

(No Model.)

J. NAYLOR, Jr.  
AUTOMATIC FIRE EXTINGUISHER.

No. 538,593.

Patented Apr. 30, 1895.

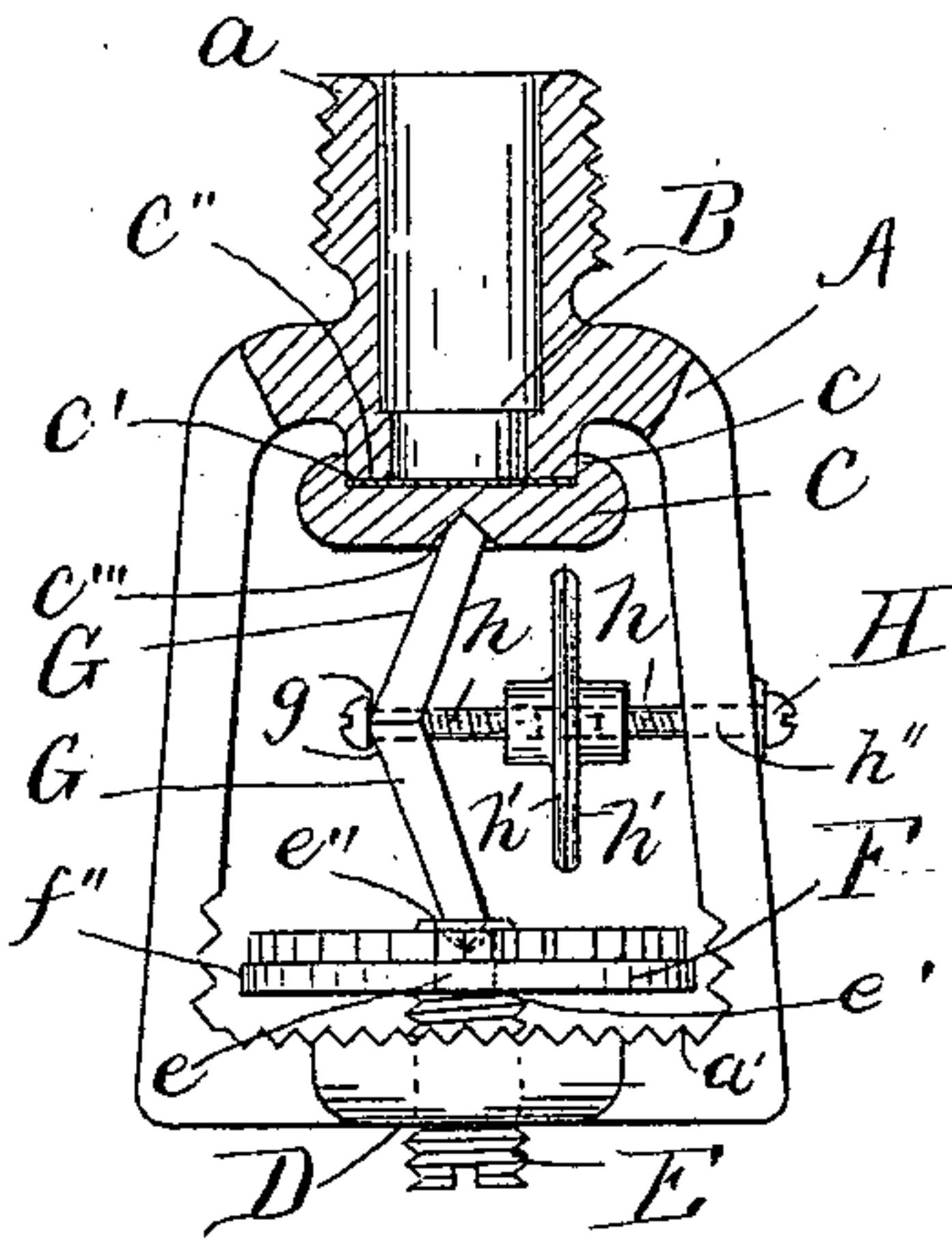


Fig. 1.

