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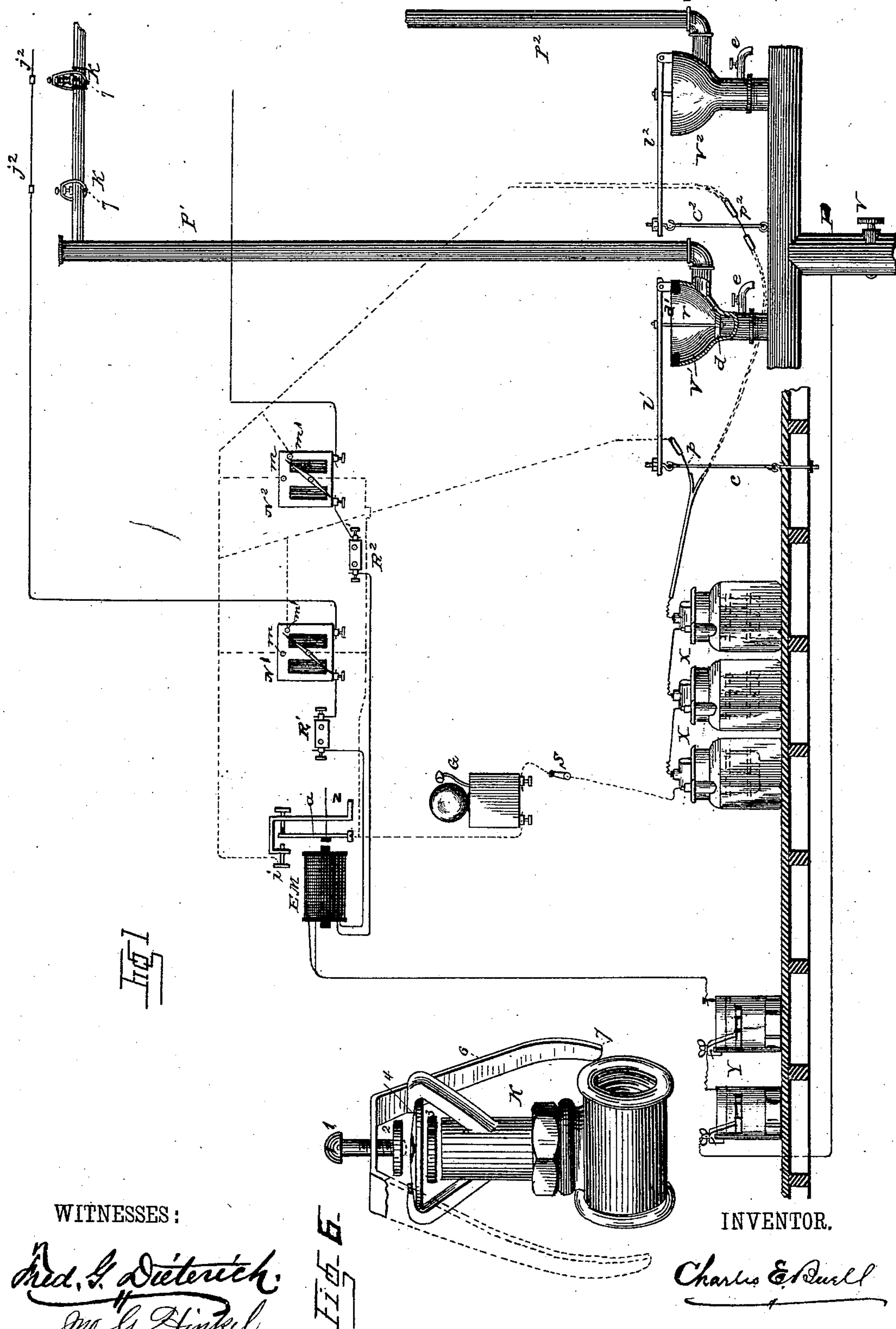
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C. E. BUELL.

FIRE EXTINGUISHER AND ALARM.

No. 275,752.

Patented Apr. 10, 1883.



WITNESSES:

*Med. L. Dieterich*  
*Jno. G. Hinkel*

INVENTOR.

*Charles E. Buell*

(No Model.)

