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PATENTED SEPT. 8, 1908.

V. LAPHAM.
SPRINKLER HEAD FOR AUTOMATIC FIRE EXTINGUISHERS.
APPLICATION FILED SEPT. 2, 1899.

Fig. 1.

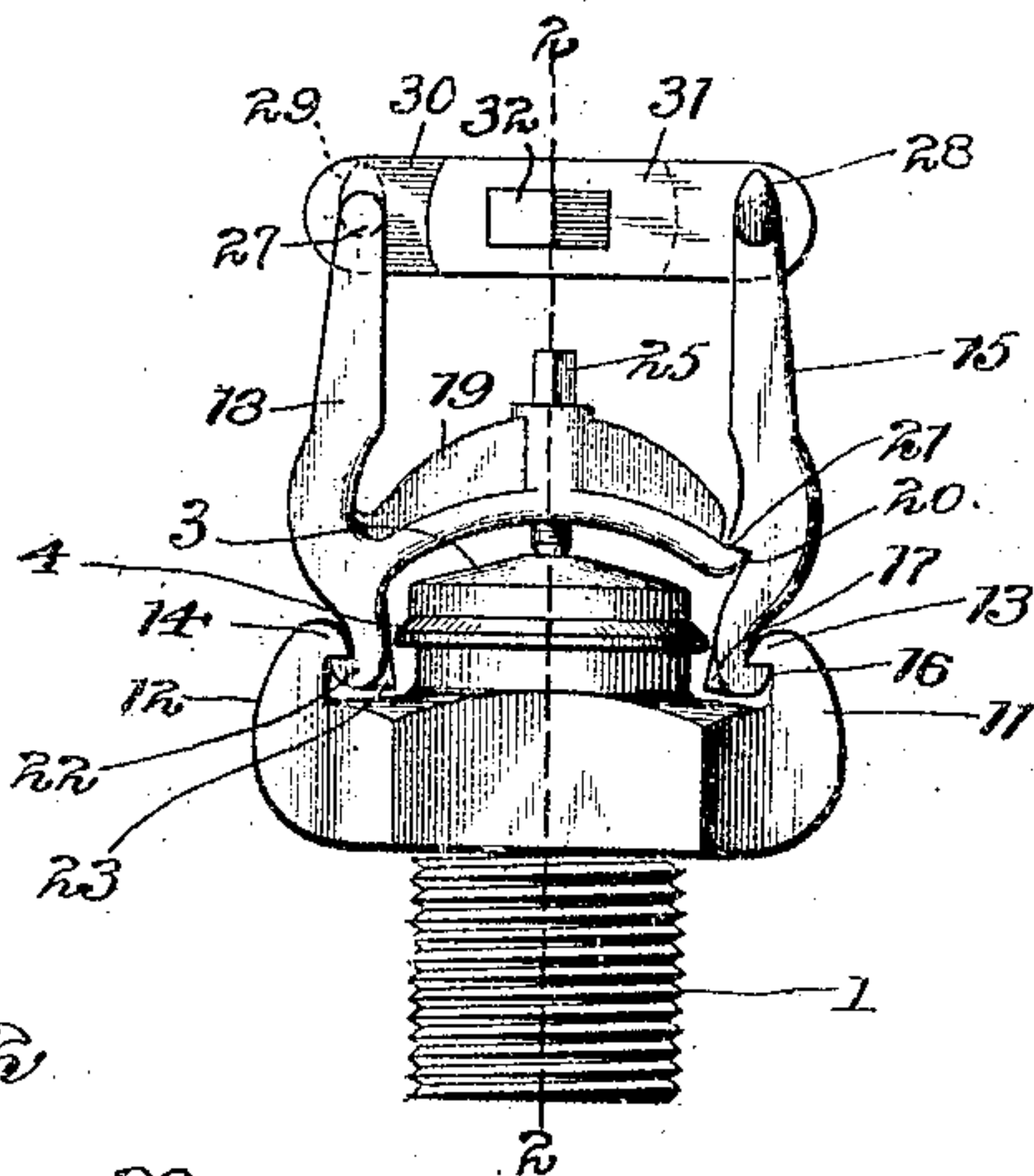


Fig. 2.