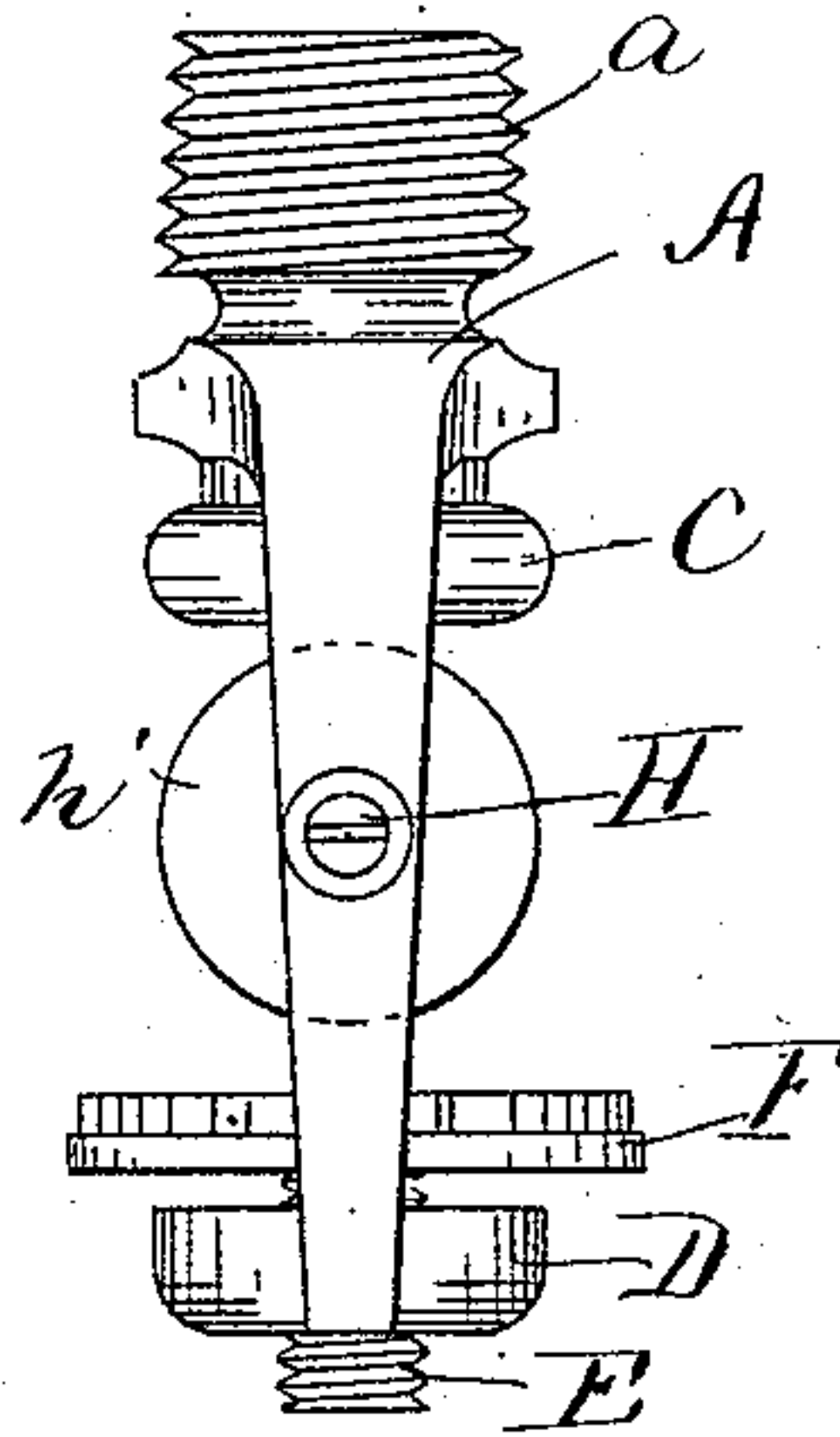


Fig. 2.

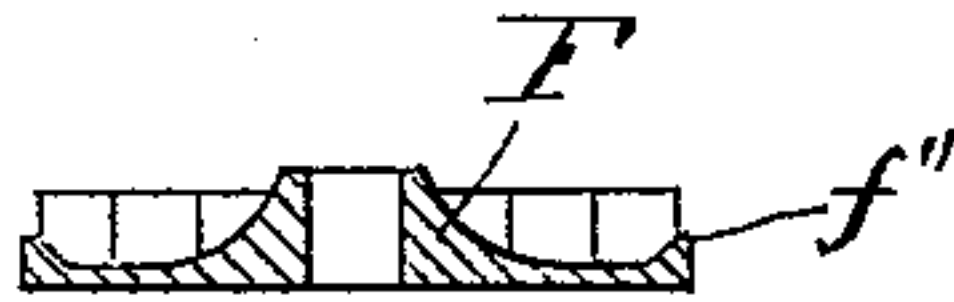


Fig. 5.

