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A. D. LINN.

AUTOMATIC FIRE EXTINGUISHER.

(Application filed Jan. 3, 1902.)

(No Model.)

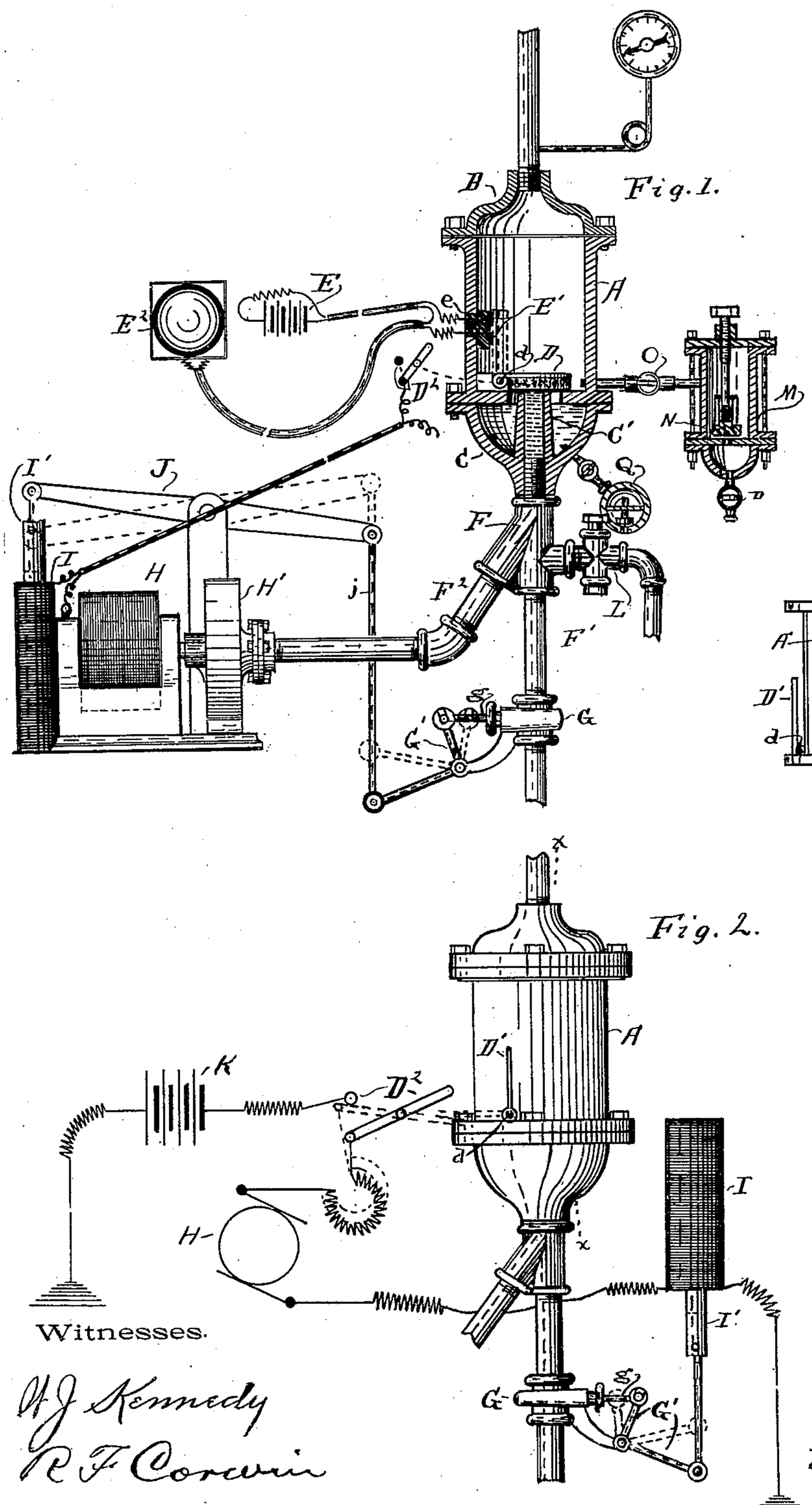

Fig. 1.