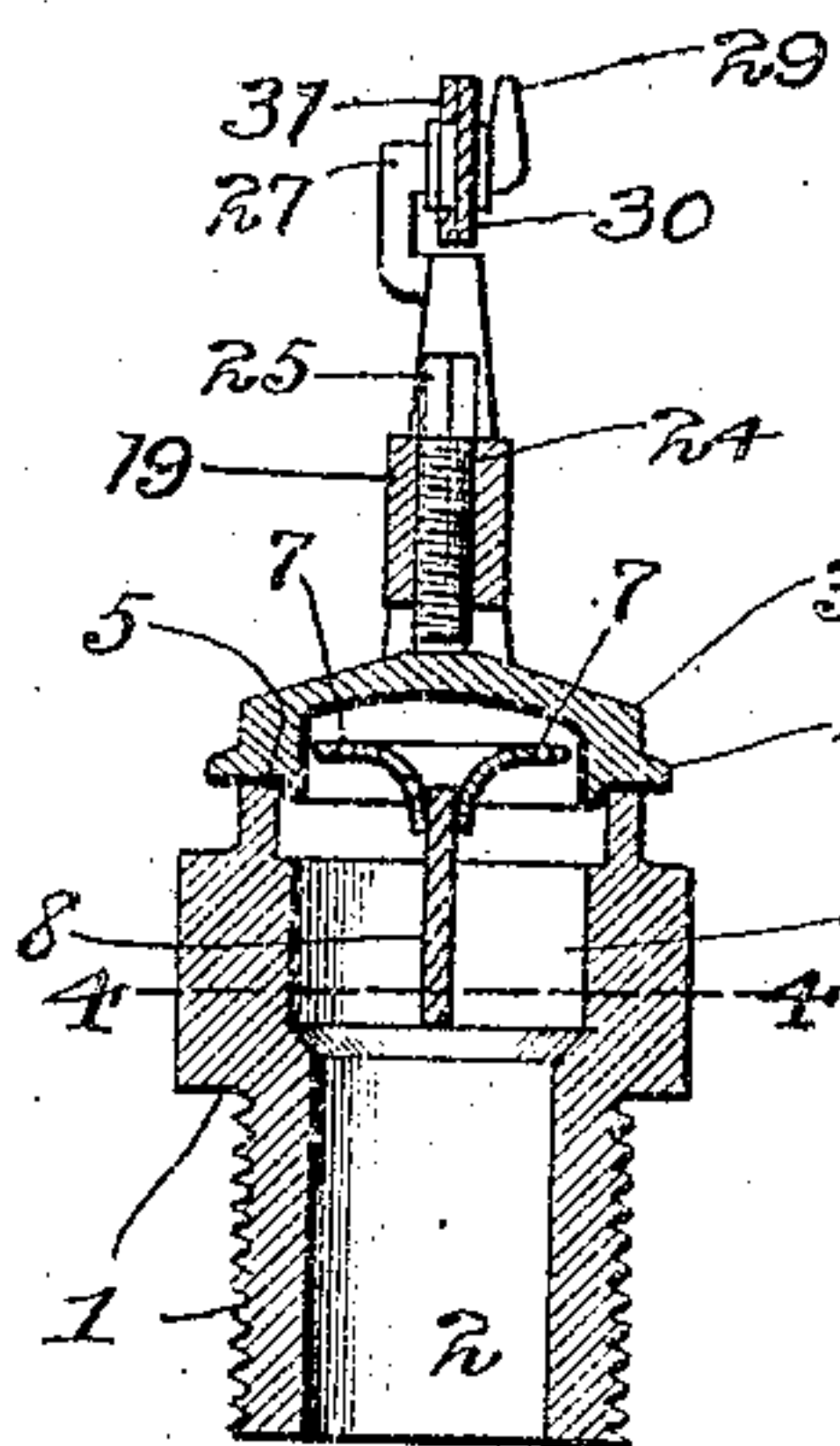


Fig. 3.

