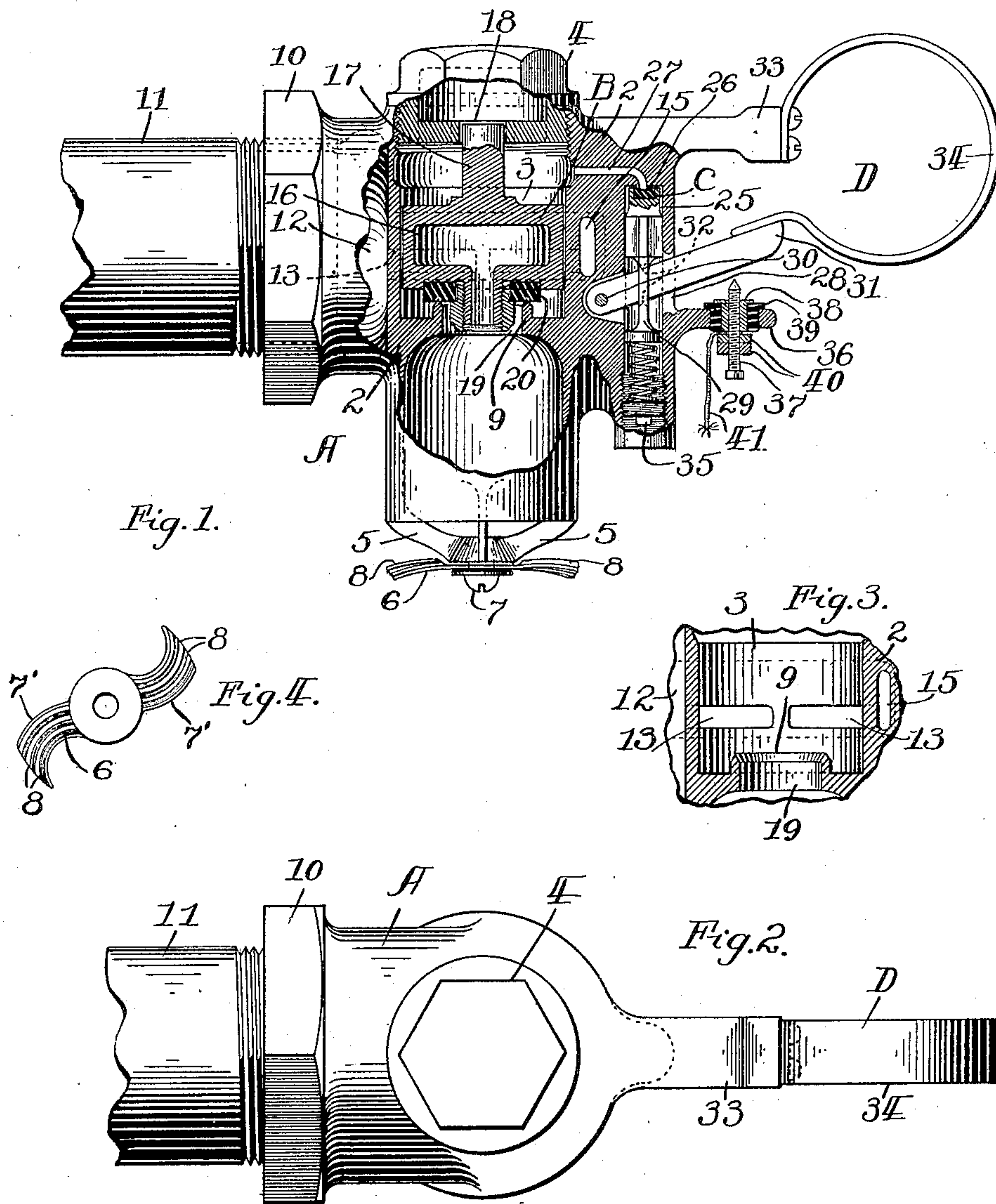


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AUTOMATIC SPRINKLER SYSTEM.
APPLICATION FILED JULY 3, 1908.

917,292.

Patented Apr. 6, 1909.

