

(No Model.)

A. M. GRANGER.
Automatic Fire Extinguishing Sprinkler.

No. 237,517.

Patented Feb. 8, 1881.

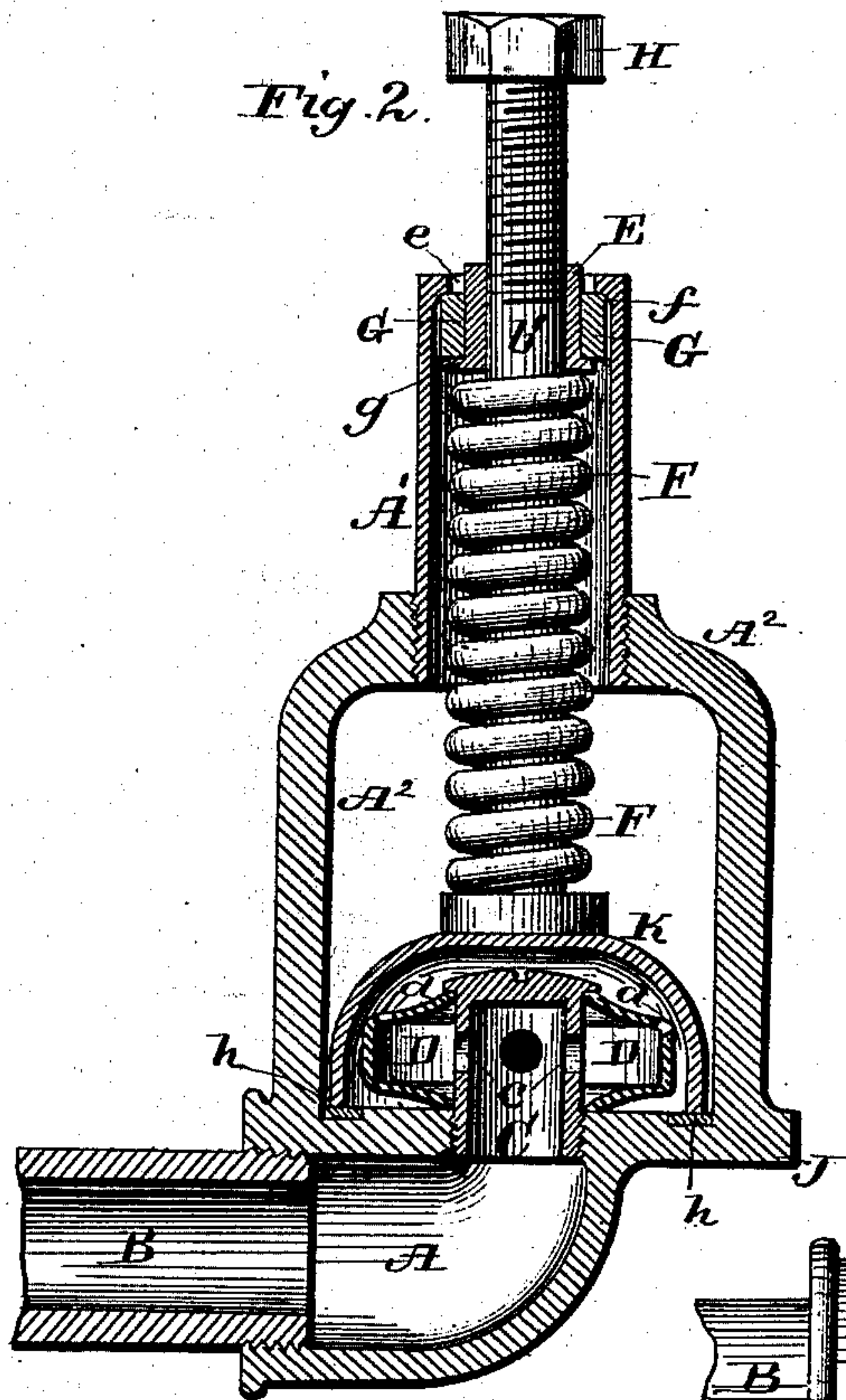
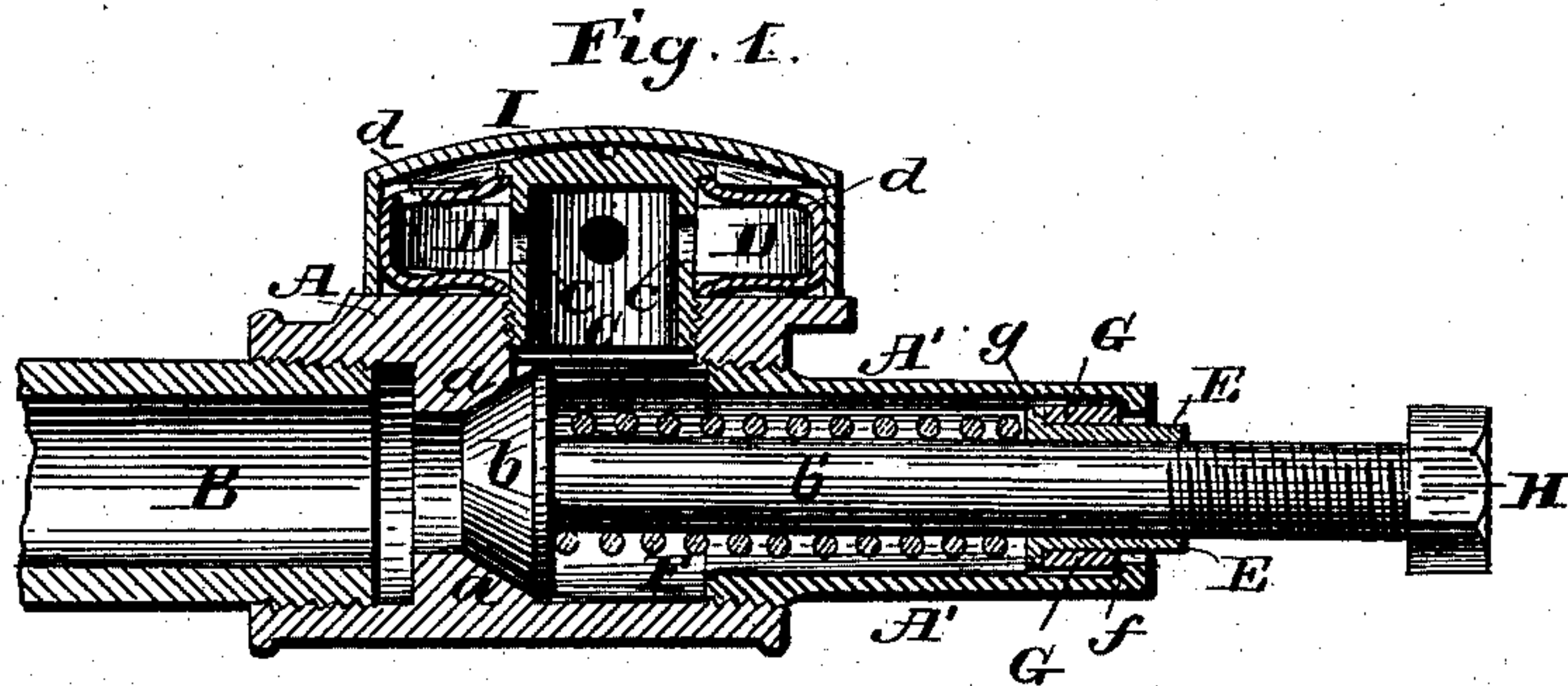