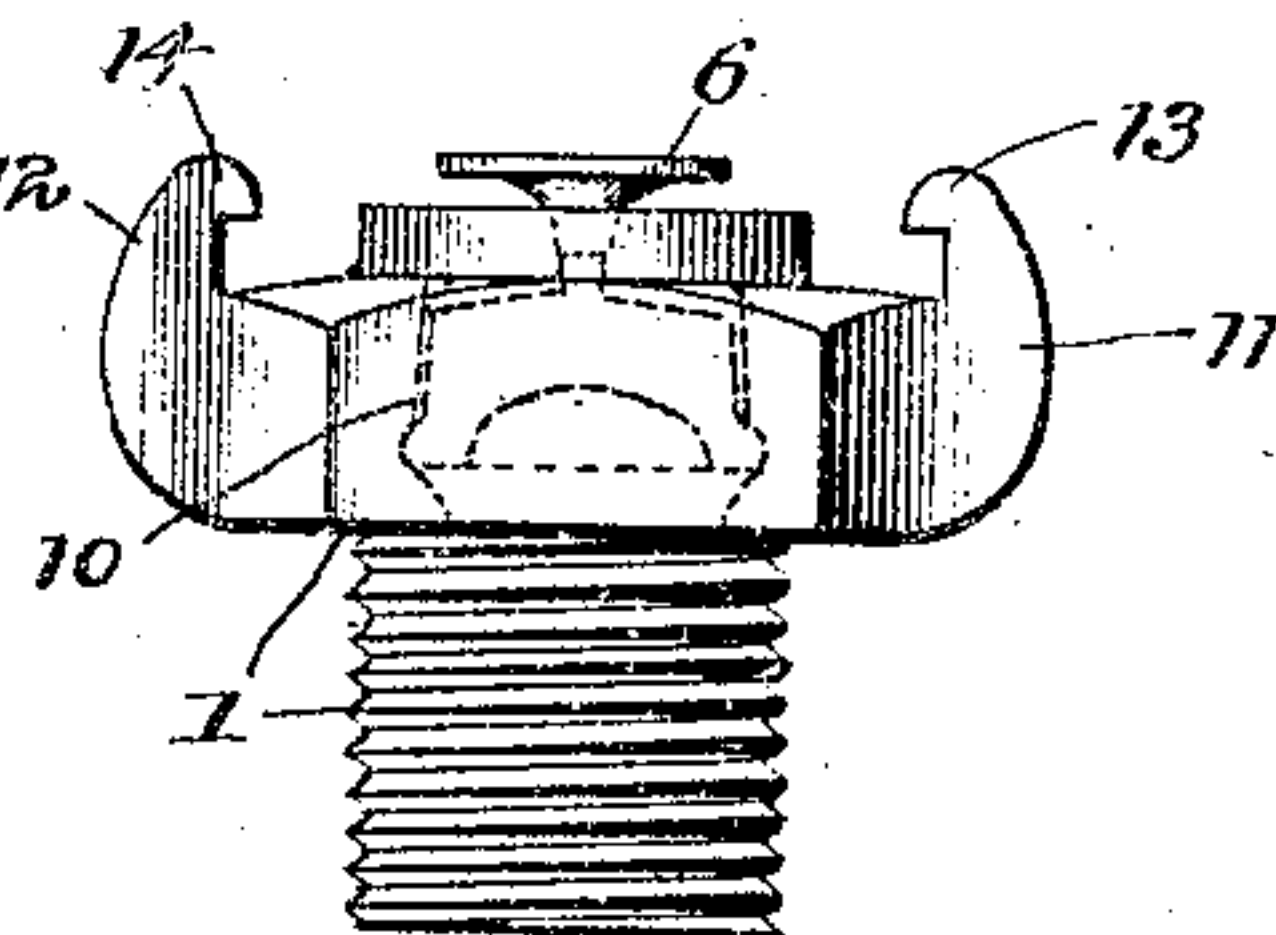


Fig. 4.

