

(No Model.)

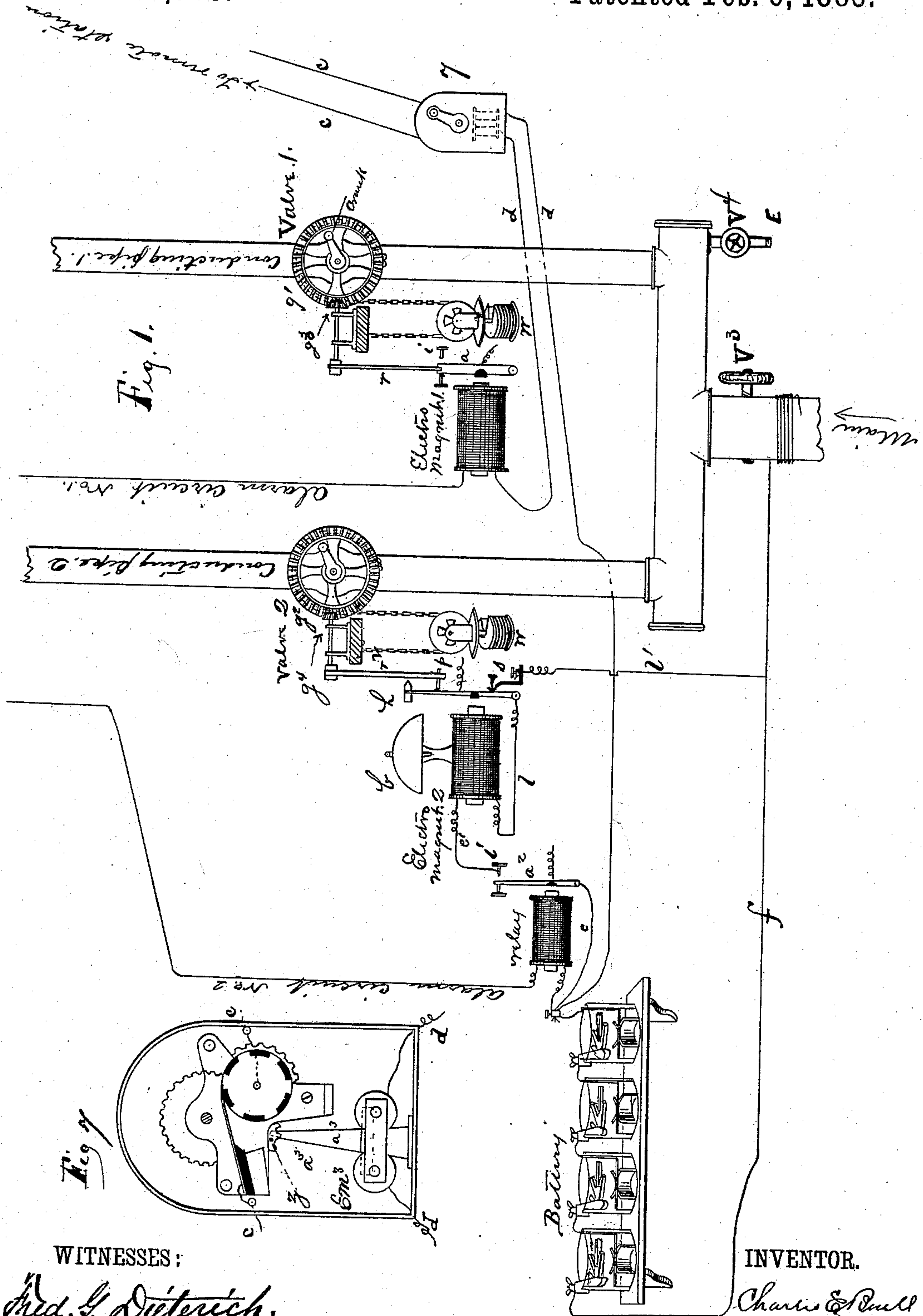
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C. E. BUELL.

AUTOMATIC FIRE EXTINGUISHING AND ALARM SYSTEM.

No. 271,783.

Patented Feb. 6, 1883.



(No Model.)

