

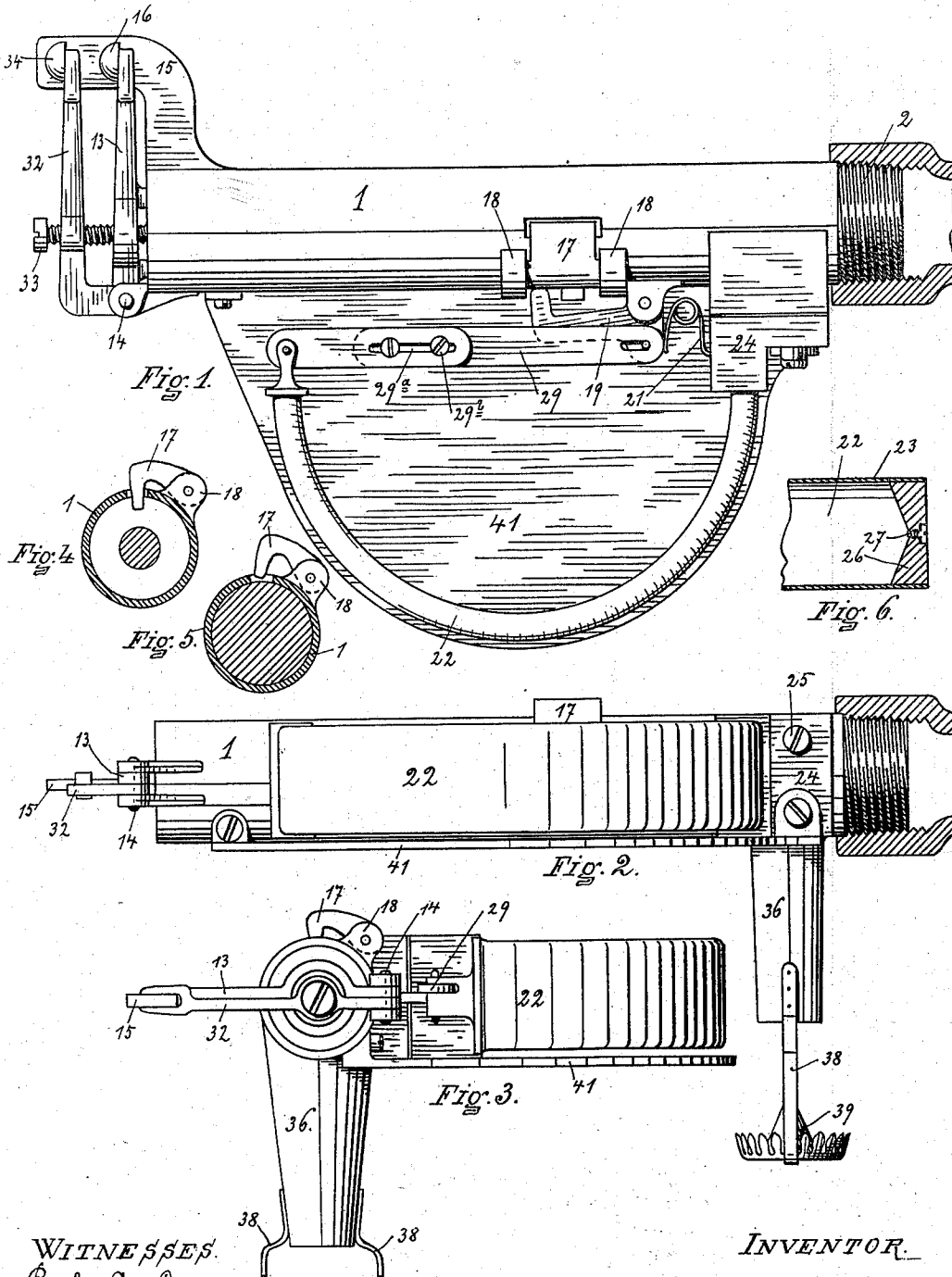
(No Model.)

