

(No Model.)

2 Sheets—Sheet 1.

A. F. NAGLE.
AUTOMATIC SPRINKLER.

No. 428,053.

Patented May 13, 1890.

Fig. 1.

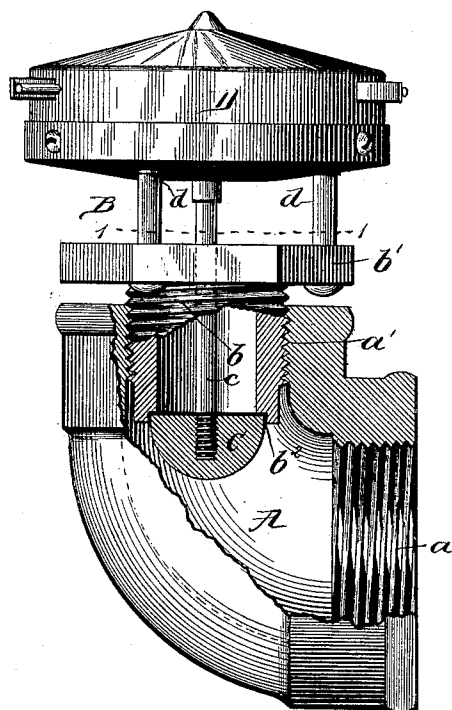


Fig. 2.

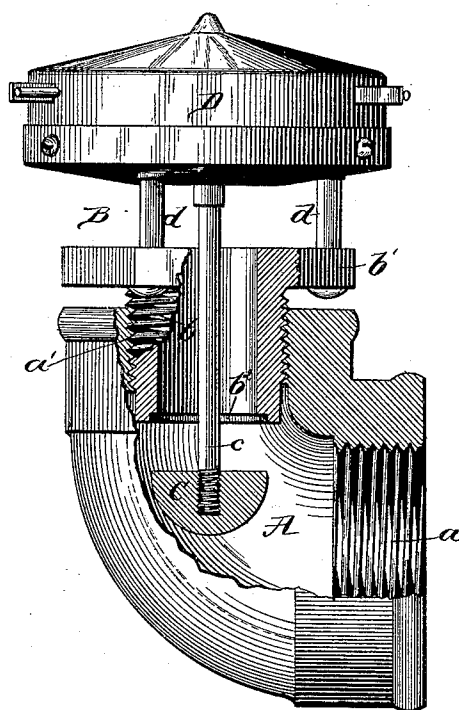
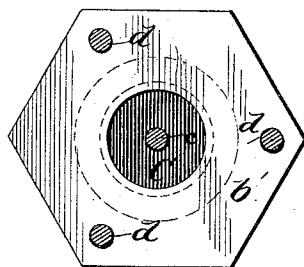


Fig. 3.



witnesses
off. H. J. Fort
A. M. Best

inventor
Augustus F. Nagle
By Leoburn T. Thacher
Attys

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2 Sheets—Sheet 2.

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Fig. 4.

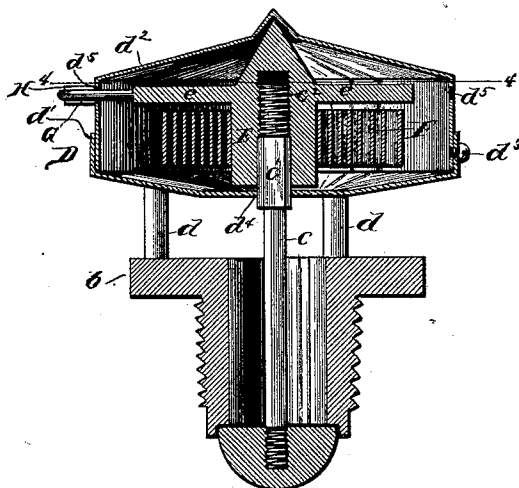


Fig. 5.

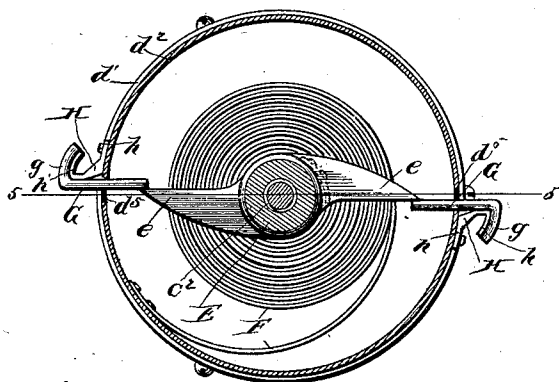
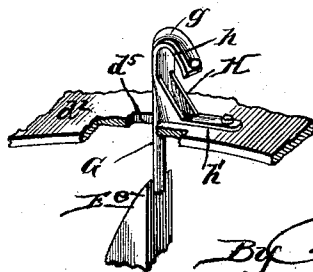


Fig. 6.



