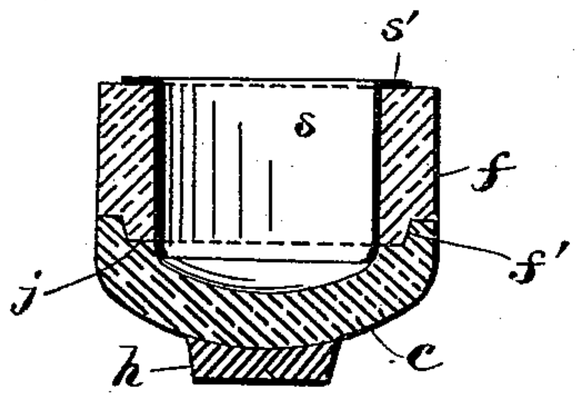


FIG. 4.

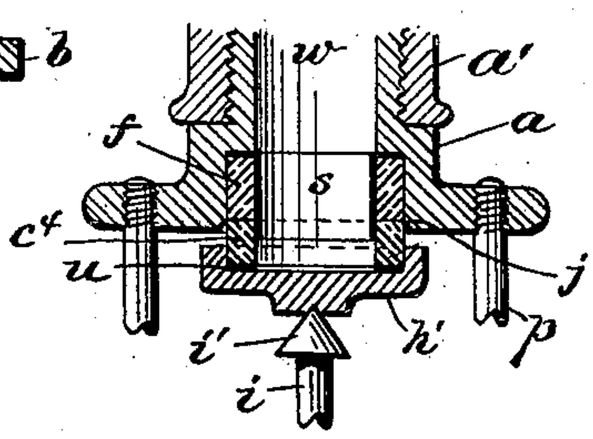


FIG. 11.

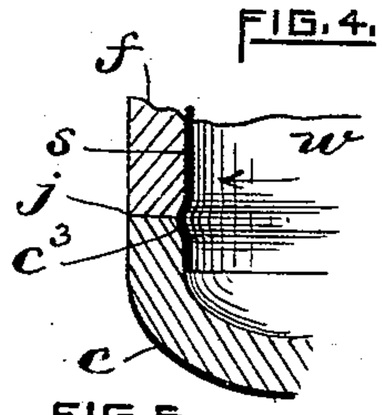


FIG. 5.

