

(No Model.)

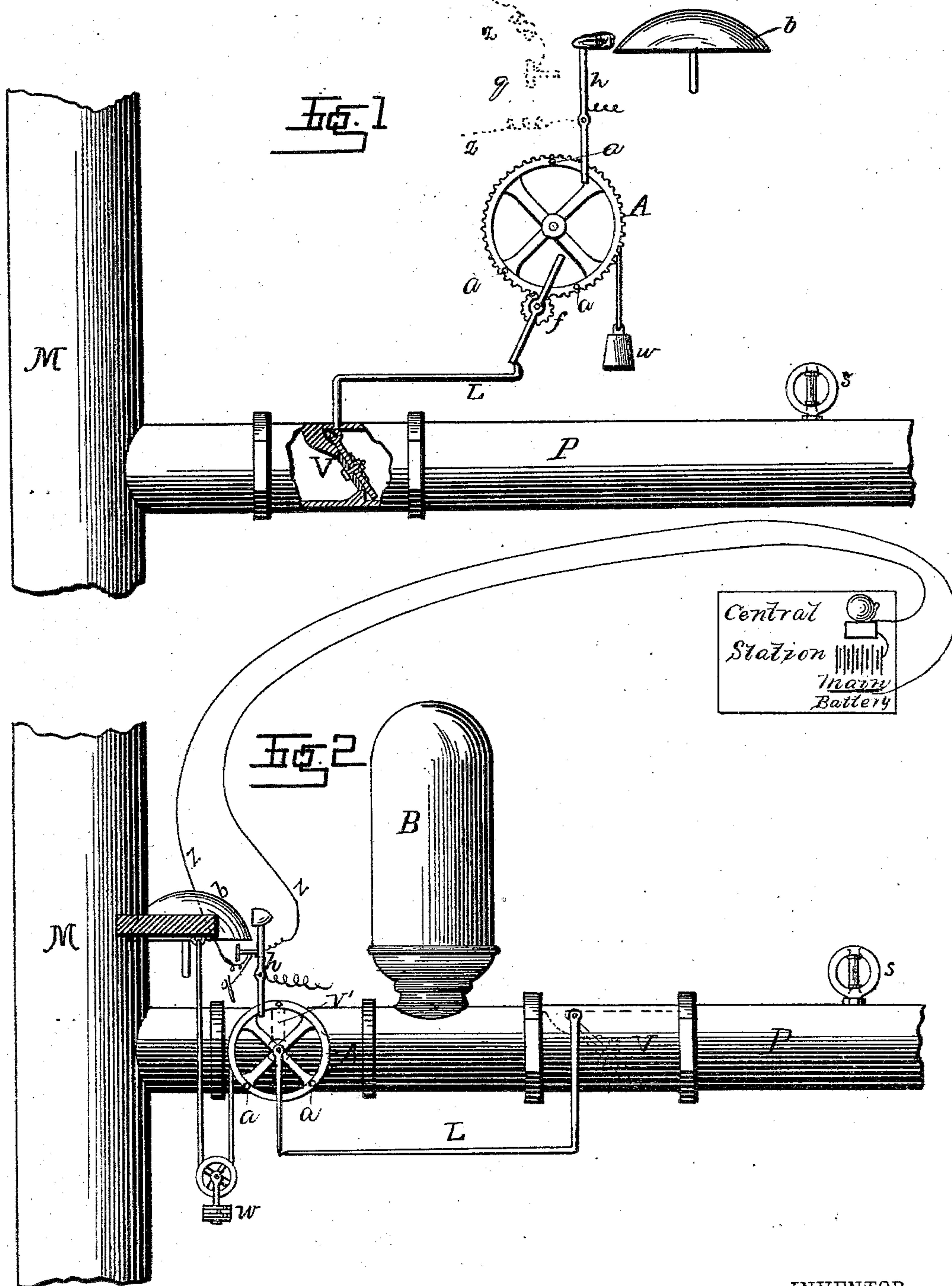
2 Sheets—Sheet 1.

