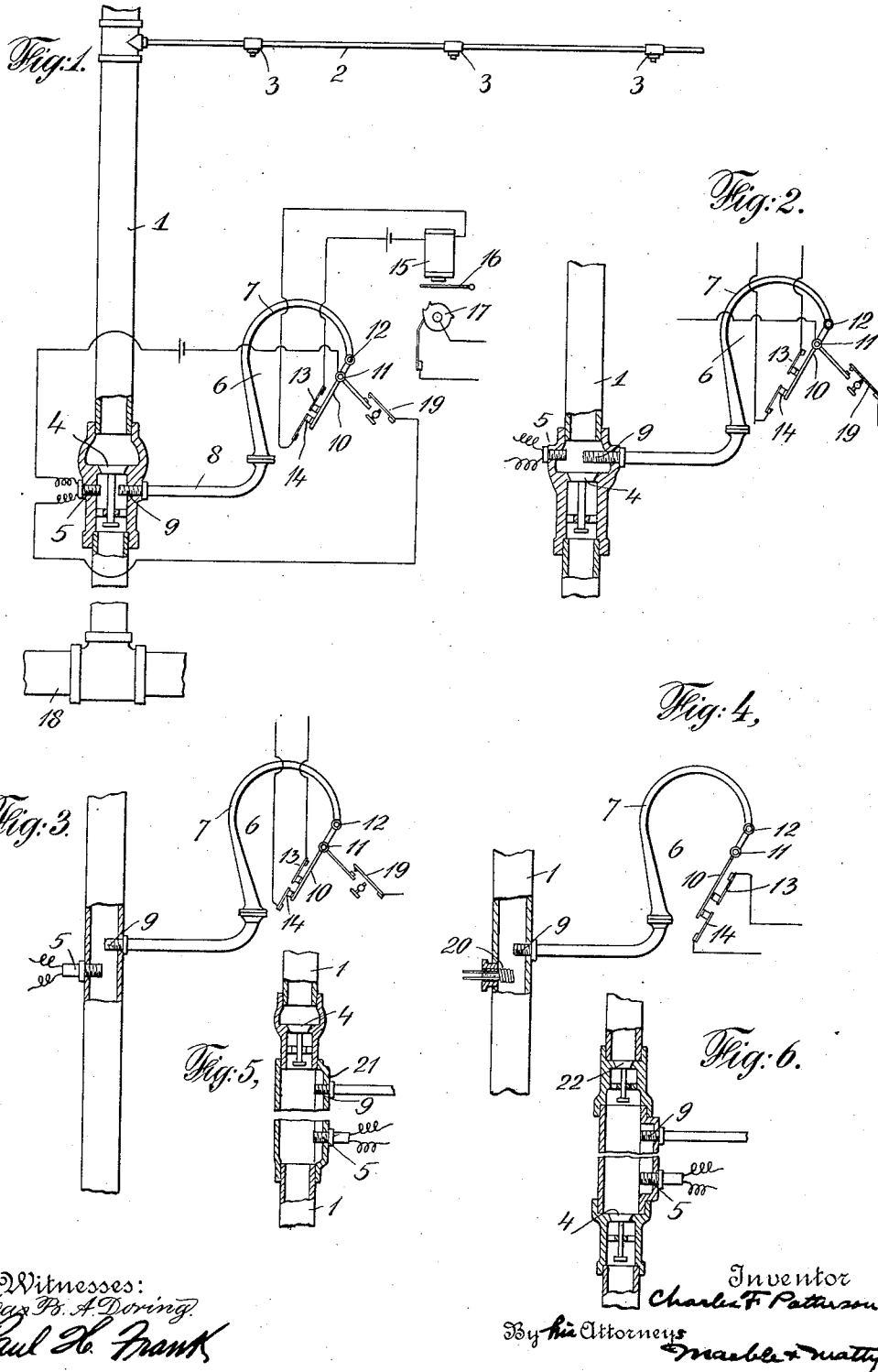


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 SPRINKLER SUPERVISORY SYSTEM.
 APPLICATION FILED JUNE 17, 1912.