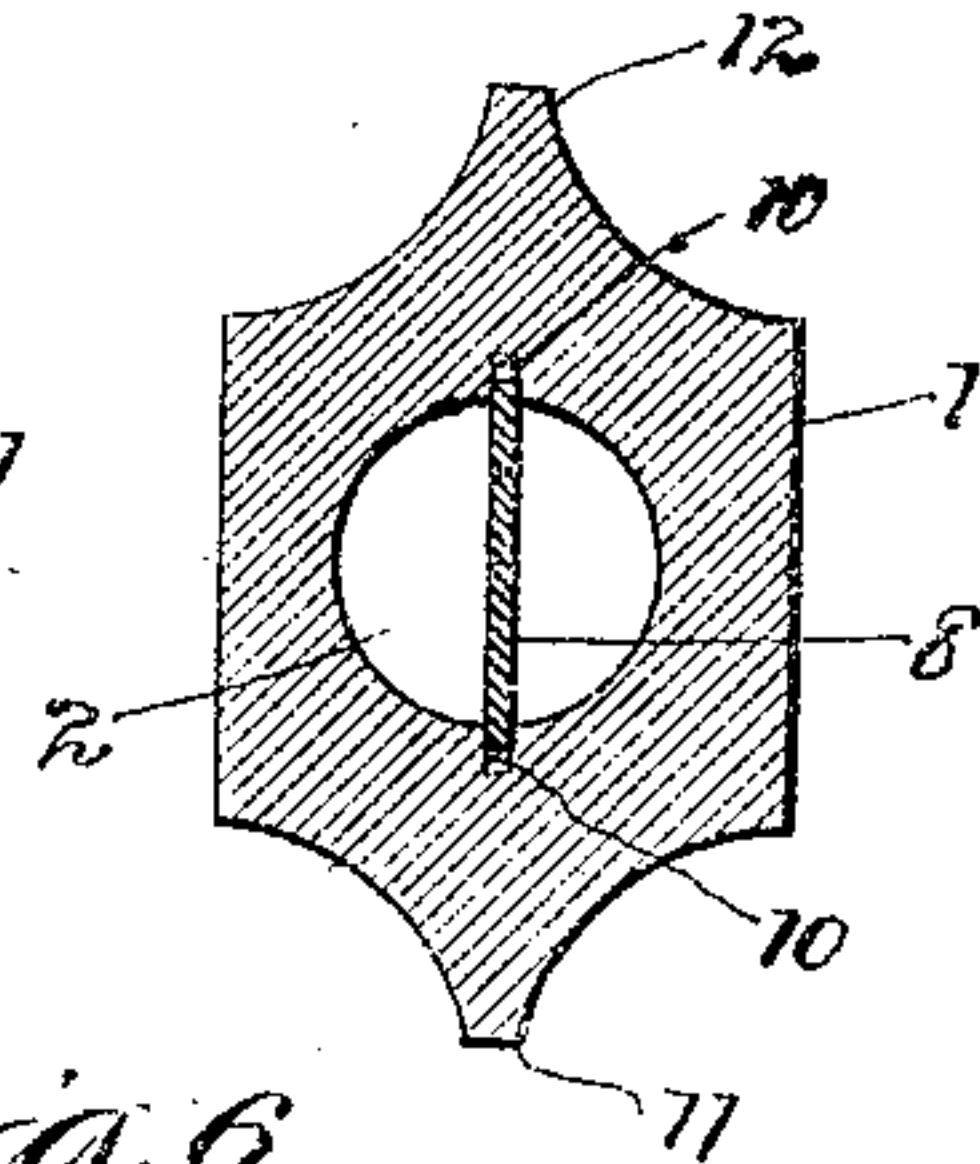


Fig. 6.

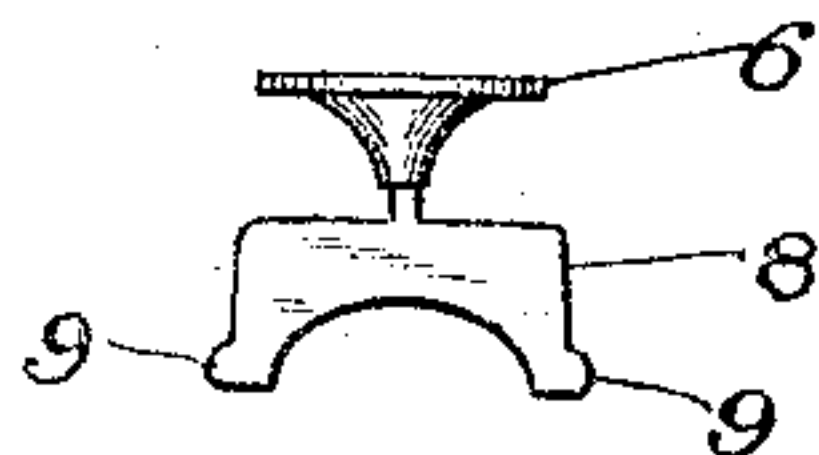


Fig. 5.

