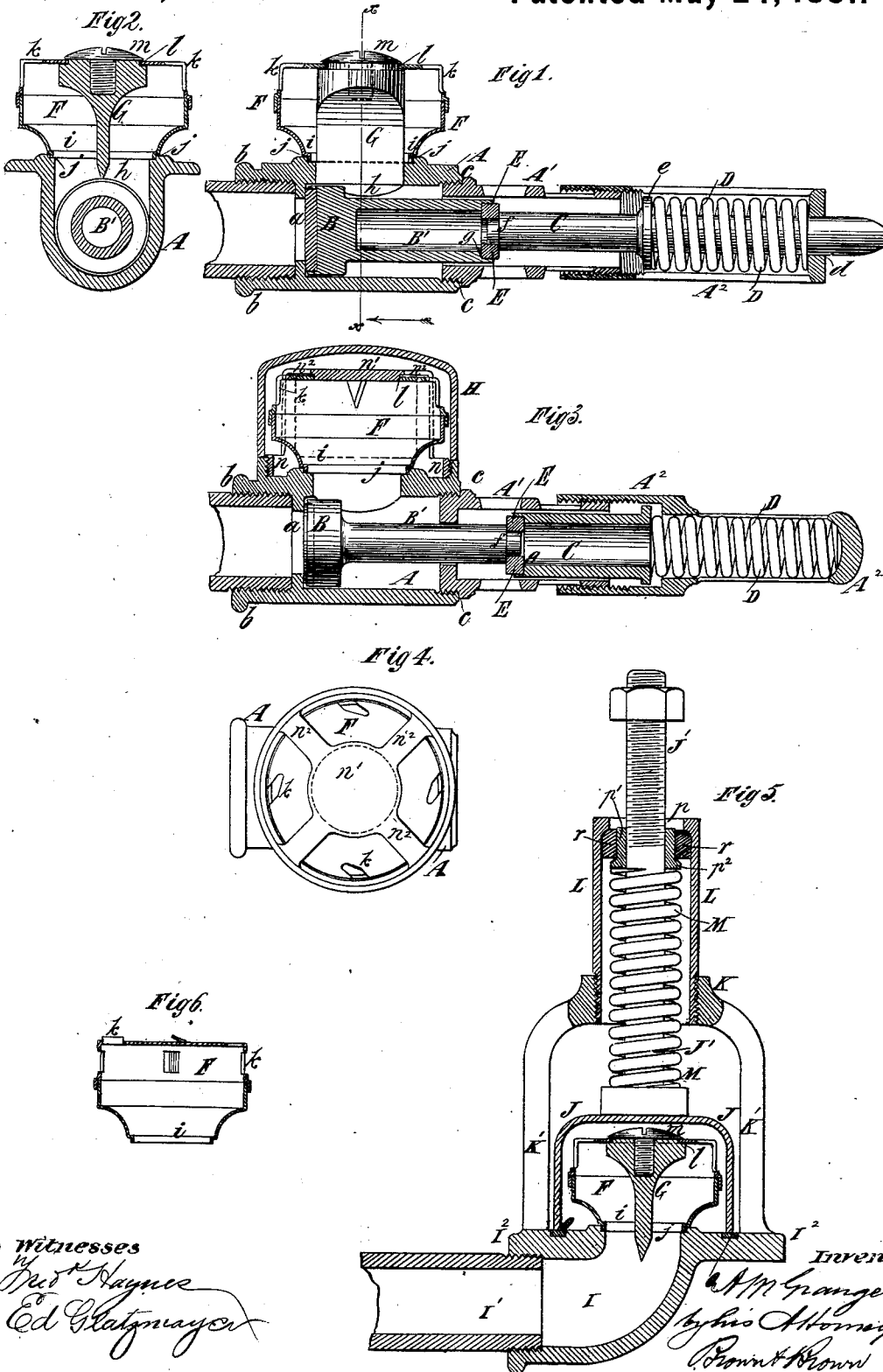


(Model.)