Fig. 3.

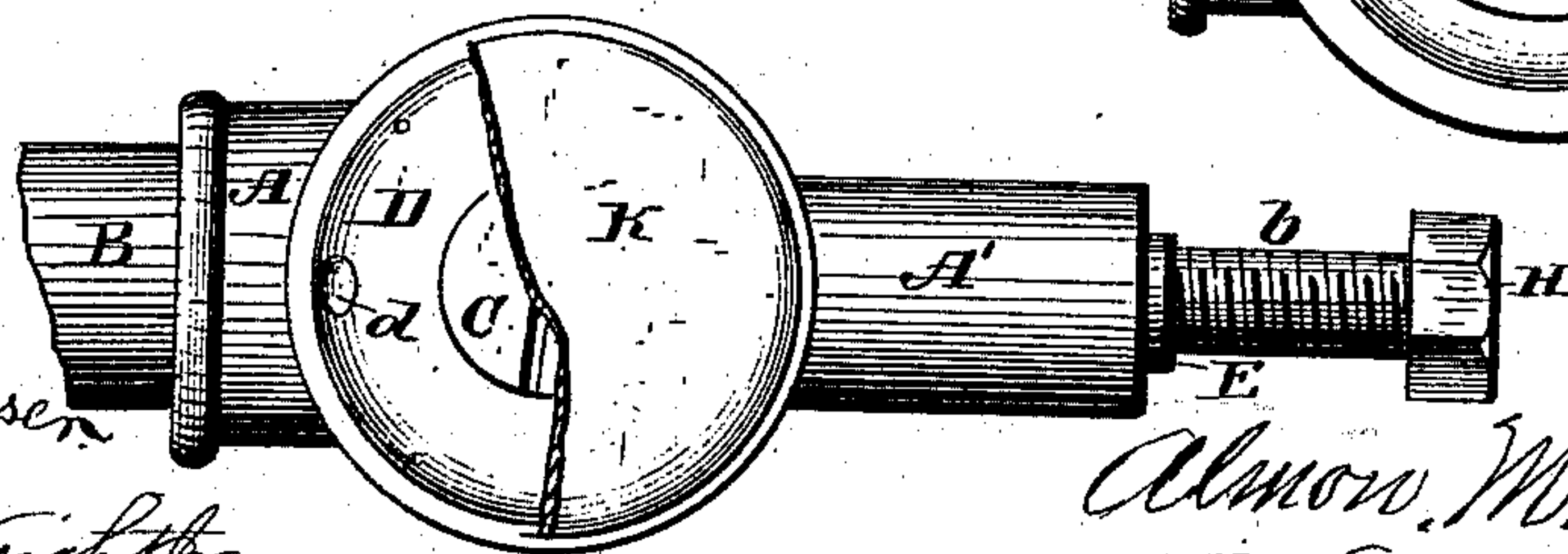