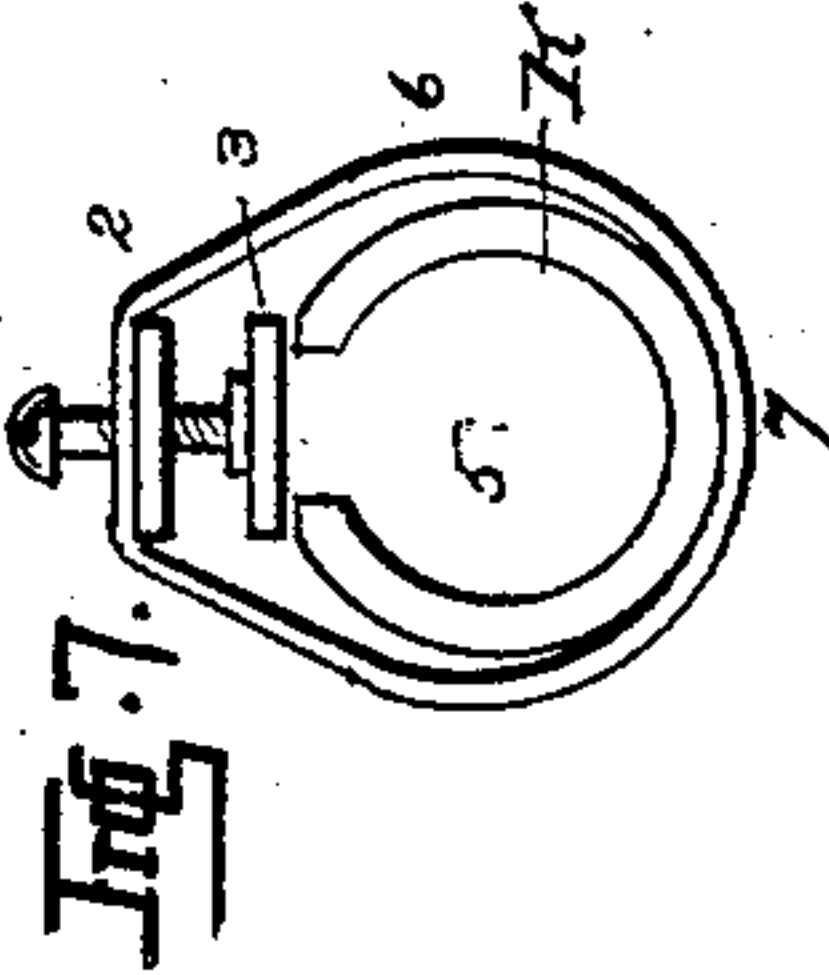
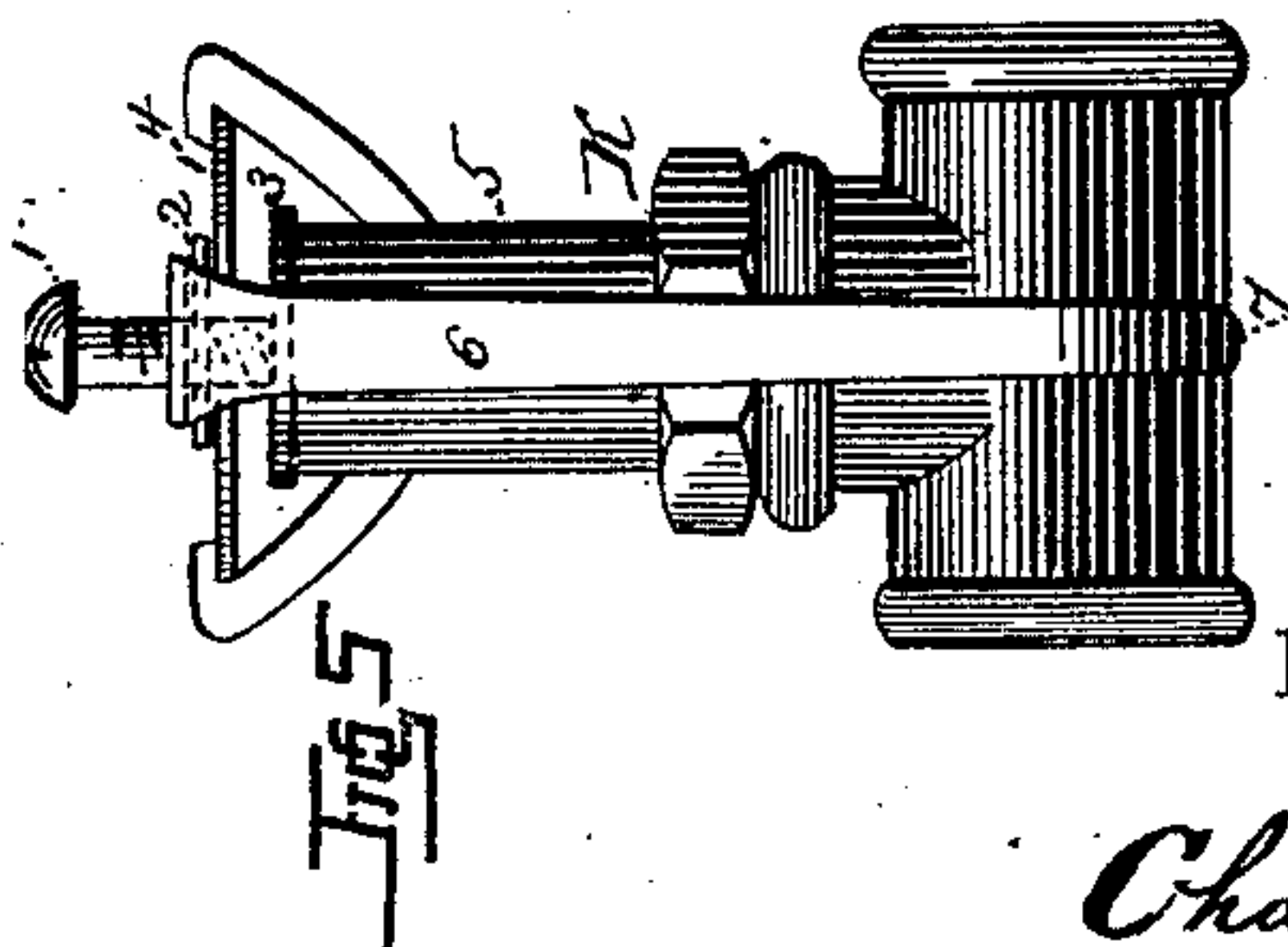