2 Sheets—Sheet 1.

C. O. YALE, Dec'd.
L. B. YALE, Administrator.
AUTOMATIC SPRINKLER.

No. 559,346.

Patented Apr. 28, 1896.



WITNESSES.
Rich. A. George.
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INVENTOR.
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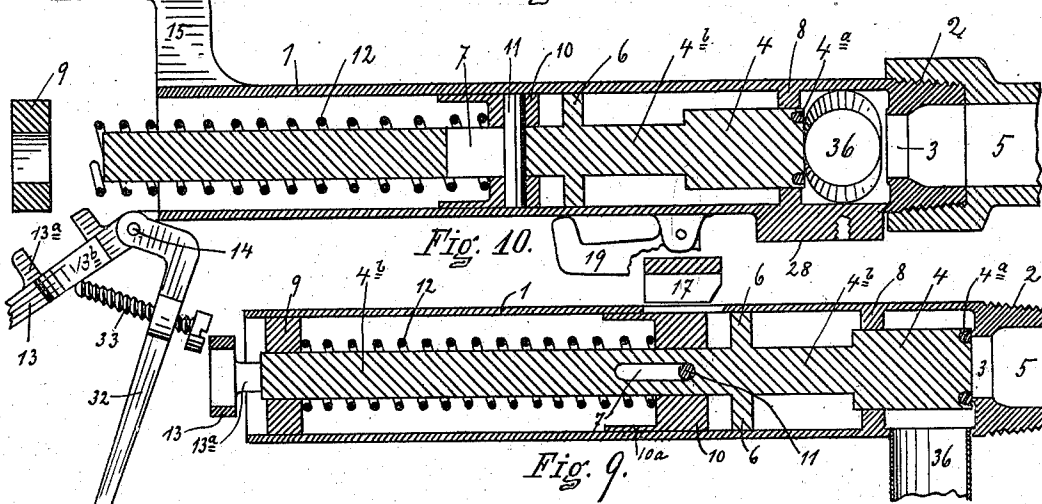
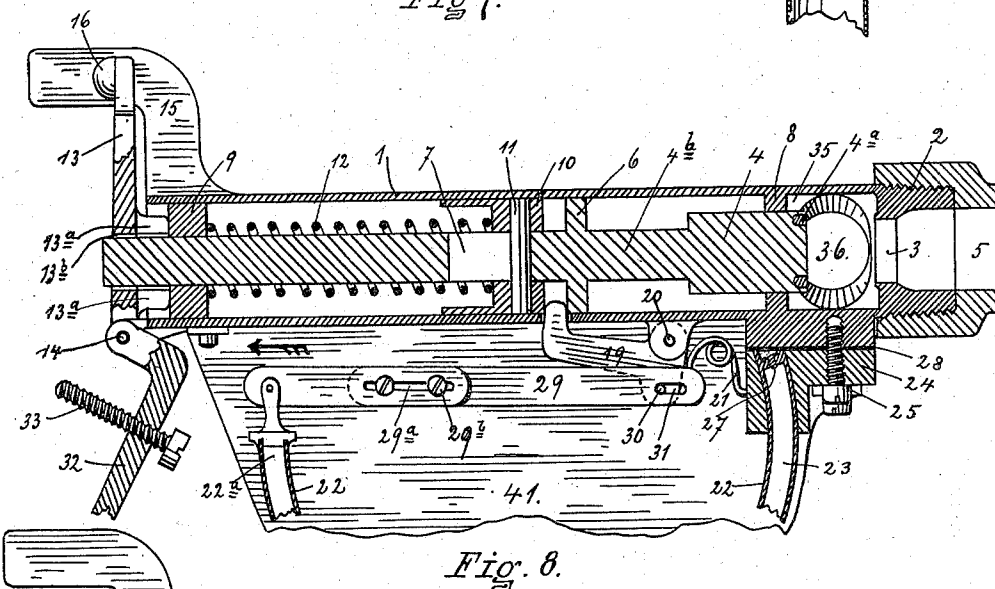
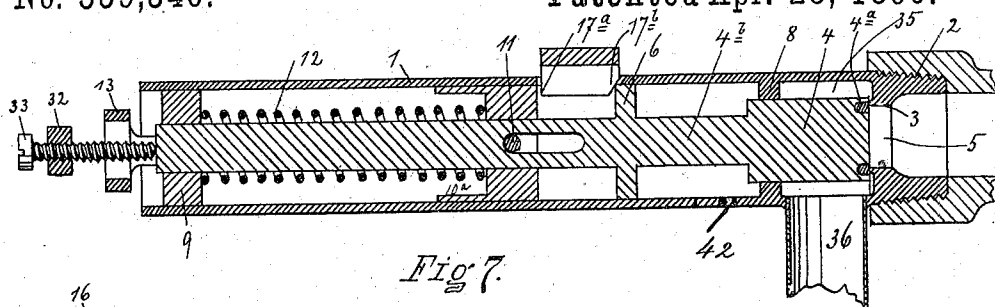
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