A. M. GRANGER.
Sprinkler for Fire Extinguishers.

No. 241,973.

Patented May 24, 1881.



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UNITED STATES PATENT OFFICE.

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SPRINKLER FOR FIRE-EXTINGUISHERS.

SPECIFICATION forming part of Letters Patent No. 241,973, dated May 24, 1881.

Application filed February 14, 1881. (Model.)

To all whom it may concern:

Be it known that I, ALMON M. GRANGER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Sprinklers or Distributers for Fire-Extinguishers and other Purposes, of which the following is a specification.

One part of my invention relates more especially to rotary sprinklers or distributers to be attached to water-pipes within a room or building, and which are provided with valves which control the passage of water through them, and which are retained closed by means of a readily fusible metal or alloy, until, by a fire, the temperature within the room or building is raised sufficiently to melt the fusible metal or alloy, whereupon the valve will be released automatically and the sprinkler set in operation. This part of the invention is applicable also to rotary sprinklers for other uses.

The rotary sprinklers in common use are provided with tangential openings which cause them to be rotated by the passage of water through them, and in some cases, the supply pipe or chamber with which such a sprinkler is used has projecting from its side a hollow cylindric neck which has openings in its periphery for the passage of water into the sprinkler, and upon which the sprinkler is free to turn, as is shown in Letters Patent No. 237,517, granted to me February 8, 1881. Such a hollow perforated neck greatly retards the velocity of water passing from the supply pipe or chamber to the sprinkler, and as these sprinklers having tangential openings are rotated by the velocity of water issuing from said openings, their efficiency is impaired.

One object of my invention is to obviate this difficulty, and to this end the invention consists in the combination of a rotating sprinkler or distributor having tangential openings and a contracted throat or base, a supply pipe or chamber having an open seat upon which the sprinkler or distributor is adapted to turn and through which water may pass directly into the sprinkler or distributor at the contracted throat or base, and thence upward and outward to the tangential openings, and

a stationary bearing fitting an opening in the end of the sprinkler or distributor opposite the throat or base, and upon which said sprinkler or distributor may turn.

The invention also consists in a novel combination, in an automatic fire-extinguisher sprinkler, of a valve and stem, a spring for holding said valve to its seat, an auxiliary stem upon which the spring acts directly, and a piece of fusible metal or alloy through which the auxiliary stem transmits the pressure of said spring to the main valve-stem and thence to the valve itself. Either the main valve-stem or the auxiliary stem is tubular, and when the piece of fusible metal or alloy melts, the pressure of water forces the valve outward from its seat and the main stem slides freely within or outside of the auxiliary stem.

The invention also consists in a novel construction of rotating sprinkler whereby I am enabled to make it of sheet metal, and therefore more cheaply than if it were of cast metal.

In the accompanying drawings, Figure 1 represents a central longitudinal section through a sprinkler and valve embodying my invention. Fig. 2 represents a transverse section upon the dotted line *xx*, Fig. 1. Fig. 3 represents a longitudinal section through a sprinkler and valve embodying a modified form of my invention. Fig. 4 represents a plan of the said modification. Fig. 5 represents a central vertical section of still another modified form of sprinkler and valve also embodying my invention, and Fig. 6 represents a central section of my improved rotating sprinkler.

Similar letters of reference designate corresponding parts in all the figures.

Referring, first, to Figs. 1 and 2, A designates a shell or body which constitutes a supply-chamber for the sprinkler, and is provided with a valve-seat, *a*, a screw-threaded end, *b*, for the reception of a water-supply pipe, and a screw-threaded end, *c*, for the reception of a casing composed of two parts, *A'* *A*².

B designates a valve fitted to the seat *a*, and provided with a tubular stem, *B'*, rigidly fixed to it; and C designates an auxiliary stem, which is smaller in diameter than the interior of the main stem *B'*. The auxiliary stem C projects

through a hole, *d*, in the rear end of the part *A*² of the casing, whereby it is guided, and it is provided with a fixed collar, *e*, between which and the end of the part *A*² is fitted a spiral spring, *D*.

