

(No Model.)

W. HARKNESS.
AUTOMATIC SPRINKLER.

No. 552,473.

Patented Dec. 31, 1895.

FIG. 1.

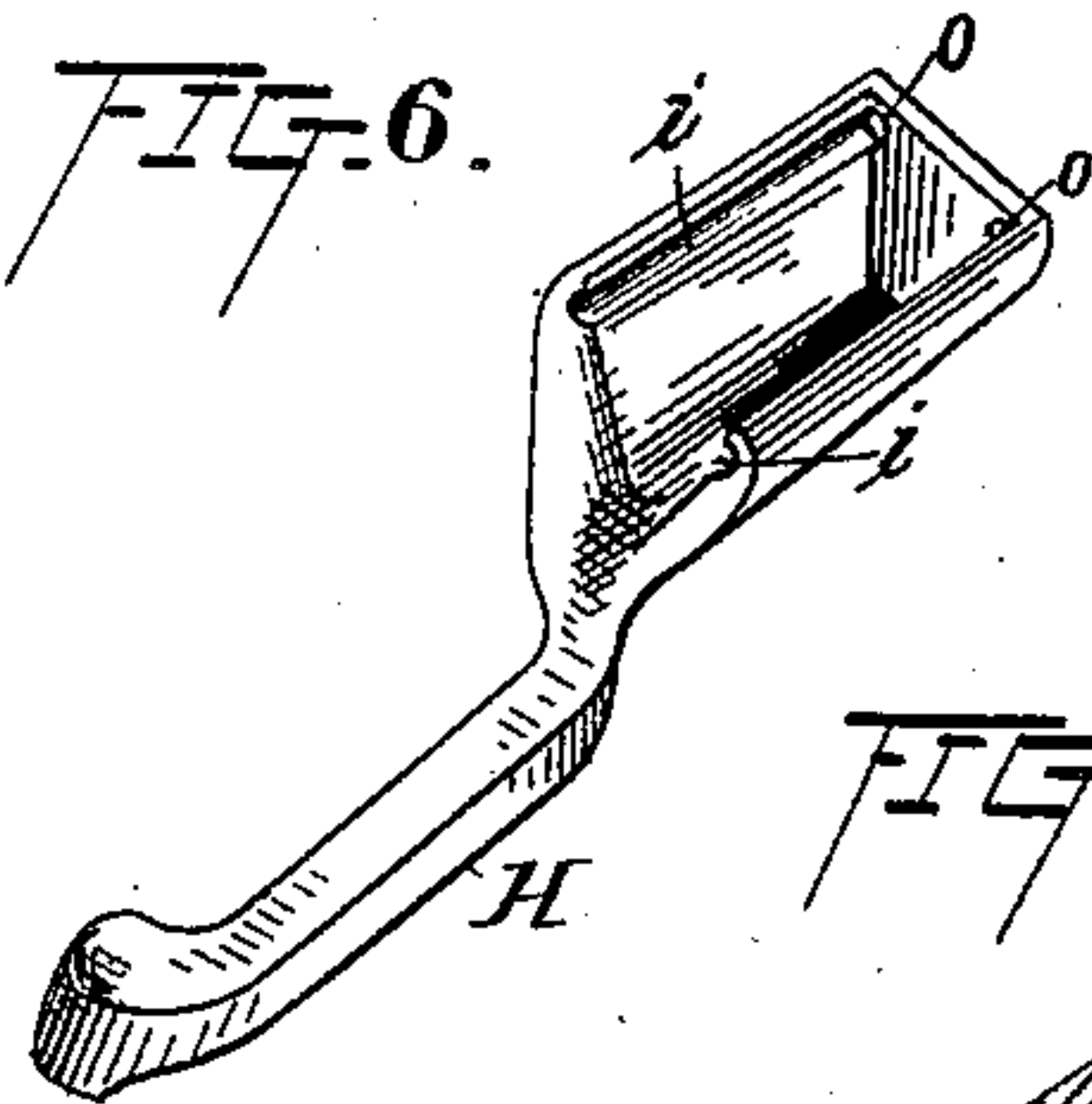
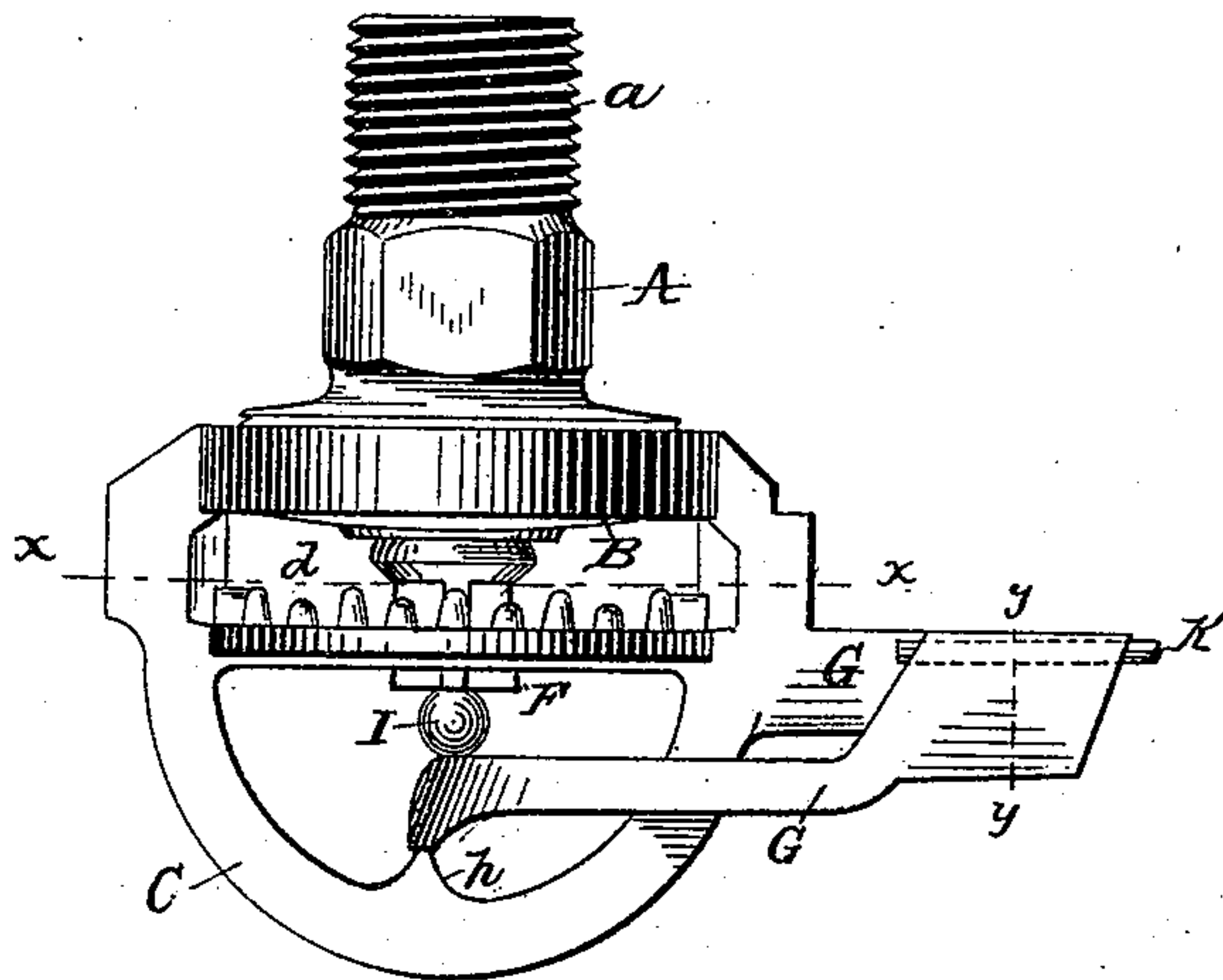


FIG. 4.