CHARLES O. YALE, OF GLOVERSVILLE, NEW YORK; LEONARD B. YALE
ADMINISTRATOR OF SAID CHARLES O. YALE, DECEASED.

AUTOMATIC SPRINKLER.

SPECIFICATION forming part of Letters Patent No. 559,346, dated April 28, 1896.

Application filed July 16, 1894. Serial No. 517,631. (No model.)

To all whom it may concern:

Be it known that I, CHARLES O. YALE, of Gloversville, in the county of Fulton and State of New York, have invented certain new and useful Improvements in Automatic Sprinklers; 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form part of this specification.

My invention relates to an improvement in automatic sprinklers.

In the drawings, Figure 1 shows a plan view of the device. Fig. 2 shows a side elevation. Fig. 3 shows an end view as seen from the left of Fig. 2. Figs. 4 and 5 show details relating to a gravity-catch shown in closed and open position, respectively. Fig. 6 shows details of construction of the thermal catch-actuator. Fig. 7 shows a longitudinal section of the device on a vertical plane. Fig. 8 shows a longitudinal section of the device, on a horizontal plane, in a different position of parts. Fig. 9 shows the same as Fig. 7 in one of its several positions of parts. Fig. 10 shows the same as Fig. 8 in one of its several positions.

Referring to the reference-numerals in a more particular description of the device, 1 indicates the body of the device, which, as shown, consists of a short section of tube. One end of the body is threaded, as shown at 2, to adapt it to engage in a pipe-fitting. In one end of the body is provided a valve-seat 3, adapted to receive the valve 4, which when in position on the seat will close the inlet-opening 5. The face of the valve is provided with a packing 4^a, of soft metal or other suitable material, adapted to rest on the projecting rim or edge of the valve-seat 3, as shown. The valve is provided with a stem 4^b, which extends through the body 1 to what may be termed the "rear end" thereof, and is provided with a fixed collar 6 and a slotted opening 7.

The valve-body 4 is adapted to run through a perforation in the partition 8, provided in the body of the device, and is guided and held at its rear portions by a ring 9 and a ring 10,

through which it is adapted to slide freely, except that as to the ring 10 the movement is limited by a cross-pin 11, which extends through the slotted opening 7 in the valve-stem and engages in the walls of the ring 10. The rings 9 and 10 are also adapted to move freely in the tubular body 1, and the ring 10 is also preferably provided with a flanged extension 10^a to furnish a better guide for the ring 10 and prevent it from binding or wedging in the body. The ring 9 forms a base for the spring 12, which is introduced between it and the ring or collar 10. The ring 9 is held in position by the lever 13, which is pivoted at 14 in ears on one side of the open end of the body and is held at the other to arm 15 by a piece 16, soldered on with soft solder. The ring 9 is directly held by a pair of ears or projections 13^a from the lever 13, which are provided on each side of the central opening 13^b therein and project into a position to engage the ring. The opening 13^b in the lever 13 is of sufficient size to allow the rear end of the valve-stem to freely pass through the same.

