

(No Model.)

G. KNOWLES, Jr.
SPRINKLER HEAD.

No. 549,969.

Patented Nov. 19, 1895.

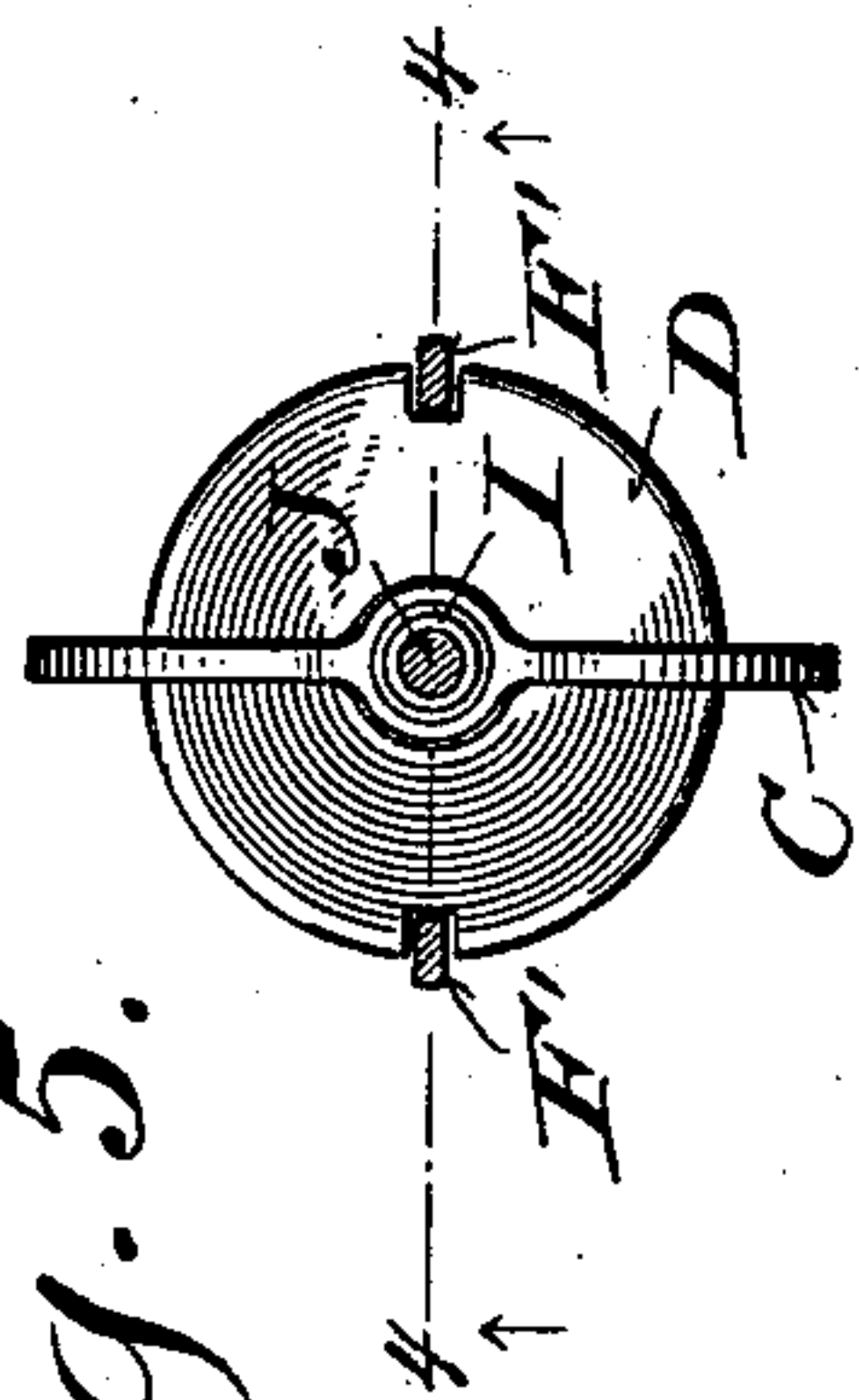


Fig. 5.

