

(No Model.)

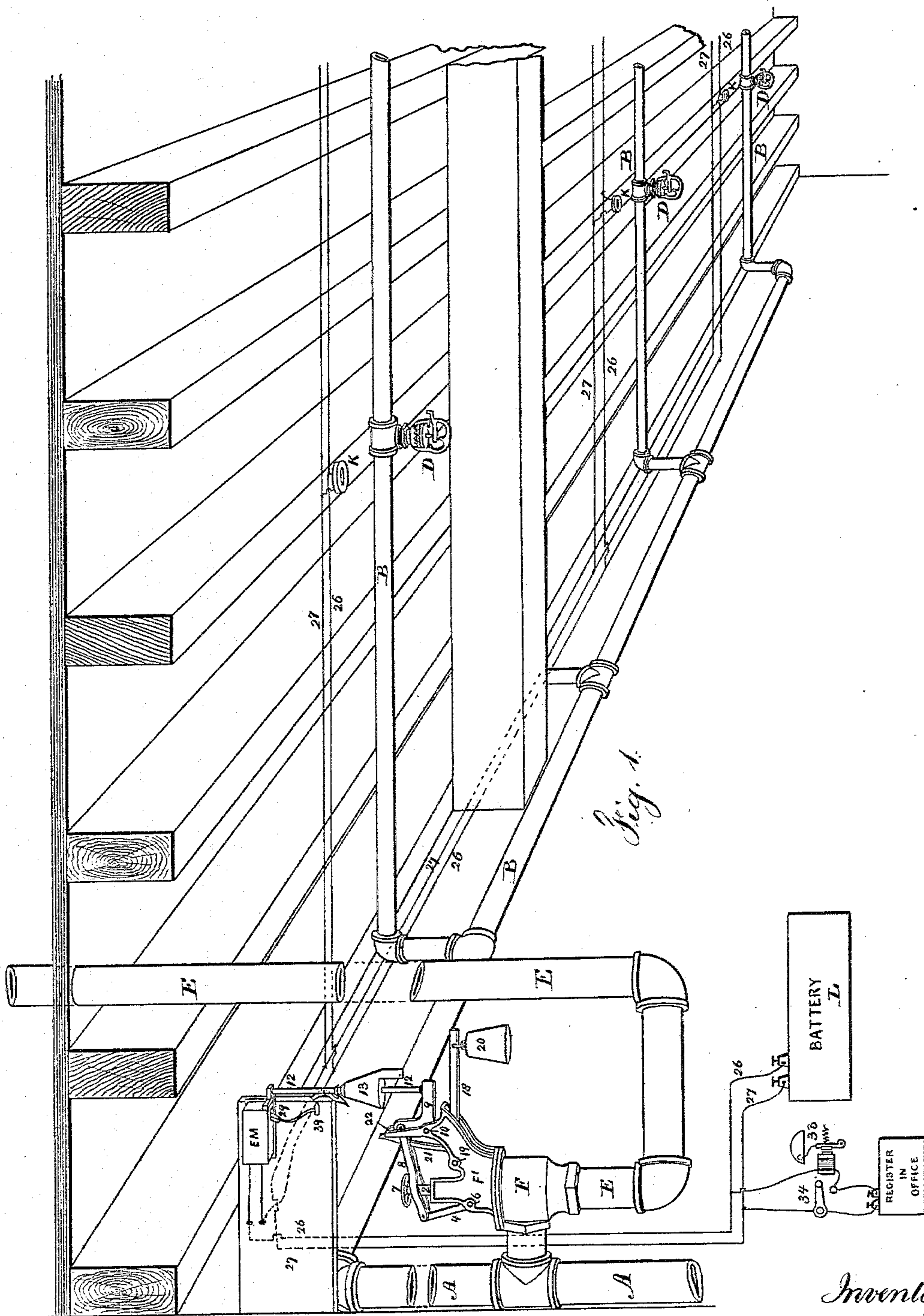
2 Sheets—Sheet 1.

W. HARKNESS.

FIRE EXTINGUISHING APPARATUS.

No. 356,875.

Patented Feb. 1, 1887.



Witnesses

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J. Stail

Inventor
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Att.

(No Model.)