2 SHEETS—SHEET 1.



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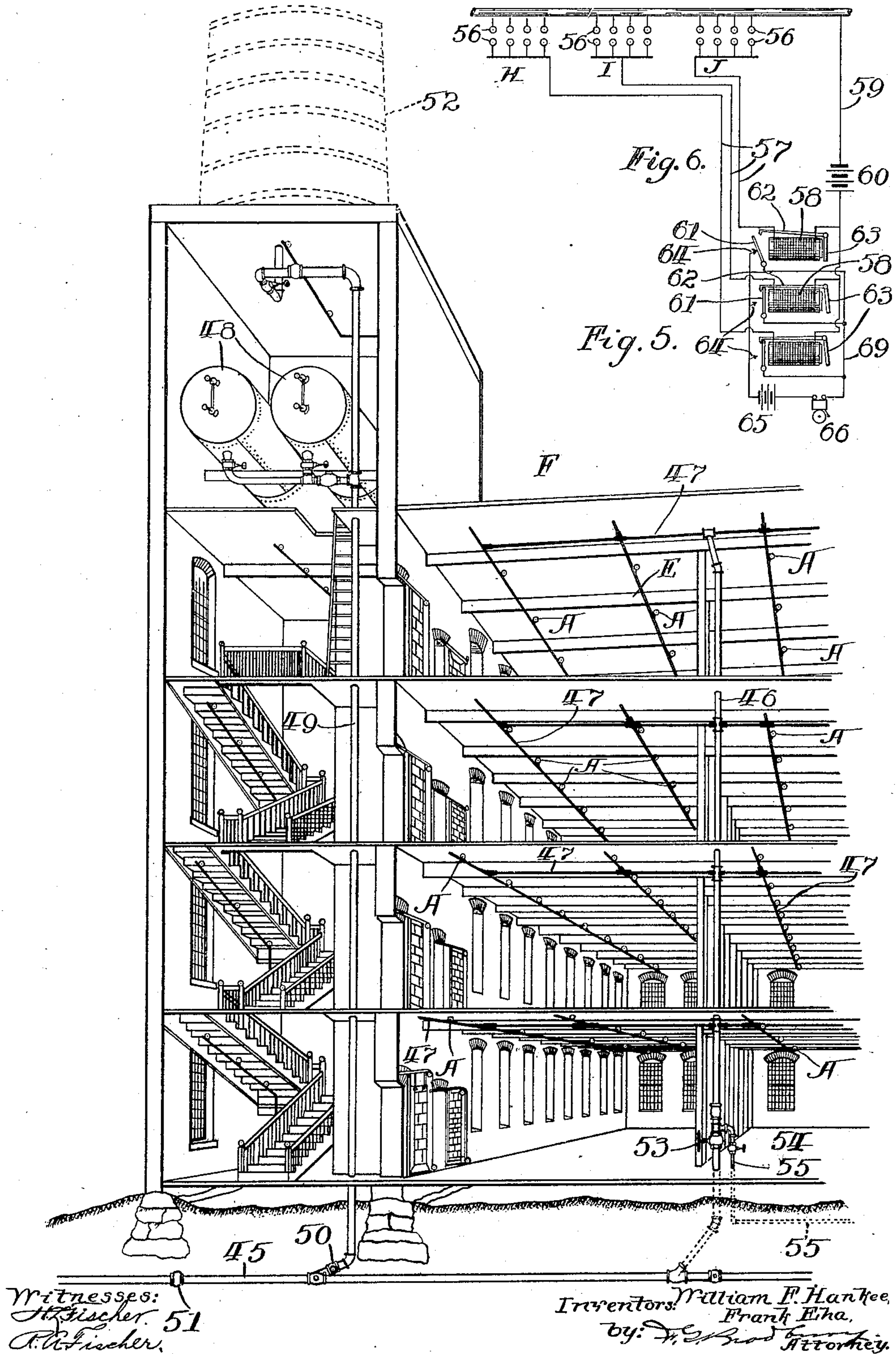
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UNITED STATES PATENT OFFICE.

WILLIAM F. HANKEE AND FRANK EHA, OF ST. PAUL, MINNESOTA.

AUTOMATIC SPRINKLER SYSTEM.

No. 917,292.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed July 3, 1908. Serial No. 441,893.

To all whom it may concern:

Be it known that we, WILLIAM F. HANKEE and FRANK EHA, citizens of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented new and useful Improvements in Automatic Sprinkler Systems, of which the following is a specification.

Our invention relates to improvements in automatic sprinkler systems and more particularly to that class wherein the combination sprinkler head valves are self-operating to automatically open and close respectively when the temperature of atmosphere surrounding them rises to a dangerous point and when the temperature subsides to normal conditions.

By the use of our improved system the damage by water from the sprinkler apparatus is reduced to a minimum and the sensitiveness of operation of the combination sprinkler head valves is increased over prior art devices. Further the system employed is simplified and more positive and effective in use than other systems and the signaling mechanism for indicating when and where a sprinkler head valve is in operation and the location of fire is more efficient than heretofore.