E designates a piece of fusible metal or alloy through which the pressure of the spring *D* is transmitted from the auxiliary stem *C* to the main stem *B'*, and which is here shown as made in the form of a collar fitting upon the turned-down end *f* of the auxiliary stem *C*, and resting in an annular recess, *g*, in the end of the tubular main stem *B'*; but the fusible metal might be in the form of a disk and the end of the auxiliary stem impinge against it. The spring *D*, being confined between the end of the case *A*² and the collar *e*, exerts a pressure upon the auxiliary stem *C*, and this pressure is transmitted through the piece of fusible metal *E* to the main stem *B'*, and holds the valve *D* tightly to its seat. When the fusible metal *E* begins to melt by heat the expansion of the spring still holds the valve to its seat and prevents any water from entering until the metal *E* is all fused, whereupon the valve *B* is opened by the water-pressure, the main stem *B'* sliding over the auxiliary stem *C*.

The valve shell or body *A* has in its side an opening, *h*; and *F* designates a sprinkler or distributor consisting of a hollow shell or chamber, contracted at its throat or base *i* and resting upon a seat, *j*, which surrounds the opening *h*, thus forming an open seat. The sprinkler *F* has tangential openings *k*, and the water entering through the open seat passes directly through the throat or base *i*, and thence upward and outward to and through the tangential openings *k*, serving to rotate the sprinkler or distributor by its reaction. Thus it will be seen that the direction of the water is directly upward from the supply-chamber, and as the water is not materially turned from its course its velocity is not lessened and the efficiency of the sprinkler is increased.

G designates a solid stem, which is made very narrow, as seen in Fig. 2, at its lower end, and forms a bridge extending across the open seat *j*, it being cast in one piece with the body *A*. The opposite sides of this stem *G* diverge upward from the narrow lower end, as seen in Fig. 2, so as to gradually spread the water outward, and its upper end is made round and extends through an opening, *l*, in the sprinkler *F*, which is secured thereon by a screw, *m*. The stem *G* might, however, have a screw-threaded projection at its end and the sprinkler be secured by a nut; but in any case the upper part of the stem forms a bearing upon which the sprinkler or distributor may turn.

Turning now, to Figs. 3 and 4, *A* designates the shell or body; *A'* *A*², the casing; *B*, the valve; *B'*, the main stem; *C*, the auxiliary stem, and *D* the spring. In this case the auxiliary stem does not extend through the end of the casing *A*² or through the spring, and the main stem *B'* is solid and of a size that will slide within the

tubular auxiliary stem *C*. *E* designates the piece of fusible metal which is fitted upon the turned-down end *f* of the main stem *B'*, and fits in a recess, *g*, in the end of the tubular auxiliary stem *C*. The operation of these parts is similar to the operation of the devices shown in Fig. 1.

In the shell or body is the open seat *j*; but in this case the opening is not obstructed in any way, but forms a direct and unimpeded passage directly upward through the throat or base *i* of the sprinkler *F*. The sprinkler *F* is retained in place upon its seat by means of a skeleton-frame composed of a ring, *n*, screwed upon the body *A*, a central hub or web, *n'*, fitting in the opening *l* in the top of the sprinkler *F*, and arms *n*², connecting said web and ring, thus retaining the sprinkler by external means.

H designates a cap, which may be made of glass or other suitable material and rests upon the ring *n*. This cap rests loosely over the sprinkler, and while it prevents the latter from being choked by dust or dirt, it is readily thrown off when water is admitted to the sprinkler *F* by the force of the water issuing from the tangential openings *k*.

Turning, now, to Fig. 5, *I* designates a supply-chamber, with which the supply-pipe *I'* communicates, and which has a flange, *I*², in which is an open seat, *j*, upon which is fitted a rotating sprinkler, *F*. The sprinkler is retained in place by a solid central stem, *G*, made narrow at its lower end, and a screw, *m*, as seen in Figs. 1 and 2.