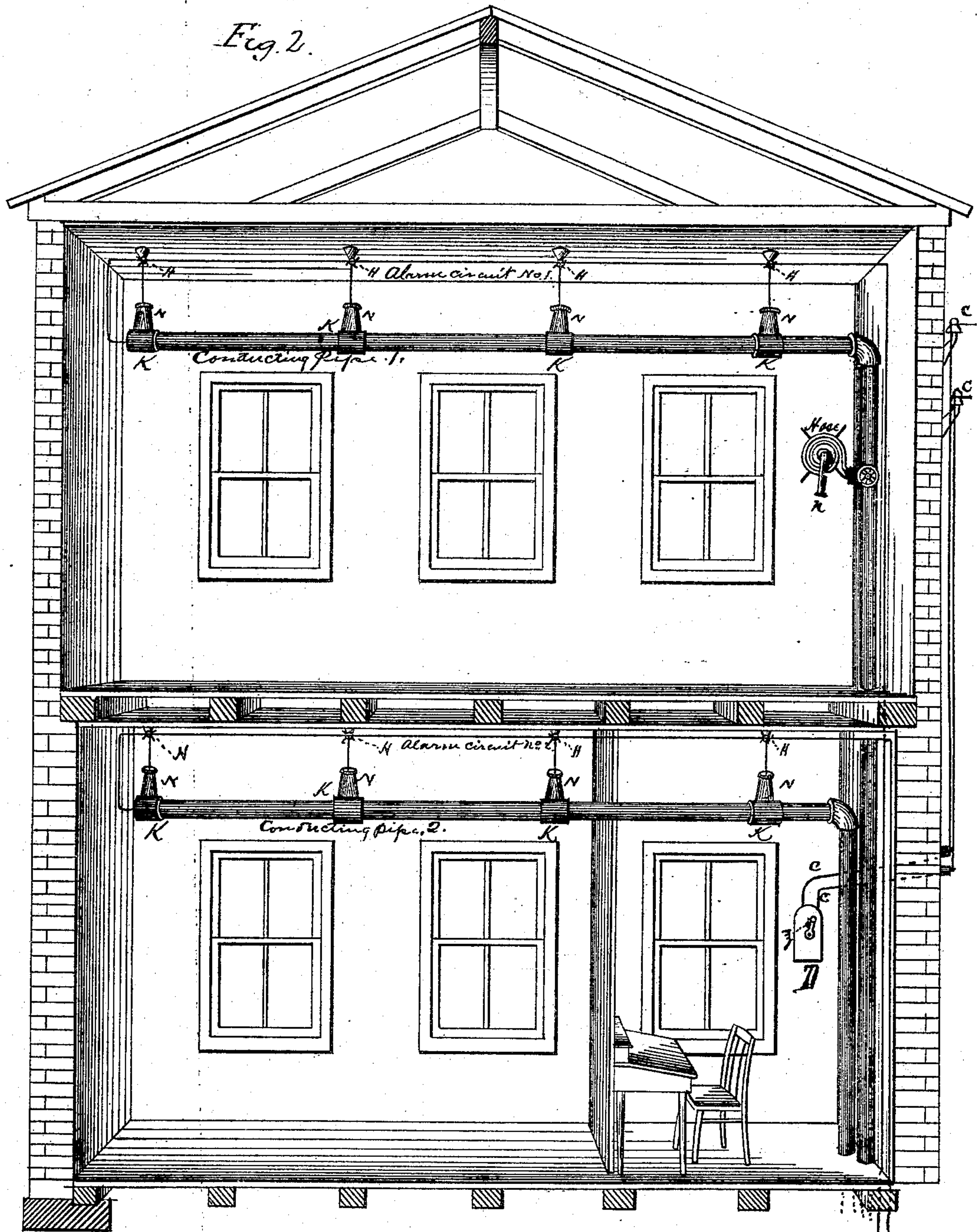
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WITNESSES:

Wm. G. Dietrich
J. G. Finkel

INVENTOR.