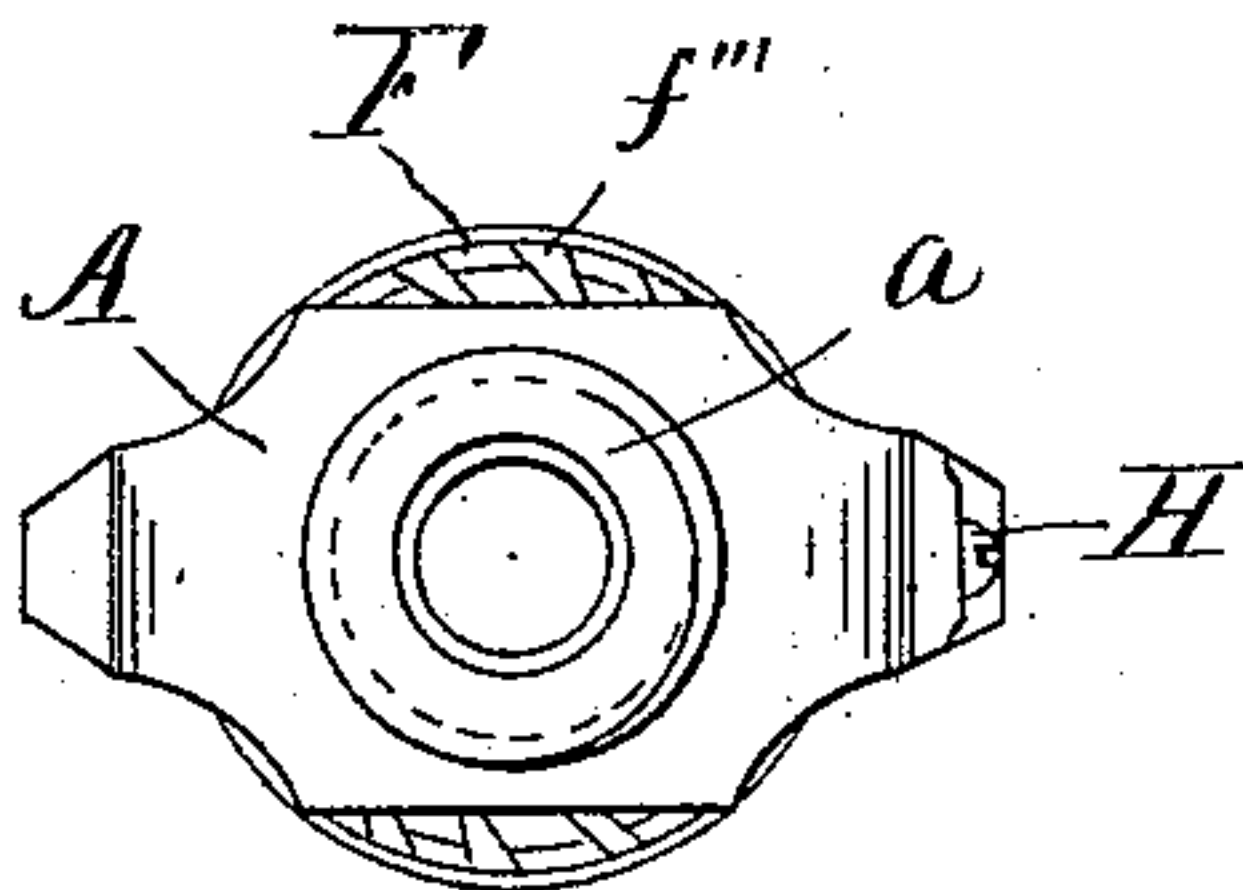


Fig. 3.