The spring 12, with the ring or collar 10, is held in check in normal position by a gravity-catch 17, pivoted in lugs 18 on the side of the body, the catch being provided with a substantially square shoulder 17^a on one end adapted to engage the ring or collar 10, and an inclined face 17^b on the other end adapted to engage the fixed collar 6 on the valve-stem. The spring 12, with the collar 10, is also adapted to be held in check under certain conditions by catch 19, pivoted at 20 to ears on the side of the body and operated by a spring 21 to cause it to project through an opening in the side of the body into the interior in position to secure the ring 10 when not otherwise held. For controlling the action or operation of the catch 19 I provide a thermal actuator 22, which consists of a curved or semicircular tube 23, substantially rectangular in cross-section, as clearly seen by comparison of Figs. 1, 2, 3, 6, and 8. This tube is secured at one end in a base-piece 24, which base-piece is secured by screws 25 on a suitable facing on the side of the body of the device.

The tube 23 is filled entirely full of alcohol

or some other liquid possessing the property of large expansion under heat. In order to facilitate the filling of the tube 23 entirely full of the fluid, I provide the inner surface 5 of the end piece of the tube in a V shape, as shown at 26 in Fig. 6, the V shape terminating at the only opening into the tube, which is closed by screw or cap 27, and when the device is filled may be sealed with solder if 10 desired.

In order to insulate the actuator device from the variations of temperature on the body of the device, there is introduced between the base 24 and the face on which it is 15 secured a packing 28, of asbestos or some suitable material, which is a non-conductor of heat. Between the free end 22^a of the device and the catch 19 is introduced an adjustable connection 29, the adjustment being provided 20 by constructing the connection in two pieces with a slot 29^a in one, and a set-screw 29^b passing through the slot and engaging the other piece, as shown. The connecting-rod 29 engages the catch 19 by means of a pin 30, provided in one of the arms of the catch, engaging 25 in a slotted opening 31 in the end of the connection 29.

For securing the valve 4 positively and securely on the seat of the inlet-opening there is 30 provided a holding-lever 32, pivoted on the pintle 14 with the lever 13 and having an adjustable set-screw 33, adapted to engage against the rear end of the valve-stem 4^b. The lever 32 is held in position by a piece 34, 35 soldered with soft solder onto the arm 15. The solder used in soldering the piece 34 onto the arm 15 is of a kind that is fusible at a lower temperature than that used in soldering the piece 16 onto the arm.

40 The ends of the levers 13 and 32 are preferably both forked to engage on both sides of the arm 15, and the solder may be applied to one or both sides of the arm 15, as found most desirable. Between the partition 8 and the 45 valve-seat is provided a chamber 35, from which extends the discharge-nozzle 36, the nozzle playing onto a plate 37, supported by arms 38 on the lower end of the nozzle, which plate is provided with a central cone or elevation 39 and upwardly-inclined fingers 40 50 around its periphery, forming a sprinkler.

In order to protect the thermal actuator 22 from the spray from the sprinkler, there may be provided a shield 41, extending from the 55 lower side of the body to a distance therefrom to protect the actuator from the lower side. This shield may be dispensed with in certain cases where a different form of sprinkler is used or under other varying conditions, and 60 it is also obvious that the thermal actuator may be entirely incased, if found desirable. In order to allow any water that may leak between the partition 8 and the valve-body during the operation of the device to escape, 65 I provide an opening 42 in the wall of the body.