C. E. BUELL.

FIRE EXTINGUISHER AND ALARM.

No. 302,980.

Patented Aug. 5, 1884.



WITNESSES:

*Ed. S. Dittrich*  
*John G. Kinkel*

INVENTOR.

*Charles E. Buell*

(No Model.)

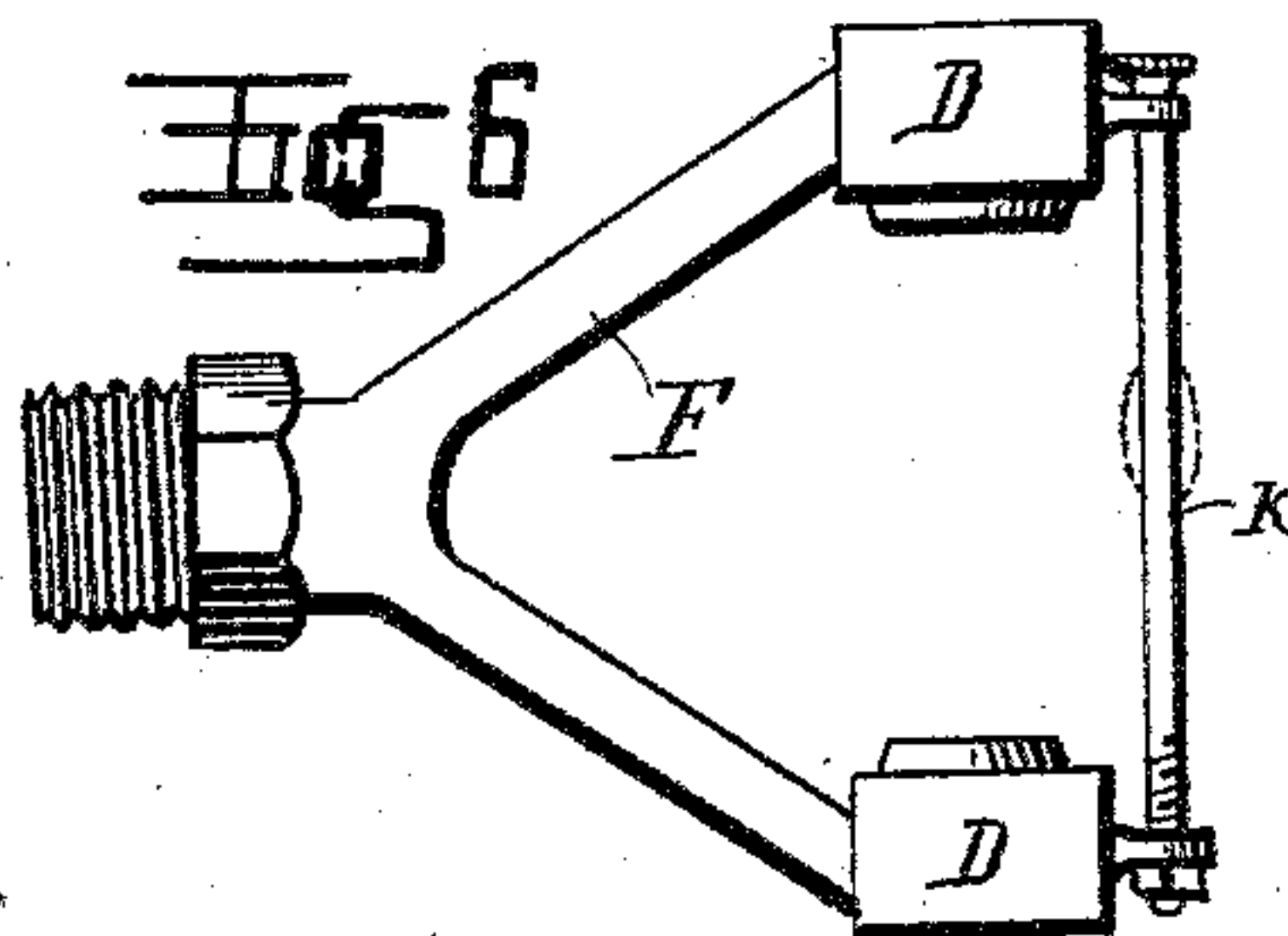