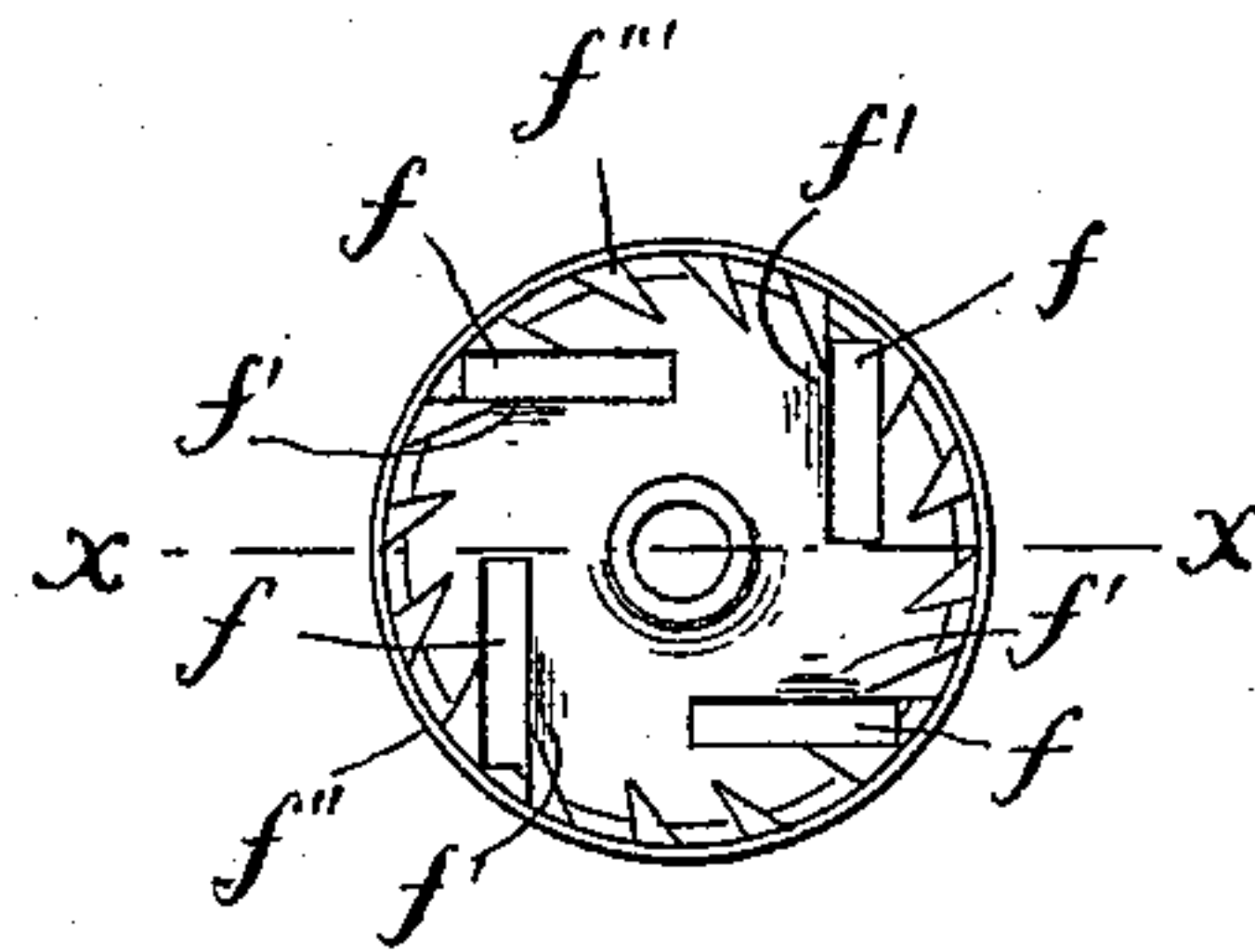


Fig. 4.

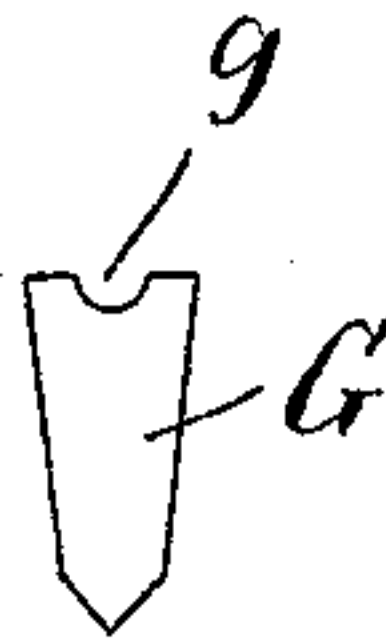


Fig. 6.

WITNESSES.

Chas. E. Moss.  
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# UNITED STATES PATENT OFFICE.

JAMES NAYLOR, JR., OF BOSTON, MASSACHUSETTS.

## AUTOMATIC FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 538,593, dated April 30, 1895.

Application filed March 9, 1894. Serial No. 503,036. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES NAYLOR, Jr., a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Automatic Fire-Extinguishers, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to what are commonly called "sprinklers" as used in connection with a permanent system for the automatic extinguishing of fires in buildings.

The object of these improvements is to produce a new article that will hold the pressure of the water with more certainty when the water is not required, and more sure to let it go in event of a fire so as to extinguish it.