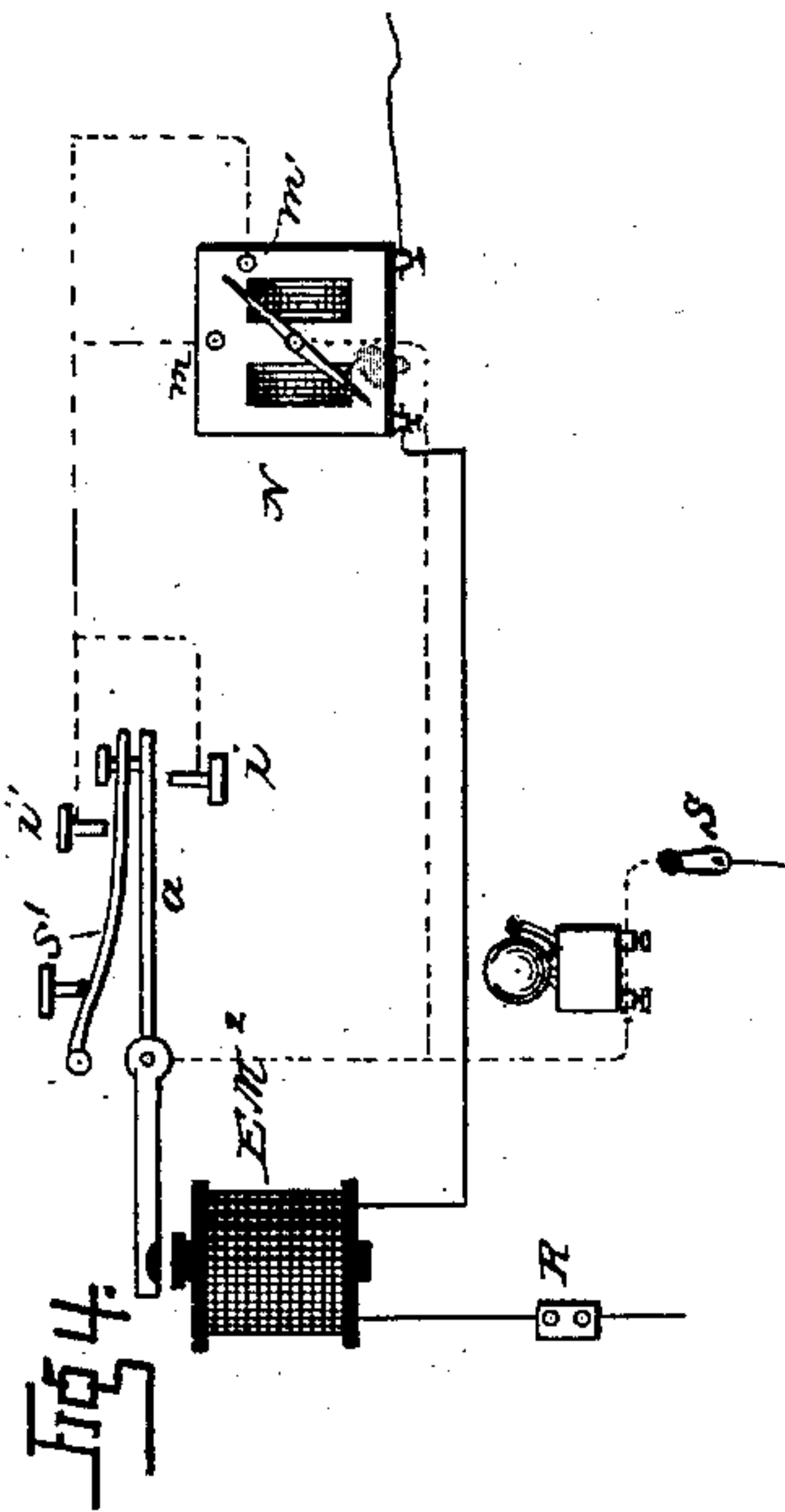