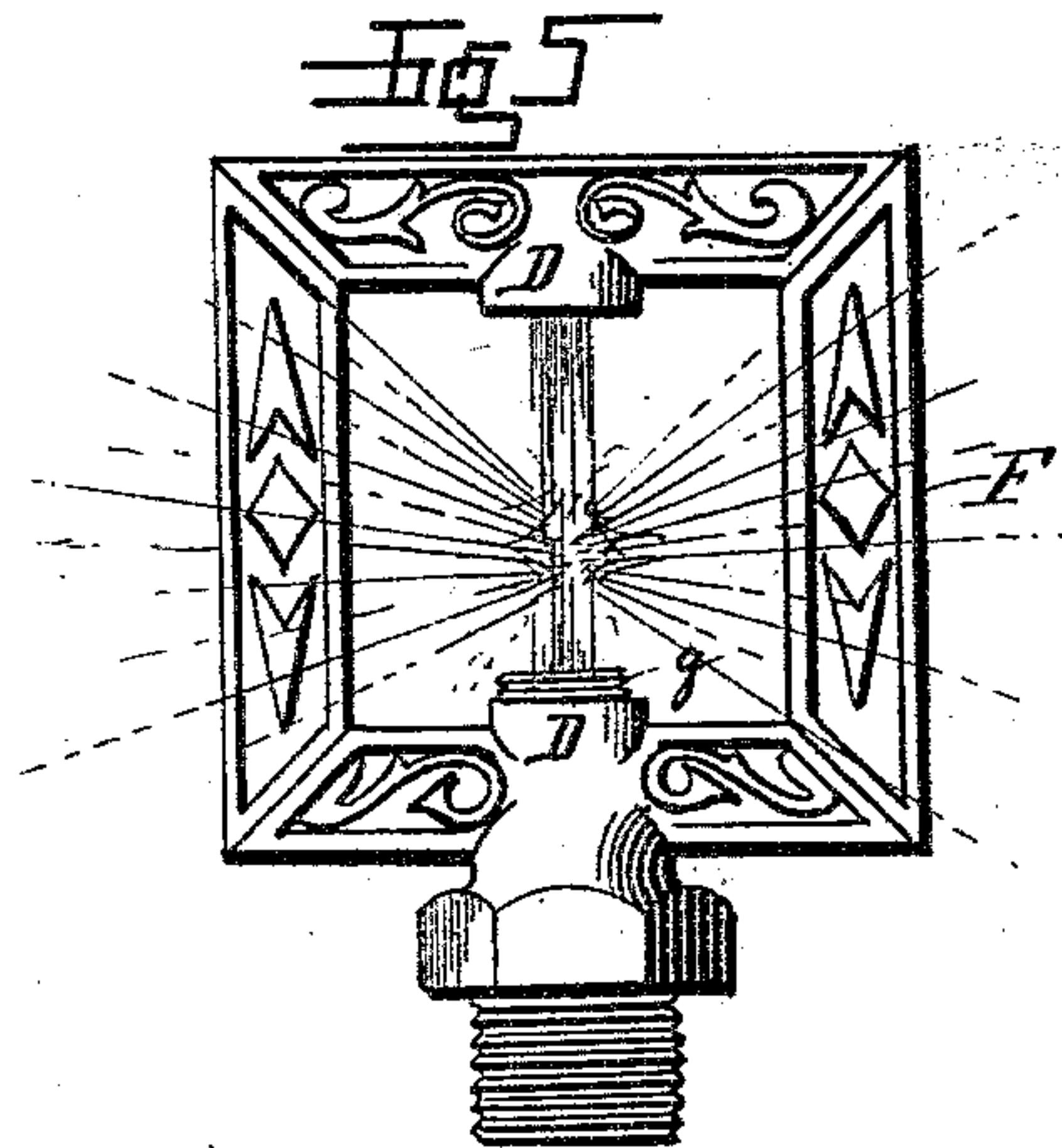
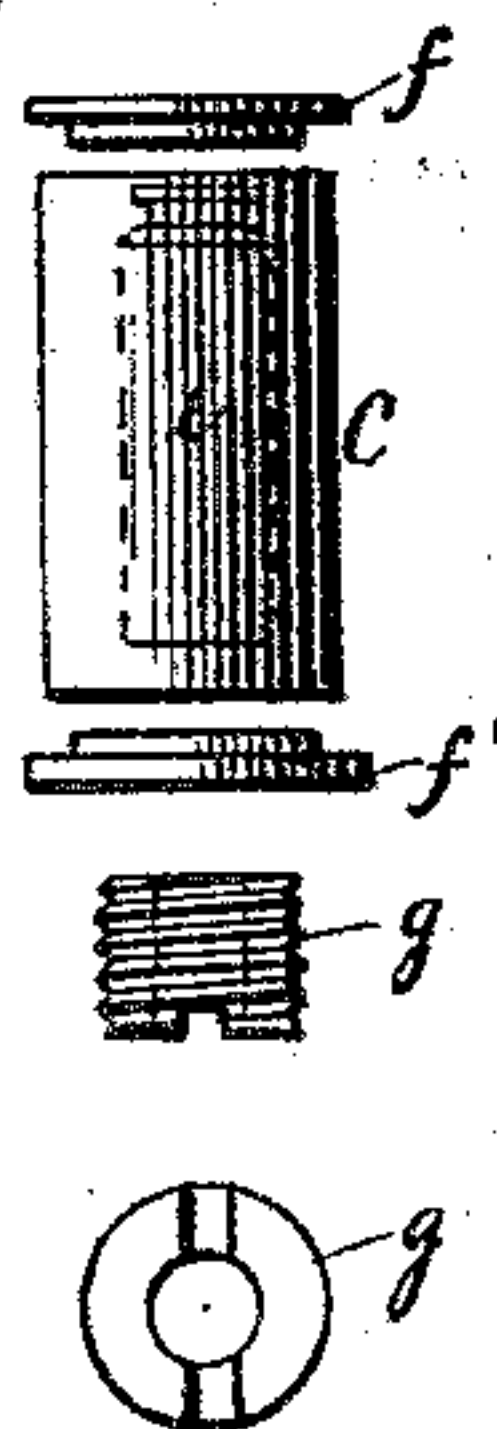