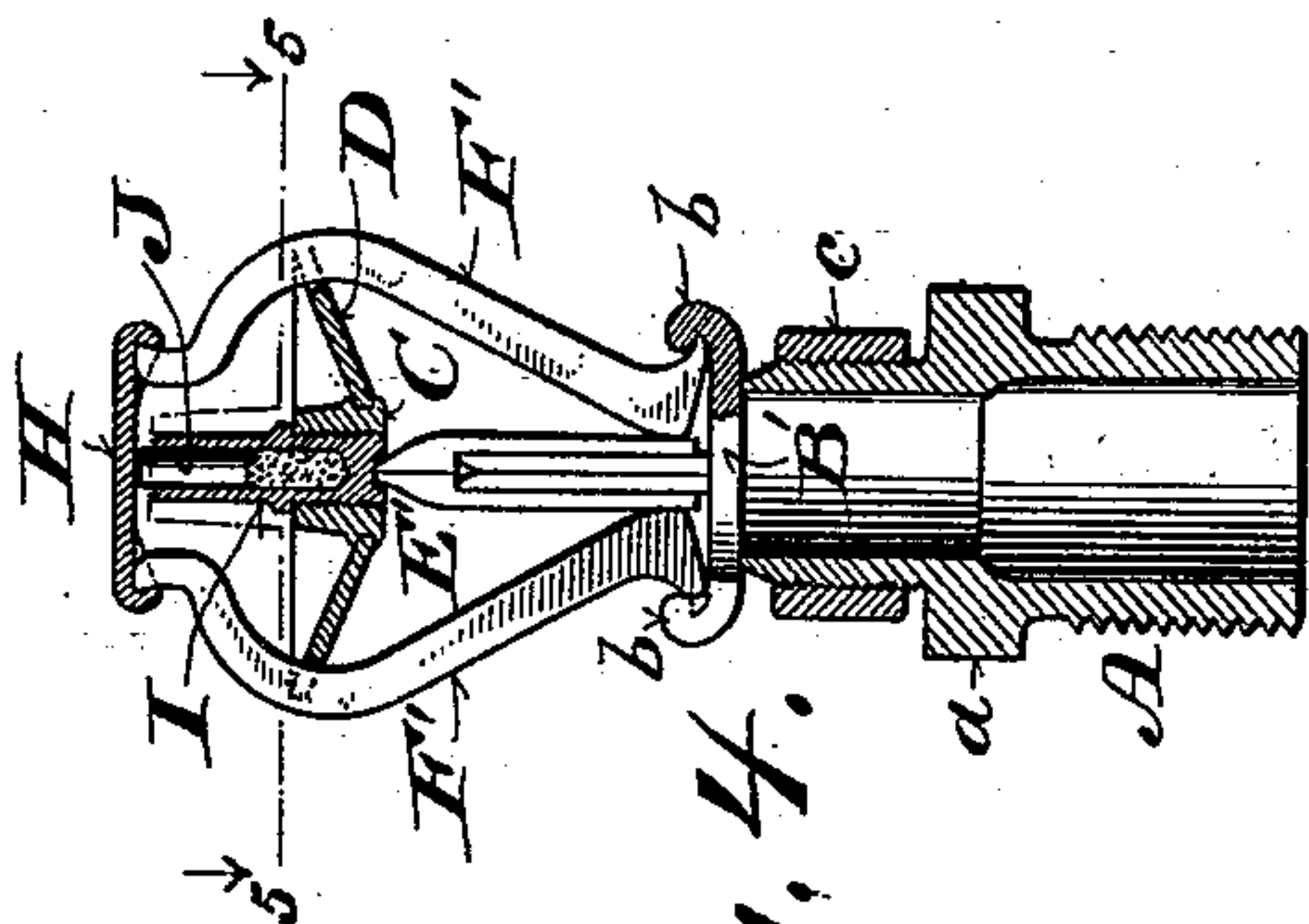


Fig. 4.



Fig. 6.

Fig. 2.