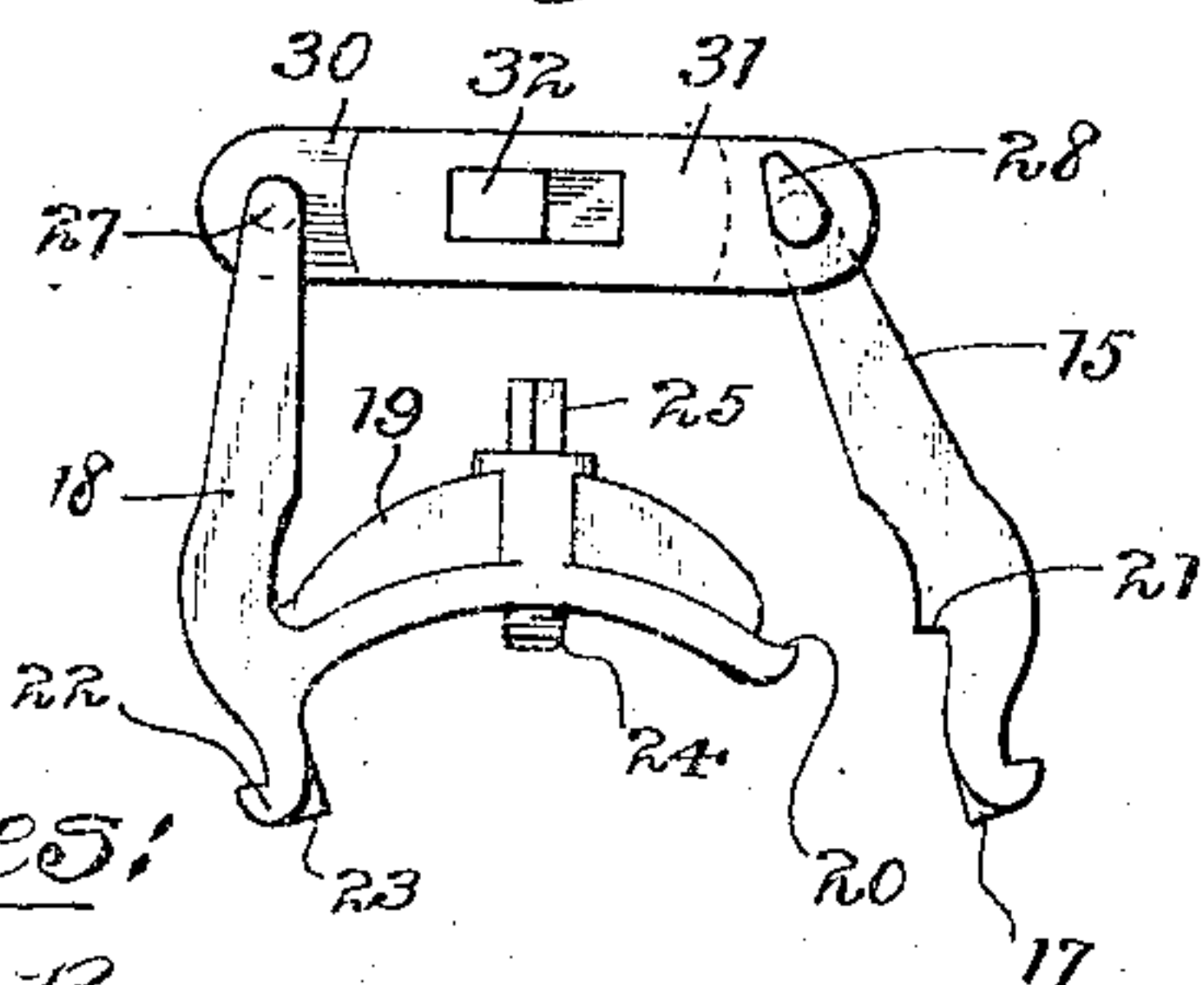
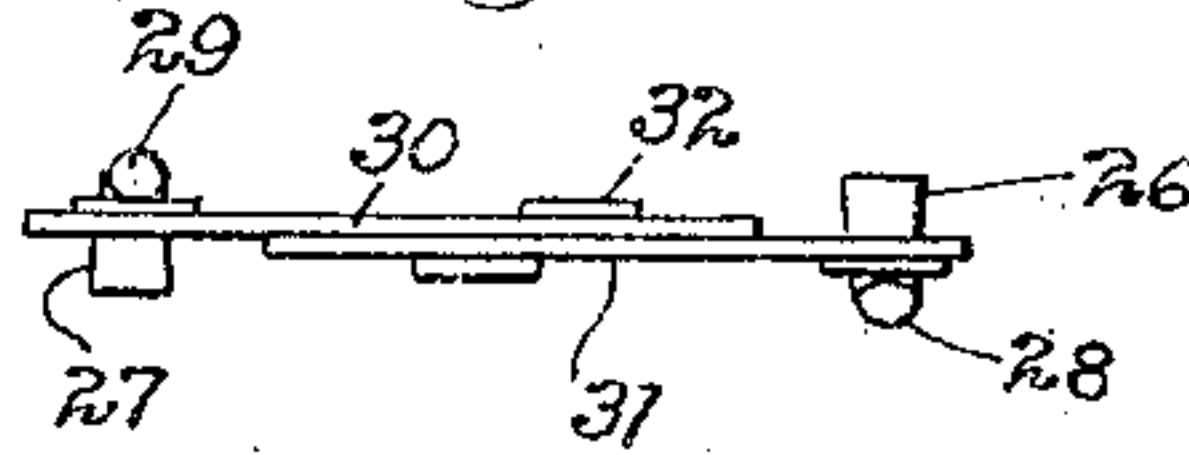