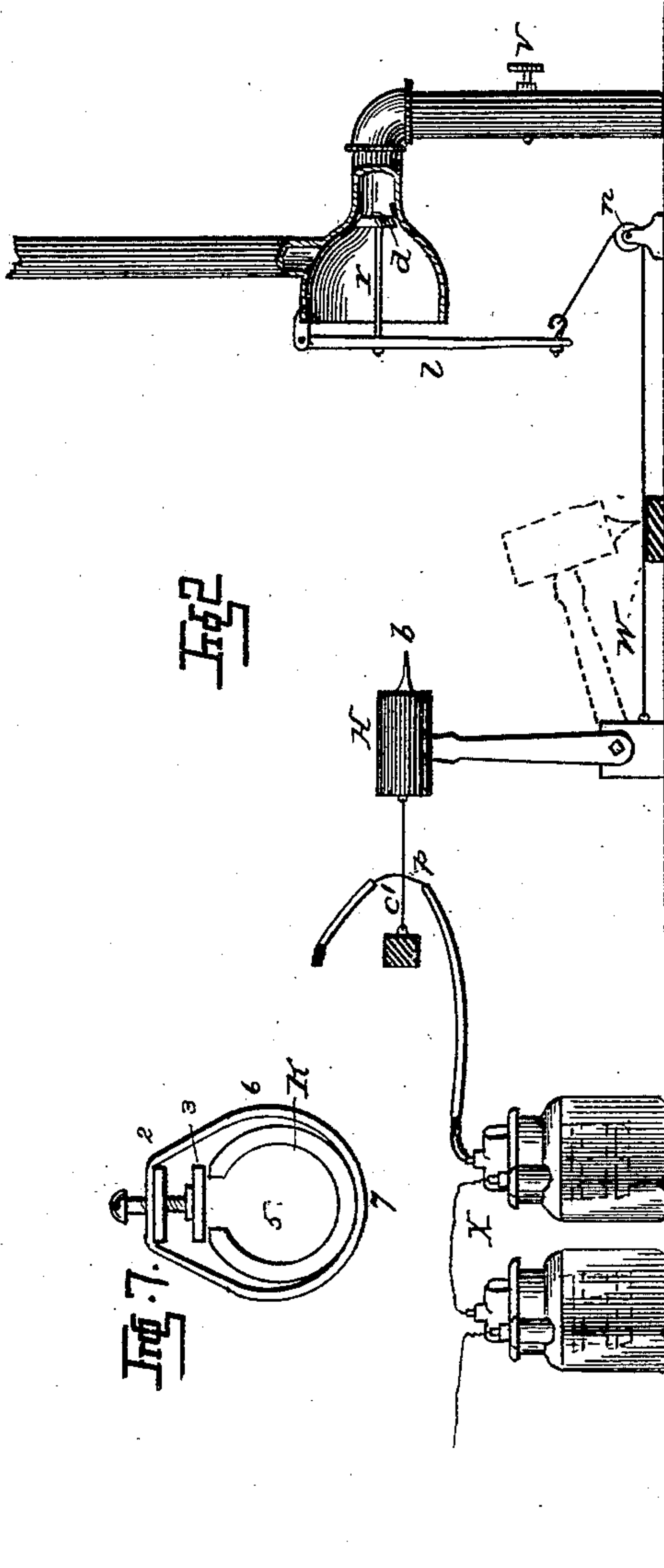
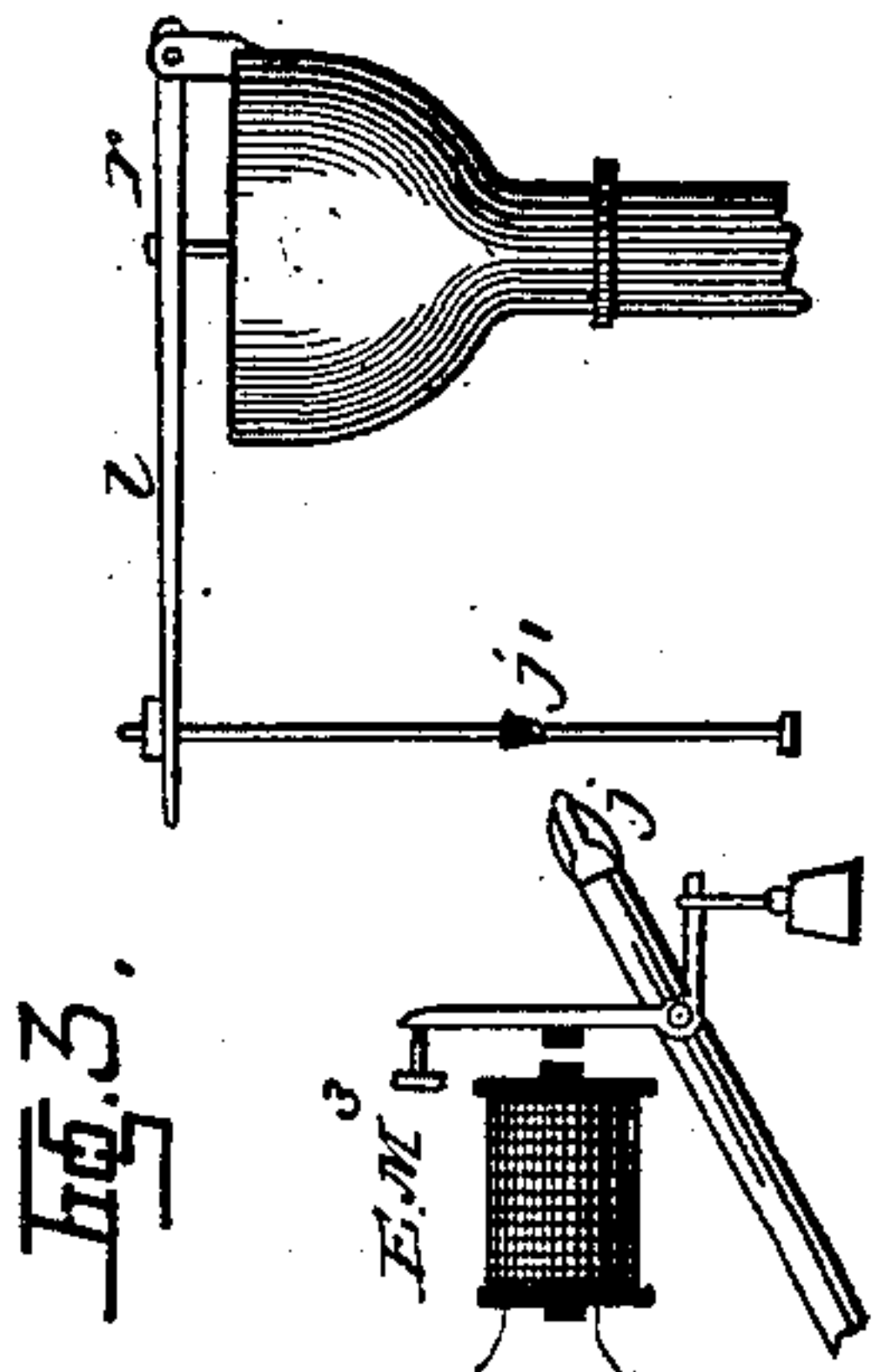
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WITNESSES:

*Fred. L. Dietrich*  
*Geo. G. Hinkel*

INVENTOR.

*Charles E. Buell*



# UNITED STATES PATENT OFFICE.

CHARLES E. BUELL, OF NEW HAVEN, CONNECTICUT.

## FIRE EXTINGUISHER AND ALARM.

SPECIFICATION forming part of Letters Patent No. 275,752, dated April 10, 1883.

Application filed February 17, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. BUELL, of the city and county of New Haven, State of Connecticut, have invented Improvements in Fire Extinguishers and Alarms, of which the following is a specification.

Experience has demonstrated that the extinguishing systems in which the water is normally turned on are liable to become inoperative by reason of the water freezing in the pipes, and in such systems there is danger of water-damage by the accidental opening of the sprinklers.

One of the objects of my invention is to organize a fire-extinguishing system from which the water is normally excluded, in which the mechanism for controlling the valves which exclude the water from the system is simple in construction, certain in operation, and not liable to become inoperative by long disuse.

Experience has also demonstrated that sprinklers whose outlets are controlled by a fusible joint so located that the water in the pipes chills the same, or when it begins to flow comes immediately in contact with said fusible connection, are very unreliable, because the fusing of the solder is sensibly affected by the water and the fusing consequently retarded, resulting in a failure to entirely open the sprinkling-apertures, and thus materially diminishing the flow of water.

It is hence another object of my invention to so locate the fusible material with respect to the discharge-opening that the water in the pipes will neither chill and delay the process of fusing nor be permitted to be discharged upon the fusible joint during the process of fusing. The rose-head having a cap over its perforations, secured by fusible solder, is of the class of distributors which I design to improve.

It has been also shown by experience that a distributor having an obstructed outlet—such as the rose-head sprinkler—is liable to become clogged and stopped up by the settling of lint and dust from without and from rust and sediment from within.

It is therefore another object of my invention to provide a fluid extinguishing nozzle, distributor, or device with an unobstructed discharge-opening, so that when the devices which hold said opening closed are released

by the fusing of the soldered joint or fastening whereby it is retained in position the water will have a free unimpeded outlet, thereby insuring the discharge of the maximum quantity of extinguishing-fluid.

By the term “unobstructed discharge-opening” I mean a distributor or device that wholly opens when released, in contradistinction to a rose-head or perforated sprinkler that may be opened or uncapped.

My invention accordingly consists, primarily, in the combination, with a closed and a normally-open electric circuit, and the pipes of a fire-extinguishing system, of devices for controlling the supply of water to said pipes, which devices are made operative by heat developed or controlled by the electric current, and an alarm located in the normally-open circuit.

My invention also consists in a distributor or fire-extinguishing device having an open or unobstructed outlet which is held closed by devices adapted to be released by the action of heat upon an easily-fusible alloy.

My invention also consists in certain combinations and sub-combinations, as will be hereinafter described.

In the accompanying drawings, Figure 1 represents a system of fire-alarm and fire-extinguishers arranged in accordance with my invention. Figs. 2, 3, 4, 5, 6, and 7 represent in detail parts of apparatus for carrying out my invention.

Referring to Fig. 1, P is a main water-supply pipe, having a valve, V, which is normally open.

V' V<sup>2</sup> are valvular devices for controlling the supply of water to the pipes P' P<sup>2</sup>, respectively, said pipes being arranged to conduct water through a building, and provided with branches and sprinklers K K, or of other preferred forms. The valvular devices V' V<sup>2</sup> consist of a metal shell with pipe-connections for connecting the same between the main and distributing pipes. This shell-like part is covered preferably by a flexible sealed cover, d', and is provided with a valve-seat for the valve d. The valve d is held to its seat by the lever l' and rod r, which in turn are held to close said valve against the water-pressure by a retaining cord or wire, C, the retaining-wire being secured to the floor or other firm unyielding



structure, and may be provided with means—as a nut and screw—for adjusting its tension. Education-valves *cc* are provided for the purpose of drawing the water out of the pipes *P'* *P*<sup>2</sup> and apparatus when desirable. The retaining-cord *C* may be a combustible cord, and be cut or burned off when desired to let on the water to a distributing-pipe.

A charged and divided main circuit extends from the battery *Y* along the line of pipes *P'* *P*<sup>2</sup>, and is adapted to be ruptured by the melting of joints *j*<sup>2</sup> *j*<sup>2</sup>, or either of them, by a heat that will open the sprinklers *K K*.