It also has for its object the production of a sprinkler that may be made at low cost and by such means that will insure a uniform and exact standard to be easily maintained in their manufacture, so that all the several parts are duplicates of each other and interchangeable.

It consists of the construction and operation of its parts in such a manner that the following features are attained: first, increased area of the fusible surfaces; second, increased area of exposed surface of the parts having the fusible surfaces; third, the conduction of heat from parts having the fusible surfaces reduced to the minimum; fourth, no fusible surfaces on the parts which directly support the valve; fifth, the instant parting at every point of the whole area of the fusible surfaces; sixth, the same strain may be given to the fusible surfaces notwithstanding the difference in the pressure of the water in the system; seventh, the impossibility of the drip from condensation or otherwise to reach the parts having the fusible surfaces; eighth, combined means of water distribution; and ninth, that each part may be separately finished and with little skill assembled or put together without any fitting whatever, all of which will be herein fully specified and set forth in the claims.

In the drawings, Figure 1 is a general elevation; Fig. 2, a side view, and Fig. 3 a top plan view, Figs. 4, 5, and 6 being detail views of parts shown also in the other figures.

A is the sprinkler head, which is screw threaded at *a* for insertion to the fittings of the system; suitable provision being made so that a wrench may be applied in making the joint water tight.

B is an ajutage nozzle which being bored smooth and of proper dimensions gives added velocity or force to the water at the orifice and therefore in capacity equal to the part supplying it.

C is the valve, having a flange *c* which serves the double purpose of holding the valve correctly to its seat and for retaining an aluminum insertion *c'*, thus forming a composite valve of metals suitable for their respective purposes, viz:—a soft non-corrosive metal to make the water joint and a strong metal to support it to its seat *c''*. The valve is also provided with a countersink *c'''* into its obvert side.

The head A is provided at D with internal screw threads for the insertion of the set screw E, said screw having an extension *e* of lesser diameter so as to form a shoulder *e'*. This extension is provided with a countersink *e''* and serves the double purpose of a support both for the valve and the water distributor F, which is freely mounted upon the said extension and in contact with the said shoulder so as to be easily revolved and is held to the screw E by the turning over of the upper edge thereof. This distributor is to be seen in the several figures, its function being so important that an exact description becomes necessary to render its action clear and understood. Fig. 4 shows a face or plan view; Fig. 5, a cross-section on line *xx* of Fig. 4. The central part is conical, the sides of the cone being concave up to the edges of the rectangular openings *ffff* which at the points *f'f'f'f'* come to a feather edge with the under surface. The rectangular openings have all their edges at an inclination of about forty-five degrees to a radial line. Around the periphery is the sharp-edged flange *f''* being square on the outside to the under surface, and inside flaring at an angle of about forty-five degrees to the square edge and the under surface. Inside this flange and adjoining it are the series of projections *f'''*. These projections have tapering sides and are set at an angle of about forty-five degrees to a radial



line. The under side of Fig. 4 is flat and all the aforescribed parts and projections are upon the same side and in one solid piece or casting.

5 The distributor is prevented from falling off the extension *e* by slightly turning over or riveting the upper edge of the said extension.

That part of the head A which is near to the distributor is serrated as shown in Fig. 1, making a series of sharp projections *a'*, which serve in combination with the distributor F to give an improved distribution.

G G are toggles each being a duplicate of the other. They are pointed at one end for insertion into the countersinks *c'''* and *e''* and at the other end are surfaces for proper bearing contact with each other and the semi-circular recesses *g g*. The set of these toggles in their proper position is what is commonly termed a toggle joint as seen in Fig. 1, being held and sustained in such position by the stay H to the head A. This stay is composed of four pieces, viz., the two screws *h h* and the two disks *h' h'*. Each screw enters the hub of each disk and the flat face of each disk is united together by the fusible solder which melts at about 160° Fahrenheit. The stay may therefore be considered as integral, although in first setting, the screws *h h* give ample range of adjustment so that the toggles may be set more or less obtuse. One of the screws *h* is interlocked by the semi-circular recesses of the toggles and the other passes freely through the opening *h''* in the head A, and thus a tensile strain is given to the stay H while a compressive strain is given to the toggles G G.

