

No. 770,755.

PATENTED SEPT. 27, 1904.

J. HUNT.

SPRINKLER HEAD FOR AUTOMATIC FIRE EXTINGUISHERS.

APPLICATION FILED FEB. 15, 1904.

NO MODEL.

2 SHEETS—SHEET 1.

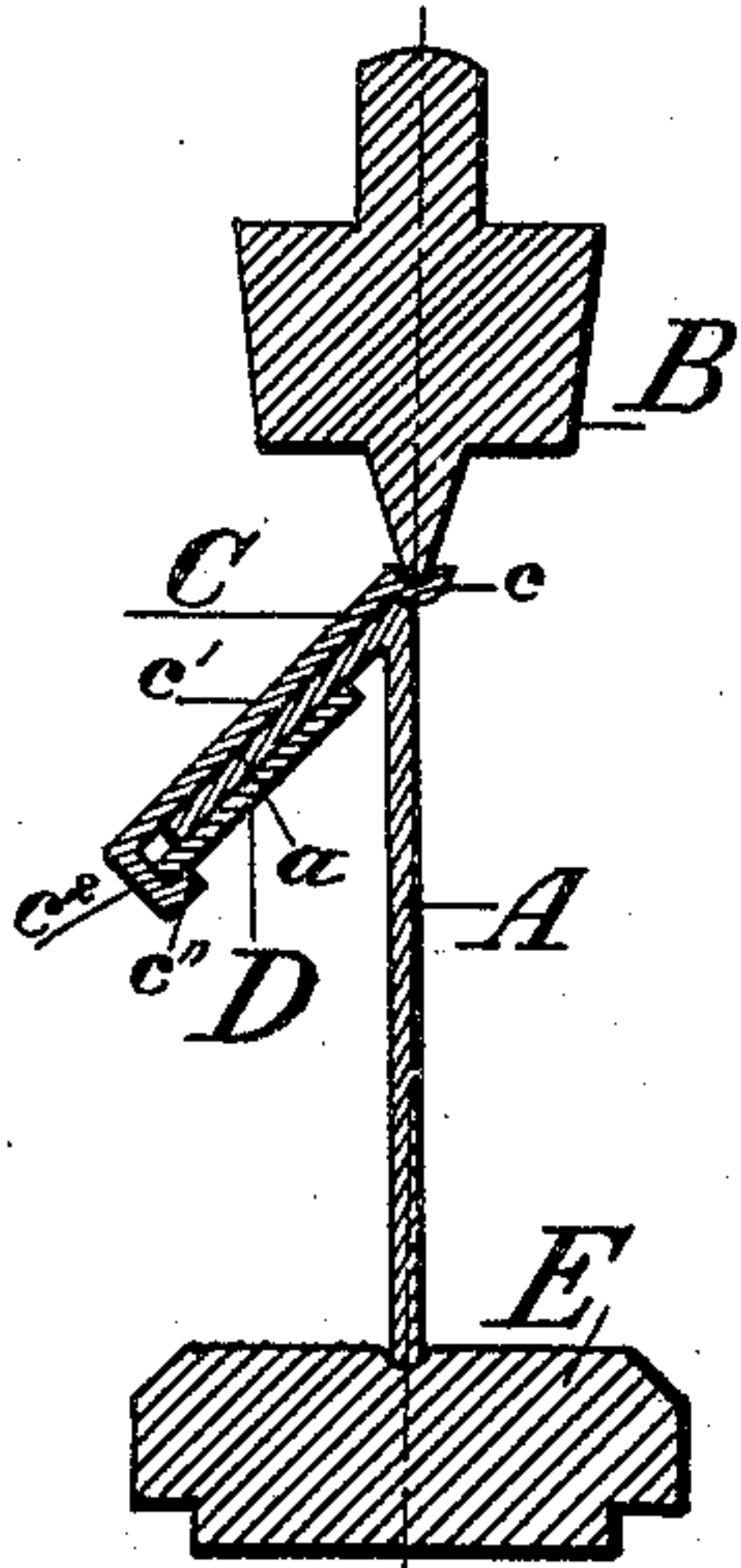


Fig. 1.

