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SIGNAL FOR FIRE SPRINKLER SYSTEMS AND THE LIKE.

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989,335. **Patented Apr. 11, 1911.**

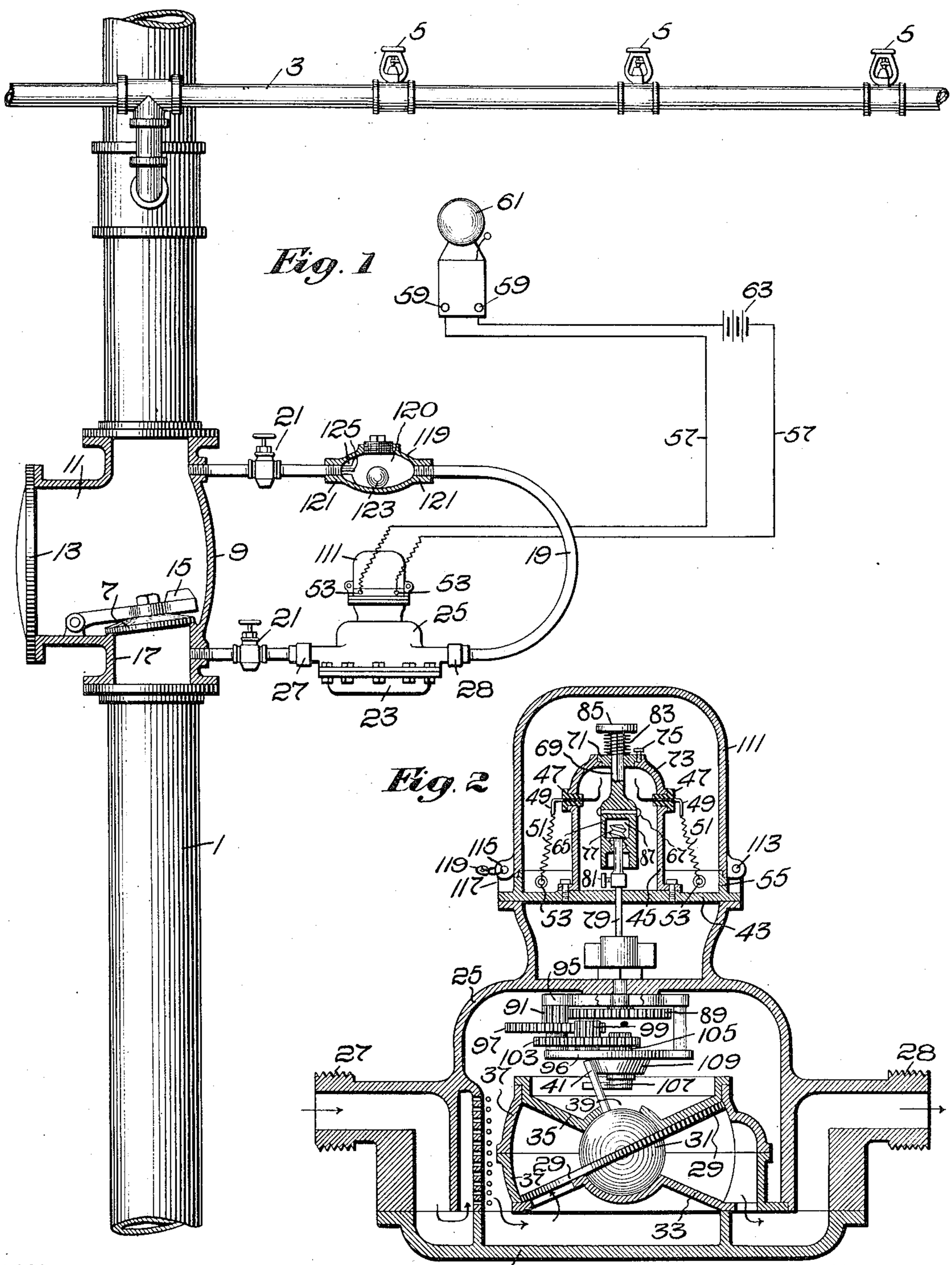

Fig. 1

Fig. 2

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989,335. Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed March 4, 1910. Serial No. 547,206.

To all whom it may concern:

Be it known that I, LEONARD D. CHANDLER, a citizen of the United States, and a resident of North Abington, in the county of Plymouth, State of Massachusetts, have invented an Improvement in Signals for Fire-Sprinkler Systems and the Like, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to signals or alarms for fire sprinkler systems and the like.