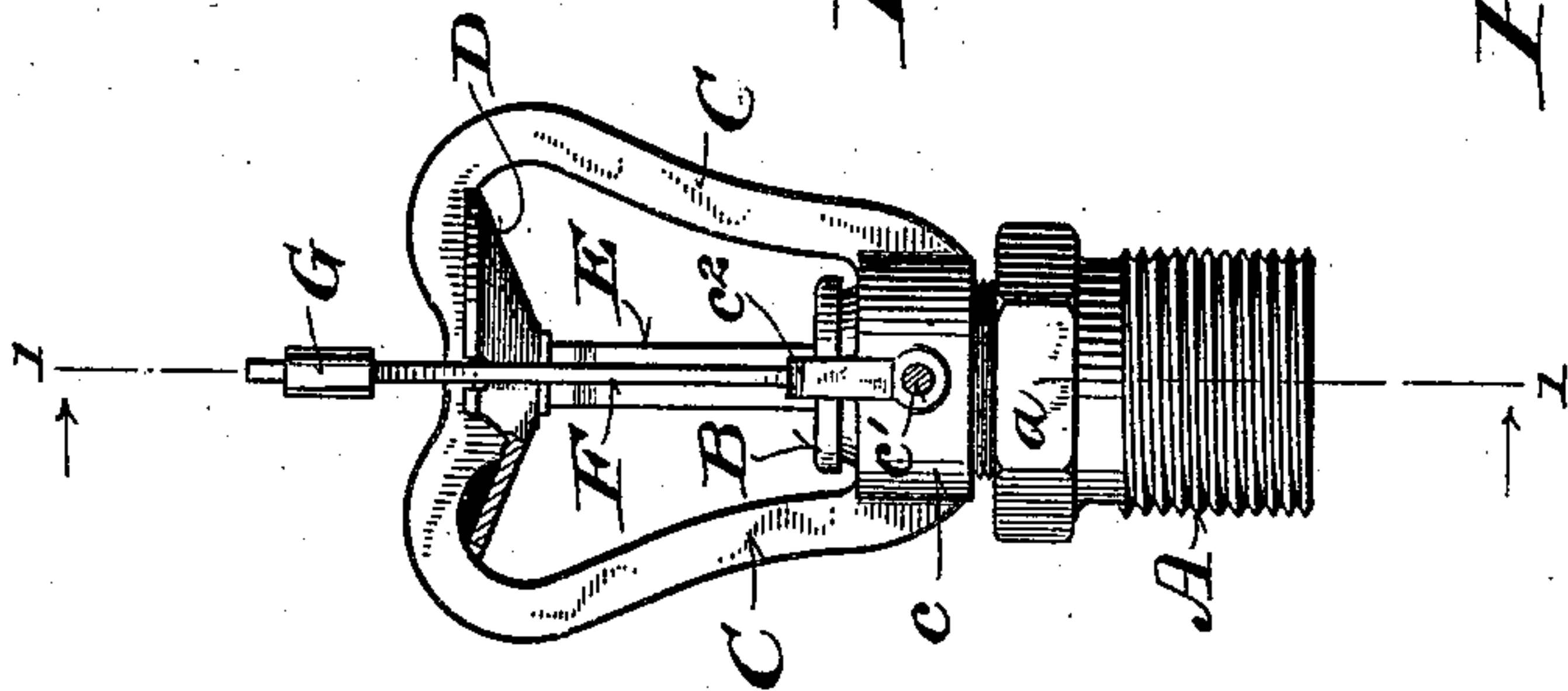


Fig. 1.

