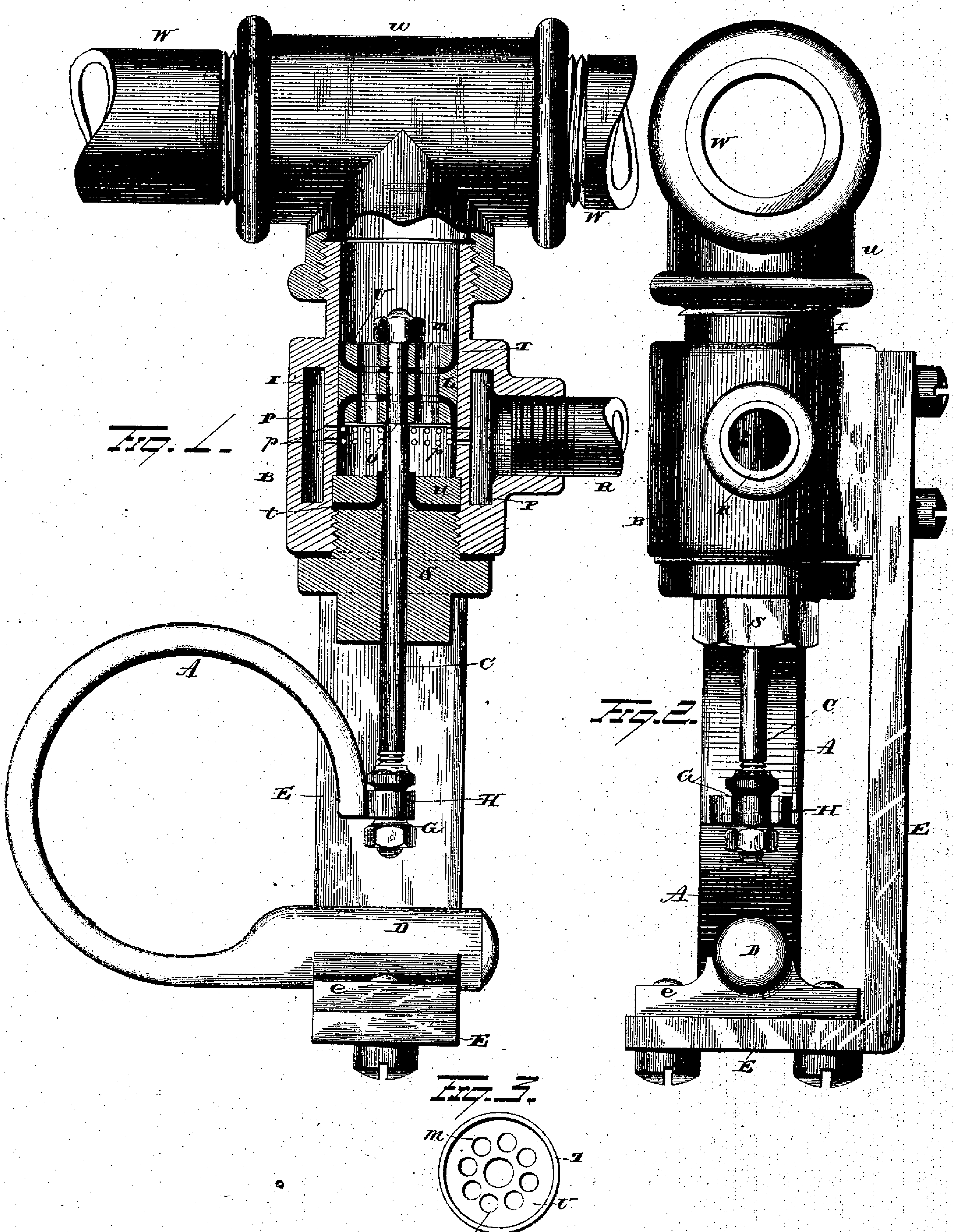
(No Model.)

A. K. RIDER.

AUTOMATIC SPRINKLER.

No. 326,155. Patented Sept. 15, 1885.



WITNESSES

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AUTOMATIC SPRINKLER.

SPECIFICATION forming part of Letters Patent No. 326,155, dated September 15, 1885.

Application filed March 30, 1885. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER K. RIDER, of Walden, in the county of Orange and State of New York, have invented certain new and useful Improvements in Automatic Sprinklers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in automatic sprinklers, and more particularly to sprinklers actuated by thermostats, the object of the same being to provide a thermostat sprinkler which can be set to operate at any predetermined temperature within very exact limits, and which will operate at a temperature far below the boiling-point of a liquid, and in which the thermostat shall act directly in opening the valve of the sprinkler, a further object being to provide an automatic sprinkler of comparatively simple construction, and adapted to general use in buildings of all kinds provided with a standing water-supply; and with these ends in view my invention consists in a sprinkler directly operated by the expansion and contraction of a liquid.