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Patented May 27, 1913.



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SPRINKLER SUPERVISORY SYSTEM.

1,063,058.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES F. PATTERSON, a citizen of the United States of America, and a resident of Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Sprinkler Supervisory Systems, of which the following is a specification.

My invention relates to means for indicating flow of water or other liquid in conduits, normally filled with liquid, but in which there is normally no flow, and my invention comprises the provision, in such conduits, of means for raising the temperature of the water or other liquid in a more or less localized portion of the conduit, above the temperature of the water or other liquid supplied to the conduit, together with heat responsive means which will operate upon fall of temperature such as will be occasioned by flow through the conduit of the cooler liquid from the source of supply.

Alternatively, my invention comprises means for cooling, below the temperature of supply, liquid in a conduit such as referred to, together with heat responsive means arranged to operate in the event of flow through the conduit of liquid from the warmer source of supply.

My invention is particularly applicable to the supervision of automatic sprinkler systems, in the main conduits or risers of which no flow normally occurs; flow, if it occurs, being due to opening of one of the sprinklers or to leakage.

The objects of my invention are to provide simple and effective means for indicating positively flow of liquid through conduits in which normally no flow should occur, particularly the conduits of sprinkler systems.

I will now proceed to describe my invention with reference to the accompanying drawings, and will then point out the novel features in claims.

In the drawings: Figure 1 shows more or less diagrammatically an elevation and partial section of one construction of my improved flow-indicating apparatus; Fig. 2 is a similar view illustrating an alternative arrangement of such apparatus; Fig. 3 is a

similar view illustrating a further alternative arrangement of the apparatus, and Fig. 4 is a similar view illustrating a further alternative arrangement wherein means are provided for lowering the temperature of the liquid instead of raising it as in the constructions of the previous views. Figs. 5 and 6 are diagrammatic sectional views illustrating further alternative arrangements.

Referring first to Fig. 1, numeral 1 designates the riser of a sprinkler system and 2 one of the sprinkler-branches provided with sprinklers 3. It is usual in such arrangements to provide the riser with a check valve to prevent downflow of liquid, and 4 designates such a check valve. 5 designates means for heating the liquid in a more or less localized portion of the conduit, the specific heating means shown being an electric heater, though obviously other heating means may be employed. 6 designates heat-responsive alarm-initiating means arranged to be operated in the event of material fall of temperature of the liquid in the vicinity of heating means 5. Any suitable thermostat or other heat-responsive device may be employed, but the one illustrated is convenient for the purpose, comprising a Bourdon tube 7 connected by a pipe 8 to a capsule 9 extending into the conduit, such capsule, pipe 8 and Bourdon tube containing air or other gas, or a suitable liquid, which, in the event of change of temperature of the liquid surrounding the capsule 9, will expand or contract, so causing the operation of the free end of the Bourdon tube. 10 designates a contact lever pivoted at 11, and secured at 12 to the free end of the Bourdon tube. This lever is provided with a contact strip which normally closes contact between contact points 13 and 14 of a circuit of an alarm transmitter, of which 15 designates the controlling magnet, and 16 the armature, and 17 the break wheel. The construction of such transmitter is well known, and I do not deem it necessary to illustrate such construction in detail here.

The operation of the apparatus is as follows: Normally the riser 1 will be filled, at least to the check valve 4, with water or

other suitable liquid; but this water or other liquid will be stationary, since normally there is no flow through the riser. The heater 5 will raise the temperature of the liquid in its immediate vicinity, and the action of this heater will be so regulated, if necessary, that normally the temperature of the liquid in the immediate vicinity of said heater, and in the immediate vicinity of the actuating means 9 of the heat-responsive means 6, will normally be several degrees, say thirty or forty degrees, above the temperature of the water or other liquid supplied by the main source of supply 18. In the event of flow taking place, through the opening of one of these sprinklers, or through the development of a material leak, the cooler liquid flowing from said source of supply 18 into proximity to the capsule 9 causes contraction of the gas or liquid within that capsule and tube 8, and consequent movement of the free end of the Bourdon tube 7, causing the contact lever 10 to break contact with contact points 13 and 14, so de-energizing the transmitter magnet 15 and causing an alarm to be sent in.