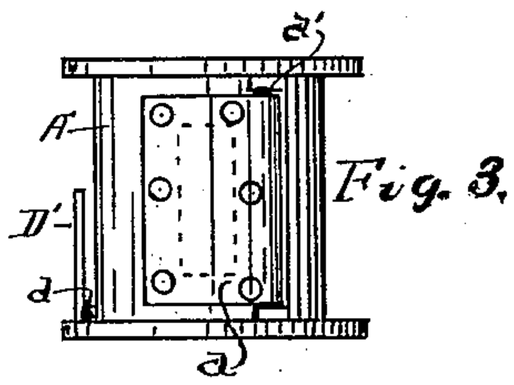

Fig. 3.

Fig. 2.

Witnesses.

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AUTOMATIC FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 712,692, dated November 4, 1902.

Application filed January 3, 1902. Serial No. 88,344. (No model.)

To all whom it may concern:

Be it known that I, ALLEN D. LINN, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Automatic Fire-Extinguishers, of which the following is a specification.

My invention relates to improvements in automatic fire extinguishing or sprinkling systems; and its objects are, first, to avert the danger of the system becoming "water-columned" or, in other words, of the pressure of water above the valve pressing the valve down so solidly as to overcome the pressure of water from below the valve, and thus render the system inoperative, a common difficulty in systems of this kind; second, to provide for sounding an alarm when the system is opened and water flows through, and, third, to provide for automatically cutting in an auxiliary supply of water and at the same time, if desired, shutting off the supply from the city mains. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of the system in the line *x x* of Fig. 2. Fig. 2 is an elevation of the same with the auxiliary pump removed, and Fig. 3 is an elevation of the cylinder removed from the system.

Similar letters refer to similar parts throughout the several views.

A represents the cylinder.

B is the cylinder-head.

C is the base, and C′ is the water channel or pipe through which water flows to the system, the upper end of which forms the seat for the valve D. This valve forms one of the principal features of my invention. In many of the systems now in use the valve is made very heavy, and, as the upper surface is purposely made several times the area of the water surface below, so that a comparatively low pressure of air will hold it against a high pressure of water, it is found that in high buildings, where it is necessary to use a long pipe, and consequently a high column of water above the valve, it will seat the valve so solidly as to wholly shut off the flow of water, and thus render the system inoperative. To avert this danger, I provide a valve that will float in water, preferably with a thick packing of cork, as indicated in Fig. 1, and pivot it within the cylinder, as at *d*, so that it will always be held contiguous to the valve-seat. I find that by this construction while a low pressure of air above will securely seat the valve against a strong pressure of water below the moment water is allowed to pass into the cylinder sufficiently to act upon the valve it will rise even against the air-pressure and before the cylinder is anywhere near filled with water and will not reseat no matter how heavy a column of water is above it. To avert the danger of the accumulation of water in the cylinder, either by condensation or otherwise, sufficiently to unseat the valve, I make use of an automatic drip M, which is connected to the main cylinder by means of the pipe and valve O. This drip is provided with a valve N, that will float in water when sufficient has entered the chamber or drip, but will be held in place by air-pressure when no water surrounds it and with a petcock P. It will be noticed that this valve is far enough below the valve D to insure its unseating before sufficient water can be deposited in the chamber A to unseat the valve D. I also provide an automatic drip Q, constructed similar to the drip M, for draining any water that may drip or be forced into the base C, and L represents a general drain for drawing the entire column of water from the system preparatory to seating the valve after the pressure of water has been shut off from below. When the valve D is thrown open, its metallic back comes in contact with the circuit-breakers E′ of the battery E or any other source of electricity and sounds an alarm at the bell E^2, which may be located at any convenient place upon the premises or elsewhere.

H represents an electric motor, and H′ represents a centrifugal pump, by means of which water may be forced through the pipe F^2 into the system, in which F represents an angled branch connection, F′ represents the conductor-pipe through which water is forced through the system from the city mains, and G represents a gate or straightway valve for

shutting off the water from flowing through the pipe F′. I provide for automatically energizing the motor H by means of the switch D^2, actuated by the arm D′, which arm is secured to the pivoting shaft or rod *d*, that supports the valve, and which is actuated by the opening and closing of the valve D.