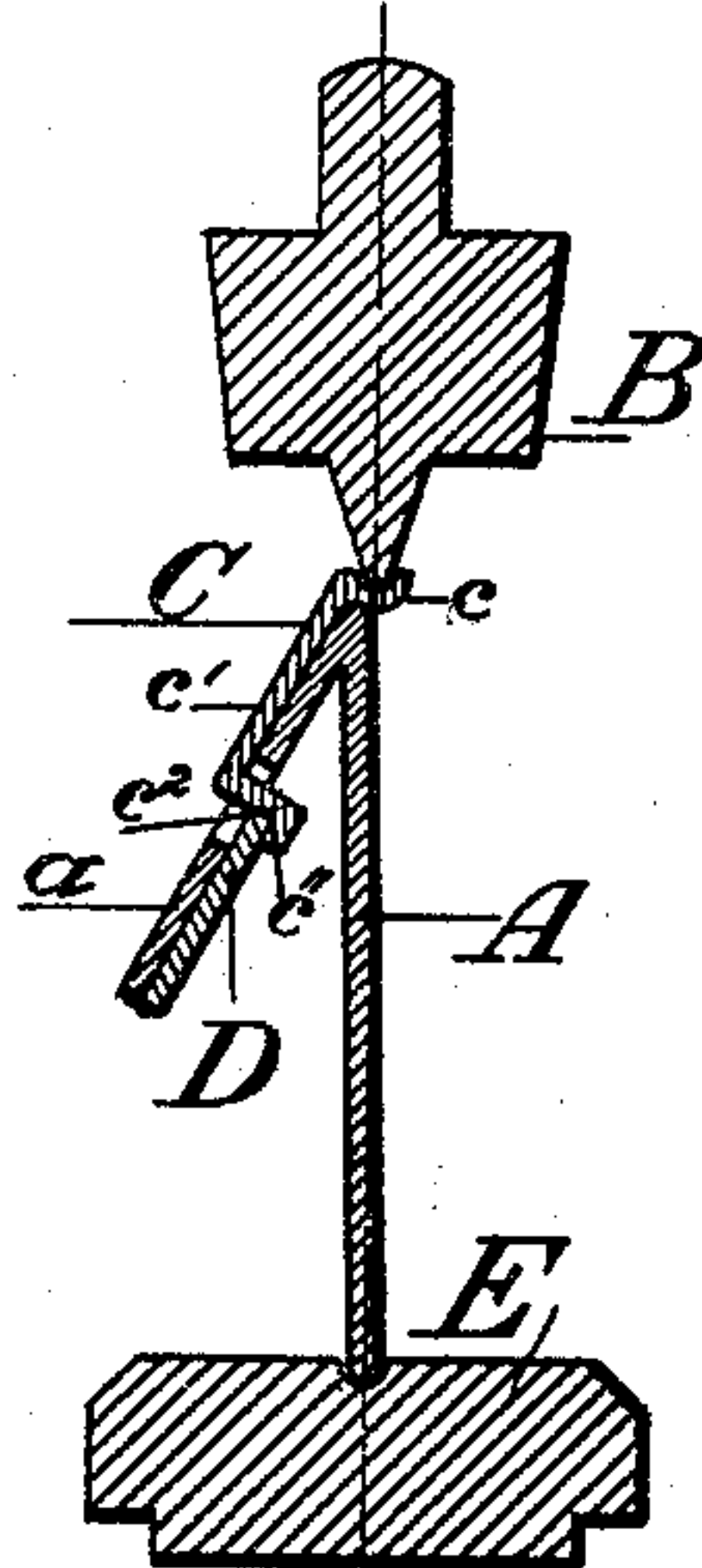


Fig. 2.