The same heat-controlled contact device 7 which serves to control the alarm transmitter may also control the action of the heating device 5. To that end, the contact lever 10 may be arranged to make or break contact with contact spring 19 in circuit with said heater. When the temperature of the liquid surrounding the heater 5 is slightly above a predetermined temperature, lever 10 will break contact with contact point 19, so cutting out the heater 5; and when the temperature falls slightly contact lever will make contact again with contact point 19 closing the circuit through the heater. The contact springs 13 and 14 of the alarm circuit have such range of movement that the slight movement of the contact lever 10 to effect control of the heater 5 does not break the circuit through these springs 13 and 14.

The heater 5, or actuating element 9 of the heater-controlled device 6, or both, may be located above the check valve 4, instead of beneath it. This is illustrated in Fig. 2. The circuits, and the manner of operation of the arrangement shown in Fig. 2 is the same as that of the arrangement shown in Fig. 1.

In both of the arrangements shown in Fig. 2, the heating of the water or other liquid within pipe 1 is quite local, and very little energy is required to maintain the water in the immediate vicinity of the heat-responsive device 6 at a temperature several degrees higher than that of the water in supply main 18.

In some cases no check valve 4 is provided in the riser or other conduit to be supervised. In such cases the heater 5 and

actuating member 9 of the heat-responsive device may be located in the riser itself, as illustrated in Fig. 3. In this arrangement a somewhat greater amount of heat energy may be required to maintain the water at the proper temperature in the vicinity of member 9.

Instead of raising the temperature of the water above that of the supply, the temperature of the water may be lowered below that of the supply. This is illustrated in Fig. 4, which is a view similar to Fig. 1, except that the heat-responsive device 6 is arranged to break the circuit of transmitter magnet 16 upon an increase in temperature, instead of upon a decrease, the contacts 13 and 14 of said device 6 being, therefore, reversed. Also, in Fig. 4, in lieu of the heating device 5, a cooling device 20 is provided. This cooling device may be a coil of small pipe to which cold fluid, such as cold brine, is supplied from a suitable source.

My invention is equally applicable to wet pipe systems and to dry pipe systems. As well known, in dry pipe systems the water is kept below a check valve, such as 4, by air pressure in the portion of the riser above the check valve, and the check valve opens and flow begins only in case of fall of this air pressure, such as is occasioned by opening one or more of the sprinklers or development of a leak. The arrangement shown in Fig. 1 will operate as well in a dry pipe system as in a wet pipe system. The same is true of the arrangement shown in Figs. 3 and 4, provided that the heater 5 or cooler 20 be located below the level at which water is normally held by air pressure. The arrangement shown in Fig. 2 will also work in a dry pipe system provided a small amount of water be allowed to remain above the check valve. As a matter of fact, it usually happens in dry pipe systems that there is some water above the check valve. Or, even when there is no water above the check valve, the arrangement shown in Fig. 2 will operate efficiently, raising the temperature of the air in the riser. In the event of reduction of air pressure sufficient to permit the check valve to open, the colder liquid from below, flowing past the check valve, will lower the temperature of the actuating means of the heat responsive device, so causing that device to operate.

As shown in Fig. 5, the means for varying the temperature of the water, and the actuating means of the heat responsive device, may be located in an enlargement 21, so as to be out of the direct path of water, and thereby protected against possible injury by objects which may be carried by the water.

As shown in Fig. 6, in case the temperature changing means and the actuating

means of the heat responsive means be located above a check valve, a second check valve 22 may be provided at a higher level to prevent flow of hot water or air upward beyond the immediate vicinity of the temperature changing means and the actuating means of the heat responsive means, by thermal circulation.