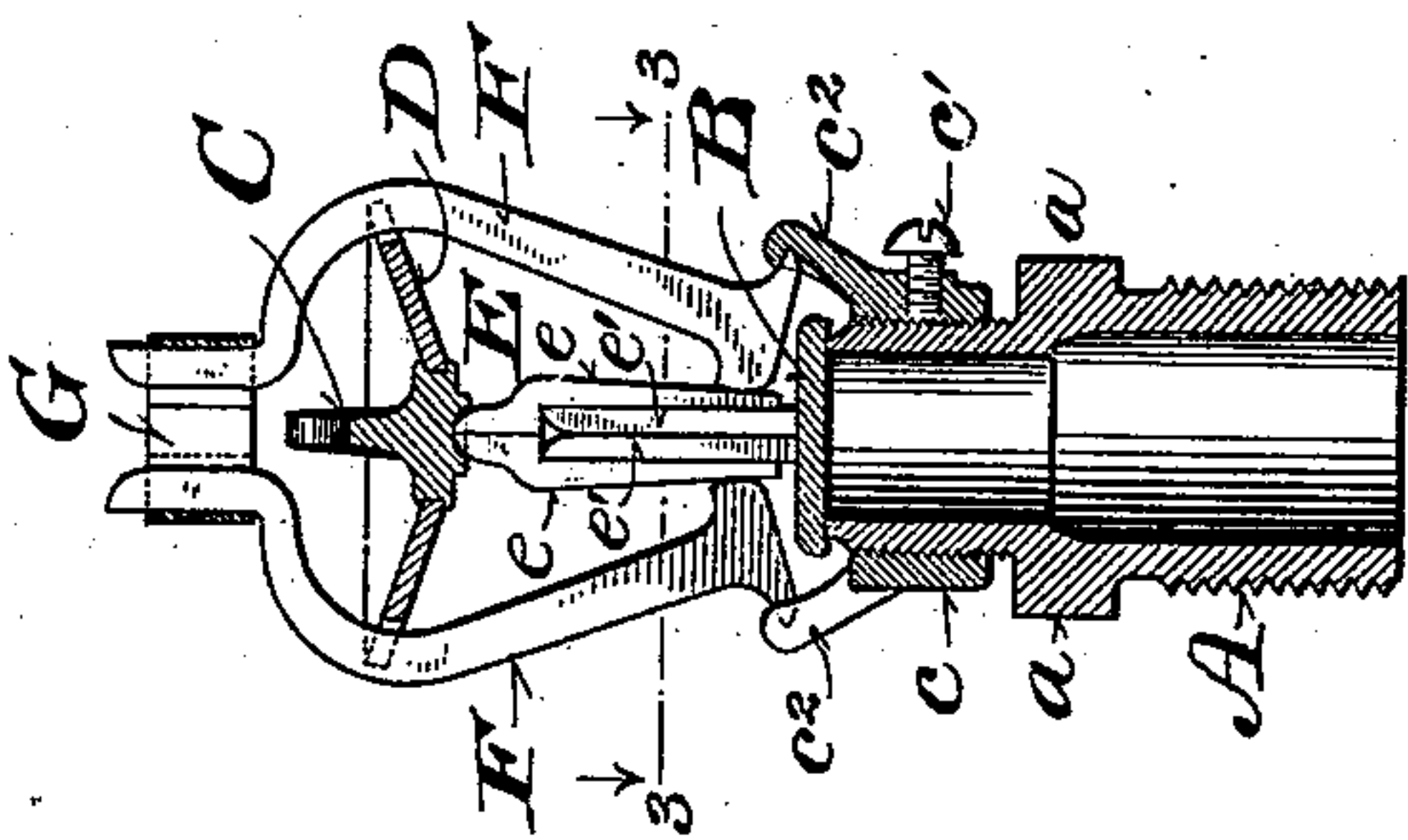
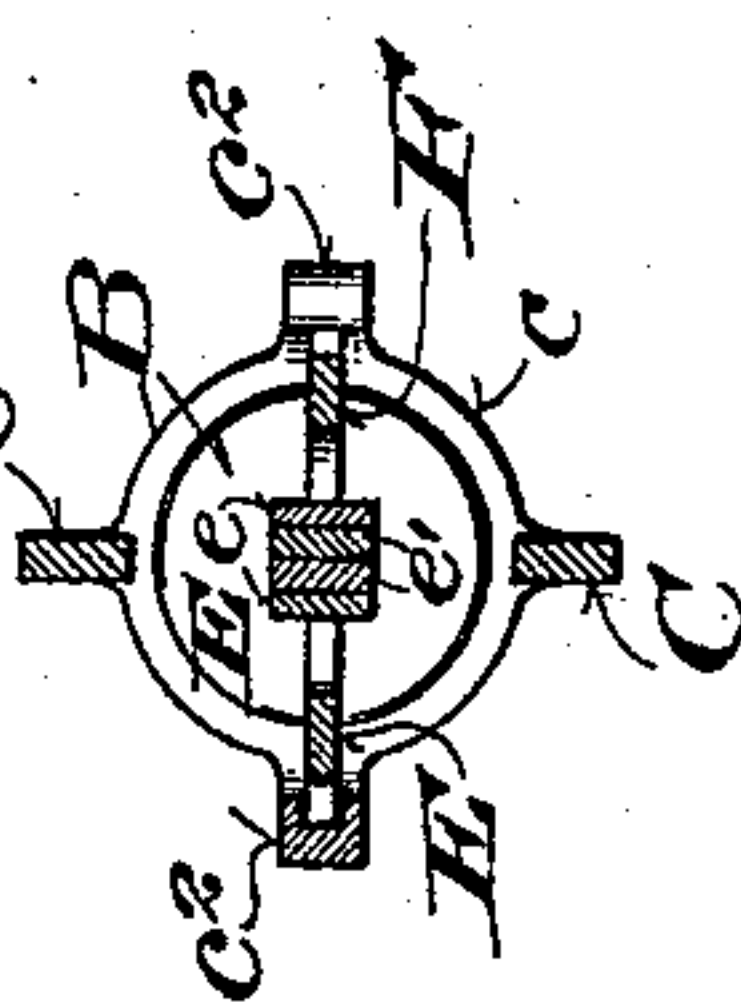


Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE KNOWLES, JR., OF MILWAUKEE, WISCONSIN.