The character of the invention may be best understood by reference to the following description of an illustrative embodiment thereof, shown in the accompanying drawings, wherein:

Figure 1 is a view partly in section and partly in elevation of a portion of a fire sprinkler system equipped with a signal device embodying my invention; and Fig. 2 on an enlarged scale is a vertical section through a part of the signal controlling mechanism shown in Fig. 1.

Referring to the drawings, 1 represents a main for supplying the water to branch pipes such as the pipe 3, the latter being provided with automatic sprinkler heads or valves 5 of usual construction, which automatically open in the event of fire and cause water to flow through said pipe from said main.

To effect a difference in pressure in the main on the commencement of the flow through said main a check valve 7 is provided in a flanged valve casing 9 interposed in said main and provided with a hand hole 11 covered by a cap 13. This valve 7 is hinged to the casing 9 and may be provided with a weight 15 to maintain the valve normally on its seat until the difference in pressure of the water above and beneath said valve is sufficient to lift the latter from its seat.

The above described parts are of usual construction and for illustrative purposes are shown herein to be used in connection with the signal or alarm device embodying my invention, which I will now describe. This alarm device comprises a by-pass pipe 19 having one end entered into the valve casing 9 beneath the valve 7 and another end entered into said casing above said valve. Said by-pass may be provided with suitable cutout valves 21. To operate this signal device or alarm a signal actuator may be provided in said by-pass. This actuator may be a water motor. In practice it is found that a water motor such as is used in water meters is very effective as a signal actuator, being uniformly, readily responsive to a flow of water through the system when the automatic sprinkler valves open. Herein a water meter motor is used which in its broad aspect is similar to that used in water meters of the disk motor type. It will be understood, however, that other motors might be used. The motor shown herein comprises (Fig. 2) a bottom case 23 and a top case 25 the latter being provided with inlet and outlet pipes 27, 28, adapted to be threaded into the by-pass pipe 19. Within the top case 25 is a disk 29 of hard rubber or other suitable material fast on a ball 31 interposed between bottom and top plates 33 and 35, the former being cupped and the latter being domed to constitute a bearing for said ball and permit mutations of said disk as more fully hereinafter described. Preferably the disk should not have a friction fit in its casing. The bottom and top plates are connected by a curved wall 37. The top plate 35 is apertured at 39 to permit a driving pin 41 fast on the ball 31 to project upwardly therethrough. A current of water entering through the inlet 27 will pass upwardly through an opening in the bottom plate 33 and impinge against the under face of the disk 29 thereby pushing the latter upwardly and causing the pin 41 to revolve as the water continues to impinge against the disk 29 in working its way around to the opposite side of said ball and out through the outlet 28. The signal device or alarm actuated by this motor may be of any suitable construction. Herein an electric bell is used, the motor being utilized for closing the electric circuit of said bell causing the latter to sound when the sprinkler valves open, as more fully hereinafter described. I will now describe a mechanism actuated by the water motor for closing the circuit for ringing said bell. Referring to Fig. 2 this mechanism comprises a base plate 43 mounted on the top of the casing 25 and supporting a cylindrical housing 45 having contact plugs 47 threaded therein at diametrically opposite points thereof, said plugs being provided with contact fingers 49 connected at their outer ends to wires 51 the latter in turn being connected to bind-

ing posts 53 in a flange 55 projecting upwardly from the plate 43. The outer ends of these binding posts 53 (Fig. 1) are connected to wires 57 said wires leading to binding posts 59 of an electric bell 61. One of these wires is interrupted by a suitable battery 63.

The inner ends of the contact fingers 49 (Fig. 2) are preferably of resilient material and herein are bent upwardly, curved oppositely and tend to spring in toward one another more or less.

Within the cylinder housing 45 is provided a contact head 65 carrying a bridge contact 67. It will be apparent that if this bridge contact is moved upwardly from its position shown in Fig. 2, to a position between and engaging the upturned ends of the contact fingers 49, the circuit will be closed to the electric bell and the latter will sound. This contact head 65 may be provided at its upper end with a guiding shank 69 having a squared portion passing through a similar shaped aperture in a cap 71 adapted to be seated in a counterbore in a domed head 73 of said housing. The cap 71 may be prevented from rotating in its seat by a set screw 75.