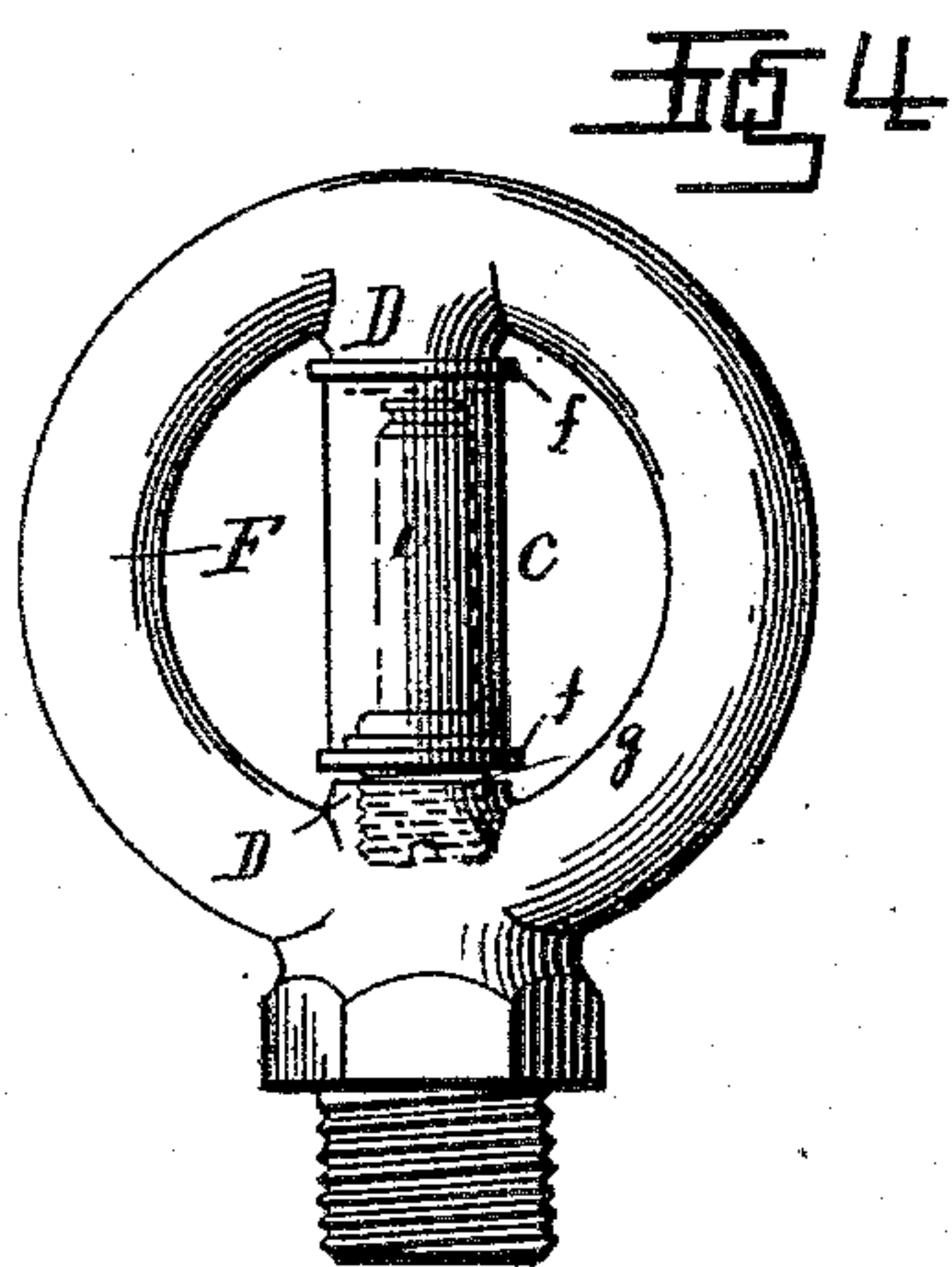
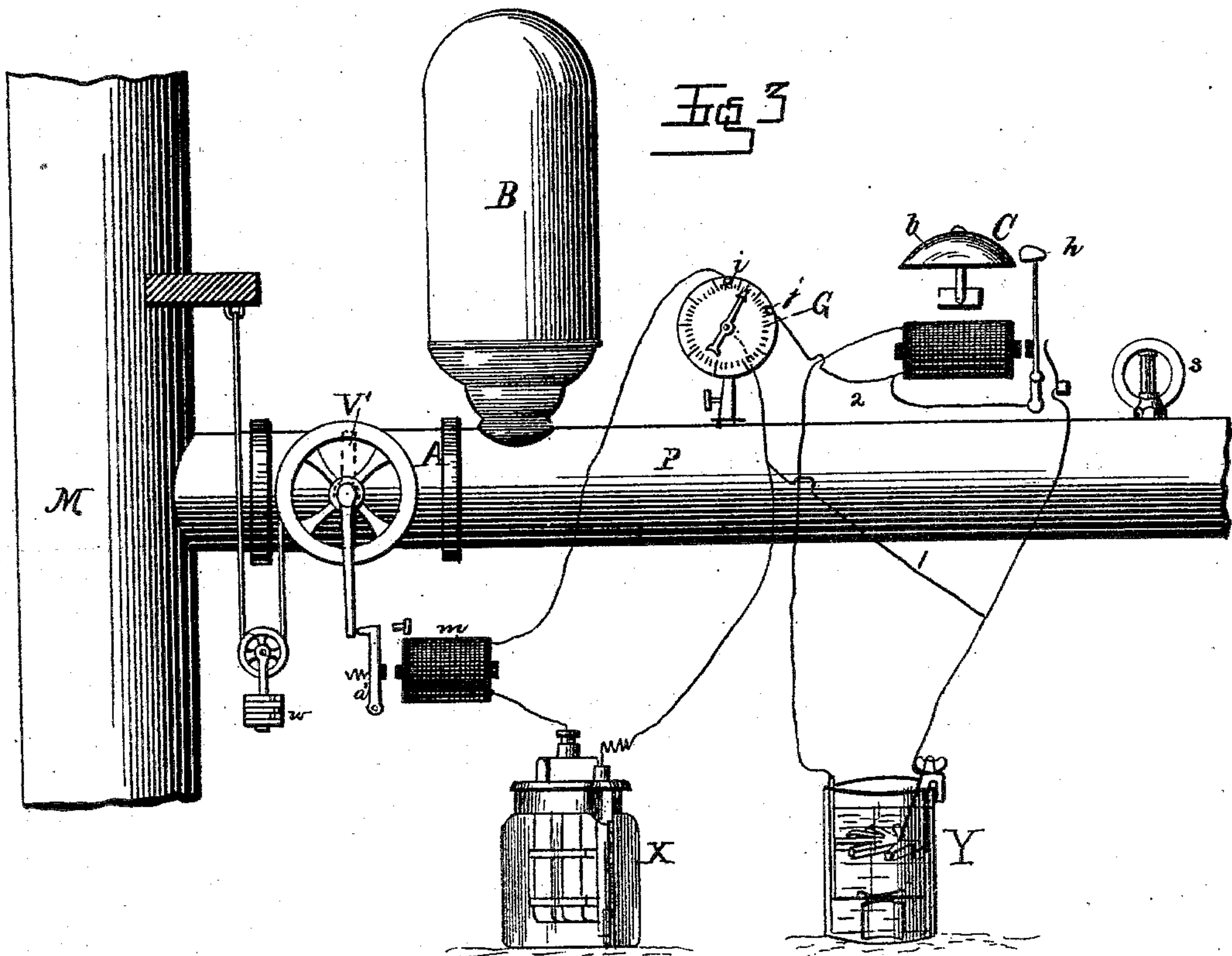
2 Sheets—Sheet 2.