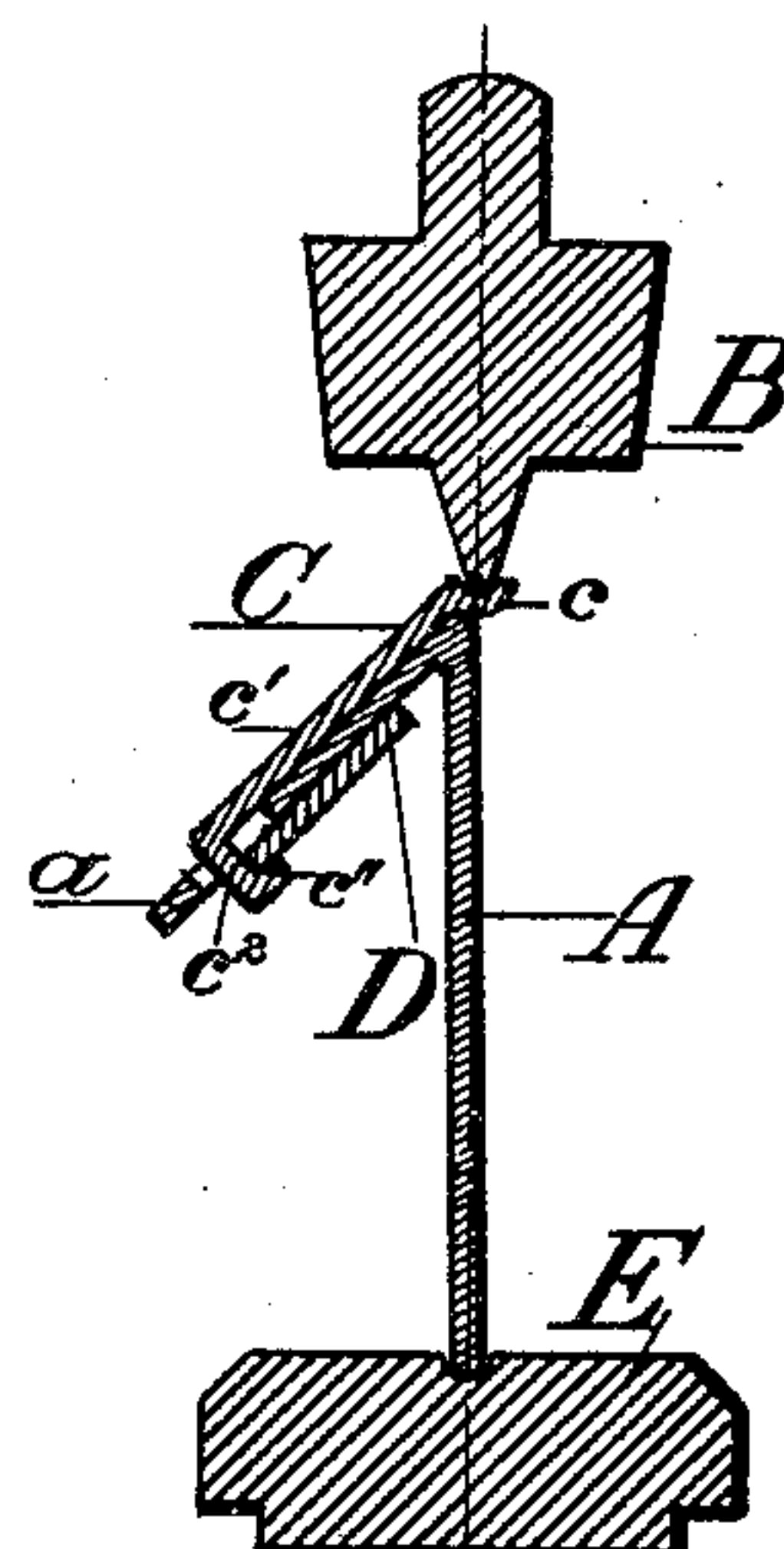


Fig. 3.