The use of an auxiliary supply of water is particularly desirable in cases where the city fire-engines are drawing so heavily upon the city mains as to practically absorb the pressure and prevent the flow of water through the pipe F′. In such cases it is very desirable to shut off this supply entirely, and I have provided for this by the use of a helical coil I and a magnetic core I′, acting upon the valve-rod *g* through the medium of the bell-crank G′, which may be accomplished by the reverse action of the lever J, connected to the crank by the rod *j*, as illustrated in Fig. 1, or it may be connected directly, as illustrated in Fig. 2. I do not, of course, desire to restrict myself to this means of actuating the valve G, as many other well-known mechanical devices exist that would be equally available for the purpose, but show it as one of the many available means and as, perhaps, the most convenient of illustration. Nor do I desire to restrict myself absolutely to the use of electricity as an auxiliary power, as compressed air or other forms of motive power may be applied; but I deem electricity far the most available in the present development of motive powers and certainly so, as the current for driving the electric motor may be obtained from public or private electric plants far removed from the motor. I have shown the battery K not as a desirable source of electric supply, but simply to assist in tracing the electric circuit to and through the several elements of my invention.

In Fig. 3 I have shown a door *a*, that is designed to open for the purpose of regulating or repairing the valve D, and to facilitate handling it I have provided to hinge it to the cylinder, as at *a*′, so that it may be easily swung open or shut, and the interior of the cylinder may be easily reached without the necessity of lifting and handling a heavy door independent of the hinges.

E represents an insulated plug for the passage of the electric wires that connect the signal system through the walls of the cylinder A to position to complete the electric circuit through the contact of the valve D, as hereinbefore set forth.

The space above the valve D in the cylinder A is designed as an air-chamber and is made large, first, to allow of a large surface of valve to be acted upon by pressure of air in the chamber and in the pipe above to prevent the pressure of water from below from unseating the valve while the pressure of air is upon it, and, second, to provide ample room for the free action of the valve.

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

1. In an automatic fire-extinguisher, a water-supply pipe, an air-chamber connected in said pipe, a floatable valve within said chamber, and an electric circuit in position to be opened and closed by the action of said valve, substantially as and for the purpose set forth.

2. In an automatic fire-extinguishing system, a water-supply pipe, an air-chamber set in said pipe, a floatable valve within said chamber in position to form a water-tight joint and hinged to open to one side of the chamber, the pivot-rod of said valve extending out through the wall of the chamber, an arm upon said rod, an electric switch in position to engage said arm when the valve swings open, an electric motor, and a pump connected therewith as an auxiliary water-supply, substantially as and for the purpose set forth.

3. In an automatic fire-extinguishing system, a main water-supply pipe, an air-chamber set therein, a floatable valve hinged therein to form a water-tight joint between the supply-pipe and the chamber and to open to one side of the chamber, an electric switch in position to complete an electric circuit by metallic contact with said valve, an electric motor, a pump connected therewith and with the supply-pipe as an auxiliary water-supply, a valve in the main water-supply pipe, levers and connecting-rods actuated electrically to open and close said valves, substantially as and for the purpose set forth.

4. In an automatic fire-extinguishing system, a main water-supply pipe, an air-chamber connected in said pipe, a floatable valve hinged in said chamber in position to form a water-tight joint with the water-pipe, and to open up to one side of the chamber, an electric circuit in position to be opened and closed thereby, an electric motor connected in said circuit, a valve in the water-pipe, an auxiliary water-supply pipe, a pump connected therewith and with the motor, the valve in the supply-pipe connected to be opened and closed by the action of the motor, and automatic dripping-cups connected with the air-chamber, substantially as and for the purpose set forth.

Signed at Grand Rapids, Michigan, December 28, 1901.

ALLEN D. LINN.

In presence of—
F. D. DIBBLE,
ITHIEL J. CILLEY.