The so called sprinkler systems now in use employing automatic sprinkler heads are only capable of automatically opening once and do not close automatically, human aid being required to shut off the flow of water at a main divisional or sectional valve, while with our improvement the combined sprinkler head valves open and close any number of times without human aid.

To these ends our invention comprises the following system, devices and parts and combinations thereof as set forth in the following specification and claims.

Figure 1 is a side elevation of one of our improved combined sprinkler head valves, part thereof being shown in vertical section; Fig. 2 is a plan view of the valves shown in Fig. 1; Fig. 3 is a central vertical section through a detail portion of the main valve cylinder, the valve being removed; Fig. 4 is a plan view of the sprayer; Fig. 5 is a diagrammatic view of our improved system showing the combined sprinkler head valves in place and said system applied to a building, and Fig. 6 is a diagram of a system of electric wiring employed with our system for indicating the operation of a section of

combined sprinkler head valves and the general location of fire.

Each combined sprinkler head valve A in a general way includes in its construction a main valve B, and a relief valve C, the latter controlling the operation of the former. These valves are carried in a suitable casing 2, upon which is mounted a thermostat D, the latter coöperating with the relief valve to open and close it. The casing has a vertical cylinder 3 the upper end of which is closed by a hollow cap nut 4 and its lower end left open and provided with intersecting depending cross pieces 5, forming a hanger on which a sprayer 6, is freely journaled by means of a screw 7, passing into said hanger. The sprayer is in the form of a disk having radiating arms 7' and reverse curved ridges 8, upon the surfaces thereof, a stream of water issuing downward from the main valve impinges against the ridges and turns the sprayer which in turn sprays the water from the valve.

Within the cylinder 3, is a main valve seat 9, and at the side of the casing is a coupling 10 by which the head can be attached to a pipe 11, of the sprinkler system E. The passage way 12 through the coupling has connection with the valve cylinder by means of the ports 13, which are connected with a circular channel 15 in the wall of the casing. The valve B fits loosely in the valve cylinder so that water passes freely from the channel above and below the valve chamber 16 the pressure normally being equal on all sides. On the upper side of the valve chamber is a solid stem 17, which passes freely through an opening 18 into the hollow nut 4, and on the lower side is a hollow stem which drops loosely into the passageway 19, leading from the valve seat 9. A washer 20 is secured below the valve chamber by means of the nut on the hollow stem and is adapted to form a tight joint upon the valve seat when the valve is in normal condition.

The relief valve is formed at the upper end of a vertical passageway 25 in the casing, its seat 26, communicating with the valve cylinder 3 by means of a passageway 27. The vertical passageway 25 is open at its lower end and at its sides at 28, and in it is a valve stem 29, water being adapted to egress from the main valve cylinder 3 above the valve B through the opening 28 when the valve C is off of its seat.

Pivoted upon the casing at 30 is a lever arm 31, which passes through an opening 32 in the stem 29 and is adapted when tilted up or down to close or open the relief valve and thereby relieve the water from above the valve B and open the latter. To the free end of the lever 31 and to an arm 33 extending from the casing is secured a thermostatic spring 34 made out of any suitable material which is adapted to expand under increase of temperature and open the valves and to contract under decrease of temperature and close said valves automatically. The action of this thermostat is extremely sensitive to changes of temperature.

To regulate the parts so as to open and close the valves at a certain critical point as desired is provided a helican expansion spring pressing upward against the stem 29 in the passageway 25. This spring is held under regulated pressure by means of the adjusting nut 35, which is threaded into the wall of the passageway 25.

Upon an arm 36 below the lever 31 and on the side of the casing is mounted an electrical contact screw 37, which is threaded into a bushing 38. This bushing is secured in an insulating block 39 which is mounted in said arm. By means of a pair of lock nuts 40 the electric signaling line 41, is secured to the contact screw. Upon the thermostat opening the valve C, the lever 31 comes into contact with the terminal screw and is adapted to complete a circuit passing through the line 41 and the pipe 11.

The sprinkler system with which our invention is shown coöperating in Fig. 5 of the drawings can be used either with what is known as a wet system or a dry system of distribution. F represents a building equipped with our system E, 45 being the main water supply pipe, 46 the riser, and 47 the branches on the different floors. Located above the upper floor are supply pressure tanks 48 which can be used in connection with the system through the connection 49 with the supply pipe 45. A check valve 50 at or near the junction of the pipes 45 and 49 prevents water forcing up into the tanks from the supply pipe 45 and a check valve 51 prevents water passing back from the pressure tanks into said fed pipe. The water is pumped at the desired pressure into the supply tanks when the latter are used. A gravity tank 52 shown dotted in Fig. 1, can be connected with the feed pipe 49 and used when required. The sprinkler system can be drained by closing a main valve 53 and opening a branch valve 54 leading outside through a drain pipe.