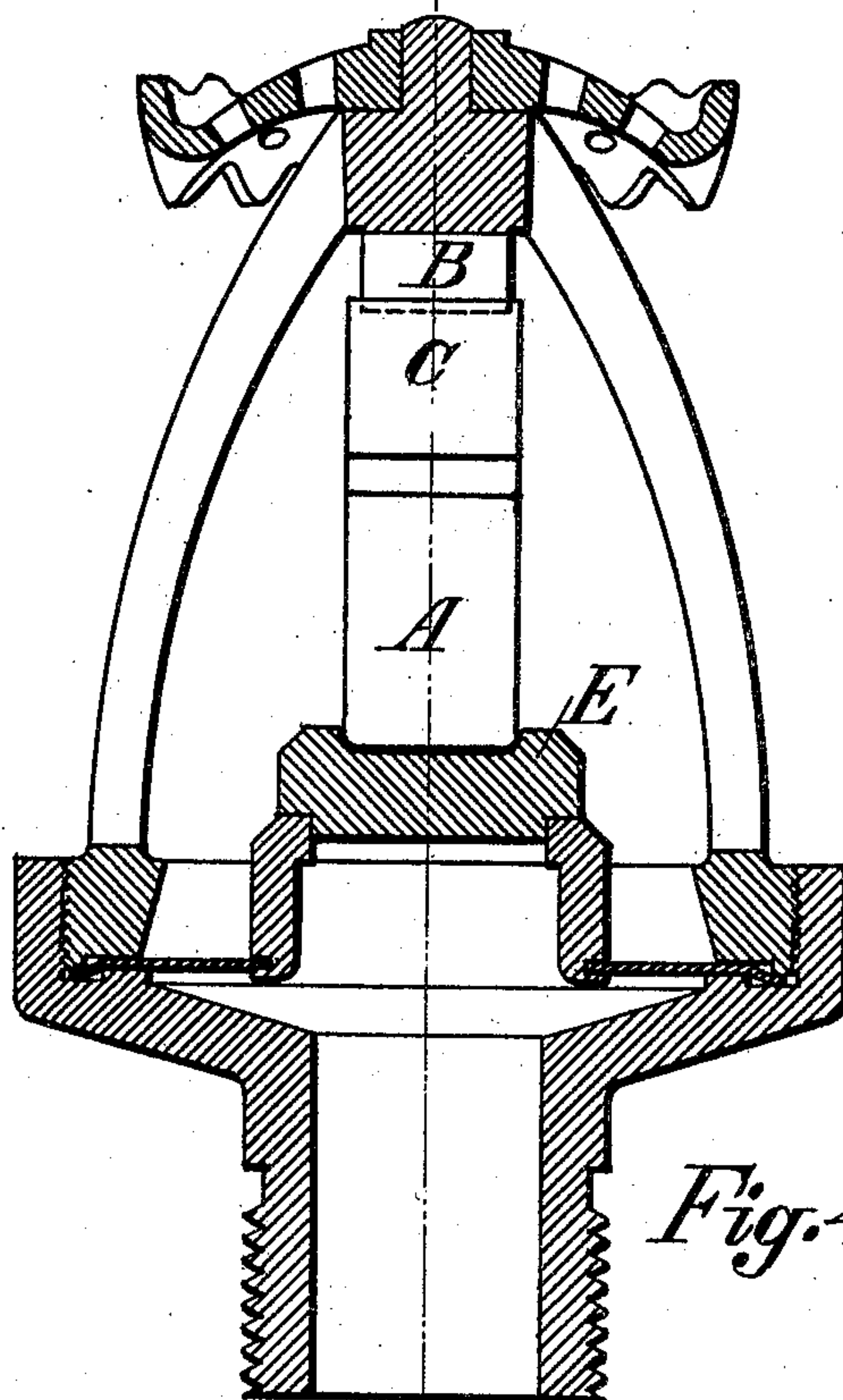


Fig. 4.

Witnesses: J. M. McDoull  
Edward D. Cox By

Inventor: Jarvis Hunt  
J. H. Hunt His Atty.

No. 770,755.

PATENTED SEPT. 27, 1904.

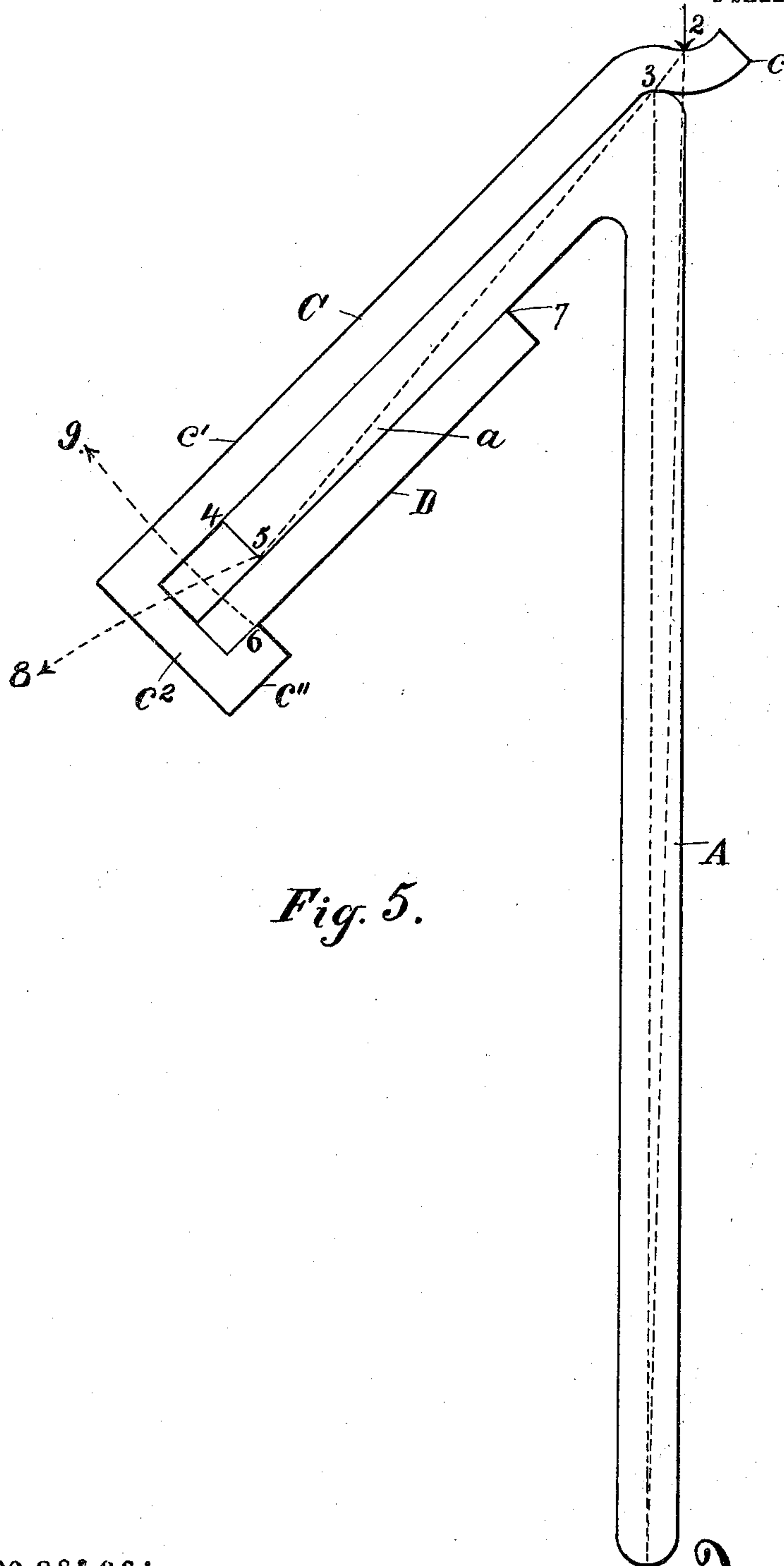
J. HUNT.