The contact head 65 is threaded interiorly to receive a screw 77 which is mounted on and may be adjusted longitudinally of a shaft 79 by a set screw 81. The contact head 65 is drawn upwardly by a helical spring 83 which is confined between the top of the cap 71 and a collar 85 threaded on the upper end of the shank 69 and adapted to be turned to vary the compression of said spring. The threaded portion of the screw 77 is of short extent and normally occupies a recess 87 in said contact head above the threaded portion therein. The spring 83 referred to will draw said contact head upwardly and tend to maintain its threaded portion against the under face of the first thread of the screw 77 and thereby insure the turning of said screw in the thread of said contact head on the rotation of said screw.

The shaft 79 carrying the screw 77 preferably should be rotated at a much slower speed than the water motor pin 41 referred to, in order that a substantial, measured or predetermined quantity of water should pass through the motor before the bridge contact shall have been moved sufficiently to close the circuit to the bell. This reduction in speed may be effected as desired. Herein this is done by an intermediate gear train comprising a gear 89 fast on the lower end of the shaft 79 and meshing with a pinion 91 on a stud journaled in spaced upper and lower bearing plates 95 and 96. Fast on this stud is also mounted a gear 97 meshing with a pinion 99 on a stud journaled in said plates said stud also carrying a gear 103 meshing with a pinion 105 on a stud shaft journaled in said plate 96. This stud shaft projects beneath the lower plate and fast thereon is a crank arm 107 adapted to be engaged by the ball pin 41 referred to. To cause this pin 41 to move in a circular path, on the under face of the lower bearing plate 96 there is secured a pin controlling cone 109.

It will be apparent that when the ball pin 41 revolves by the action of the water flowing through the motor the crank 107 will be rotated and through the gear train described the shaft 79 will be rotated and with it the screw 77. This will cause the contact head 65 to move axially upwardly and bring the bridge contact 67 between the resilient contacts 49 and close the circuit of the electric bell and sound the latter. To reset the contact head 65 the cap set screw 75 is removed permitting the cap 71 to be lifted from its seat and the shank 69 on the contact head rotated to screw the contact head 65 back to its normal position, as shown in Fig. 2, whereupon the cap 71 may be again seated and secured by the set screw 75.

To prevent tampering with the contact control described, the latter may be inclosed in a bonnet 111 which may be hinged at 113 to the flange 55 referred to and may be provided with a lock eye 115 coöperating with a similar eye on said flange and may be fastened by a wire 117 and seal 119.

The gear train described herein is so arranged that 125 turns of the crank 107 will occasion but one turn of the shaft 79, so that a substantial quantity of water will have to pass through the motor before the shaft 79 will have turned sufficiently to move the contact head sufficiently to close the circuit to the bell. This quantity may be varied as desired, but in practice it is found convenient to have the circuit closed when, for example, six to ten gallons have passed through the motor. Thus it will be apparent that the alarm would not be sounded by a slight leakage or weeping of the system and, furthermore, by the use of the water motor or water meter motor described the circuit would not be closed by pulsations or water hammer in the main 1, but said circuit will be closed only when the automatic valves have operated in the event of fire.

To prevent water from backing in through the by-pass pipe 19 an automatic ball or other valve may be interposed in said by-pass. This automatic ball valve comprises a chamber 120 having inlet and outlet pipes 121 threaded on to ends of the by-pass pipe 19 said chamber containing a free ball 123. Adjacent the outlet end of said chamber are arranged a series of fins 125 projecting inwardly from said chamber so that when the water is flowing through the by-pass from

the under side of the valve 7 referred to, to the upper side thereof, the ball will be impelled against the ends of the fins 125 and arrested and will not prevent the flow of water therethrough since the water will be free to flow between said fins. If, however, the water should start to flow back through the by-pass the ball will be pressed or seated against the opening of the inlet of said chamber and will plug the pipe 19 and prevent flow therethrough.

In operation on the opening of the automatic sprinkler valves 5 the pressure above the check valve 7 will be reduced from that on the under side thereof. The weight on said check valve retards the operation of the latter so that said valve will not be sensitive to slight differences in pressure, whereas a slight reduction in the pressure will cause the motor through the gear train and connections described to close the circuit to the electric bell before the difference in pressure will be sufficient to lift the check valve 7 from its seat. On the happening of the latter event the check valve 7 will be lifted and permit the water to flow freely through the main 1 and supply the branch pipes 3.

It will be apparent that by my invention is provided a signal device which is simple in construction and operation; which is immune to water hammer, pressure fluctuations or leakage in the system, but is responsive and effective in operation when a substantial, measured or predetermined quantity of water has passed through the system.

It will be understood that the invention is not limited to the particular embodiment shown herein but that various modifications may be made without departing from the spirit and scope of the invention.

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

1. An apparatus of the class described comprising, in combination, a sprinkler system; sprinkler valves therein; a signal; and means for operating the latter after a predetermined volume of water has passed through the system.