C. E. BUELL.

FIRE EXTINGUISHER AND ALARM.

No. 302,980.

Patented Aug. 5, 1884.



WITNESSES:

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INVENTOR.

*Charles E. Buell*



# UNITED STATES PATENT OFFICE.

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## FIRE EXTINGUISHER AND ALARM.

SPECIFICATION forming part of Letters Patent No. 302,980, dated August 5, 1884.

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

*To all whom it may concern:*

Be it known that I, CHARLES E. BUELL, (a citizen of the United States of America,) of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Fire Extinguishers and Alarms, of which the following specification is a full, clear, and exact description.

My invention relates to means for giving an alarm of the existence of a fire and for extinguishing the same.

The primary object of my invention is to provide for automatically giving notice, through alarm mechanism, of any material diminution of the water-pressure in the pipe system or the storage-tank or stand-pipe, which feeds the extinguishing-nozzles. Of course my present invention contemplates an extinguishing-service wherein the supply pipes, tanks, or stand-pipes are kept full of water or other extinguishing-fluid under pressure; and my alarms are so combined with the extinguishing-service that, upon any diminution of water-pressure therein due to leakage or the fusing or accidental opening of any sprinkler, the inhabitants of the building protected, as well as the central station or headquarters of the fire-department or sprinkler company, will be instantly notified thereof.