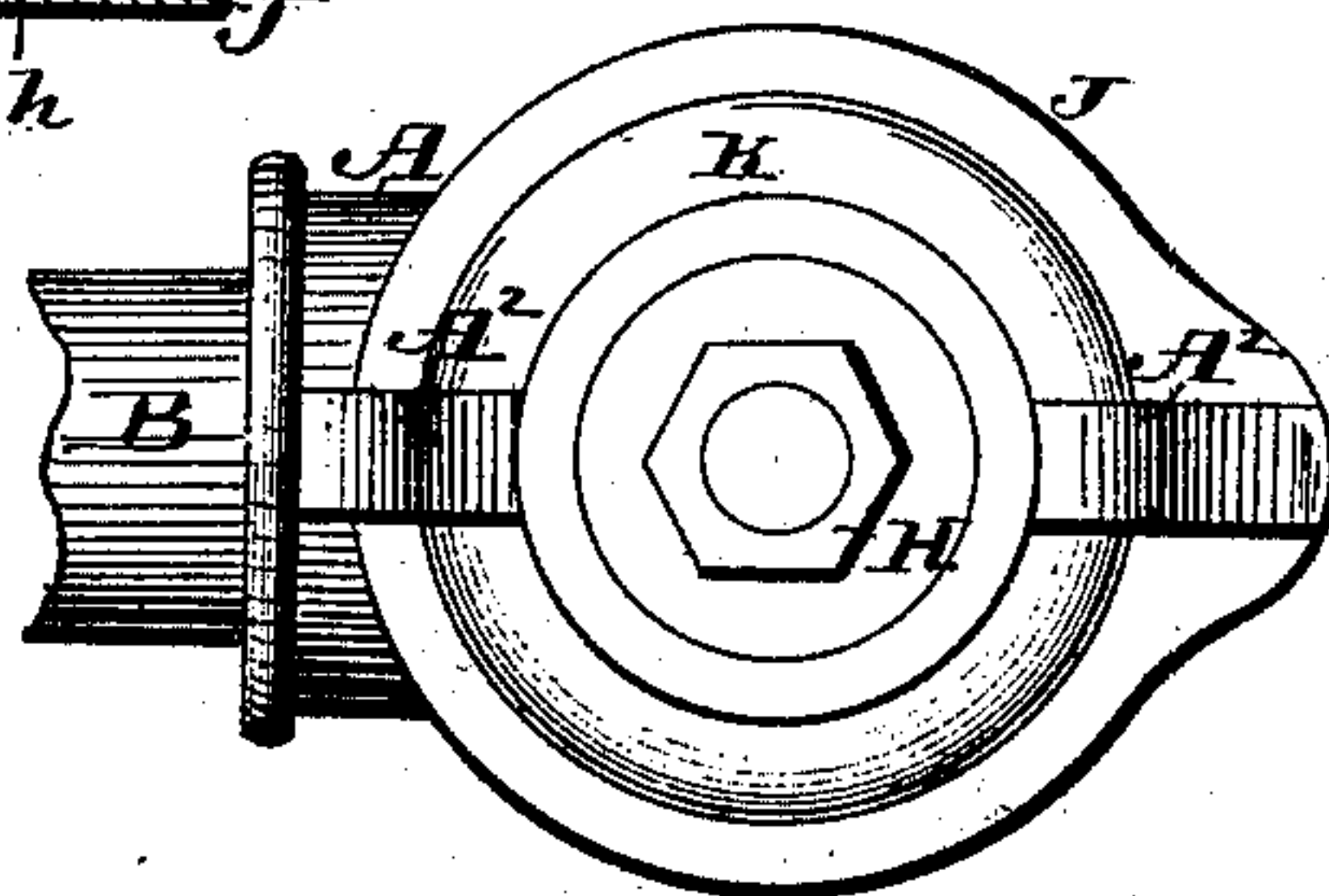