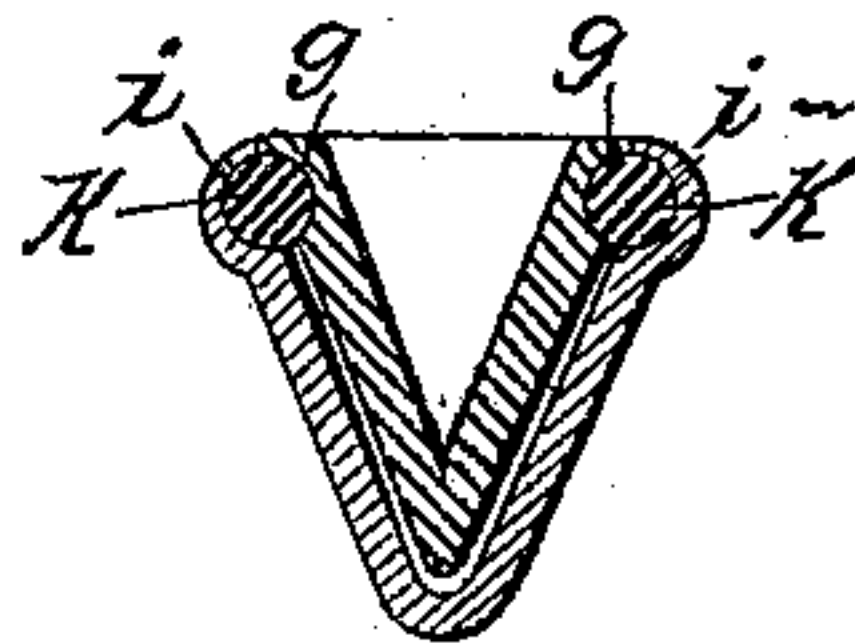


FIG. 2.