My invention accordingly consists in the combination with a pipe system, stand-pipe, or tank constructed for the purposes stated, and containing water or other extinguishing-fluid under pressure, of an alarm or alarms and devices arranged to make said alarm or alarms operative upon a decrease of the pressure within the pipe system, tank, or stand-pipe. Certain combinations and sub-combinations relating to this branch of the invention are also hereinafter defined.

My invention further consists in the improvements in the sprinkling-nozzle set out in the claims hereto annexed. The sprinklers which I illustrate in this instance are constructed to discharge opposing streams, the term "opposing" being used to define streams that move in diametrically-opposite directions, and to distinguish such streams from

those which impinge upon each other at an oblique angle, the latter being defined as "intersecting" streams.

In the accompanying drawings, which constitute a part of this description, and in which like parts are indicated by like letters, Figure 1 represents in elevation an alarm mechanism arranged to illustrate one feature of my invention. Fig. 2 represents an elevation of another embodiment of the invention, showing, among other features, a remote station provided with an alarm to be made operative by electrical means simultaneously with the sounding of the alarm at the building protected, as will be presently described. Fig. 3 is an elevation of still another embodiment, showing an electrical but no mechanical alarm. Fig. 4 is a view of my sprinkler, shown sealed against a water-pressure, and also of several of the parts detached. Fig. 5 is a view of the sprinkler in action, and Fig. 6 is a modification of the sprinkler adapted to be differently adjusted.

Referring to the drawings, A represents a clock-train driven by the weight  $w$ , and having (Fig. 1) a fan,  $f$ , which interlocks with the lever L, which is rigidly attached to the valve V, said valve being of well-known construction. The sprinkler  $s$  is one of a series of sprinklers of any approved construction.

M represents a water-main, stand-pipe, or tank adapted to contain water or other extinguishing-fluid under pressure. The water enters the pipe P of the extinguishing-service from tank M, flowing through the opening controlled by the valve V. When the pipe P becomes filled, the valve V is forced to its seat and the lever L is interlocked with the wound-up clock-train, so as to retain it wound up in an obvious manner. The pressure being equal on both sides of the valve V, it remains pressed against its seat, with the clock-train holding its lever rigid, and thus serves to maintain a uniform pressure in the pipe P, cutting off slight variations. Any well-known form of pressure-operated device or mechanism may be employed in place of that shown to release the clock-train. Now, when a sprinkler,  $s$ , is opened by heat or otherwise, the sudden



decrease of pressure in the pipe P allows the pressure in the main stand-pipe or tank M to force up the valve V and lever L, thereby releasing the clock-train A, which, in running down, operates through pins *a* on the side of the rim of the wheel of mechanism A the pivoted hammer *h* in such manner as to sound an alarm on the bell *b*. In Fig. 2 the mechanism A is connected directly to a valve, V', which in the position shown is closed, the clock-train assisting to maintain it in such position until a diminution of pressure in the pipe P occurs, when the opening of valve V will release the lever L, and thereby permit the unwinding of the clock-train A, which produces an alarm in manner already set forth. By this means the pressure from the main or tank M can be shut off from the pipe P of the extinguishing-service with obvious advantages. The air-chamber B is placed between the valves V and V'. Water to any desired pressure is let into pipe P, and a like pressure is at the same time stored in the air-chamber B, after which the valve V' is turned to cut off the pressure from the tank or main M, and the clock-train is interlocked with the lever L, which also adjusts the valve V to a closed position. Now, if a sprinkler, *s*, opens, the stored pressure in the air-chamber B will exert its force upon valve V, opening the same, and expend its energy upon the water in pipe P, thereby accelerating the flow of water through said pipe. A sudden decrease of the pressure in pipe P makes operative the mechanism A, thus turning on the water-supply and sounding an alarm on the local bell, as before explained.

The wheel-work of the alarm mechanism may be made to serve as a transmitting mechanism of an electric circuit in an obvious manner, or the rod of the hammer *h* may be a key to an electric circuit, as shown, and by its movements caused to open and close a circuit, *z z*, to produce an alarm at the remote station B' (which may be the fire authorities' headquarters or the office of the extinguisher company) simultaneously with the alarm produced mechanically upon the local bell *b*.