An electro-magnet, *E M*, is included in the two circuits, and is a differentially-wound electro-magnet. The divided circuit being adjusted by the resistance *R'* *R*<sup>2</sup>, the circuits can be made equal, and the armature *a* of electro-magnet *E M* will be retracted by the weight *Z*, or a spring against its back insulated contact-stop, and the local circuit of the battery *X* (shown in dotted lines) will be normally open.

The galvanometers *N'* and *N*<sup>2</sup> are included in the charged circuits described, and are provided with contact-stops *m m'*, and with connections to their needles, so that a movement of the needle of either into contact with their respective stops *m* or *m'* will close the open local circuit.

In the local circuit I place a gong, *G*, for sounding an alarm, a switch, *S*, for opening the circuit when desired, and at *p*, I place a very fine platinum wire, so pressed into contact with the combustible cord *C* that when the local circuit is closed the current from battery *X* will heat the wire *p* to white heat and instantly burn off the cord *C*, releasing the valve *d*, which, being released, is forced open by the pressure of the water in the main *P*, and the water be let into the required distributing-pipe. The battery *X* should be a battery of large surface and suitable electro-motive power.

The operation of the system is as follows: The water being excluded from the pipes *P'* *P*<sup>2</sup> by the pressure of their valves *d* to their seats by the tightening of cord *C*, when a fire occurs, the heat opens a valve or sprinkler, *K*, and a joint, *j*<sup>2</sup>. The opening of either of the divider main circuits by the melting of a joint closes the local circuit of battery *X* by the action of the unbroken circuit upon the electro-magnet *E M* and its armature *a*. The attraction of the said armature, followed by the closing of the local circuit, heats the platinum wire *p* and burns off the cord *C*, as previously mentioned, and the water is let on to the distributing-pipe along the line of the broken circuit, and an alarm is sounded at the same time on the gong *G*.

The gong *G* can be in another sub-circuit or local circuit and avoid the adding of its resistance to the heating-circuit, and any preferred form of electro-magnet and connections can be used in place of the electro-magnet *E M* shown; but the employment of the electro-magnet *E M* and galvanometers *N'* *N*<sup>2</sup> possesses

the advantage of safety against the electrical system being out of order by neglect or accident, or by malicious interference without the fact being known, as any decrease or increase or change of direction of the force charging the circuits, or either of them, or the rupture of either, would be visible upon the galvanometers and sounded by the gong *G*, so that the system will be known to be in order if an alarm has not been sounded.

As it might require a large cord to retain a valve required for a large supply of water, I have shown in Fig. 2 the valve-lever *l*, held by a wire or wire cord passing over a stationary pulley-wheel, *n*, and secured to a beam with a poised weighted blade, *H*, retained by a cord, *C'*, adapted to be burned off by the heating of wire *p*, allowing the edge *b* of the weighted blade *H* to fall upon the wire *C*, cutting it, and thus releasing the valve *d*, the wire *p* being heated by battery *X*, as shown in Fig. 1 and described.

Fig. 3 shows another modification for controlling a supply of water to a distributing-pipe by an electric circuit through the intermediate action of heat. The lever *l* is shown as held depressed by a wire jointed with a fusible joint, *j'*, and a gas-jet in such relation to the said joint as to melt it when a flame of gas is burning. The form of gas-burner is used in which the gas is constantly burning in a small side jet, or any automatic gas-lighting devices may be used. The gas is normally turned off, except the side jet mentioned, and is held turned off by a lever that is attracted by an electro-magnet, and is adapted to fully turn on and light the gas when the electro-magnet ceases to attract the lever. Such a device can be controlled by a charged circuit.

Fig. 4 shows an electro-magnet and apparatus that may be employed in place of the form shown in Fig. 1 with like safety, and adapted particularly for use where a single circuit is to be used through a building. The electro-magnet *E M*<sup>2</sup> is of ordinary construction, the armature *a* being held out of contact with the local-circuit contact-stops by the spring *S'*, in such a manner as to close the local circuit by a rise or fall of the tension of the current in the helices of the electro-magnet. The galvanometer *N* has been previously described. A polarized armature may be employed to accomplish the closing of the circuit in place of said galvanometer.

Fig. 5 shows a side elevation of a sprinkler *K*, consisting of a nozzle, 5, held closed by a plate, 3, pressed against the opening of said nozzle by a screw, 1, which runs in a nut, 2. A metal spring-strap, 6, is placed over the nut 2 and soldered under the pipe at 7, thus holding the nut and screw in pressing the valve 3 to cover the opening in the nozzle. When the solder at 7 is fused, the strap of metal springs apart, as shown in Fig. 6, and the valve-plate 3, nut 2, and screw 1, together with the strap 6, are forced away by the pressure of water.