The operation of the device is substantially as follows: The sprinkler is attached to a water-pipe by the screw 2, in which a constant pressure of water or air is maintained. The 70 valve 4 is held firmly onto the seat 3 by the securing-lever 32, held by soft solder, as before stated, and the adjusting set-screw 33, pressing against the end of the valve-stem. In this position the water or air under pressure 75 in the feed-pipe is held in check and ready for use. The spring 12 is also held in the position shown in Fig. 7 at one end by the lever 13, secured by soft solder, as stated. At the 80 other end it is held in check by the collar or ring 10 and the catch 17, with its shoulder 17^a, projecting into the interior of the body in position to engage the face of the collar 10. In this position the parts remain until the device is heated sufficiently to melt the solder, which 85 secures the piece 34 and the lever 32. When this is done, the pressure of the supply of water through the inlet 5 forces the valve 4 back from the position shown in Fig. 7 to that shown in Fig. 8. At the same time that the temper- 90 ature is raised sufficiently to fuse the solder which secures the lever 32 the thermal actuator 22 is heated, and in heating expands, so that its free end moves in the direction indicated by the arrow in Fig. 8, and when so 95 expanded the catch 19 is moved by the spring 21 into the position shown in Fig. 8, so as to engage the face of the ring or collar 10, the same being held back by catch 17 sufficiently, so that the end of the catch 19 will freely enter. 100 At the time that the valve is forced back by the pressure of the water entering through the inlet-opening the fixed ring 6 on the valve-stem engages on the inclined face 17^b of the catch 17 and throws the catch out, so that the 105 shoulder 17^a thereof will not engage the collar 10, and the collar is at that time held in check by the catch 19. In this position the parts remain with the sprinkler in full operation until the temperature of the thermal catch-actuator 110 is reduced to its normal position, in which case it contracts, and its free end 22^a moves in the opposite direction from that shown by the arrow in Fig. 8. When it has resumed its normal position, the adjustment of parts is such 115 that by the thrust movement on the connection 29 the catch 19 will be withdrawn, releasing the collar 10, which is instantly moved forward by the action of the spring 12, forcing the valve and stem forward from the position shown in Fig. 8 to the position shown 120 in Fig. 9, closing the inlet-opening and shutting off the supply of water and thus stopping the action of the sprinkler. In case the temperature of the surroundings of the 125 sprinkling device should again rise to a point sufficient to melt the solder which secures the piece 16 holding the lever 13 the lever 13 would, together with the washer, spring 12, collar 10, valve-stem and valve, all be 130 forced back from the position shown in Fig. 9 to that shown in Fig. 10 by the pressure of

the water at the inlet-opening 5, and the sprinkler would a second time be in full operation.

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

1. The combination in an automatic sprinkler, of a valve, a valve-securing device held by solder, a spring for closing the valve, a catch securing the spring under tension and a thermal actuator connected with the catch.

2. In a sprinkler, a body having a valve-seat, a valve, a valve-holding means secured by solder, a valve-closing spring, two catches securing the spring under tension, one operated by the valve, the other operated by the thermal actuator, combined.

3. In an automatic sprinkler, a body having a valve-seat, a valve, means for securing the valve on the seat held by solder, a spring tensioned to hold the valve on the seat held at its base end by solder, a catch for holding the spring in check, and a thermal actuator

connected with the catch, combined substantially as set forth.

4. In a sprinkler device, the combination of a valve-seat and valve, a spring for closing the valve, means for holding the valve and means for holding the spring each held by solder fusible at different temperatures.

5. In a sprinkling device, the combination of the valve, the valve-seat, the spring for closing the valve, the two levers for holding the valve and spring respectively, and solder fusible at different temperatures to admit of the releasement of the levers at different temperatures, securing the levers, substantially as set forth.

In witness whereof I have affixed my signature in presence of two witnesses.

CHARLES O. YALE.

Witnesses:

CHAS. J. EDÉO,
F. A. BOSWORTH.