The advantages derived by this construction are in the main stronger means to hold the valve tight, and surer action, the operation being as follows:—Being in place and a part of a permanent system which with the contained water is at or about 60° Fahrenheit and a fire occurring near it, the sudden rise of temperature quickly imparts heat to the disks owing to their large exposed area, which heat is all retained because it cannot be conducted off through the light screws to other colder parts. As a consequence the solder melts at 155° Fahrenheit and allows the disks to part instantly at every point, even before the other parts have become heated at 120° Fahrenheit. The toggles, valve and half the stay H are forced away by the oncoming stream of water, and here it may be observed that the flange and projections of the distributor are so made that with the oncoming stream it is impossible for any of the released parts to become in any way entangled because of all the forty-five degree angles affording a free release whenever contact of the parts occurs. The stream strikes the distributor directly on the cone, and by it, it is deflected without much loss of force outwardly coming in contact with the projections and flange part is thrown upward and part downward, passing through the rectangular openings and against the ser-

rated surface of the head from whence it is deflected in every direction. The force of the water striking the angular projection causes its rapid rotation, and by all these causes the general effect is to break the stream into numberless drops and throw same in all directions, both upward and downward, and to have the same effect if placed either as a pendant as shown in the drawings, or reversed as it would be by being placed above the pipes of the system.

The half of the stay H which remains does not in any way hinder the stream, as it is securely held to the head, having freedom to pass farther back but not forward.

After the fire is extinguished the water supply is shut off at the main valve of the system and the several parts replaced without removal of the head A from the system.

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

1. In an automatic fire extinguisher the combination with the head A provided with a nozzle and the set screw E, valve C and toggles G pivotally supporting said valve to said nozzle from said set screw; of the stay H supporting said toggles to said head and provided with means for automatic release between said toggles and said head as herein shown and described.

2. In an automatic fire extinguisher the combination with a screw threaded head provided with a nozzle; of the valve C and toggles G G directly supporting said valve to said nozzle and provided with recesses *g*, the disks *h' h'* soldered together and provided with the screws *h h*, either of which may be and is interlocked by means of said recesses and the other held by said head substantially as shown and described.

3. In an automatic fire extinguisher the combination with the head A provided with a nozzle, the valve and its support to said nozzle consisting of the single toggles G G provided with pointed ends and semi-circular recesses *g g* and the set screw E; of the stay H engaging said recesses and secured to said head, and adapted to be automatically released at a point between said head and said toggles as herein set forth.

4. In an automatic fire extinguisher the combination with the head A provided with a nozzle, a valve closing said nozzle having a countersink into its obvert side, a set screw E also provided with a countersink *e''*, a distributor F mounted upon said screw and adapted to revolve; of the single toggles pivotally inserted into said countersinks and placed between said valve and said distributor, and the stay sustaining said toggles to said head and adapted to be automatically released between said head and said toggles as herein set forth.

5. In an automatic fire extinguisher the combination with a screw threaded head provided with an ajutage nozzle, a valve lat-



erally held to said nozzle, and the set screw E; of the direct means of support between said screw and said valve consisting of the single toggles G G and the indirect means of support of said valve from said head to said toggles, consisting of the screws *h h* and disks *h', h'*, said disks soldered together so as to be automatically released as herein set forth.

6. In an automatic fire extinguisher the combination with a screw threaded head provided with a nozzle and the set screw E; of the valve provided with a flange and a non-corrodible insertion *c'* and supported to said nozzle by the single toggles G G and stay H, said stay adapted to be automatically released, and the distributor F loosely mounted on said set screw and adapted to be rotated by the oncoming stream of water as herein set forth.

7. In an automatic fire extinguisher the combination with a screw threaded head, provided with a nozzle and the set screw E, a support interposing said set screw and the valve C, means for sustaining said support to said head and for its automatic release; of the distributor F mounted freely upon the extension *e* and shoulder *e'* of said set screw and held thereto by turning over the upper edge of said extension, the said distributor

provided with means to cause its rotation by the oncoming stream and for throwing said stream in all directions as herein set forth.

8. In an automatic fire extinguisher the combination with a screw threaded head provided with a nozzle and the serrated surface *a'*, of a mounted distributor adapted to revolve and provided with openings *fff*, substantially as shown and described.

9. In an automatic fire extinguisher the combination with a screw threaded head provided with an ajutage nozzle and the serrated surfaces on said head, the set screw E having an extension *e* and a distributor mounted thereon, a valve in contact with said nozzle, toggles directly supporting said valve, and the disks united with solder; of means whereby the whole is adjustably held together consisting of the screws *h h* and said screw E as herein shown and described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 25th day of January, A. D. 1894.

JAMES NAYLOR, JR.

Witnesses:

FRANK L. NAYLOR,  
BIRDELLA G. NAYLOR.