Witnesses
W. S. F. H.
C. Feigel.

Inventor
Augustus F. Nagle.

By C. W. Brown & Co.
Attys

UNITED STATES PATENT OFFICE.

AUGUSTUS F. NAGLE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE NAGLE
AUTOMATIC SPRINKLER COMPANY, OF SAME PLACE.

AUTOMATIC SPRINKLER.

SPECIFICATION forming part of Letters Patent No. 428,053, dated May 13, 1890.

Application filed September 26, 1889. Serial No. 325,167. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS F. NAGLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Sprinklers, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of the end of a distributing-pipe and a sprinkler applied containing my improvement, partly in section and broken away and with the cap closed; Fig. 2, a similar view with the cap open; Fig. 3, a plan section taken on the line 1 1 of Fig. 1; Fig. 4, a vertical section of the sprinkler, taken on the line 5 5 of Fig. 5; Fig. 5, a plan section of the same, taken on the line 4 4 of Fig. 4; and Fig. 6, a detail perspective showing the stop for the spring and a portion of the case, taken on an enlarged scale.

My invention relates to sprinklers, or "sprinkler-heads," as they are sometimes called, which are applied to the ends of the distributing-pipes in the ordinary construction and arrangement of automatic fire-extinguishing apparatus.

The invention relates to the opening and closing of the valve, and is an improvement upon the sprinkler described and shown in my prior application, Serial No. 317,711. The outlets of these automatic sprinklers have generally been closed heretofore either by a plug soldered over the outside of the outlet with a low-fusing solder or by valves of various construction held in place by springs or levers. The first method is objectionable, because the solder, being in contact with the internal fluid and expelled by the fluid-pressure, is too slow in opening the outlet, although it provides a perfectly air and water tight stopper and one not likely to give away without the action of heat. The second method, while providing a more sensitive stopper, involves great difficulty in making the valves perfectly air and water tight and at the same time secure against internal fluid-pressure and the strain of the device used to close the valve; hence this method is also objectionable.

My present invention is designed to obviate both of these difficulties and at the same time secure the advantages of both.

It consists in placing a cap over the inside of the outlet and cementing it in place with asphaltum or some similar material, so that the cap will be perfectly air and water tight, and, in connection with the internal pressure of the fluid in the pipes, will be held perfectly secure in place. The cemented cap is raised from its seat by any suitable exterior device.

In the drawings, A represents the nozzle or terminal of a distributing-pipe, being shown in the drawings as threaded at each opening, the section *a* adapting it to be fitted to the end of the pipe and the section *a'* adapting it to receive the threaded nozzle or stem of the sprinkler. The sprinkler B has a cylindrical stem or nozzle *b*, which is threaded so as to be fitted in the threaded end *a'*, just mentioned above. The outer end of this stem is provided with quite a wide flange *b'*, extending outward and preferably of polygonal shape to afford means for turning the sprinkler into the threaded end of the pipe-nozzle. The inner end of the stem *b* is preferably recessed slightly, as seen at *b²*, which is for the purpose of providing a better seat for a cap C, which is nicely fitted to this seat on the inner end of the sprinkler-stem. This cap is attached to a stem *c*, which passes outward through the outlet of the sprinkler and furnishes the means whereby the cap is moved in the interior of the nozzle when the sprinkler is screwed thereto. The cap, when seated on the stem of the sprinkler, as shown in Fig. 1 of the drawings, forms a stopper to this outlet; but in order to make the joint perfectly air and water tight it is sealed or cemented by asphaltum or any other similar material which will make a perfectly tight joint and at the same time may be broken with comparative ease. The cap is automatically lifted from its seat by forcing it inward through its stem *c* by any suitable exterior device. The device shown in the drawings for accomplishing this purpose I will now briefly describe, but simply for illustration, as this device constitutes the subject-matter of a separate application heretofore filed by me, and the pres-