Fig. 4.



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AUTOMATIC FIRE-EXTINGUISHING SPRINKLER.

SPECIFICATION forming part of Letters Patent No. 237,517, dated February 8, 1881.

Application filed December 4, 1880. (No 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 Automatic Fire-Extinguishing Sprinklers, of which the following is a specification.

My invention relates to sprinklers which are attached to water-pipes within a room or building and are provided with valves which control the passage of water through them, and which are retained closed by means of a readily-fusible metal until, by a fire, the temperature of the room or building is raised sufficiently to melt or fuse said metal, whereupon the valve will be released automatically and the sprinkler set in operation. The fusible metal is frequently applied in the form of a film of soft solder, uniting two closely-fitting metallic surfaces by soldering them together; but this method is objectionable, because upon the solder commencing to melt the valve will open very slightly and permit the water to pass into contact with the soldered part or parts, thus retarding the fusing of the metal.

The object of my invention is to enable such valves to be held closed by means of a spring and a piece of metal fusible at a low temperature, which is made separable from the parts of the sprinkler, whereby the valve is held tightly to its seat until it is suddenly released and opened wide.

To this end my invention consists in the combination, in an automatic fire-extinguishing sprinkler, of a valve, a spring for holding said valve to its seat, and a piece of fusible metal or alloy against which said spring bears, and which forms a stop to hold said spring compressed, so that it will exert a pressure upon the valve to hold it tightly to its seat until said piece is melted, whereupon the valve will be relieved of the pressure of the spring, and will be opened to permit of the passage of water. The fusible metal or alloy is preferably in the form of a ring or collar fitting loosely around the stem or a sleeve thereon, and the end of said ring or collar bears against a shoulder in the shell, and thereby is enabled to serve as a stop for the spring.

It also consists in novel features of construction to be hereinafter described.

In the accompanying drawings, Figure 1 represents a central longitudinal section through a sprinkler embodying my invention, and Fig. 3 represents a plan thereof. Fig. 2 represents a central vertical section of a sprinkler of modified form, also embodying my invention, and Fig. 4 represents a plan thereof.

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

Referring first to Fig. 1, A designates the main portion of a shell or body, having at one end a screw-thread for the reception of a water-supply pipe, B, and at the other end a screw-thread for the attachment of a removable shell or body portion, A', which is of tubular form.

In the portion A of the shell or body is a valve-seat, *a*, and *b* designates a valve fitting said seat and controlling the passage of water through the sprinkler. In rear of the valve is a hollow nipple, C, screwed into the shell, and having fitting upon it a sprinkling device, D, with which it communicates by openings *c*, and which is provided with openings or perforations *d*, through which the water escapes.

The openings or perforations *d* are preferably tangential to the sprinkling device D, so that the issuance of water from them will cause the sprinkling device D to rotate; but the construction of the parts C and D forms no part of my invention.

The valve *b* is provided with a stem, *b'*, passing loosely through an opening, *e*, in the end of the tubular shell or body portion A', and the said portion A' has an internal shoulder, *f*.

E designates a sleeve fitting loosely upon the stem *b'*, and having at its inner end a flange, *g*, which is small enough to pass through the hole *e*, which receives the stem *b'*; and F designates a spiral spring surrounding said stem and fitting between the flanged end of said sleeve E and the back of the valve *b*. Upon the sleeve E is a piece, G, represented as in the form of a collar or ring, and composed of a metallic composition or alloy which is fusible at a comparatively low temperature. This collar is larger in diameter than the flange *g* on the sleeve E, and is too large to pass through the hole *e*, and consequently, when the tubular shell portion A' is screwed into the part A, the shoulders *f* bear upon the collar G,

and the latter transmits the pressure through the spring F, to the valve *b* in line with its axis, holding the valve tightly closed. The flanged sleeve E might perhaps be dispensed with and the fusible collar G fitted upon the stem *b'*; but I prefer to use both said sleeve and collar.

When the part A' of the shell is to be inserted into the part A, and when the spring F is extended, it would require considerable force to compress the spring sufficiently for the screw-threads on the two parts to engage; and to obviate this difficulty I preferably form a screw-thread on the end of the stem *b'*, and apply thereto a nut, H. If said nut is turned inward on the stem it will bear on the end of the sleeve E, and thereby the spring F may be compressed until, when the valve is inserted into the portion A of the shell, the screw-thread on the part A' will readily engage with that on the part A. The nut H is then to be unscrewed, as seen in the drawings, which represent the sprinkler in its normal inoperative condition. When the temperature is raised by a fire above the fusing-point of the collar G, said collar will gradually melt, but the spring meanwhile holds the valve tightly against the seat, and no water can escape and come in contact with the fusible collar to retard its fusion. As soon, however, as said collar is melted, so that it can pass through the hole *e*, it is forced through by force of the spring, and the valve is suddenly released and opened by the water-pressure and the sprinkler set in operation. The sudden expansion of the spring forces the sleeve E against the nut H with a sharp blow, and this aids the water-pressure to open the valve, and said nut also prevents the sleeve E and spring F from being thrown off the stem and lost; but although the nut is very desirable it is not a necessary part of my invention and may be dispensed with.