The signaling system illustrated diagrammatically in Fig. 6, shows the manner of grounding one of the terminals on each combined sprinkler head valve, 56 represents the electrical terminals of each valve, the valves

being grouped; H. I. and J. representing three groups although any suitable number may be employed. These groups may be located on different parts of a building and each is connected by one set of terminals and a line conductor 57 with a coil of annunciator drops 58, one drop being provided for each group of terminals. The circuit is completed and passes back through the pipes of the sprinkler system by means of the single parallel line conductor 59 which contains a source of current supply such as the battery 60. Indicating shutters 61 of ordinary construction are normally held in superior position by means of triggers 62, which are carried upon pivoted armatures 63 adjacent to the poles of the magnet cores. When any one pair of terminals of a group are closed by means of a thermostat lever impinging against the corresponding contact screw, a circuit is completed through the coil of the annunciator which is connected with said group and a local circuit is established through the shutter of the annunciator, a contact 64 against which said shutter falls, and a circuit passing through a battery 65, bell 66 and loop 67, thus ringing said bell and indicating by the drop of the annunciator the general location of fire.

In accordance with the patent statutes, we have described the principles of operation of our invention, together with the apparatus which we now consider to represent the best embodiment thereof.

Having described our invention what we claim as new and desire to protect by Letters Patent is.

1. A sprinkler system, comprising, in combination, a main water supply pipe, a branch leading therefrom having an outlet and a valve in said outlet having means for opening and closing it automatically any number of times without human aid, said valve comprising a frame, a vertical cylinder having an inlet in its side between its ends, an outlet at its lower end, a relief port above said inlet and a seat over said outlet, a main valve freely disposed in said cylinder, a relief valve passageway connected with said relief port, a relief valve in said passageway having a stem, a spring pressing up against said stem to hold the relief valve upon its seat and close said relief port, means for varying the tension of said spring, a thermostat loop connected by one end to said frame, a lever pivoted to said frame and connected to the other end of said loop and in engagement with said stem to automatically open and close said relief valve, a sprayer below the outlet of the main valve and an electric contact with which the free end of said loop is adapted to impinge when the relief valve is opened and to disconnect when said relief valve is closed.

2. A device of the class set forth, compris-

ing, in combination, a frame forming a vertical cylinder having an inlet in its side between its ends, an outlet at its lower end, a relief port above said inlet and a seat over said outlet, a main valve freely disposed in said cylinder, a relief valve passageway connected with said relief port, a relief valve in said passageway having a stem, a spring pressing up against said stem to hold the relief valve upon its seat and close said relief port, means for varying the tension of said spring, a thermostat loop connected by one end to said frame, a lever pivoted to said frame, and a lever pivoted to said frame of said thermostat loop and in engagement with said stem to automatically open and close said relief valve any number of times without human aid and a sprayer below the outlet of the main valve.

3. A device of the class set forth, comprising, in combination, a frame forming a cylinder having an inlet at its side between its ends, an outlet at its lower end, a relief port above said inlet and a seat over said outlet, a main valve freely disposed in said cylinder, a relief valve passageway connected with said relief port, a relief valve in said passageway, means for pressing said relief valve to close said relief valve passageway, a thermostat loop connected by one end to said frame, and a lever pivoted to said frame and connected to the other end of said thermostat loop and pivoted to said stem to au-

tomatically open and close said relief valve any number of times without human aid. 35

4. A sprinkler system, comprising, in combination, a main water supply pipe, a branch leading therefrom, having an outlet, and a valve in said outlet having means for opening and closing it automatically any number of times, said valve comprising a frame, a vertical cylinder having an inlet in its side between its ends, an outlet at its lower end, a relief port above said inlet and a seat over said outlet, a main valve freely disposed in said cylinder, a relief valve passageway connected with said relief port, a relief valve in said passageway having a stem, a spring pressing up against said stem, to hold the relief valve upon its seat and close said relief port, means for varying the tension of said spring, a thermostat loop connected by one end to said frame, a lever pivoted to said frame and connected to the other end of said thermostat loop and in engagement with said stem to automatically open and close said relief valve and a sprayer below the outlet of said main valve. 45 50 55

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses. 60

WILLIAM F. HANKEE.

FRANK EHA.

Witnesses:

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R. A. FISCHER.