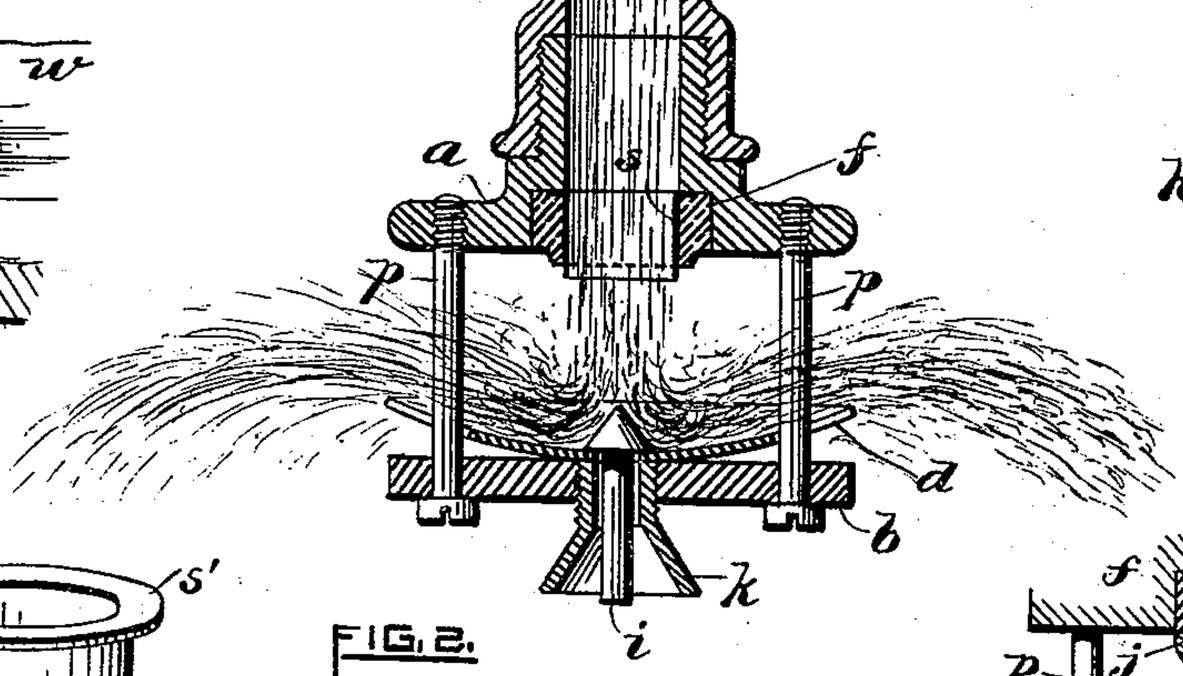


FIG. 2.

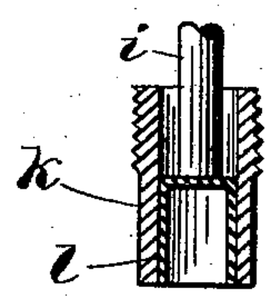


FIG. 10.

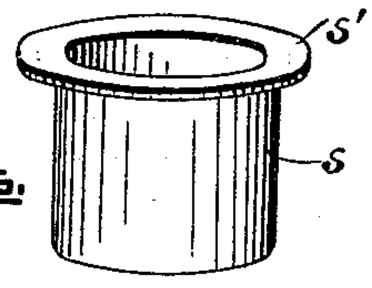


FIG. 6.

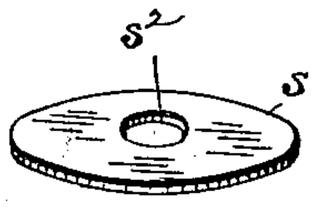


FIG. 7.

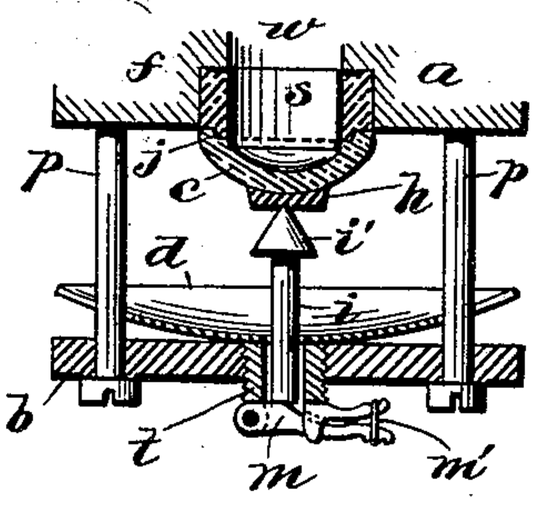


FIG. 3.

WITNESSES.

Charles Hannigan.

Ida M. Warren.

INVENTOR.

Robert J. Gilmore.

by Remington & Henthorn

"

Attys.

UNITED STATES PATENT OFFICE.

ROBERT J. GILMORE, OF PROVIDENCE, RHODE ISLAND.

AUTOMATIC FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 488,003, dated December 13, 1892.

Application filed January 27, 1892. Serial No. 419,414. (No model.)

To all whom it may concern:

Be it known that I, ROBERT J. GILMORE, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Automatic Fire-Extinguishers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My present invention relates to automatic "fire-extinguishers," so called; and it consists, essentially, in the combination, with a valve-seat and valve, of a thin flexible seal of impervious material in immediate contact with and covering the valve-joint, all as will be more fully hereinafter set forth and claimed.