SPRINKLER-HEAD.

SPECIFICATION forming part of Letters Patent No. 549,969, dated November 19, 1895.

Application filed September 26, 1893. Serial No. 486,512. (No model.)

To all whom it may concern:

Be it known that I, GEORGE KNOWLES, JR., of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Sprinkler-Heads; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to that class of automatic fire-extinguishing apparatus which embraces a system of pipes provided at suitable intervals with distributors or sprinkler-heads which are constructed and arranged to be automatically opened by the action or influence of abnormal heat.

Many forms of distributors or sprinkler-heads have been devised and are known in the art of fire-protection; but they have generally been found defective and unreliable in practice, either by opening prematurely or failing to open promptly when subjected to that degree of temperature intended to permit the escape of the fire-extinguishing fluid. This defect and uncertainty in operation has generally been due to too great a strain, either from internal pressure or a too direct leverage upon the confining part or parts designed to be directly affected and released only by the action or influence of a certain predetermined degree of temperature.

The main object of my invention is to provide a sprinkler-head simple, compact, and symmetrical in construction and reliable in operation.

It consists, essentially, in the construction and arrangement of the devices for holding the cap to its seat under ordinary conditions and for promptly and certainly releasing it when subjected to abnormal heat, as hereinafter particularly described, and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a medial longitudinal section on the line 1 1, Fig. 2, of a sprinkler-head embody-

ing my improvements. Fig. 2 is a side elevation of the same, certain parts being broken away. Fig. 3 is a cross-section on the line 3 3, Fig. 1. Fig. 4 is an axial section on the line 4 4, Fig. 5, of a modification of the device. Fig. 5 is a cross-section on the line 5 5, Fig. 4; and Fig. 6 is a plan view of the cap shown in Fig. 4.

Referring to Figs. 1, 2, and 3, A represents a hollow plug formed at a point between its ends with a head or squared portion *a* to receive a wrench and externally screw-threaded on opposite sides of said head for attachment to a T-coupling of a service-pipe and for the attachment of a frame or yoke C, as hereinafter explained.

B is a cap adapted to close the aperture at the outer end of said plug, against which it is designed to be loosely seated.

C is a yoke or frame formed with an internally-threaded sleeve or collar *c*, by which it is adjustably screwed upon and attached to the plug A. It is provided with a set-screw *c'*, by means of which it is secured and prevented from turning upon said plug when properly adjusted.

D is a deflector or spreader permanently attached to the frame C, opposite the discharge-aperture in plug A, and arranged to spread or distribute the fire-extinguishing fluid as it escapes from said aperture over the area intended to be protected by the sprinkler-head.

E is a strut or post adapted to bear at opposite ends against the cap B and frame C and hold the former snugly against its seat on the end of plug A. It is composed of four loosely-assembled and symmetrically constructed and arranged parts *e e* and *e' e'*, which abut against each other outside of a direct line connecting the end bearings of the strut, one of which is formed by the two outside and the other by the two inside members. The end thrust or strain to which the strut is subjected therefore tends to separate its component parts.

F F are two similar levers having offsets or projections at one end, by which they are fulcrumed to projections *c² c²* of frame C, and adapted to bear against the longer arms of the outer members *e e* of the strut and thereby hold them together against the inner

members $e' e'$, as shown in Fig. 1. They are bent around the deflector D toward each other and are held in place, as shown, by a link G, slipped over their ends and composed of separable parts attached to each other by solder fusible at a certain temperature.