Charles E. Buell

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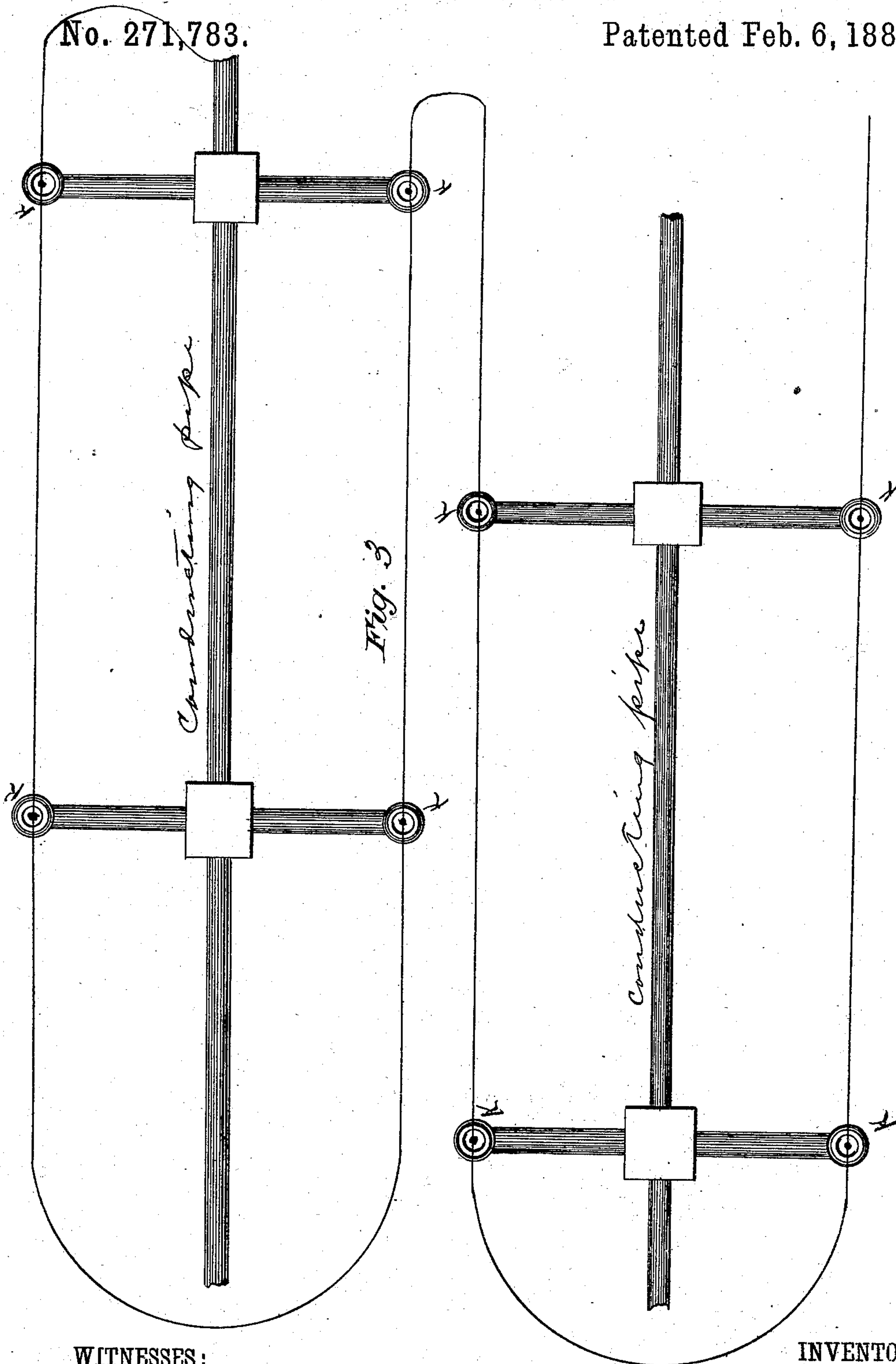