Hitherto it has been the usual practice in the manufacture of automatic fire-extinguishers, &c., to fit the valves to the seats by grinding or scraping the adjacent surfaces or faces to prevent the air, gas, or fluid contained in the piping system from leaking out through the valve-joints. Sometimes compressible materials have been interposed between the faces of the valve and seat, the parts being snugly kept in contact by connections or levers arranged to be released by heat, as in the case of fire. There are objections to such former methods of construction. The cost of the apparatus or extinguisher is increased by reason of the labor involved in scraping or grinding the valve to the seat. Packing interposed between the joint-faces is unreliable and frequently becomes useless, particularly so when it is in contact with the water standing in the extinguishers, and also when the latter are employed in a sprinkler system located, say, in chemical works, the result in such cases being to so corrode the surfaces together that the internal pressure (such as usually carried) will be insufficient to force the valve or cap from the seat after the releasing mechanism has been liberated by heat arising from the fire.

The object I seek to attain is to provide automatic fire-extinguishers, &c., with means whereby they are rendered more efficient and reliable, the device also serving to prevent the valve and seat from corroding to a great extent. With my invention the inner edge of the valve-joint of the fire-extinguisher is separated from the air, water, or gas under pressure by means of an interposed short thin flexible tube (or disk, as the case may be) of impervious material, which serves as a seal. The pressure of the water or air forces the seal laterally against the walls of the seat and valve and across the inner edge of the valve-joint. The strength of the sealing material when reduced to the desired thickness—say one one-hundredth of an inch, more or less—is very limited and offers no appreciable resistance to the decapping of the extinguisher when the releasing mechanism is freed. Neither does it obstruct the flow of water through the extinguisher after the valve or cap has been unseated.

In the accompanying sheet of drawings, Figure 1 is a vertical central sectional view showing an automatic fire-extinguisher embodying my improvement, the device being in its normal position. Fig. 2 is a similar view showing the device in action. Fig. 3 is a similar sectional view showing another manner of retaining the valve in position. Fig. 4 is an enlarged central sectional view showing a valve and seat made of non-metallic material, the valve-joint being covered with the flexible seal. Fig. 5 is a partial sectional view of the valve and seat showing how the seal when under pressure is adapted to accommodate itself to uneven surfaces. Fig. 6 is a perspective view of the seal itself as adapted to the foregoing arrangement of parts. Fig. 7 is a perspective view of the seal when used in a disk form. Fig. 8 is a sectional view of the seal similar to that shown in Fig. 6, but having a closed end. Fig. 9 is a sectional view of the lower portion of another form of extinguisher or automatic sprinkler provided with my improvement or seal, the latter being also represented in Fig. 7. Fig. 10 is a partial sectional view showing a manner of securing the valve-spindle in position, and Fig. 11 is a sectional view showing my improvement applied to a sprinkler having a tubular seat and valve made of glass.

It is assumed that the functions and manner of operation of automatic sprinklers or

fire-extinguishers are well understood, particularly such as are provided with valves or caps held in position by levers secured in place by low-fusing solder or metal adapted to melt by heat, as in the case of an incipient fire.

In the drawings, *a* indicates the head portion of the sprinkler, arranged to be screwed to a supply-pipe *a'*, forming a part of the usual piping system.

b is the base or yoke, secured to the head *a* by screws *p*, or these parts may be fastened together in any well-known manner. The head is provided with a central hole communicating directly with the pipe *a'* and is further provided with a valve-seat *f*, which may be integral with the head or it may be insertible, as represented in the drawings. In the latter case the head is counterbored and the seat let into it, as in Figs. 1, 2, 3, and 11. In order to prevent corrosion, the seats may be made of non-metallic material, as porcelain, glass, &c. The valve proper or cap *c* may also be made of the same material as the seat. In such case the circular joint-faces may be rabbeted, as at *f'*, Fig. 4, &c., and the parts placed together as molded or cast and without grinding.

In the drawings the yoke *b* is provided with an annular screw *k* and deflector *d*. The lower portion of the screw is adapted to receive a plug *l* of thin metal, the two parts being secured together by low-fusing solder. Resting upon the end of the plug is the valve-supporting rod *i*, having its upper end *i'* pointed and in contact with a pressure-plate *h*, arranged to receive the cap *c*. The plug *l* may be cylindrical, as shown in Fig. 10, or in lieu thereof the end of the rod *i* may rest upon a lever *m*, Fig. 3, held in position at its free end by a link *m'*, secured thereto by low-fusing metal.