When the parts are assembled, as shown in Fig. 1, the cap may be forced tightly against the end of the plug and strain put upon its supporting or retaining strut E by turning the frame C down on the screw-threaded end of said plug. The force of the end-thrust exerted through the strut E, which holds the cap to its seat against the pressure exerted thereon by the fire-extinguishing medium, and which tends to separate the component parts of the strut, is many times reduced through the combined leverage of the members $e e' e'$ and levers F F, and the solder by which the link G is held together is thus relieved of undue strain, such as under ordinary conditions would disrupt said link and release the cap. When, however, the temperature rises sufficiently to melt the solder, the spreading tendency of the levers F F is sufficient to sever the link and release the strut E, the component parts of which fly apart, leaving the cap B unsupported and free.

In place of a fusible or separable link for holding the confining-levers F F together in operative position any other suitable confining device arranged to be released or disengaged by the melting of a solder-joint or the expansion of a solid or confined material when subjected to heat may be employed, and, in short, various changes in the minor details of construction and arrangement may be made within the intended spirit and scope of my invention.

Referring to Figs. 4, 5, and 6, illustrating a modification of the device, the cap B' is formed on opposite sides with overhanging projections bb , which afford fulcrum-supports for the levers F' F'. The opposite ends of these levers are connected and held in position to confine the component parts of the cap-supporting strut E', as shown in Fig. 4, by a yoke or keeper H, which is located in the path of the movable part J of an expansion device designed to be operated by a certain degree of heat and comprising in connection with said movable part a chamber I, formed in or attached to the frame C and supplied with a suitable material, which when subjected to abnormal heat will expand and drive the movable part J outward against and thrust the yoke or keeper H off from the levers F' F'.

One of the levers F or F' and one of each of the members $e e'$ of the strut E may be omitted without materially affecting the character of the sprinkler-head.

I claim—

1. In a sprinkler head, the combination with the cap and yoke or frame, of a strut adapted to bear at its ends against said cap and frame,

and composed of a number of loosely assembled parts having bearings against each other offset from the line of end thrust connecting the end bearings of the strut, and one or more levers adapted to hold the component parts of the strut together and to be released by abnormal heat, substantially as and for the purposes set forth.

2. In a sprinkler head the combination with the cap and frame, of a strut adapted to bear at its ends against said cap and frame, and composed of four symmetrically arranged and loosely assembled parts bearing against each other out of the direct line connecting the end bearings of the strut, the two outer parts affording one end bearing and the two inner parts the other end bearing of the strut, two confining levers on opposite sides of said strut, fulcrumed to an adjunctive part of the head and bearing against the outer parts of the strut, and a keeper confining the longer arms of said levers, and adapted to be released by abnormal heat, substantially as and for the purposes set forth.

3. In a sprinkler head the combination with the cap and frame, of a post adapted to bear at opposite ends against said cap and frame, and composed of four parts capable of close assemblage side by side throughout their entire length, the two outer parts being laterally offset to receive the two inner parts between them, and constituting one end bearing of the post, and the two inner parts projecting beyond the opposite ends of the outer parts when assembled, and constituting the other end bearing of the post, and extra means outside and independent of the component parts of the post adapted to hold them together in operative position and to be released by the action of heat, substantially as and for the purposes set forth.

4. In a sprinkler head, the combination with a screw threaded plug, a cap adapted to close the discharge aperture therein, and a frame provided with a threaded sleeve by which it is adjustably connected with said plug, of a strut adapted to bear at opposite ends against said frame and cap and to hold the latter against its seat, and composed of four loosely assembled parts, two of which form one end bearing, and the other two the other end bearing of the strut levers arranged to confine the component parts of said strut in operative position, and means adapted to release said levers when subjected to abnormal heat substantially as and for the purposes set forth.

5. In a sprinkler head, the combination with a hollow screw threaded plug, a cap adapted to close the same, and a frame provided with a threaded sleeve by which it is adjustably connected with said plug, of a strut composed of four loosely assembled parts, two of which are offset to receive the other two between them, and constitute one bearing end of the strut, and the other two project beyond them and constitute the other bearing end of the

strut, confining levers fulcrumed to a part of
the head and bearing on opposite sides of the
strut against the longer arms of its outer mem-
bers, and a fusible or separable link adapted
5 to connect the opposite ends of said levers
and hold them and the strut in operative po-
sition, substantially as and for the purposes
set forth.

In testimony that I claim the foregoing as
my own I affix my signature in presence of 10
two witnesses.

GEORGE KNOWLES, JR.

Witnesses:

CHAS. L. GOSS,
JOHN A. GOSS.