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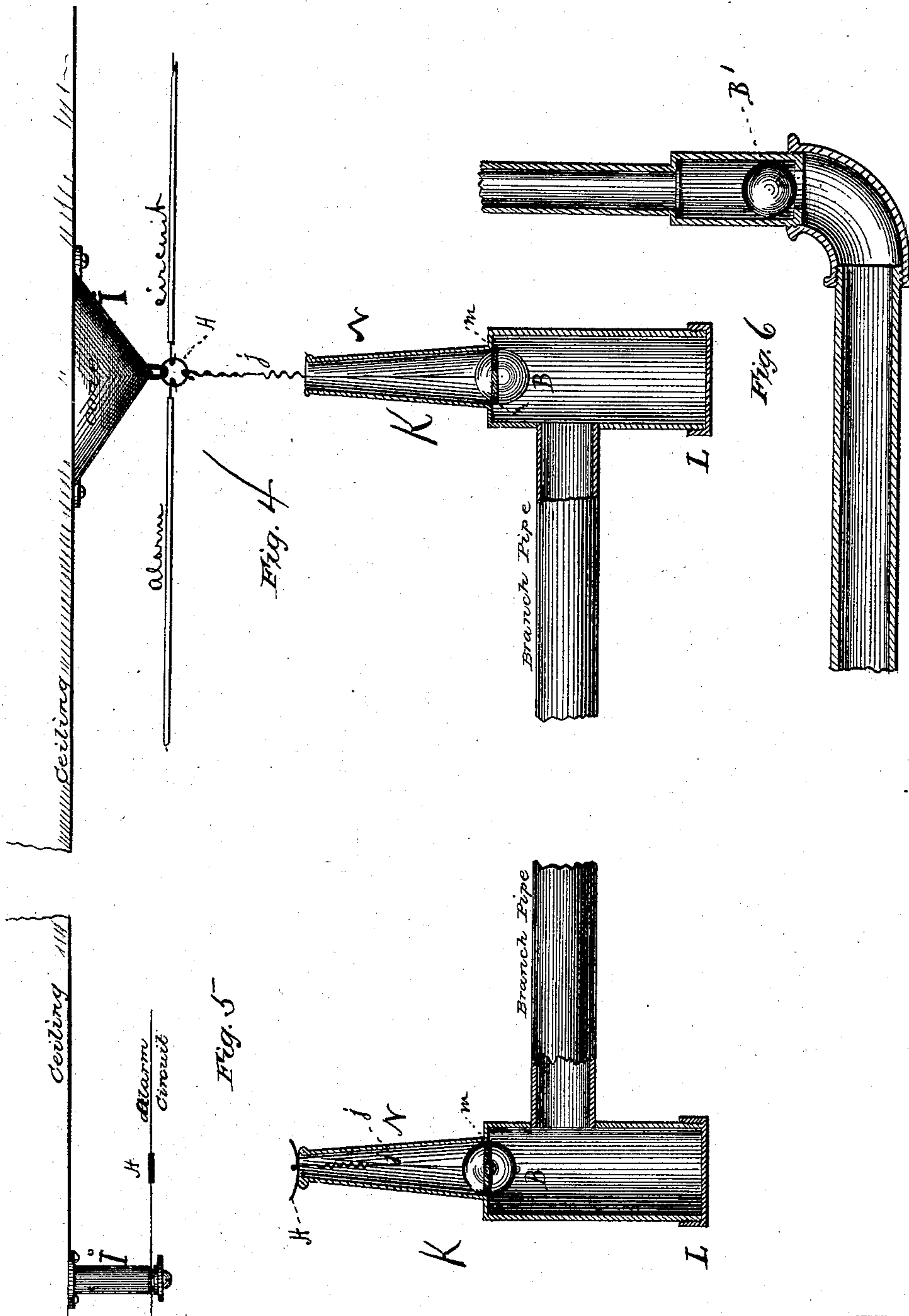
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