SPRINKLER HEAD FOR AUTOMATIC FIRE EXTINGUISHERS.

APPLICATION FILED FEB. 15, 1904.

NO MODEL.

2 SHEETS—SHEET 2.



*Fig. 5.*

Witnesses:

John L. Hawley  
Museum Director

Inventor:

Jarvis Hunt

By J. W. Happing

His Attorney,



# UNITED STATES PATENT OFFICE.

JARVIS HUNT, OF CHICAGO, ILLINOIS, ASSIGNOR TO PHOENIX FIRE EXTINGUISHER CO., OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

## SPRINKLER-HEAD FOR AUTOMATIC FIRE-EXTINGUISHERS.

SPECIFICATION forming part of Letters Patent No. 770,755, dated September 27, 1904.

Application filed February 15, 1904. Serial No. 193,616. (No model.)

*To all whom it may concern:*

Be it known that I, JARVIS HUNT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have  
5 invented certain new and useful Improvements in Sprinkler-Heads for Automatic Fire-Extinguishers, of which the following is a specification.

The present invention relates to a strut for  
10 holding the cap or valve of the sprinkler-head seated.

It is well understood by those skilled in the art that the parts of the valve-holding device, whatever be its construction, are held together  
15 by solder which is fusible at a predetermined temperature—say 155° Fahrenheit. It is also well understood that under varying conditions to which the head is subjected it may or may not “fire” at the temperature previously de-  
20 termined upon. For instance, let it be supposed that a head far removed from the main valve opens, the water will fill the system between the main valve and the opened head and will therefore react and influence the tempera-  
25 ture of every intervening head. Hence to the extent that said intervening heads are affected by the passing current of cold water their action will be retarded, so that instead of firing or opening at the aforesaid predeter-  
30 mined temperature (meaning thereby the temperature of the atmosphere surrounding them) they will not fire until the heat of the atmosphere surrounding them overcomes the chilling or cooling effect of the water flowing past  
35 them. It is therefore desirable that this chilling or cooling effect be reduced to a minimum, and this is one of the objects of the present invention. To this end I place the solder joint as far as possible from the cap or valve  
40 and in a position in which it is least liable to be influenced by the absorption of heat by the water. It is also well understood that the ideal valve-holding device should have a maximum holding power combined with a mini-  
45 mum strain upon the solder joint under normal temperatures and a minimum holding power with complete and instantaneous rupturing of the solder joint and separation of

the parts when subjected to a predetermined abnormal temperature.

Another object of the invention is to provide a valve-holding device of the strut type that possesses these qualities in the highest degree attainable.

Another object of the invention is to provide a strut of such construction that external  
55 blows have little or no tendency to disarrange the parts or rupture the solder joints between them.

Another object of the invention is to provide a strut having a post with a laterally-projecting arm and a lever so constructed and arranged that strains put upon the post tending  
60 to tip it will tend to move the lateral arm toward the lever, thereby relieving the solder joint between them of any strain from this cause.

Other objects will appear hereinafter.

All of these things are hereinafter more fully described with reference to the accom-  
70 panying drawings, which are made a part hereof, and in which—

Figure 1 is a section of a strut of preferred form embodying the invention and of the cap and upper portion of the yoke, the cutting-  
75 plane being indicated by the dotted line in Fig. 4. Figs. 2 and 3 are similar views of struts embodying some features of the invention under modifications. Fig. 4 is a sectional  
80 elevation of a complete sprinkler-head having a strut of preferred form embodying the invention. Fig. 5 is an enlarged elevation of the strut.