Fig. 7.



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UNITED STATES PATENT OFFICE.

VALENTINE LAPHAM, OF CHICAGO, ILLINOIS.

SPRINKLER-HEAD FOR AUTOMATIC FIRE-EXTINGUISHERS.

No. 897,908.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed September 2, 1899. Serial No. 729,358.

To all whom it may concern:

Be it known that I, VALENTINE LAPHAM, a resident of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Sprinkler-Head for Automatic Fire-Extinguishers, of which the following is a specification.

My invention relates to sprinkler heads for automatic fire sprinkler systems, and its object is to produce a novel, efficient and sensitive sprinkler head which shall be yokeless and provided with an internally anchored deflector whereby there shall be a full and uninterrupted lateral distribution of the water.

The present well known type of sprinkler head has a yoke between whose apex and the valve cap is arranged the collapsible strut. The arms of this yoke obviously obstruct the free distribution of the water and heretofore it has been proposed by various ways to so construct this yoke as that it should present the least interference to the water, but none of the proposed methods contemplated the discarding of the entire yoke. Another and greater objection to the yoke with its consequent weight, is that it prevents the location of the distributing pipes of the sprinkler system near the ceiling or joist. The specifications of the board of underwriters require that the deflectors shall be located not closer than three inches from the ceiling or joist or farther than ten inches. The measurements are all reckoned from the deflector. By the use of my sprinkler head, the pipes may be located at least two inches nearer to the ceiling or joist than heretofore, which is a matter of paramount importance where it would be impossible to install a sprinkler system having the usual form of sprinkler head, as in low basements, stairways, and rooms generally having low ceilings.

In the accompanying drawings, Figure 1 is an elevation of my sprinkler head; Fig. 2, a section on line 2 of Fig. 1; Fig. 3, an elevation of the nozzle alone; Fig. 4, a section on line 4 of Fig. 2; Fig. 5, an elevation of the collapsible devices; Fig. 6, an elevation of the deflector removed; Fig. 7, a plan of the collapsible link and immediate parts of the levers.

The nozzle 1 has the usual passage 2 communicating with the distributing pipes of the sprinkler system and is normally closed by the usual valve cap 3, preferably having a

slightly projecting flange 4 and also provided with a gasket 5 of block tin, copper, or other suitable material, represented by the black line in Fig. 2 on the entire under surface or face of the cap. This gasket makes a tight joint and prevents corroding. As shown in Fig. 2, the outlet end of the passage 2 is made of slightly greater diameter than the lower portion thereof for a purpose hereinafter explained.

The preferable, though not necessary, form of deflector is illustrated in the drawings. It is anchored or held in the passageway 2 and within the hollow cap, being incased by the latter and projecting preferably slightly above the top plane of the outlet of the nozzle, as seen in Fig. 3. As shown, the deflector has a cone-shaped portion which may be provided with a series of holes for the distribution of water directly above the sprinkler head. This cone may be made integral with, or secured to, a flat strip 8, which may be of the form shown in Fig. 6, wherein it is provided at its lower corners with small lugs or projections 9, sliding downwards in opposite grooves 10 in the walls of the passage 2 so as to extend diametrically across the passage. The grooves at the bottom are somewhat deeper to receive the lugs 9 which spring therein, the strip 8 having sufficient resiliency to slightly buckle or bend until the bottom of the grooves is reached.

The nozzle has oppositely located lugs 11 and 12 which are hook-shaped by reason of the inwardly overhanging portions or hooks 13 and 14, respectively. These lugs constitute one means whereby the collapsible devices for holding the cap to its seat may be normally held to the nozzle.