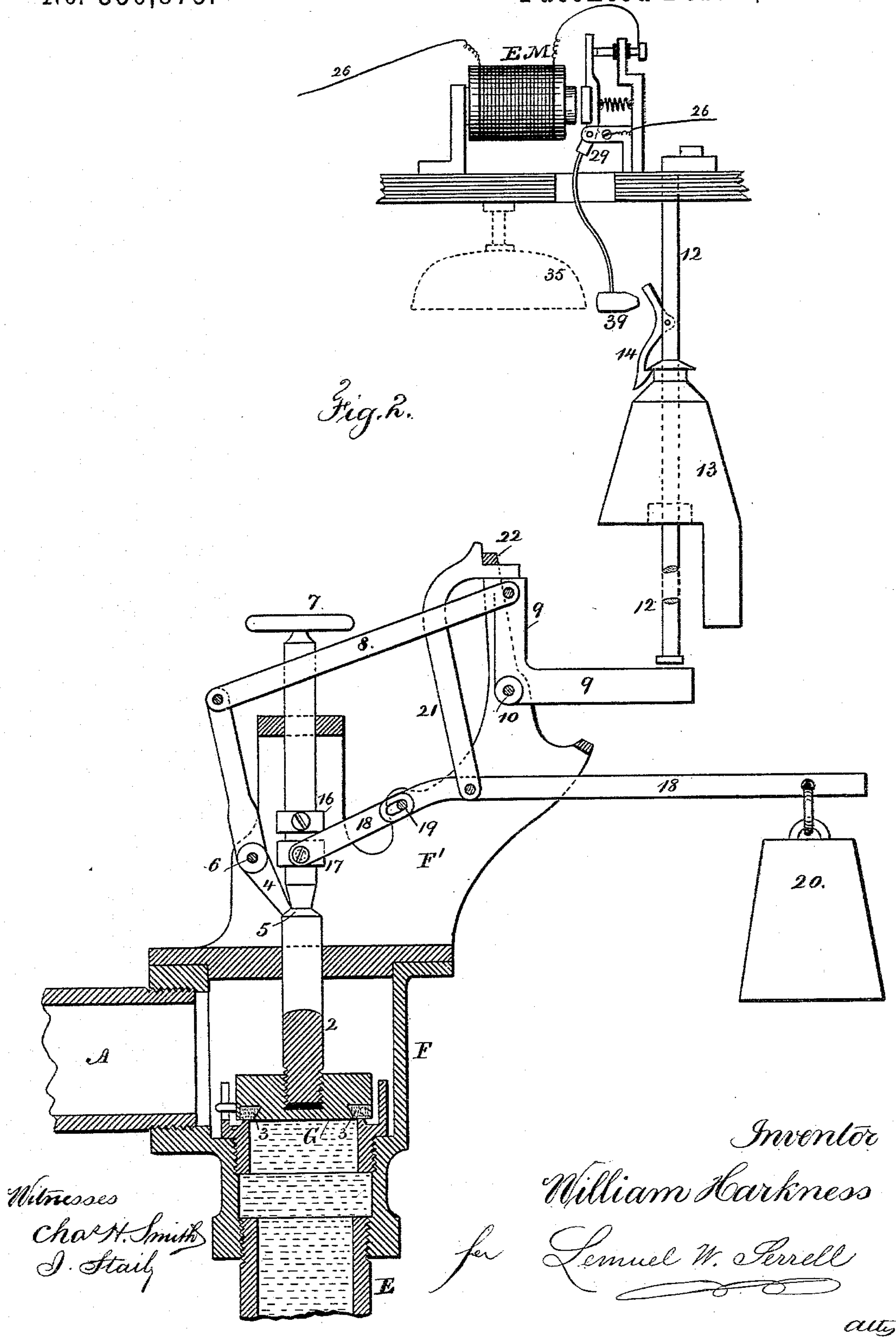
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UNITED STATES PATENT OFFICE.

WILLIAM HARKNESS, OF NEW YORK, N. Y.

FIRE-EXTINGUISHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 356,875, dated February 1, 1887.

Application filed May 17, 1886. Serial No. 202,368. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HARKNESS, of the city and State of New York, have invented an Improvement in Fire-Extinguishing Apparatus, of which the following is a specification.

In many places—such, for instance, as in dry-goods warehouses—there is considerable risk of damage to the goods resulting from the use of any fire-extinguishing apparatus where there are pipes containing water or other fire-extinguishing liquid and valves automatically unsealed by the action of heat, because in all such instances any leakage from the pipes or from the valves may damage the goods to a very large extent before such leakage is discovered.