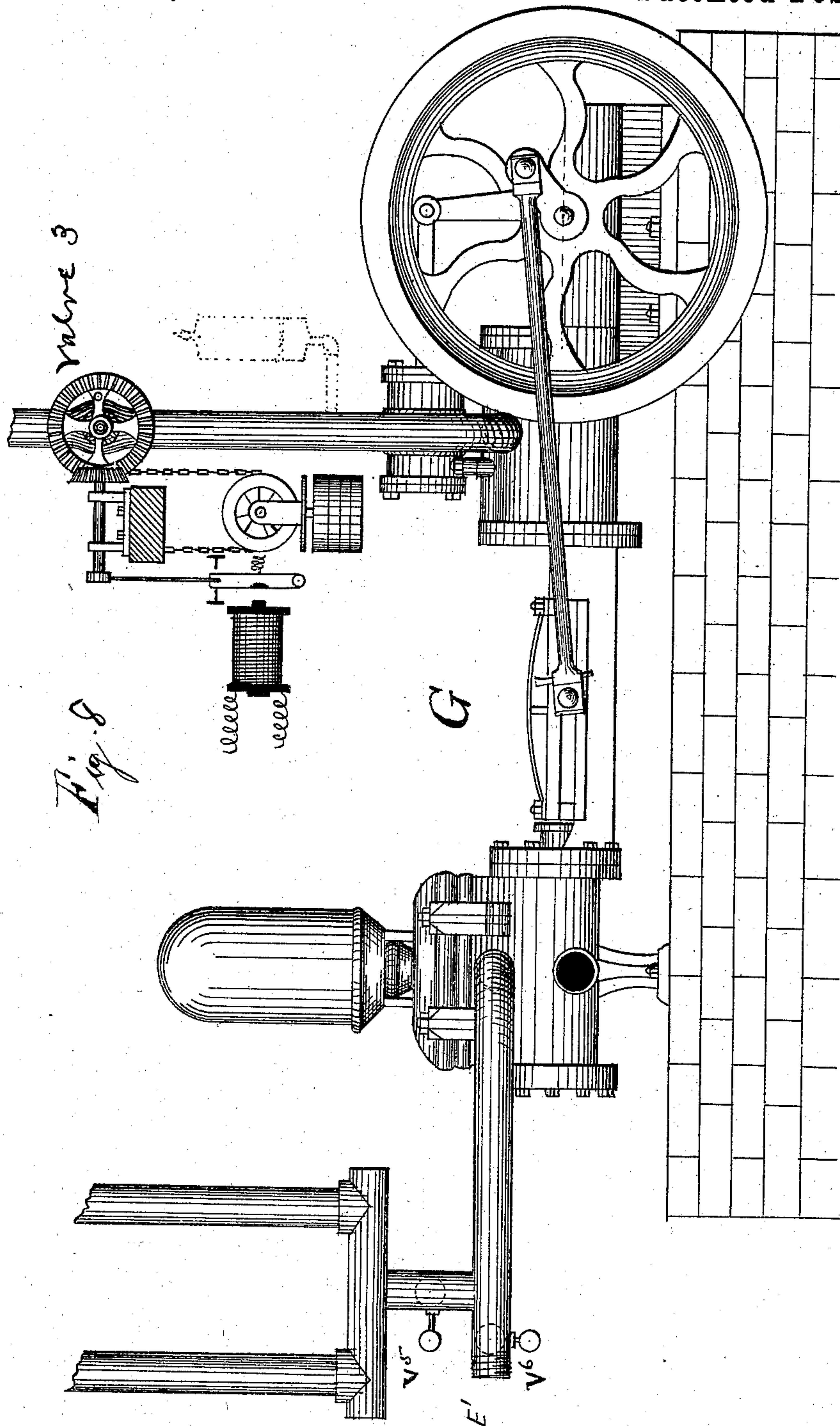
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Charles E. Buell