2. An apparatus of the class described comprising, in combination, a sprinkler system; sprinkler valves therein; a signal; and a meter motor for operating said signal after a measured volume of water has passed through the system.

3. An apparatus of the class described comprising, in combination, a sprinkler system; automatic sprinkler valves therein; a signal; electric connections for the latter including an electric circuit and means for closing said circuit to operate said signal after a predetermined volume of water has passed through the system.

4. An apparatus of the class described comprising, in combination, a sprinkler system; automatic sprinkler valves therein; an electric bell; a circuit therefor; a switch in said circuit; and means for operating said switch to close said circuit after a predetermined volume of water has passed through the system.

5. An apparatus of the class described comprising, in combination, a sprinkler system including a pipe; automatic sprinkler valves for the latter; a check valve in said pipe; a by-pass around said check valve; a signal; and means in said by-pass for operating said signal after a predetermined volume of water has passed through the latter.

6. An apparatus of the class described comprising, in combination, a sprinkler system including a main pipe; automatic sprinkler valves for controlling the outlet from said main; a check valve in the latter; a by-pass around said check valve; a water motor interposed in said by-pass; and a signal actuated after said motor has made a predetermined number of mutations.

7. An apparatus of the class described comprising, in combination, a sprinkler system including a main; sprinkler valves for automatically controlling the outlet from said main; a check valve in the latter; a by-pass around said check valve; a water motor interposed in said by-pass; an electric switch controlled by said motor; and an electric signal adapted to be operated by said switch.

8. An apparatus of the class described comprising, in combination, a sprinkler system including a water main; a check valve in the latter; a by-pass for said main around said check valve; automatic sprinkler valves adapted for reducing the water pressure on one side of said valve, a water motor in said by-pass set in operation by the said reduction in pressure; and a signal operated by said motor.

9. In a sprinkler system, the combination of a water main; automatic sprinkler valves therefor; a check valve in said main; a by-pass around said check valve; a water motor interposed in said by-pass; a signal; and speed reduction means interposed between said motor and signal for operating the latter.

10. In a sprinkler system, the combination of a water main; automatic sprinkler valves therefor; a check valve in said main; a by-pass around said check valve; a water motor interposed in said by-pass; a signal; and a gear train interposed between said motor and signal for operating the latter.

11. In a sprinkler system, the combination of a water main; a check valve therein; a by-pass around said check valve; a water meter motor interposed in said by-pass; a screw shaft for the latter; a bridge contact head threaded on said screw; a bridge contact carried by said head; fixed contacts adjacent said bridge contact; an electric circuit con-

nected to said fixed contacts; an electric signal in said circuit and connections from said motor to said screw shaft for moving said bridge contact to close said circuit after a measured quantity of water has passed through the motor.

12. An apparatus of the class described comprising, in combination, a sprinkler system including a water main; a check valve therein; a by-pass in said main around said check valve; a signal; means in said by-pass for operating said signal after a predetermined quantity of water has passed in one direction through said by-pass and means to prevent water passing in an opposite direction through said by-pass.

13. An apparatus of the class described comprising, in combination, a sprinkler system including a water main; a check valve therein; a by-pass in said main around said check valve; a signal; means in said by-pass for operating said signal after a measured quantity of water has passed in one direction through said by-pass; and an automatic check valve for preventing water passing in an opposite direction through said by-pass.

14. An apparatus of the class described comprising, in combination, a sprinkler system; automatic sprinkler valves therein; a signal device; and a water motor for operating the latter after a predetermined volume of water has passed through one or more of said valves.

15. An apparatus of the class described comprising, in combination, a sprinkler system including a water main; a check valve in the latter; a by-pass for said main around said check valve; automatic sprinkler valves adapted for reducing the water pressure on one side of said check valve; a water meter motor in said by-pass operable on said reduction in pressure; and a signal operated by said water meter motor.

16. An apparatus of the class described comprising, in combination, a sprinkler system; sprinkler valves therein; a signal; and measuring means for operating said signal after a predetermined volume of water has passed through the system.

17. An apparatus of the class described comprising, in combination, a sprinkler system including a main; sprinkler valves for automatically controlling the outlet from said main; a check valve in the latter; a by-pass around said check valve; a water meter motor interposed in said by-pass; an electric switch controlled by said motor; and an electric signal adapted to be operated by said switch.

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

LEONARD D. CHANDLER.

Witnesses:
IRVING U. TOWNSEND,
HENRY T. WILLIAMS.