ent invention is not limited to these special devices for lifting the cap, which may be employed with any suitable device adapted to effect the result desired. A circular case D is mounted on the flange *b* by means of short posts *d*. This case is somewhat convex, both at top and bottom, and is preferably made in two parts *d'* *d''*, the latter fitting within the former and the two fastened together by screws *d'''* or any other suitable device. The case also answers as a distributor, and for this purpose the convexity of the bottom or inner face is desirable. In this bottom or inner face of the case there is also a central angular opening *d''*, which accommodates the stem *c* of the cap, this stem being provided with an angular section *c'*, corresponding to the said opening, so that the stem may slide back and forth within the latter, but can not turn therein. The stem *c* passes into the case, and at its extremity within the latter is provided with a threaded section *c''*. A nut E is fitted to turn upon this threaded end of the stem *c* and is provided with two or more radial arms or projections *e*, extending outward nearly to the wall of the case. In the side of the case, near the top thereof, a series of short slots *d''* are cut corresponding in number and having the same relative arrangement as the arms on the nut. A spring F, something like a clock-spring, is arranged within the case and inside of the projections on the nut. The inner end of this spring is fastened to the nut, while the outer end is fastened to the inside of the case, as seen in Fig. 5 of the drawings. By turning the nut in the proper direction it is evident that the spring will be coiled around it and that when so coiled, if released, it will operate to rotate the nut, thereby causing it to turn on the threaded end of the stem and so drive the latter inward, the stem being held from rotation, as already described, and the opening in the nut being large enough to turn freely around the angular section of the stem. When the nut is in proper position within the case and this action of the springs occurs, the rotation of the nut and the strength of the spring will be sufficient to drive the stem inward and lift the cap from its seat. To provide for the automatic action required in fire-extinguishers, stop-pins G are provided, being straight with the exception of a hook or turn *g* at one end. These pins are inserted in the side slots of the case and are long enough to reach inward, so as to stand in front of the arms on the nut and so form stops against the movement of the latter when the pins are fastened in place. The fastening of the pins is accomplished by soldering their outer bent ends to a suitable support, which, as shown in the drawings, is a small bracket H, having a base *h*, by which it is secured to the outside of the case and a vertical arm *h'*, extending outward from the case and bent at its extremity to correspond to the hook on the stop-pins. The end of the pins is hooked over this bent end of the

bracket, as seen in Fig. 6 of the drawings, and is secured in this position by soldering. The spring being wound up and the stops inserted and secured, as seen in Fig. 5 of the drawings, before the top or outer portion of the case is put in position, the latter is then applied by turning the nut on the projecting end of the cap-stem and the parts secured together, as already described, and the sprinklers are then ready to be applied to the pipes, being in the form shown in Fig. 4 of the drawings. In case of fire, the solder which holds the stop-pins is melted, thereby releasing the nut, which is then turned by the force of the spring in the proper direction to set the stem inward and lift the cap.

With this improvement no spring or any other device is required back of the cap to assist in holding it to its seat; but it is securely held in position by the fluid-pressure in the pipes and the sealing material. Furthermore, it is not necessary to make such a careful fitting between the cap and its seat as is usual, for the reason that the sealing material perfectly closes the joint and makes it absolutely fluid-tight, even though the fitting of the two metallic parts may be somewhat imperfect. When force is applied to the cap from without, the seal will be broken away at once and not gradually, as in the case of the old soldering device. There is no strain upon the cap which would tend to break the joint, and the sealing is not affected by corrosion or any other effect of either air or water, so that the cap remains perfectly closed for any length of time. It will be seen, therefore, that with this device for closing the nozzle of the sprinkler I obtain all the advantages of the stoppers heretofore used, as mentioned above, and at the same time avoid their defects, to which I have alluded.

It will be seen that the cap is readily seated on the stem or nozzle of the sprinkler and sealed in position before the latter is applied to the pipes, the sprinkler prepared for application to the pipes being in the condition shown in Fig. 1 of the drawings when it is screwed into the pipe terminal, as already described.

I do not wish to be understood as confining this improvement to the actual details of construction and arrangement shown in the drawings and described above, for the sealed cap may be applied in different situations and in connection with different devices and yet retain the main feature of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In automatic sprinklers for fire-extinguishers, an internally-seated cap arranged within the nozzle or pipe so as to be opened inward and sealed upon its seat with asphaltum or other like material, substantially as and for the purposes specified.

2. In automatic sprinklers for fire-extin-

guishers, the nozzle by which it is attached
to the pipes, in combination with a cap
seated at the inner end of the nozzle within
the pipes and sealed upon its seat by as-
5 phaltum or other similar material, and an
automatic device for breaking the seal and
forcing the cap inward, adapted to be released

and set in operation by heat, substantially as
and for the purposes specified.

AUGUSTUS F. NAGLE.

Witnesses:

CARRIE FEIGEL

A. M. BEST.