The improved strut has a part A, herein called a “post,” which bears at one end against  
85 the cap or valve, whence it extends to within a short distance of the top of the yoke B, an intervening part C, herein called a “lever,” which is interposed between the upper end of the post and top of the yoke, and a key D,  
90 each of which parts has peculiarities hereinafter described.

I am aware that, broadly considered, a strut composed of a post, a lever, and a key somewhat resembling the corresponding parts of  
95 the strut of the present application is not new,



and therefore declare that my present invention is limited to the hereinafter-described construction and arrangement of these parts.

According to this invention the post is provided with a laterally-projecting arm  $a$ , which preferably joins the post proper at the end farthest from the cap or valve E. Preferably this arm forms an acute angle with the post proper; but this is not material to the invention in its broadest aspect, which is satisfied if the arm projects laterally.

The lever C crosses the plane of the post, or, more particularly, the line of thrust through the post and has a short arm  $c$ , which bears against the yoke, and a longer arm  $c'$ , which lies against and is soldered to the laterally-projecting arm  $a$  of the post, and this longer arm is provided with a shoulder  $c''$ , which is engaged by the key or locking-plate D, which also is soldered to the lateral arm  $a$  of the post. Several arrangements of this key are shown in the drawings. In each instance the lever C has a branch  $c^2$ , which crosses the plane of the arm  $a$  and has a shoulder adapted to engage the key. In the form shown in Fig. 1 the branch  $c^2$  is beyond the extremity of the arm  $a$  and the key projects beyond said arm far enough to engage the shoulder. The corner at the junction of the extremity and under side of the arm  $a$  and the corner at the junction of the extremity and upper side of the shoulder  $c''$  form fulcrums upon which the key rocks in firing. In this form the branch  $c^2$  and shoulder  $c''$  overhang the end of the key and protect it from blows that might dislodge it or weaken the solder joint by which it is secured to the under side of the arm. In the forms shown in Figs. 2 and 3 the arm  $a$  has an opening through it and the branch  $c^2$  extends through it. The two forms differ only in that the shoulders are presented in different directions. In each of these two forms the key is of less width than the opening, and in firing the end of the key moves into the opening. In both of these modified forms of the device the lateral branch of the lever, its shoulder, and the end of the key play in or through the opening in the lateral arm of the post as the parts are separating, and this is objectionable. In fact, any arrangement of parts which makes it necessary for two soldered surfaces to slip or slide or drag upon or along one another either in direct contact with each other or so nearly in contact that the space between them is filled more or less with solder is objectionable. This is because (taking either of the two modified forms of applicant's device as an example) the difference in the length of the two arms of the lever is such that at the point where this slipping or sliding or dragging action takes place each unit of resistance to the movement of the lever has an enormous advantage over each unit of power applied to the short arm of the lever. This being so even the slight resistance produced by the

capillary attraction or adhesion due to the presence of the melted solder may retard the movement of the parts to the extent of sluggishness, and where one part has to pass another with a sliding or shear-like action a small granule or piece of grit or other foreign substance in the solder will absolutely prevent or arrest their movement. It is for these reasons that I prefer the form shown in Fig. 1, in which the key-fulcrum of the lever is wholly beyond the extremity of said arm. For a like reason the meeting faces of the lateral arm and key are plane, neither the lateral arm nor the key having any part or feature crossing the plane of their meeting faces. It is found in actual practice that when thus constructed the instant the firing temperature is reached the movement of the parts in separating is too rapid for the eye to follow. It will be seen that the solder joint is as far removed from the cap as possible, and that by reason of the laterally-extending arm the joint is exposed on all sides. These conditions make it less susceptible to the influence of the water in the system and more susceptible to the heat of the surrounding atmosphere.

The present invention is characterized by an individual post which extends from the cap or valve to within a short distance of the upper part of the yoke or corresponding element, said post being provided with a lateral arm or projection, to which is secured the longer arm of a lever which crosses the plane of the post, the shorter arm on one side of said plane being adapted to receive the thrust or pressure from the yoke, while the longer arm is secured to the lateral arm or projection of the post by some suitable means, preferably including a key or locking-plate. The only thing intervening between the end of the post and the top of the yoke is the thickness of the lever, and in this respect the strut differs from many of those already patented and some of which have long been in public use in that the latter are made up of two posts of equal or substantially equal length placed end to end.