One of the main objects of my invention is to provide a sprinkler head whose parts shall present no obstruction to the distribution of the water, and to this end, as will be noticed, the retaining devices, which, as shown, are the lugs on the nozzle, are located substantially below the line of the water as it emerges from the nozzle and is spread by the deflector. Furthermore, it is obvious that any other form or construction of internally located and anchored deflector may be employed and also any other suitable means for so anchoring the deflector may be adopted.

The collapsible devices for normally holding the valve cap to its seat comprise a substantially vertical lever 15 having a projec-

tion or hook 16 engaging the hook 11 on the nozzle and also preferably having a projection 17 on the opposite side engaging under the flange 4 to act as a kicker to render certain the removal of the cap. The other lever, whose preferable form is as shown, consists of a substantially vertical portion 18 and a truss or bridge 19 having a projecting end 20 engaging under a shoulder 21 on the lever 15. The lever 18 has a projection or hook 22 similar to hook 16 and engaging under hook 14 on the nozzle and also has a projection 23 acting the same as kicker 17. The bridge extends diametrically across and above the cap and a set screw 24 having an angular head 25 extends transversely centrally through the bridge and impinges against the central axis of the cap.

The levers 15 and 18 respectively have hooks formed of straight right-angled portions 26 and 27 extending in opposite directions through holes in the ends of a collapsible or fusible link and having upwardly extending points or ends 28 and 29, respectively. This link may be made of any desired form and construction for the purpose designed, but I prefer the link shown in my Patent No. 575,121, issued to me on January 12, 1897, and I have illustrated the same herein. Briefly speaking, this link comprises two strips or members 30 and 31 having openings through which extends the rocker 32, the parts being suitably held together by low fusible solder.

The collapsible devices are assembled and placed in position as follows: The hooks on the top ends of the levers are inserted through the holes in the link, as shown in Fig. 5, and the parts are now ready to be secured to the nozzle. The set screw having been screwed upwards sufficiently, the projection 20 is brought to bear under shoulder 21 and the parts in this position are then inserted sidewise of the nozzle so that hooks 16 and 22 engage under hooks 13 and 14, respectively, as shown in Fig. 1. The set screw is now screwed downwards onto the cap and the result is a tensile strain on the link which connects the upper ends of the levers. This strain is resisted by the link which maintains the parts in the position shown in Fig. 1 until it becomes fused by fire or unusual heat, whereupon all such parts are thrown free of the nozzle and the valve is both kicked from place by the levers and forced off by the pressure of water. The sprinkler head is thus entirely stripped above the plane of its outlet and the outcoming water will be distributed over the whole lateral area without obstruction inasmuch as the usual and objectionable yoke is dispensed with altogether and the deflector located in the passageway.

As shown, the deflector is internally anchored in the enlarged portion 2^a of the pas-

sageway and its deflector portion proper is contained within the valve cap. The passageway is preferably made of somewhat larger diameter at the outlet end as before described in order to compensate for the space taken up by the deflector so that there is no liability of interference to the water or diminishing of its flow. The water thus has a full, free flow between the deflector 8 and the seat of the valve cap.

Although I have described more or less precise forms and details of construction, I do not intend to be understood as limiting myself thereto, as I contemplate changes in form, the proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient, and without departing from the spirit of my invention.

I claim:

1. A sprinkler head comprising a nozzle having a water outlet, a closure for such outlet, engaging hooks on the nozzle located on opposite sides of the outlet, a substantially vertical lever having a bridge secured thereto and extending laterally thereof, bearing against the closure and engaging one of said hooks at its lower end, a second substantially vertical lever engaging the other of said hooks at its lower end and bearing against the free end of said bridge and a collapsible link connecting the upper ends of said levers.
2. A sprinkler head comprising a nozzle having a water outlet, a closure for such outlet, and means for normally holding such closure seated consisting of a pair of substantially vertical levers detachably engaging the nozzle at their lower ends, one of the levers having a bridge secured thereto and extending laterally across and above such closure and engaging the other lever with its free end, a collapsible link connecting the upper ends of the levers and a set screw extending through the bridge and bearing against the top of the closure, such screw exerting tension on the link and tending to force the bridge-provided lever outwards and the bridge from engagement with the other lever.
3. A sprinkler head comprising a nozzle having a water outlet substantially at the top plane thereof, hooks on the nozzle on either side of the outlet, a closure for such outlet, two substantially vertical levers having hook-shaped lower ends engaging under the nozzle hooks, a bridge connected to one of the levers, extending laterally across and above the closure and engaging under a shoulder on the other lever intermediate of its length, a set screw in such bridge and bearing against the closure, such screw tending to force the bridge to an oblique position and to release it from engagement with said shoulder when the head is shot off, and a collapsible link connecting the upper ends of the levers and tending to resist tensile strain.
4. A sprinkler head comprising a nozzle