UNITED STATES PATENT OFFICE.

CHARLES E. BUELL, OF NEW HAVEN, CONNECTICUT.

AUTOMATIC FIRE EXTINGUISHING AND ALARM SYSTEM.

SPECIFICATION forming part of Letters Patent No. 271,783, dated February 6, 1883.

Application filed August 2, 1882. (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
5 Combined Automatic Fire-Extinguisher and Fire-Alarm System, of which the following is a specification.

My invention consists primarily in the combination of the following - named elements,
10 viz: a system of pipes arranged to conduct water through a building; a series of capped or valvular branches connected to said conducting-pipes, each branch adapted to open independent of the others by a dangerous rise
15 of temperature; a charged electric circuit extending through the building, the said circuit being held normally closed by the fusible devices which hold the said branches closed; an electro-magnet included in said electric circuit;
20 a valve or cock for turning on the water-supply, which is adapted to be actuated and controlled by the action of said electro-magnet, and an alarm apparatus made operative by the breaking of said electric circuit, the
25 whole arranged and operating substantially as hereinafter set forth.

My invention further consists in certain novel combinations and sub-combinations, which will be fully described in the following
30 specification and set forth in the claims.

In the accompanying drawings, Figure 1 represents the water-supply and electrical apparatus arranged according to my invention. Figs. 2 and 3 represent the distribution of the
35 conducting-pipes through a building, Fig. 2 being a view in elevation, and Fig. 3 a plan view, of the same. Fig. 4 is a view in cross-section of one of the branches with the retaining-wire and electrical conductors arranged according to
40 my invention. Fig. 5 is a view in cross-section of a modified arrangement of one of the branches, the retaining device, and electric circuit shown in Fig. 4. Fig. 6 is a view in cross-section of an air-escape. Fig. 7 is a view in elevation of
45 an alarm apparatus which may be used with my system. Fig. 8 is a view in elevation of an automatic device for controlling the water-supply through the intermediate use of a power-pump.

50 Referring to Fig. 1, there is shown a main water-pipe, to which are connected two con-

ducting-pipes for distributing water to different parts of a building. The main pipe is provided with a compression-cock, V^3 , and a small
cock, V^4 , for controlling an eduction-pipe, E. 55 The conducting-pipes are each provided with a compression valve or cock, (marked respectively Valve 1 and Valve 2.) These valves are provided with a beveled gear and weight and
60 a crank for winding up the weight when it has run down. g' g^2 g^3 g^4 represent the beveled gears, and r an escapement-rod for controlling the valve mechanism, the escapement-rod r in
turn being controlled by the armature a of an electro-magnet included in the alarm-circuits. 65

The electro-magnets, batteries, and circuits are well known and require no description.

In connection with valve 1 of the conducting-pipe 1, the electro-magnet for controlling the valve mechanism is included directly in
70 the charged circuit, and its armature a intercepts the rod r when the circuit is intact, but releases the rod r and allows the valve 1 to fly open when said circuit is ruptured and the armature a is retracted to its back contact, i . 75

In connection with the alarm-circuit No. 1 there is shown a signaling apparatus, (marked 7,) which is included in the alarm-circuit by the
loop-wires d d , and will be more fully described hereinafter. (See Fig. 7.) 80

In connection with valve 2 of the conducting-pipe 2, I have shown a relay electro-magnet in the charged alarm-circuit No. 2, adapted to close a circuit over the wire e , armature a^2 ,
85 contact i , wire e' , through the helices of electro-magnet 2, over wires l and l' , through the armature-lever of said magnet, and the contact-spring S , the wire l' connecting to the return battery-wire f . When the alarm-circuit No. 2 is broken the armature a^2 is retracted against
90 its contact-stop i , short-circuiting the battery through the large magnet 2.

The armature of the electro-magnet 2 has a projection, p , which intercepts the rod r^2 , and also has a hammer, L , for sounding the bell b . 95 When the electro-magnet is energized the rod r^2 is released and the hammer L brought into contact with the bell b . At the same time the contact at s is broken and the alarm repeated after the well-known form of vibrating continuous-ringing bells. There are advantages
100 in using this form of apparatus, as large elec-

tro-magnets can be economically employed and powerfully charged to trip the valve mechanism and vigorously sound an alarm by the full force of the battery short-circuited through them.

Referring to Fig. 2, the conducting-pipes 1 and 2 are shown as protecting separate floors of a building with the branches K K K and electric circuits, which will be more fully described in their relation to each other in describing Fig. 4. There is also shown a coil of hose, with its nozzle, and means for turning on water to subdue a fire by the use of said hose, after warning has been given. There is also shown the district-telegraph box D, of well-known construction, but improved by the addition of a fusible projection, from which the wound box may be worked in the ordinary manner, but which will melt and release the mechanism and sound an automatic signal upon a dangerous increase of temperature.

In Figs. 2 and 3 the alarm-circuits are shown as connected to the conducting-pipes as a return-circuit. When it is desired to employ the alarm-circuit for signaling and other uses it can be done by varying its tension without breaking it, as shown in former applications for patents filed by me. By the use of a double insulated wire, which can be contained in one covering, a double metallic circuit is afforded by the use of the conducting-pipe. In many instances it may be desirable to inclose the conducting-wire within the conducting-pipe. To make the circuit effective the wire should be well insulated and brought out of the pipes at the points of fusion and returned to the interior of the pipe again through non-conducting and water-tight plugs.