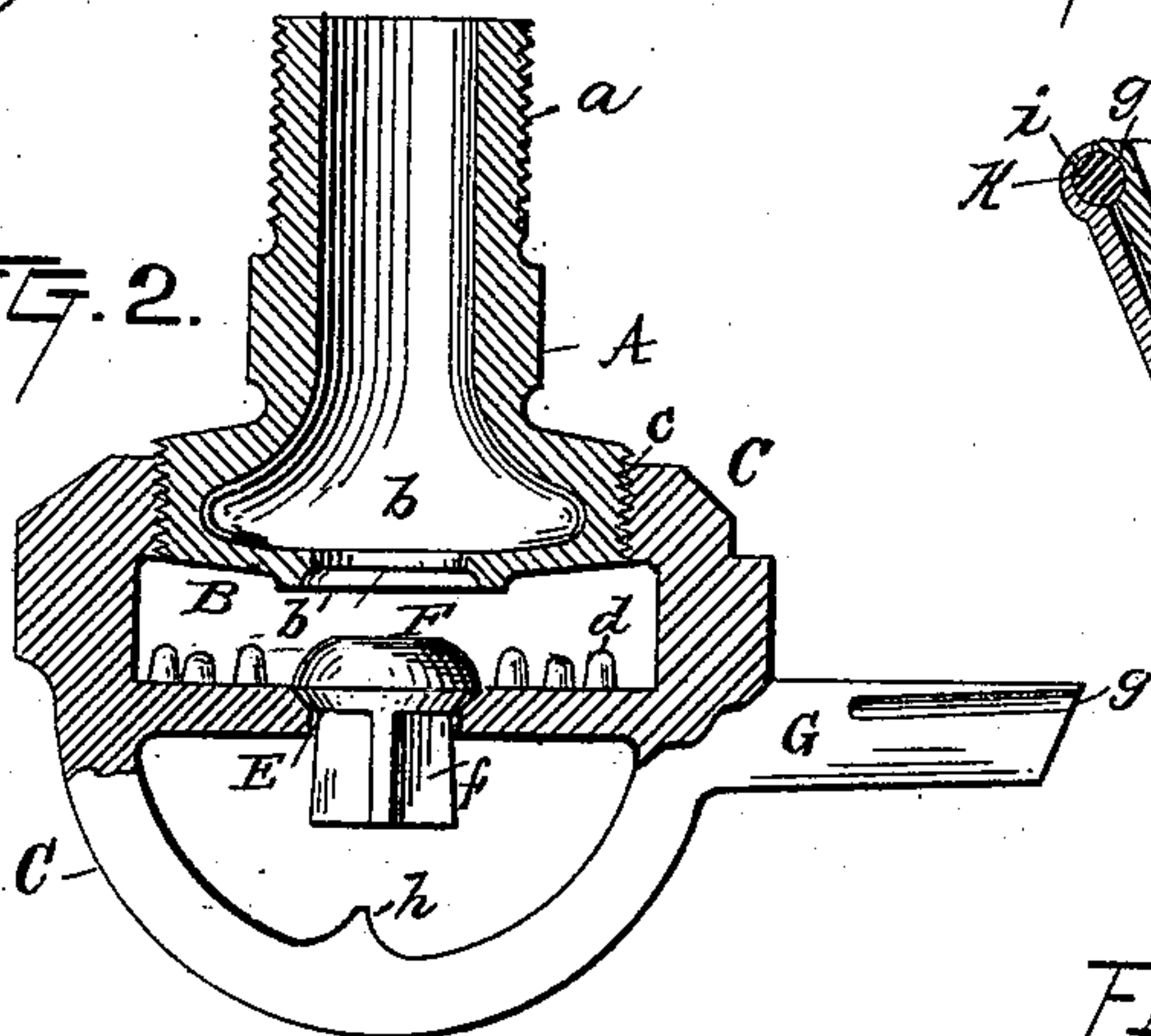
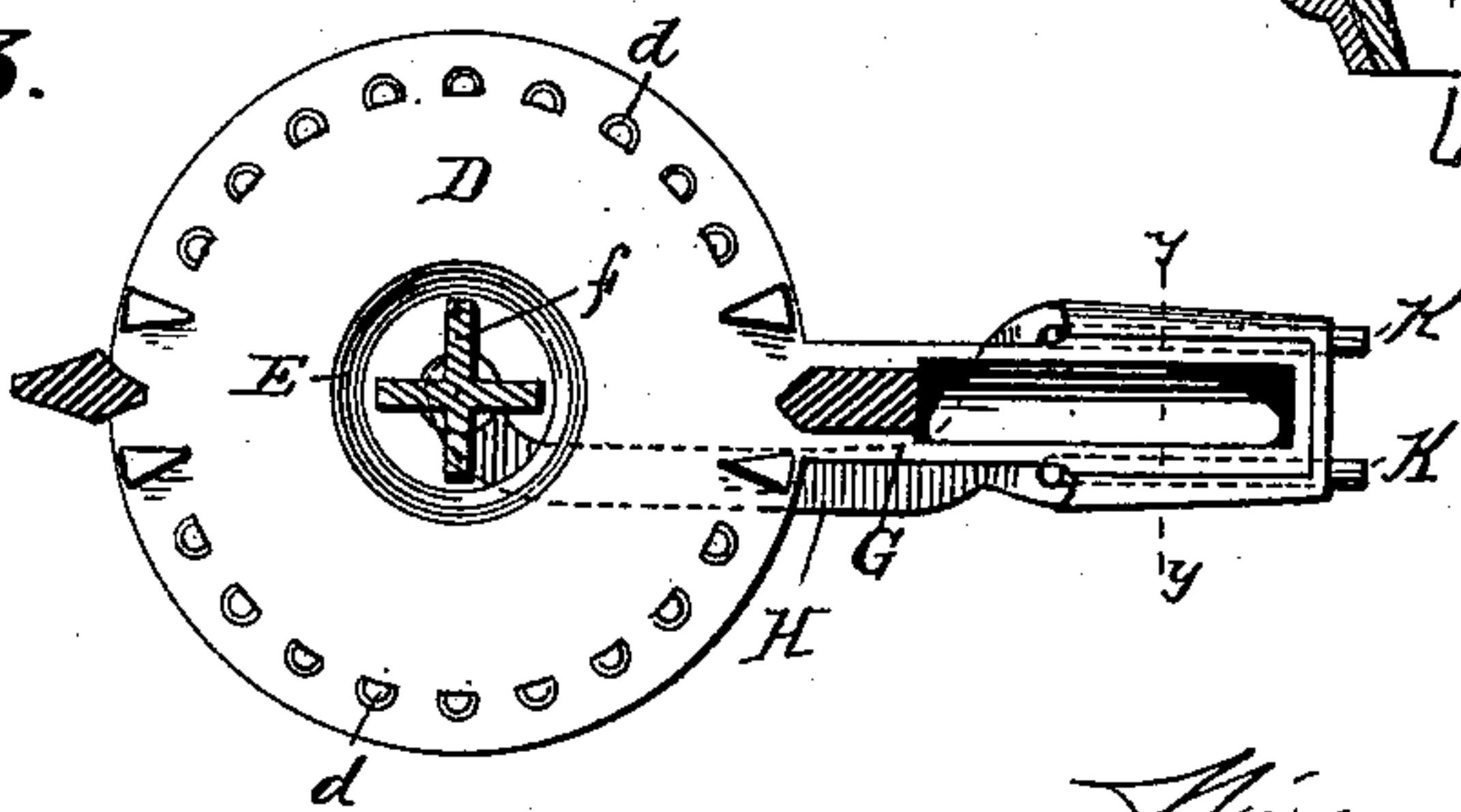