having a water outlet substantially at the top plane thereof, hooks on the nozzle on either side of the outlet, a closure for such outlet, two substantially vertical levers having hook-shaped lower ends engaging under the nozzle hooks, a bridge connected to one of the levers, extending laterally across and above the closure and engaging the other lever intermediate of its length, a set screw in such bridge and bearing against the closure, hooks on the upper ends of the levers and extending in opposite directions, and a collapsible link having holes near its ends engaging by the hooks on the upper ends of the levers.

5. A sprinkler head comprising a nozzle having a water outlet, hooks 13 and 14 on the nozzle, a valve cap 3 for the outlet, a lever 18 having a hook 22 engaging hook 14, a bridge 19 connected to lever 18 and having a free end 20, a lever 15 having a hook 16 engaging hook 13 and having a shoulder 21 bearing against said end 20, a set screw 24 in the bridge and bearing against the cap, and a collapsible link connecting the upper ends of the levers.

6. A sprinkler head comprising a nozzle having a water outlet, hooks 13 and 14 on the nozzle, a valve cap 3 for the outlet, a lever 18 having a hook 22 engaging hook 14, a bridge 19 connected to lever 18 and having a free end 20, a lever 15 having a hook 16 engaging hook 13 and having a shoulder 21 bearing against said end 20, a set screw 24 in the bridge and bearing against the cap, hooks 26 and 27 on levers 15 and 18, respectively, and a collapsible link attached to said hooks 26 and 27 and connecting between the upper ends of the levers.

7. A sprinkler head comprising a nozzle having water outlet hooks 13 and 14 on the nozzle, a valve cap 3 for the outlet, a lever 18 having a hook 22 engaging hook 14, a bridge 19 connected to lever 18 and having a free end 20, a lever 15 having a hook 16 engaging hook 13 and having a shoulder 21 bearing against said end 20, a set screw 24 in the bridge and bearing against the cap, said cap having a flange 4, projections 17 and 23 on the inner sides of the lower ends of the levers and adapted to engage under the flange when the levers collapse, and a collapsible link connecting the upper ends of the levers.

8. A sprinkler head comprising a nozzle having a water passage of greater diameter near the outlet, a closure for such outlet, means for normally holding such closure seated, and a stationary deflector secured in such passage at its greater diameter and consisting of a perforated inverted cone which projects slightly above the top plane of the

outlet and is of substantially the same diameter as the greater diameter of such passage.

9. A sprinkler head comprising a nozzle having a water passage and outlet provided with opposite grooves in the interior walls of such outlet, which grooves extend from the mouth of the outlet inwards, a valve cap for such outlet, means for normally holding such cap seated, and a deflecting device mounted inside the water passage and comprising a flat strip extending diametrically across the passage and a circular disk on such strip for the lateral deflection of the water, and catch mechanism whereby the strip may be anchored in the nozzle when forced inwards in the groove.

10. A sprinkler head comprising a nozzle having a water passage and outlet, a valve cap for such outlet, means for normally holding such cap seated and a deflecting device mounted inside the water passage and comprising a flat strip extending diametrically across the passage and secured in the grooves in the walls of such passage, such grooves extending from the mouth of the outlet longitudinally inwards, and an inverted conical spreader or deflector proper on the strip and having holes for the passage of water directly above the head, such deflector being arranged axially with the outlet or passage and projecting slightly above the top plane of the water outlet.

11. A sprinkler head comprising a nozzle having a water outlet or passage provided with opposite longitudinal grooves made deeper at the inner ends, a valve cap for such outlet, means for normally holding such cap seated and a deflecting device consisting of a flat strip extending diametrically across the passage and having projections sliding in said grooves and engaged by such deeper portion thereof, and a deflector proper on said strip and projecting slightly above the top plane of the water outlet for the full, free lateral distribution of the water.

12. A sprinkler head comprising a nozzle having a bottom outlet, a closure for such outlet, levers pivotally connected at their inner ends to said nozzle, a cross-piece arranged between said levers and secured to one of them, a set-screw working in said cross-piece and exerting tension upon the closure to hold it closed and upon the levers to force their outer ends apart, and a fusible link connecting the outer ends of such levers and receiving and normally overcoming the tension exerted by the set screw upon the levers.

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