My invention further consists in a balanced valve for admitting water to the sprinkler, said valve being connected with and operated by a thermostat-coil.

My invention further consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view of the apparatus in side elevation, partly in section. Fig. 2 is a view of the same in end elevation, and Fig. 3 is a transverse section through the valve.

W is the water-main or stand-pipe, conveniently provided with a T-coupling, *w*, at the point where it is desired to attach the automatic sprinkler.

The valve-casing I consists of a short cylindrical tube, and has an annular chamber, P, formed about it in the shape of a belt by means of an outer casing, B. The casing I screws into the T-shaped coupling *w*, and the casing B is provided with a threaded perforation, in which the end of the sprinkler-pipe R is screwed, communicating with the chamber P. The chamber P also communicates with the interior of the casing I through a belt of perforations, *p*.

L represents a piston-valve adapted to work within the casing I. It consists of the disk L, provided on its upper and lower faces with cup-shaped leather or other flexible packing T, held in contact with the disk L and interior surface of the casing by means of the washers U U. The piston as thus constructed is provided with a series of perforations, *m*, for the free transmission of water through it, and with a central perforation, through which the valve-stem C passes. The stem C is provided with a shoulder, *o*, against which the outer face of the piston abuts, and with a nut, *n*, which secures the piston on the stem in the ordinary manner. The outer end of the casing I is closed by a screw plug or head, S, provided with a central perforation, through which the valve-stem C passes. The valve-stem is packed by a flexible washer, *t*, held in position by a metal washer, *u*.

The outer end of the valve-stem C is provided with a spool-shaped nut, G.

A represents a thermostat adapted to operate the valve. It is preferably of the same general construction as that shown and described in Letters Patent No. 294,405, granted to me on March 4, 1884, and consists of a curved flat tube constructed of spring metal or other flexible material, filled with a liquid—oil, glycerine, or spirits, for example—and hermetically sealed. For the purpose, however, of furnishing an increased volume of liquid and obtaining a more marked effect for a slight change in temperature, I find it convenient to provide the stationary end of the thermostat with an enlarged reservoir, D, which may be cylindrical, as shown, or any other desired shape. A slight change in temperature, while causing a slight change in the volume of each molecule of the liquid, will cause a sum total of increase in volume which will be proportionate to the number of molecules or amount of liquid, and since this increase will effect the expansible portion only of the thermostat-tube its movement will be materially increased by the enlarged reservoir.

The reservoir end of the thermostat is supported in a suitable rest, *e*, on the lower end of a hanger or bracket, E, and its free end is provided with a pair of jaws, H, which partially embrace the spool G on the valve-stem C. The upper end of the hanger or bracket E is secured to the casing B.

At ordinary temperatures the piston or valve L will cover the perforations *p*, leading from the interior of the casing I into the chamber P; but when the temperature rises to a certain degree, as in the case of a fire breaking out in the room or from any other cause, the thermostat-tube will tend to straighten, and thereby move the piston L sufficiently to uncover the perforations *p*, as shown in Fig. 1, and the sprinkler will commence to discharge water. Should the air become cooled after a time, the liquid within the thermostat would contract again, the tube return to its normal position, and the piston L be thereby slid over the perforations *p*, and the discharge of water would cease.

By adjusting the spool G on the stem C the valve may be regulated to open sooner of later, as may be desired, thereby adjusting its operation to correspond with different degrees of temperature.

The expansive force of a liquid is infinitely greater than that of a vapor when raised in temperature the same number of degrees, and hence I deem it important that the action of the valve shall depend upon the former rather than upon the weak force of the latter; but it is not absolutely necessary that the liquid should be confined in a tube of the above construction, as it might be arranged in such a manner as to act directly on a piston.

It is obvious that slight changes might be resorted to in the construction and arrangement of the parts described without departing from the spirit and scope of my invention. For instance, it is not essential to use a balanced valve in all cases, as the thermostat is powerful enough to operate an ordinary valve, unless the head of water be unusually strong, and the shape of the thermostat may be other than the circular form shown; hence I do not wish to limit myself strictly to the construction herein set forth; but,

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

1. The combination, with a sprinkler and a water-supply pipe, of a valve located between the sprinkler and supply-pipe, a valve-rod, and a thermostat consisting, essentially, of a flattened metallic tube, curved as shown, and filled or partly filled with an expanding fluid and connected with the valve-rod.

2. The combination, with a sprinkler and a water-supply pipe, of a balanced valve located between the sprinkler and the supply-pipe, a valve-rod, and a bent-tube thermostat connected with the valve-rod for operating the valve, substantially as set forth.

3. The combination, with a sprinkler, a water-supply pipe, and a valve located between the sprinkler and the supply-pipe, of a bent-tube thermostat connected with the valve and having an enlarged reservoir, forming a part of and communicating with the bent tube, whereby an increased movement is obtained for a given rise or fall in temperature, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALEXANDER KIRK RIDER.

Witnesses:
W. C. STEVENS,
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