FIG. 5.



FIG. 3.



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WILLIAM HARKNESS, OF NEW YORK, N. Y., ASSIGNOR TO THE GENERAL
FIRE EXTINGUISHER COMPANY, OF SAME PLACE.

AUTOMATIC SPRINKLER.

SPECIFICATION forming part of Letters Patent No. 552,473, dated December 31, 1895.

Application filed April 14, 1890. Serial No. 347,825. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HARKNESS, of the city of New York, in the county and State of New York, have invented certain
5 new and useful Improvements in Automatic Sprinklers, of which the following is a specification.

My invention relates to that class of sprinklers or valves used with systems of fire extinguishing wherein the sprinklers or valves remain normally closed against the flow of the fire-extinguishing liquid to be automatically released or opened by the action of heat, so that the liquid may flow or be discharged
15 through them, and an automatic sprinkler of this character is set forth in Letters Patent No. 417,025, granted to me December 10, 1889.

In a fire-extinguishing system it is essential that the sprinkler or valve shall be one that
20 will always operate when desired. In other words, it must be one so sensitive as to insure its release by such a rise in temperature as is created by a fire in the location of the sprinkler, or when the temperature shall reach
25 above the normal—for instance, say, to 200° Fahrenheit; but it must not be too sensitive—that is, it must not be so constructed as to render it liable to be released by accident when there is no occasion therefor, or by an
30 ordinary rise in temperature, and I have invented certain improvements over the sprinkler set forth in the aforesaid Letters Patent, which will be hereinafter more particularly pointed out; and my invention has particular
35 reference to that part or that means or mechanism of the automatic sprinkler which holds the valve to its seat against the pressure of the fire-extinguishing liquid, but which is adapted to be released automatically by the
40 action of heat, and I have produced a sprinkler with which there is absolutely no danger of the discharge of liquid at an inopportune or unnecessary occasion, but which is perfectly operative by such a rise in temperature
45 created by fire as above stated.