The valve *J* employed in this example of my invention is of inverted cup-shape, of a size to fit over the sprinkler *F*, and resting upon a packing, *o*. The sprinkler and valve are always filled with water, which is, however, kept from escaping by the packing *o*.

K designates a ring or socket, supported by arms *K'* from the flange *I*², and *L* is a cylindrical case screwed therein and having an opening, *p*, in its top.

The valve *J* has a rigidly-attached stem, *J'*, projecting upward through the case, and having a sleeve, *p'*, fitting loosely upon it.

M designates a spiral spring inserted between the top of the valve *J* and the sleeve *p'*, and upon the exterior of the sleeve is fitted a ring or collar, *r*, of fusible alloy, which is too large to pass through the opening *p*, and is held by a shoulder, *p*², upon the sleeve from movement in the other direction. The fusible collar *r* forms a stop for the spring, and thus the valve *J* is held tightly to its seat until the collar is melted by heat, when the sleeve *p'* will slip through the opening *p*, and the pressure of the spring *D* will be taken off the valve *J*, permitting it to be opened by the pressure of water.

This device presents no novel features, except the manner of retaining the sprinkler *F* in place.

The sprinklers shown might be composed of a single piece of cast metal; but in order to

cheapen their construction I may form them of two cup-shaped parts, as seen in Fig. 6, which may be drawn up from sheet metal, and are slipped one within the other and secured together by solder. In the lower part is a contracted throat or base, *i*, and in the upper part are formed the tangential openings *k*.

I am aware that sprinklers or distributors have been made of spherical form, and provided with radial nozzles bent at their outer ends, so that liquid issuing from them will react upon the nozzles and turn the sprinkler or distributor; but such sprinklers or distributors have no bearing at the end opposite the throat or base, and are much more expensive than my simple sprinkler or distributor provided with tangential openings.

I am also aware that lawn-sprinklers have been formed with a thick metal ring having tangential openings or perforations which is adapted to rotate between a portion of a coupling for a hose and a metal cap-plate. Such sprinklers are, however, heavy, and have no contracted throat or base, and therefore the water-inlet is nearly as large as the diameter of the sprinkler, and a large pipe or hose is necessary.

I do not claim either of the above-described sprinklers as of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a rotating sprinkler or distributor, having tangential openings and a contracted throat or base, a supply pipe or chamber having an open seat upon which said sprinkler or distributor is adapted to turn, and through which water may pass directly into the distributor at the contracted throat or base and thence upward and outward to the tangential openings therein, and a stationary bearing fitting an opening in the end of the sprinkler or distributor opposite the throat or base, and upon which said sprinkler or distributor may turn, substantially as herein specified.

2. The combination of the sprinkler or distributor *F*, having the contracted throat or base *i*, the tangential openings *k*, and the opening *l*, the supply-chamber *A*, having an open seat, *j*, and the stem *G*, fitting at the outer end in the opening *l*, and forming a bearing upon which said sprinkler or distributor may turn, substantially as specified.

3. The chamber or body *A*, having an open seat, *j*, and the stem *G*, the opposite sides of which diverge upward, in combination with the rotating sprinkler or distributor *F*, substantially as specified.

4. In an automatic fire-extinguisher, sprinkler, or distributor, the combination of a valve and main stem, an auxiliary stem, a spring acting upon said auxiliary stem to hold the valve to its seat, and a piece of fusible metal or alloy through which the pressure of the spring is transmitted to the main stem and valve, substantially as specified.

5. In an automatic fire-extinguisher, sprinkler, or distributor, the combination of a valve and main stem, a tubular auxiliary stem, a spring acting upon said auxiliary stem to hold the valve to its seat, and a piece of fusible metal or alloy through which the pressure of the spring is transmitted to the main stem and valve, substantially as specified.

6. A rotating sprinkler or distributor composed of two cup-shaped parts inverted one upon the other and secured together, one of said parts having a central open throat or base for the passage of water to the sprinkler or distributor, and the other part having tangential openings for the discharge of water, substantially as specified.

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Witnesses:

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