The object of my present invention is to provide means for extinguishing the fire automatically, but to prevent the water passing into the distributing-pipes until a fire actually occurs, and, in addition to this, to provide means for indicating whether the apparatus is in working order, and also to provide for an alarm being given, so that the premises may be entered and examined after a fire has occurred, so that injury to the goods from the flow of water after the fire has been extinguished may be prevented.

In carrying out my invention I provide an elevated reservoir containing water or other fire-extinguishing liquid, or any other source of water-supply under pressure may be used, a system of pipes extending throughout the building to be protected, and automatic sprinklers with valves that are unsealed by the action of heat; but the system of pipes in its normal position is empty, and this system of pipes is connected to the reservoir or other source of water-supply, and there is a valve which closes the passage, and this valve is opened automatically by an electric appliance controlled by an electric thermostat, so that when a fire occurs and the temperature is abnormally raised the thermostat closes the electric circuit and causes the valve to be opened that admits water into the system of dry-pipes. The heat of the fire at the same time unseals the automatic sprinklers that are exposed to its action, and the water rushing through the

pipes is discharged upon the fire through the automatic sprinklers that have been unsealed by the action of the heat.

In the drawings, Figure 1 is a perspective view illustrating a portion of a building with my improvements applied therein, and Fig. 2 is a vertical section of the valve and the appliances therewith connected.

The rising pipe A is connected at the respective floors to the system of branch pipes B, passing along the ceilings, and provided with automatic sprinklers D at suitable distances apart and located in the usual manner adapted for fire-extinguishing apparatus. These automatic sprinklers are of any desired or convenient construction. Letters Patent No. 323,578, granted to me, illustrate a sprinkler that may be made use of. In all cases, however, these sprinklers are constructed in such a manner that they will become unsealed or open at a temperature of about 155° Fahrenheit.

A pipe, E, extends up to the tank or other source of water-supply or fire-extinguishing liquid under pressure. This pipe E is connected to the pipe A by the valve-box F, and in this box is a valve, G, closing against the pressure of the water. The valve-stem 2 is screwed into the valve, and there is, by preference, an elastic face, 3, to the valve where it rests upon the valve-seat. Above the valve-box is a frame, F', and 4 is a dog pivoted at 6 to the frame F', and the end of the dog rests upon a shoulder, 5, in the valve-stem.

7 is a hand-wheel at the upper end of the valve-stem, by which the stem can be rotated and partially unscrewed from the valve G, to cause the valve to be pressed firmly upon its seat when the dog 4 rests upon the shoulder 5.

To the upper end of the dog 4 a link, 8, is connected that extends to the bent lever 9, that is pivoted at 10 upon the frame F'; and above the horizontal portion of the bent lever 9 is a vertical rod, 12, and 13 is a weight sliding upon this rod and held up by a latch, 14. The length of the rod 12 and the distance that the weight 13 will fall when unlatched are such that the weight, acting upon the bent lever 9 and link 8, will unlatch the dog 4 and allow the valve G to open by the pressure of

the water; but as an additional precaution I prefer to make use of a collar, 16, fixed upon the valve stem 2, and a sliding collar, 17, below the same, held in a fork at the end of a lever, 18, which lever is pivoted at 19 and provided with a weight, 20, and there is also a stirrup, 21, hinged to the lever 18, and passing at its upper end over the vertical portion of the bent lever 9, and there is a stop, 22, on the frame F' that limits the movement of the stirrup 21 toward the bent lever 9, so that when the weight 13 is caused to fall and trip the bent lever 9 the upper end of said lever 9 swings out from beneath the stirrup 21, and the latter falls, together with the weight 20, and the lever 18 lifts the valve G off its seat, admitting water to flow into the branch pipes B.

The weight 13 has a downward projection at one side, which passes below the end of the lever 9, so as to rest upon the lever 18, and increase the weight that moves said lever 18 and lifts the valve G.

I combine with the dry-pipe system and automatic sprinklers an electric circuit and thermostatic circuit-closers. These thermostatic circuit-closers may be of any desired character—such, for instance, as a bulb of mercury with one of the circuit-wires fastened into the bulb and the other circuit-wire into the thermometer-tube, or a spring of two metals may be made use of, both of these devices being well known.