In the accompanying drawings, forming a part hereof, Figure 1 represents a side elevation of a sprinkler embodying my invention in a sealed or normal condition. Fig. 2 represents a central section of the same. Fig. 3
50 is a cross-section taken through line X X of

Fig. 1. Fig. 4 is an enlarged cross-section taken through line Y Y of Figs. 1 or 3. Fig. 5 is a view of a modification of my invention, and Fig. 6 is a perspective view of the retain-
55 ing-arm.

A is the body part, which terminates at the top in the tube *a* adapted to be united to a pipe-line by a suitable coupling. The bottom part B is preferably bell-shaped or flaring to form a chamber *b* and is screw-threaded on the outside, so as to be secured to the frame C, and in the under side of the chamber *b* there is an opening *b'*, which forms the valve-seat for the valve F, which normally
60 remains against its seat. Thus it will be seen that the body part is cast all in one piece, one end, as stated, terminating in a tube or pipe to be united to the main pipe-line, and the other forming a chamber *b* with an opening
65 therethrough on its under side forming the seat for the valve, or the tube *a* may run straight through its inner end, becoming the seat for the valve F.

Screwed or otherwise fastened to the body
75 part at *c* is a frame C made U-shaped and having a stationary spraying-plate D forming part of it, the upper surface of which is close to the under side of the chamber *b* and has an annular row of pins or projections *d* upon it near
80 its outer edge, every other one of said pins or projections being shorter than the adjoining one, and each one being flattened and vertical on the inside surface, as shown in Fig. 3, so as properly or more effectually to distribute
85 or spray the water—that is, by reason of the pins or projections being of different heights the water as it issues from the sprinkler is subdivided and part is caused by the shorter pins to be sprayed downward and part by the
90 larger pins to be sprayed upward, which cannot be effected if the pins on the spraying-plate are all of the same height. The central part of this spraying-plate has an opening E in which the shank *f* of the valve F plays and
95 is guided. When the valve F is down, as shown in Fig. 2, it hangs upon the spraying-plate D and presents its rounded top surface to the water as it issues from the opening *b'*.

To one side of the frame C is an arm or extension G, its outer end preferably being made
100 V-shaped, as shown, and hollow on the inside,

having grooves *g* running along its length or lengthwise on the outside on both sides thereof. II is a retaining arm, lever, or support, whose inner end rests upon a projection or strut *h* on the frame C as a fulcrum, and this arm holds the valve in a raised position by means of a ball or other spherical piece I, which is interposed between the valve F and the arm II and rests upon the arm II, and when this ball is held in place between the arm II and the valve F, as it will be by screwing down the body part A, it holds the valve normally in a raised position against its seat. The outer end of the arm or lever II is also preferably made V-shaped and hollow on the inside, and has grooves *i* on its inside on both sides running lengthwise thereof corresponding to the grooves *g* on the extension G of the frame C, and also has openings *o* in its end leading into the grooves *i*, and the V-shaped end of the arm II is adapted to be placed or to fit over the V-shaped end of the extension G of the frame C, or vice versa, forming a V-joint, and when so placed the grooves on the inside of the extension G, together with the grooves on the outside of the arm II, form a round passage or opening for a peg or pin K, which is to be inserted therein through the opening *o* in the end of the arm II, which end keeps the pegs or rivets from spreading, thereby locking the extension G and the arm II together and preventing the arm II from falling until the pegs K have fused, and after the pins are inserted the parts can only be separated, otherwise than by the fusion of the pins, either by removing the pins or severing them for their entire length, as will be readily understood.

The pegs or pins K are made of metal capable of liquefaction at a low temperature, and, as just stated, when they are inserted in the manner just described they lock the parts together holding the retaining arm or support II to the extension G of the frame C so long as the temperature in the location of the sprinkler does not rise to such a point as will cause these pegs to fuse, in which latter case the outer end of the arm II will be released and will drop from the extension G, and the ball I will roll away from under the valve F, which will thereby be forced downward from its seat by the pressure of the fire-extinguishing liquid, thereby permitting the fire-extinguishing liquid to be discharged through the opening *b*.