Referring to Fig. 4, the branch pipe K is shown in cross-section. It consists of a pipe terminating in a chambered nozzle or sprinkler, N. The sprinkler extends below the level of the pipe and projects above it in a contracted nozzle, a ball, B, of glass or other insulating material, (or, if of metal, insulated from the sprinkler by a rubber or cloth ring, m,) is held to close the orifice of the nozzle N by the covered wire j, which is drawn taut and connected to the ring H, to which the alarm-circuit wires are also connected. The ring H is securely fastened to the cone-shaped insulator I, and is formed of an alloy that will melt by the increase of the temperature to a dangerous degree, and by melting detach the wire j and rupture the circuit-wires. The ball B, when released by the melting of its supporting-ring H, will drop into the recess below the inlet-pipe, leaving the nozzle open for the delivery of water, the breaking of the circuit by the melting of the same ring, H, serving to turn on the water and sound the alarm, as previously described. The cone-shaped insulator, being above and near the opening in the nozzle N, serves to spread the water over a considerable area. The insulating-cone can be of wood, glass, or other suitable material, and screwed

to the ceiling. Other forms of sprinklers can be used without departing from my invention.

In Fig. 5 the ball B is shown supported by a wire, j, held taut by a filament of fusible metal, H, which rests across the orifice of the nozzle N, the alarm-circuit being maintained separate, and provided with fusible joints, and arranged as described in Letters Patent to me, No. 262,887. As shown, the sprinkler is provided with a removable cap, L.

Fig. 6 represents a pipe terminating in an open section, having a chamber which contains a ball, B', of wood, which normally rests loosely over an orifice, which is preferably oblong. By placing this device at the highest point in the system of conducting-pipes, the air is permitted to be driven from the pipes by the incoming water, the ball B' being carried up to close the pipe by the entrance of the water after the air is expelled.

Referring again to Fig. 1, when the water has been admitted to the system of pipes, and it is desired to again empty the pipes, the valve or cock V³ should be closed and the valve V⁴ opened, when the water in the conducting-pipes will pass out, and can be conducted away by hose attached to pipe E. At the same time the air will be admitted to the system through the device shown in Fig. 6. The valves 1 and 2 being adapted to be opened and closed at will, as well as automatically, the water can be turned on to a floor in which the heat has not acted to turn it on, and the hose be brought into requisition to protect the property.

Fig. 7 shows a signaling-box such as are used on district telegraphs in its general construction. Such box, being partly wound up, is provided with a stop, z, which may consist of a pin of fusible metal driven into the wheel of the circuit-breaking mechanism, and normally held retained by another projection or by the armature a³ of the electro-magnet E M³, intercepting the pin z. This electro-magnet is included in the alarm-circuit by the loop-wires d d, (shown in Fig. 1,) and its circuit-breaking mechanism opens and closes the signal-telegraph circuit c c when made operative. This signaling-box is adapted to be used in the ordinary manner of using district-boxes, and to act automatically to turn in a signal to a distant station by a dangerous increase of temperature, serving to melt the projection z or to make operative the electro-magnet E M³. In Fig. 2 this form of box is shown without connection with the alarm-circuit, but dependent upon the fusible projection z for its automatic action, the advantage of employing a box of this description being that a definite number signal which denotes the locality of the fire can be turned in by a single rupture of the alarm-circuit in the building or by the melting of the retaining-pin z.

Fig. 8 represents the form of compression cock or valve shown in Fig. 1, and described as adapted to turn on a water-supply when

made operative by the action of the electro-magnet. In this figure the valve is shown as controlling the steam-pipe which supplies steam to move the steam-pumping apparatus G. The valve 3 being opened by the breaking of the circuit through the helices of the controlling electro-magnet, steam is turned on automatically and water at once forced into the system of pipes and delivered to put out a fire. The steam-pump, being well-known, requires no description. An alarm, as previously described, can be used with this modification as well, and water can be turned into a water-wheel by like devices for working a power-pump to extinguish fires.

The cocks V⁵ and V⁶ and pipe E' are for withdrawing the water from the pipes of a system. A steam-whistle can be made to sound in connection with the turning on of steam by the breaking of a circuit, (shown in dotted lines.)

I do not claim herein a distributor or sprinkler consisting of a nozzle and devices adapted to wholly open said nozzle by the action of heat, in contradistinction to that class of sprinklers in which a rose-head or perforated nozzle is uncapped or uncovered by the action of heat, as I intend making such claim in another application.