The screw admits of adjusting the pressure of the plate over the opening. The plate can be brass, with a lead or tin-foil facing, and the strap 6 be of thin metal. At the point soldered  
 5 a piece of wood or thick paper can be placed between the joint of solder 7 and the pipe to insulate it from the pipe, to more readily melt. This form of sprinkler has the solder removed from the water, is adapted to be made sensi-  
 10 tive, and is fully released or unsoldered before water can escape to chill the process of fusing; and when the valve-plate 3 is off of the opening the nozzle is wholly open. A spreader, 4, may be used to spread the water delivered by  
 15 the nozzle 5, if desired.

Fig. 7 shows a valve-plate 3 held to close an opening in a water-pipe—without the employment of the nozzle 5—by the devices shown in Figs. 5 and 6, and described.

20 I reserve the right to claim in another application any improvements described and shown in this application and not now claimed.

What I claim is—

1. The combination, with pipes arranged to  
 25 conduct water through a building, and valve mechanism whereby the water-supply to said pipes is controlled, of an electric circuit and devices adapted to make operative said valve mechanism by heat developed or controlled by  
 30 said electric circuit, and an alarm apparatus in a sub-circuit which is made operative by the first-named circuit, the whole arranged and operating substantially as set forth.

2. The combination, with pipes arranged to  
 35 conduct water through a building, and valve mechanism whereby the water-supply is controlled, of a normally-closed electric circuit which is adapted to become ruptured by heat, a normally-open circuit containing an alarm  
 40 apparatus, devices adapted to close said last-named circuit when the normally-closed circuit is ruptured, and devices adapted to make operative said valve mechanism by heat developed or controlled by the normally-open  
 45 circuit, the whole arranged and operating substantially as described.

3. The combination, with the valve mechanism of a fire-extinguishing system which is held closed by devices adapted to be ruptured by  
 50 heat, of a normally-closed electric circuit adapted to be opened by heat, a normally-open electric circuit, and devices in the first-named circuit which, when said circuit is ruptured, make operative the normally-open circuit which develops or controls heat that releases said valve mechanism, substantially as  
 55 and for the purpose set forth.

4. A fire-extinguishing nozzle or device having an open or unobstructed outlet held closed  
 60 by fusible devices adapted to be wholly released by the action of heat, substantially as described.

5. A fire-extinguishing nozzle or device having an open or unobstructed outlet which is held closed by fusible devices adapted to be  
 65 released by the action of heat, the said fusible devices being in such relation to the nozzle or pipe as not to be chilled by the water therein, substantially as set forth.

6. A fire-extinguishing nozzle or device having an open or unobstructed outlet which is held closed by fusible devices adapted to be released by the action of heat before any water can escape to defeat the process of fusing, substantially as described.  
 75

7. A fire-extinguishing nozzle or device having an open or unobstructed outlet which is held closed by fusible devices that are in such relation to the nozzle or pipe as not to be chilled by water therein, and adapted to be  
 80 wholly released by the action of heat before any water can escape to defeat the process of fusing, or in any way interfere with the proper opening or operation of said device, substantially as described.  
 85

8. A fire-extinguishing nozzle or device having an open or unobstructed outlet which is held closed by fusible devices adapted to become wholly released by the action of heat and the pressure in the pipe before any water can  
 90 escape, substantially as described.

9. A fire-extinguishing nozzle or device having an open or unobstructed outlet which is held closed by adjustable devices that are secured thereto by fusible material, the said devices adapted to become released by the action of heat and the pressure in the pipes before any water can escape to defeat and delay the proper opening of the device, and the fusible material being so located with relation to  
 100 the nozzle or pipe as not to be chilled by water therein, substantially as described.

10. A fire-extinguishing nozzle or device having an open or unobstructed outlet which is closed by a plate secured thereto by a clamp  
 105 that is fusible at a point opposite said opening, substantially as described.

11. A fire-extinguishing nozzle or device having an open or unobstructed outlet which is held closed by a valve or plate secured thereto by devices that are adjustable, and that are adapted to be released by the action of heat upon fusible material located at a point opposite said outlet, and a spreader so arranged with relation to said outlet as to spread  
 115 and deflect the water delivered therefrom, substantially as described and shown.

CHARLES E. BUELL.

Witnesses:

A. C. BUELL,  
 J. W. BUELL.