I have shown thermostatic circuit-closers at K, and these should be adjacent to each automatic sprinkler. At L is represented a box to contain a battery, and 26 27 are the positive and negative circuit-wires passing to the respective thermostatic circuit-closers. The helix of an electro-magnet, E M, is included in either circuit-wire 26 or 27, and this electro-magnet is provided with an armature-lever, 29, and a hammer, 39, and the circuit, by preference, passes through the back stop of the armature, so that the armature is vibrated as soon as the electric circuit is closed at either of the thermostats, and the hammer 39 strikes against the latch 14, and by the repeated blows unlatches the weight 13, allowing the same to fall and open the valve G, as before described.

It will now be understood that there is not to be any water in the branch pipes B while in their normal position; hence damage from leakage is effectually prevented; but whenever a fire occurs the heat causes the thermostat to close the electric circuit, and thereby open the valve to admit water from the pipe E into the pipes A B, and the heat by this time has opened one or more of the automatic sprinklers D, and the water rushes from the pipes B through such automatic sprinklers upon the fire.

It is to be borne in mind that fire-extinguishing apparatus may often remain in a building for many years before its services are required, and during this time the battery may get out of order. I therefore provide a safety-indicator to call attention periodically to the

battery. This device may be of suitable construction; but I prefer an electric bell, 33, within the circuit of the branch wires 26 27, and in the same circuit is a circuit-closing device, such as a switch or push-button, at 34, by acting upon which the bell will be rung if the battery is in order; but it is preferable to conduct the wires 26 27 to the office or counting-room in the building, and to close the electric circuit by a clock that operates every twenty-four hours—say at noon of each day—so that the battery may be kept in working order should it fail to give the signal at the proper time.

If desired, the hammer 39 may be made to strike an alarm-bell, 35. (Shown by dotted lines in Fig. 2.) After the latch 14 has been moved out of the way this alarm-bell 35 will call attention to the apparatus and to the existence of a fire, so that the water may be turned off after the fire has been extinguished.

There may be a pipe passing into the building from the outside, near the sidewalk, and extending up and connected to either the pipe E or the pipe A, as illustrated in my Patent No. 340,210, so that a hose from a fire-engine may be connected to the same. The check-valve should be provided in such pipe, as set forth in said patent.

The wires 26 and 27 may be conducted to the office or counting-room in the building, and a clock may be used to close the circuit periodically, through sensitized paper or otherwise, so as to mark the strength and condition of the battery by the intensity of the mark upon the paper, and the battery must be replenished whenever there are indications of weakness.

The mechanism for opening the air-valve may be controlled by an electro-magnet, and any suitable arrangement of circuits and alarm or indicating devices.

I claim as my invention—

1. The combination, with the branch pipes and automatic sprinklers, of a water-supply pipe, a valve to the same, and valve-opening mechanism, an electric circuit, thermostatic circuit devices, an electro-magnet for controlling the valve-opening mechanism, and a branch circuit from the battery and an automatic indicating device therein for indicating the condition of the battery, substantially as set forth.

2. The combination, with the water-supply pipe, of a series of distribution-pipes and sprinklers, a valve for closing the water-supply pipe, a screw-stem for the valve, the pivoted dog 4, for holding the stem and valve in place, a suspended weight, an electric circuit, including a thermostat and magnet, and an armature, hammer, and latch for suspending the weight, whereby the weight is allowed to fall and disconnect the pivoted dog and turn on the water-supply when the thermostat acts in the circuit, substantially as set forth.

3. The combination, with the water-supply and distribution pipes in a fire-extinguishing

apparatus, of a valve to close the water-sup-
ply, a pivoted dog to hold the valve, a weight
to be dropped, a lever connected to the dog,
to withdraw the same when the weight falls,
5 a latch to suspend the weight, an electric cir-
cuit, a thermostat in the same, and an electro-
magnet, armature, and hammer, to withdraw
the latch and allow the weight to fall when the
electric circuit is closed or opened at the ther-
10 mostat, substantially as set forth.

4. The supply-water pipe E, the valve G,
to close the same, in combination with the
distribution pipes and sprinklers, a pivoted
dog to hold the valve to its seat, the screw-

stem with a shoulder thereon for the end of 15
the dog, the link 8 and lever 9, and a weight
to act on the lever and withdraw the dog, a
lever, 18, and weight to aid in opening the
valve, and a stirrup, 21, over the end of the
lever 9 and acting to hold up the weight 20, 20
substantially as set forth.

Signed by me this 11th day of May, A. D.
1886.

WILLIAM HARKNESS.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.