I claim—

1. The combination, with a pipe or pipes arranged to conduct water through a building, and from which the water is normally excluded, of a normally-charged electric circuit composed of lengths of wire not easily fused, held in electrical continuity by an easily-fused alloy, extending through said building, an electro-magnet in said circuit, and a valve mechanism and alarm apparatus controlled by said electro-magnet and adapted to turn on a water supply and sound an alarm when the said circuit is broken by the action of heat, substantially as described.

2. The combination, with a pipe or pipes arranged to conduct water through a building, and provided with valves that open by heat, of a normally-charged electric circuit composed of lengths of wire not easily fused, held in electrical continuity by an easily-fused alloy, extending through said building, an electro-magnet in said circuit, and a valve mechanism controlled by said electro-magnet and adapted to turn on a water-supply to said pipes when the said circuit is opened by the action of heat, substantially as described.

3. The combination, with a pipe or pipes arranged to conduct water through a building, and provided with valves which open by heat, of a normally-charged electric circuit composed of lengths of wire not easily fused, held in electrical continuity by an easily-fused alloy, an electro-magnet in said circuit, and a valve mechanism and an alarm apparatus controlled by said electro-magnet and adapted to turn on a water-supply to said pipes and sound an

alarm when the said circuit is opened by the action of heat, substantially as described.

4. The combination, with a pipe or pipes arranged to conduct water through a building, and provided with valves that open by heat, of an electric circuit that is normally charged, and is composed of lengths of wire not easily fused, held in electrical continuity by the same fusible devices that are employed to hold the said valves closed, an electro-magnet in said circuit, valve mechanism and alarm apparatus controlled by said electro-magnet, and made operative to turn on a water-supply and sound an alarm when the said electric circuit and valves, or either of said valves, are opened by the action of heat, substantially as set forth.

5. The combination, with a pipe or pipes from which the water is normally excluded, and having a series of branches provided with valves that open by heat, of a charged electric circuit adapted to open by the action of heat, an electro-magnet in said circuit adapted to release a valve mechanism for turning on a water-supply to said pipes when the said circuit is opened by the action of heat, and an alarm apparatus adapted to sound an alarm when the battery charging said controlling circuit becomes exhausted and broken by accident, by the action of heat, or either, substantially as described.

6. The combination, with one main pipe, of two or more conducting-pipes, each conducting-pipe having a series of branches provided with valves that open by heat, a valve in said main pipe for controlling the flow of water to the several conducting-pipes, a separate electric circuit which is normally charged, and is composed of lengths of wire not easily fused, held in electrical continuity by easily-fused alloy, extending along the line of each conducting-pipe, an electro-magnet in said circuit, and a valve mechanism for each conducting-pipe, controlled by said electro-magnet and adapted to turn on a water-supply to said conducting-pipe when the electric circuit corresponding to said pipe, is opened by the action of heat, substantially as described.

7. The combination, with a conducting-pipe, of a series of sprinklers, each provided with a valve that is electrically insulated from said conducting-pipe.

8. In a fire-extinguisher and fire-alarm system, substantially as described, the combination, with an electric circuit that is normally charged, and composed of lengths of wire not easily fused, held in electrical continuity by an easily-fused alloy, of an electro-magnet in said circuit for controlling a valve mechanism, and an electro-magnet, also in said circuit, for controlling devices adapted to transmit a definite alarm-signal upon an independent electric-circuit, substantially as described and shown.

9. The combination, with a conducting-pipe of a valve and mechanism for turning on a water-supply, of an electro-magnet for control-

ling said valve mechanism that is included in a sub-circuit which is normally open, a relay electro-magnet included in a closed circuit, and connections, substantially as shown, whereby
5 the electro-magnet in the sub-circuit will be powerfully charged to trip the valve mechanism when said relay responds to a rupture of the said closed circuit.

10 10. The combination, with a pipe or pipes arranged to conduct water through a building, and provided with valves that open by heat and from which the water is normally excluded, of valve mechanism controlled by an electro-magnet in a normally-charged circuit, so as to
15 turn on a water-supply to said pipes when said

circuit is opened by heat, and an air-education valve for hastening the discharge of the air from said pipes when the water-supply is turned on, substantially as described.

11. The combination, with a system of con- 20 ducting-pipes and a series of valvular openings in said pipes, of an electric circuit supported and insulated by cone-shaped insulators, which are so arranged in their relation to said openings as to spread the water delivered at 25 said openings, substantially as described.

CHARLES E. BUELL.

Witnesses:

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