What I claim is:

1. The combination with a conduit normally containing liquid and in which no flow of that liquid normally occurs, of means for indicating flow through such conduit, comprising means for varying the temperature of a portion of the liquid in such conduit with reference to the temperature of the liquid supplied to that conduit, and heat responsive means located in operative proximity to the region within which the temperature of the liquid is so changed, and arranged to operate upon material change of temperature of the liquid in its vicinity

2. The combination with a conduit adapted for the flow of liquid therethrough, and adapted to contain liquid normally without flow, of means for indicating flow through such conduit comprising heating means arranged to raise locally the temperature of a portion of the liquid within the conduit, and heat responsive means arranged to be operated by fall of temperature of the liquid within the zone of such localized heat.

3. The combination with a conduit adapted for the flow of liquid therethrough, and adapted to contain liquid normally without flow, of means for indicating flow through such conduit comprising heating means arranged to raise locally the temperature of a portion of the liquid within the conduit, and heat responsive means arranged to be operated by fall of temperature of the liquid within the zone of such localized heat, said heat responsive means comprising contact mechanism adapted to control a signaling circuit.

4. The combination with a conduit adapted for the flow of liquid therethrough, and adapted to contain liquid normally without flow, of heating means arranged to raise locally the temperature of a portion of the liquid within the conduit, and heat responsive means arranged to be operated by fall of temperature of the liquid within the zone of such localized heat, said heat responsive means comprising contact means, and an alarm transmitter controlled by such contact means.

5. The combination with a conduit adapted for the flow of liquid therethrough, and adapted to contain liquid normally without flow, of means for indicating flow through such conduit comprising heating means arranged to raise locally the temperature of a portion of the liquid within the conduit, and heat responsive means arranged to be

operated by fall of temperature of the liquid within the zone of such localized heat, said heat responsive means further provided with means for controlling the action of said heating means.

6. The combination with a conduit adapted for the flow of liquid therethrough, and adapted to contain liquid normally without flow, of means for indicating flow through such conduit comprising heating means arranged to raise locally the temperature of a portion of the liquid within the conduit, and heat responsive means arranged to be operated by fall of temperature of the liquid within the zone of such localized heat, said heat responsive means comprising contact mechanism adapted to control a signaling circuit, said heat responsive means further provided with means for controlling the action of said heating means.

7. The combination with a conduit adapted for the flow of liquid therethrough, and adapted to contain liquid normally without flow, of electric heating means arranged to raise locally the temperature of a portion of the liquid within the conduit, and heat responsive means arranged to be operated by fall of temperature of the liquid within the zone of such localized heat, said heat responsive means comprising contact means, and an alarm transmitter controlled by such contact means, said heat responsive means further comprising contact means controlling the action of said electric heating means.

8. The combination with a conduit adapted for the flow of liquid therethrough, and adapted to contain liquid normally without flow, said conduit provided with a check valve for preventing flow in one direction, of means for indicating flow through such conduit comprising means, located in the vicinity of such check valve, for varying the temperature of the liquid in the vicinity of such check valve with reference to the temperature of the liquid supplied to the conduit, and heat responsive means located in operative proximity to the region in which the temperature of the liquid is so changed, and arranged to operate upon material change of temperature of the liquid in its vicinity.

9. The combination, with a sprinkler system comprising a supply pipe and sprinklers served thereby, of means for indicating flow through such supply pipe comprising means for varying the temperature of a portion of the liquid in such pipe, and heat responsive means located in operative proximity to the liquid, the temperature of which is so changed, and arranged to operate upon material change of temperature of the liquid in its vicinity.

10. The combination with a sprinkler system comprising a riser and sprinklers served thereby, of a check valve in said riser, heat-

ing means located beneath the check valve
for raising locally the temperature of the
liquid in said riser and temperature respon-
sive means likewise located beneath said
5 check valve, and arranged to be operated by
fall of temperature of the liquid within the
zone of such localized heat.

In testimony whereof I have signed this
specification in the presence of two subscrib-
ing witnesses.

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents.
Washington, D. C."