I am aware of the Grinnell sprinkler, which has been in use for a number of years and which has a post and a lever which crosses the general plane of the post with only the thickness of the lever intervening between the end of the post and the yoke; but the present invention involves not only these two elements, but the lateral arm or projection on the post itself and the means for securing the longer arm of the lever to this projection.

Referring now to Fig. 5, 1 represents the rocking center of the post; 2, the rocking center of the lever; 3, the point of contact between the post and lever; 3 4, the solder joint between the arm and lever; 5, the fulcrum on the arm on which the key rocks; 6, the fulcrum on the lever on which the key rocks; 5 7, the solder joint between the key and arm; 1 2,



the line of thrust through the strut while the joints are intact; 1 3, the line of thrust through the post when the joint is ruptured; 2 3, the line of thrust through the lever when the joint is ruptured; 5 8 and 6 9, the paths in which the fulcrums 5 and 6 move, respectively, when the joint is ruptured. The contacting surfaces of the arm and lever are located between parallel lines touching the points 1 and 3 and at right angles to the straight line 1 3, connecting them, this position being hereinafter referred to as between the ends of the post. By reason of this position of the arm and lever and the further fact that they form an acute angle with the post (or, more strictly speaking, with the line 1 3) the tipping of the post or its tendency to tip moves or tends to move the arm toward the lever, and under no condition does the arm move away from the lever. Thus the solder joint between them is largely relieved of any strain put upon the post, whether it be the endwise strain incident to the pressure upon it while the joints remain intact or the lateral strain incident to the lateral pressure of the lever against its upper end when the joint gives way or lateral strain incident to a blow put upon it from the side remote from the lever. These conditions will exist with the lines 1 3 and 4 3 at any angle up to a right angle, and when the right angle is reached the arm will move or tend to move away from the lever. In this respect, among others, the strut of the present application differs from struts made of two posts of equal or substantially equal length and having lateral arms meeting upon a line which is perpendicular to a straight line drawn through their rocking centers. By making the post of the maximum length possible the movement of its upper end produced or permitted by the movement of the lever to the extent necessary to entirely clear the key is reduced to a minimum, and the fulcrum 5, being located between the ends of the post, will have even less movement, so that the latter does not to any appreciable extent approach the path of the fulcrum 6, so as to either retard the rocking action of the key or pinch it. On the other hand, by reason of the great difference in the length of the two arms of the lever the fulcrum 6 moves with great speed and dislodges the key almost before the fulcrum 5 has moved from its original position. The point of contact 3 between the post and lever is practically on a line drawn from the fulcrum 6 to the rocking center 2, and the key itself is disposed in the same general direction, and by reason of this the strains put upon the key are substantially at right angles to it and the movement of that portion of the key which is soldered to the arm is directly away from it, so that all tendency to slide or creep is avoided.

With the parts arranged as shown in the drawings the fulcrum 5 moves away from the

key; but this part of the invention is satisfied so long as it moves in a path which is outside of the fulcrum 6. If the fulcrum 5 moved in a path inside of the fulcrum 6, (a condition which may be brought about by changing the angular relations of the parts,) it would bear upon the key at a point between the fulcrum 6 and that portion which is soldered to the arm  $\alpha$ , and thus exert a constant strain upon the key, tending to rupture the joint that holds it.

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

1. In a sprinkler-head, the combination of a post having between its ends a lateral arm, a lever bearing upon one end of the post and having an arm lying against the lateral arm of the post, and means for securing the lever and lateral arm together, said lever and lateral arm forming an acute angle with the post, substantially as described.

2. In a sprinkler-head, the combination of a post having between its ends a lateral arm, a lever, bearing upon one end of the post and having an arm lying against the lateral arm of the post, and means for securing the lever and lateral arm together, said lever and lateral arm forming an acute angle with the post and the bearing-point of the lever upon the post being in line with the contacting surfaces of the lateral arm and lever, substantially as described.

3. In a sprinkler-head the combination of a post having between its ends a lateral arm, and a lever, bearing upon one end of the post and comprising a short arm having on one side of the post a rocking center, and a long arm on the other side of the post lying against the lateral arm thereof and means for securing the lever and lateral arm together, said lateral arm and lever forming an acute angle with the post and the bearing-point of the lever upon the post and a rocking center of the lever being in line with the contacting surfaces of the lateral arm and lever, substantially as described.

4. In a sprinkler-head the combination of a post having between its ends a lateral arm, a lever, bearing upon one end of the post and comprising a short arm having on one side of the post a rocking center and a long arm on the other side of the post, a key engaging the lateral arm and lever, and means for securing the key in place, the rocking center of the lever, its bearing-point upon the post, and its point of contact with the key being in line with each other, substantially as described.