By simply unscrewing the part A' at any time the valve can be examined to ascertain whether it is in an operative condition, and after the operation of the sprinkler a new fusible collar may be readily substituted for the one destroyed and the sprinkler prepared for a second operation.

It is also obvious that if a lever be applied to the stem *b'* behind the nut H, the valve *b* may be drawn back from its seat against the force of the spring, and if water escapes freely through the sprinkler it will be evident that the device is operative, and that the pipes or passages are not clogged or choked. When the valve is thrown open its flat back will abut against the end of the shell portion A' and serve, in a measure, to prevent water from escaping round the stem through the opening *e*.

Inasmuch as the sleeve E or the ring or collar G is loosely fitted upon the stem, the valve may be turned in its seat by a tool applied to the stem, affording provision for grinding in the valve, in case of leakage, without detaching the sprinkler from its supply-pipe, and in such case the pressure of the spring

upon the back of the valve will be advantageous.

As clearly shown in Fig. 1, the shoulder *f* upon the part A', and the front face of the flange *g* on the sleeve E, are both inclined or rounded, and hence when the ring G melts the sleeve will readily pass through the opening *e*, and will not be held by said flange catching against said shoulder. The shoulder *f* being inclined or rounded, and the valve and seat being conical, the two will tend to hold the valve and stem centrally in the shell or body in putting the parts together.

In order to prevent the sprinkling device D from being clogged with dust and dirt, I may cover the same with a loose cap or cover, I, which will be at once thrown off by the force of the water at the commencement of the operation.

In the device shown in Fig. 2 the tubular part A' of the shell, with its appurtenances, is the same as that previously described, the same letters of reference being used to indicate such parts; but for the part A of the shell I substitute a skeleton frame, A², having a bottom plate, J. The sprinkling device D is arranged above said plate and is supplied with water by a pipe, B. Instead of the form of valve shown in Fig. 1, I employ a valve, K, of inverted-cup shape, fitting over the sprinkling device D and resting upon a seat on the plate J, formed by a packing-ring, *h*, the valve being held to said seat by the spring F bearing upon its back. In this form of my invention the sprinkling device D is constantly filled with water, and as soon as the valve K is released it is raised by the force of the water and the operation of the sprinkler commences.

By my invention I provide an automatic sprinkler which is certain in its operation, and in which the valve is released suddenly and not gradually.

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

1. The combination, in an automatic fire-extinguishing sprinkler, of a valve, a spring for holding said valve to its seat against the water-pressure, and a piece of fusible alloy forming a stop for said spring, substantially as specified.

2. The combination, in an automatic fire-extinguishing sprinkler, of a valve, a spring for holding said valve to its seat, and a ring or collar of fusible alloy fitting loosely upon the stem of said valve and forming a stop for said spring, whereby provision is afforded for both turning the valve and stem and moving them longitudinally, substantially as specified.

3. The combination, in an automatic fire-extinguishing sprinkler, of a valve controlling the passage of water through the same and a valve-stem projecting therefrom, a fusible collar surrounding said stem, a spring arranged between said collar and the back of the valve, and a shell or body portion having an internal shoulder against which said collar bears, substantially as and for the purpose specified.

4. The combination, in an automatic fire-extinguishing sprinkler, of a valve controlling the passage of water through the same and a stem projecting therefrom, a fusible collar surrounding said stem, a spring arranged between said collar and the back of the valve, and a shell or body portion having an opening in its end large enough for the passage of said stem but smaller than said fusible collar, substantially as and for the purpose specified.

5. The combination of the shell or body A A', the latter portion having an opening, e,

and shoulder *f*, the valve *b*, and stem *b'*, the fusible collar G, and the nut H, substantially as specified.

6. The combination of the shell or body A A', the latter portion having an opening, *e*, and a shoulder, *f*, the valve *b*, and stem *b'*, the flanged sleeve E fitting said stem, and the fusible collar G, substantially as specified.

ALMON M. GRANGER.

Witnesses:

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ALBERT H. NORRIS.