The V-shaped ends of the arms G and II may first be soldered together, if desired, and the pegs afterward inserted and the sprinkler will still be sensitive enough to operate at the desired time, since the metal of the V-shaped ends is made thin so as to enable the solder and pegs to fuse as soon as possible when attacked by heat.

As will be noticed by the drawings the arms or levers are so arranged and the grooves are so cut therein that when the arms or levers are put together and the pins or pegs inserted in the grooves the edges of the grooves are

on opposite sides of a plane passing through the center of the pins or of a plane parallel to the plane of the releasing movement. This feature when employed enables the use of arms or levers of various construction or shapes and variously arranged with relation to each other.

I have shown in the drawings two pegs K, but of course, as will be readily understood, one or more might be employed in practice, if desired, and instead of the pegs being first made and inserted into the openings formed by the grooves *g* and *i* these pegs might be formed by running soft solder into and filling these openings, which when cold will hold the arms G and II together in the same manner before described. The inside of the V-shaped ends of the arms G and II are made hollow, so that the heat may get at or surround or attack, if possible, all parts of the pegs K, and this construction (shown in Figs. 4 and 6) is very satisfactory in practice; but in order to secure, if desired, a more sensitive valve the under side of the V-shaped ends of the arms G and II may be cut away, as shown in Fig. 5, thereby leaving a central opening or slot L between the two pegs, when two pegs are used, through which of course the air may circulate, and in case of any rise in temperature the heat will the more completely come in contact with or attack the pegs, which will the more readily melt, and the sprinkler will thereby be the sooner discharged.

As before stated, the arms G and II are preferably made V-shaped and hollow, one fitting over the other; but as will be readily understood they may be made of any other shape, as square or rounded and hollow, so that one may fit over the other, and held together by means of the fusible pin or pins, without departing from the spirit of my invention.

I have shown but one construction of sprinkler to which my invention may be applied; but I do not mean to limit my invention as applied to that one form or to the particular mechanism for holding the valve to its seat locked by the fusible pegs in substantially the manner described, nor do I mean to limit myself to the relative arrangement of arms G and II shown, nor to the pegs running lengthwise thereof, since, as will be readily understood, the arm G might be arranged to fit over the arm II instead of as shown, and the fusible pegs might run crosswise or otherwise thereof to lock them together and still be covered by my invention; but

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

1. In an automatic fire extinguishing sprinkler, the combination with the body part A constructed as shown and described, having a valve seat *b* therein frame C having the arm G made hollow and V-shaped at its outer end and having grooves *g* therein fixed spraying plate D arranged below the valve seat *b*, valve F, a mechanism to hold said valve to its seat consisting of the arm II made hollow and V-

shaped at its outer end and having grooves *i* therein adapted to be united to the arm G by pins or pegs K of metal fusible at a low temperature and a ball I interposed between the valve F and the arm H, substantially as set forth.

2. In an automatic fire extinguishing sprinkler which remains normally closed, a mechanism for holding the valve closed against its seat which consists of two V-shaped arms, one fitting over the other, forming a V-joint, said arms being held together by a fusible pin or pins running lengthwise of said arms, substantially as and for the purpose set forth.

3. In an automatic fire extinguishing sprinkler the combination with the body part having a metal valve seat and a metal valve of a

mechanism to hold said valve to its seat which consists of the arm G made hollow and V-shaped at its outer end and having grooves *g* therein, arm H also made hollow and V-shaped at its outer end and having grooves *h* therein, said arms being held together by fusible metal pins or pegs K running lengthwise of said arms in said grooves and a ball I interposed between the valve F and the arm H, substantially as and for the purpose set forth.

This specification signed and witnessed this 10th day of April, 1890.

WILLIAM HARKNESS.

In presence of—

A. W. KIDDLE,
E. C. ROWLAND.