5. In a sprinkler-head the combination of a post having between its ends a lateral arm, a lever bearing upon one end of the post and comprising a short arm having a rocking center on one side of the post and a long arm on the other side of the post, a key engaging the lateral arm and lever and a solder joint for holding the key in place, rocking center of the lever, its bearing-point upon the post and its point of contact with the key being in a line



which forms an acute angle with the post, substantially as described.

6. In a sprinkler-head, the combination of a post having between its ends a lateral arm, a lever bearing upon one end of the post and comprising a short arm having a rocking center on one side of the post and a long arm on the other side of the post, said long arm having a shoulder, a key engaging the shoulder and lateral arm of the post, and a solder joint for holding the key in place, the key being disposed in the direction of a line extending from the rocking center of the lever to the shoulder, substantially as described.

7. In a sprinkler-head, the combination of a post having a lateral arm, a lever bearing upon one end of the post and comprising a short arm having a rocking center on one side of the post, and a long arm on the other side of the post, said long arm having a branch which crosses the plane of the lateral arm and is provided with a shoulder presented toward the post, a key lying against the under side of the lateral arm and engaging said shoulder, whereby the extremity of the key is protected by the lateral branch of the lever, and means for holding the key in place, substantially as described.

8. In a sprinkler-head, the combination of a post having a lateral arm terminating at its extremity between the ends of the post, a lever bearing upon the end of the post and comprising a short arm having on one side of the post, a rocking center, and a long arm on the other side of the post, said long arm extending beyond the lateral arm of the post and having a lateral branch which crosses the plane of said lateral arm and is provided with a shoulder, a key arranged against the lateral arm of the post and engaging the shoulder, and means for holding the key in place, the rocking center of the lever, its bearing-point upon the post and the shoulder of the lever being in line with each other, substantially as described.

9. In a sprinkler-head, the combination of a post having a lateral arm terminating at its extremity between the ends of the post, a lever bearing upon the end of the post and comprising a short arm having on one side of the post a rocking center, and a long arm on the other side of the post, said long arm extending beyond the lateral arm of the post, and having a lateral branch which crosses the plane of said lateral arm and is provided with a shoulder, a key arranged against the lateral arm of the post and engaging the shoulder, and means for holding the key in place, the rocking center of the lever, its bearing-point upon the post and the shoulder of the lever being located upon a line which forms an acute angle with the post, substantially as described.

10. In a sprinkler-head the combination of a post having a lateral arm, a lever bearing upon the post and comprising a short arm

having a rocking center on one side of the post and a long arm on the other side of the post, and a key engaging the lateral arm and lever, said lateral arm and lever having key-fulcrums, both located between the ends of the post and each located within the path in which the other moves as the parts are separating, substantially as described.

11. In a sprinkler-head the combination of a post having a lateral arm, a lever, bearing upon one end of the post and comprising a short arm having on one side of the post a rocking center, and a long arm on the other side of the post, and a key engaging the lateral arm and lever, the lever being provided with a fulcrum upon which the key rocks as the parts separate, and the arm being provided with a fulcrum upon which the key rocks as the parts separate, the key-fulcrum of the arm being so disposed with relation to the rocking center of the post that it moves in a path outside of the key-fulcrum of the lever, substantially as described.

12. In a sprinkler-head the combination of a post, a lever bearing upon the post, the post and lever having arms of unequal length disposed laterally with respect to the post, the longer of said arms being provided with a lateral branch located wholly beyond the extremity of the shorter arm, said lateral branch being provided with a shoulder, and a key lying against the shorter arm and projecting beyond the extremity thereof and engaging said shoulder, the parts being soldered together, substantially as described.

13. In a sprinkler-head, the combination of a post, a lever bearing upon the post, the post and lever having arms of unequal length disposed laterally with respect to the post, the longer of said arms being provided with a lateral branch located wholly beyond the extremity of the shorter arm and provided with a shoulder presented toward the extremity of the shorter arm, and a key lying against the shorter arm and projecting beyond the extremity thereof and engaging said shoulder, the parts being secured together by solder, substantially as described.

14. In a sprinkler-head, the combination of a post, a lever bearing upon the post, the post and lever having arms disposed laterally with respect to the post, one of said arms being provided with a key-fulcrum, and a key lying against said arm and extending past said fulcrum, and the other of said arms being provided with a lateral branch located beyond the extremity of the key and crossing the plane thereof, said branch being provided with a shoulder presented toward the key and engaging its end, substantially as described.

JARVIS HUNT.

Witnesses:

W. E. KLEINPELL,  
L. M. HOPKINS.