My invention resides, mainly, in the employment of an interior seal *s*, of suitable flexible material, as rubber, tin-foil, or other impervious material or substance adapted to be reduced to a very thin state. In the drawings the thickness of the seal is exaggerated. I prefer to make the seal in the form of a thimble, as in Figs. 1, 4, and 6, provided with the top flange *s'*, the latter adapted to be interposed between the head and seat to retain the seal in position when in use. The cylindrical portion of the seal extends downwardly past and entirely around the internal portion of the valve-joint *j*, as clearly shown. The diameter of the seal is substantially the same as that of the water-passage *w*. It will be seen that the seal bears against the seat and valve at the same time. The lower end of the seal may be closed, as indicated at s^3, Fig. 8, although I usually prefer the open form represented in the other figures.

In Fig. 9 I have represented my improvement combined with a well-known form of sprinkler—that is, a sprinkler having a slightly-yielding seat *e*, of metal, having the form of an annulus. The seat-holder f^2 may be insertible, as drawn, or integral with the head *a*. The seat is held in place by the annular screw or nut *r*. The valve *c'* is plano-convex in form and is made of porcelain or other suitable material. Its base is protected and strengthened by a sheet-metal disk c^2, spun around the valve, the latter in turn being supported by the valve-rod *i*, as before described, or in any suitable manner. In this style of sprinkler I make the seal *s* in the form of a disk and provide it with a central hole s^2. (See, also, Fig. 7.) The seal is firmly retained in position on top of the seat *e* by said screw *r*. Without the seal the valve is very liable to leak, owing to the limited seating area, &c. Moreover, internal pressure acting upon the inelastic (although springy) metallic seat has a tendency to depress or crimp the seat next to the point of support, thereby, as it were, slightly elevating the central portion away from the valve, it being remembered that the latter cannot move upwardly after the sprinkler has been once set or adjusted. With my improvement, however, the defect just referred to is overcome, because the seal is so thin and flexible that even under a slight pressure it will conform to the shape of the seat and valve and snugly bear against both, thereby sealing the valve-joint and preventing the escape of air or liquid confined within the sprinkler.

In sprinklers provided with a seal *s* it is obvious that upon placing the valve or cap *c* in position to engage the seat the seal will be deflected toward the center by the curvature of the valve, as in Figs. 4, 9, &c., thereby lapping onto the valve. When the sprinkler is brought into service through the medium of heat acting to fuse the solder, as common to automatic extinguishers of this class, the internal pressure (whether of a "dry" or "wet" system) forces the valve or cap from its seat, followed by a flow of water, as in Fig. 2. At the same time the lower end of the seal *s* will be forced through the seat-opening. The force required even to rupture the thin seal is very small indeed when the latter is unsupported by the valve.

In Fig. 11 the seat *f* and valve or movable cap c^4 are made of pieces cut from a glass tube, the seal *s* extending below and covering the joint *j*, as before described. The bottom end of the valve c^4 is provided with a plate *h'*, supported by the rod *i*, also as before described. A packing *u*, made of rubber, is interposed between the plate and valve, as clearly shown.

I claim as my invention—

1. In combination with a valve-seat, a valve bearing against the same and a flexible seal covering the joint between the valve and its seat by overlapping the same, substantially as described.

2. In combination with a valve-seat, a movable valve and a flexible seal covering the joint between the valve and seat by overlap-

ping the same, said seal being secured at one edge to the stationary part, substantially as described.

3. In an automatic fire-extinguisher, the combination of the head portion having a glass or other suitable non-metallic seat fitted therein, a non-metallic valve or cap bearing against said seat, an interiorly-mounted thin flexible tubular seal *s*, covering the valve-joint or seam and in contact with the adjacent surface of the valve and seat, and mechanism holding the valve in normal contact with the seat arranged to be released by heat upon the breaking out of a fire, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

ROBT. J. GILMORE.

Witnesses:
GEO. H. REMINGTON,
CHARLES HANNIGAN.