In Fig. 3 the mechanism A is arranged to control the water-supply valve V' between the main M and air-chamber B. In this instance the mechanism A is interlocked with an armature-lever, *a'*, of an electro-magnet, *m*, which is included in a circuit controlled by the pressure-gage G. Another circuit from the same or a separate battery controls an alarm apparatus, and is arranged so that the hand of the gage will close the alarm-circuit when it is forced up in contact with the stop *j*, and will close the circuit through the magnet *m* when the hand falls back in contact with the stop *i*. The stop *j* is preferably arranged to be reached by the hand of the gage before the greatest pressure is reached in the pipe P. The parts being arranged as described, upon the opening of a sprinkler, *s*, the water is rapidly forced out of the pipe P by the stored pressure in the air-chamber B, and as the pressure in the pipe

P rapidly decreases the hand of the gage is caused to leave the stop *j*, thus sounding the alarm on the bell *b* of the apparatus C. As the pressure continues to decrease in the pipe P, the hand of the gage moves toward the stop *i*, and when it contacts therewith the clock-train is made operative through the electrical connections between the gage and said clock-train and the valve V' opened, thus turning on the full supply from the tank or main M. The period of time between the sounding of the alarm and the turning on of the main water-supply affords an opportunity for persons to reach the scene before great water damage has occurred in the event of an accidental opening of a sprinkler.

The sprinkler shown in Fig. 4 consists of a ring-like tube, with openings D D so arranged as to discharge streams vertically in opposite directions, in order that the streams will be opposed to each other, and thus more effectually spread in a broken sheet over a desired area.

By varying the diameter of the openings in their relations to each other almost any desired direction can be given to the spray, and by spirally grooving one or both of the openings a rotary motion can be given to the streams. Any of the well-known devices for causing sprinklers to deliver a rotary stream may be used.

The openings D D are shown held closed by the plates *f f*, with the tube *c* intermediate. The screw *g* has a hole through it in the direction of its length, and is adjusted to press the plates tightly to their seats, the protruding end of screw *g* being the seat for the lower plate. The plates *f f* are preferably faced by a yielding material to insure a perfect joint. The tube *c* is of glass, contains a capsule of chlorate of potash sugar-coated with paraffine, wax, or other like protecting film, and immersed in sulphuric acid, and well stoppered, and adapted to burst under the influence of heat.

The sprinkler shown in Fig. 5 is rectangular in form, with square tubes for conveying the water to the upper opening. In this view water is shown issuing from the openings D D and spreading. This form of sprinkler may be made ornamental, as shown. In Fig. 6, a V-shaped sprinkler is shown provided with a rod, *k*, and a nut adapted to draw the branches of the sprinkler together and clamp the explosive device *c*.

A piece of wood, metal, or glass may be used to hold the plates *f f* against the openings D D, in the form of sprinkler shown in Fig. 6, in which case the rod *k* would be made in two pieces and joined together by a solder-joint, as shown in dotted lines in this view.

The parts of my sprinkler may be adjusted against a water-pressure by means of a wedge or lever instead of the screw, or the ring-like part may be depressed in a vise to allow the plates *f f* and tube *c* to be placed in position to be held securely when the ring is released.



Obvious modifications may be made in the several parts entering into my invention, and I therefore reserve the right to make all changes falling within the scope of the claims hereto annexed.

I reserve the right to claim in subsequent applications the specific improvements shown in Figs. 3 and 6 of the drawings hereto annexed.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In apparatus for the extinguishment of fires, a system of distributing-pipes, stand-pipe, tank, or other structure in which water or other extinguishing-fluid is stored under pressure, combined with mechanism constructed and arranged to be made operative upon a diminution of said pressure, and an alarm constructed and arranged to be sounded by said mechanism when the latter is set in operation by the diminution of the pressure, as aforesaid, substantially as herein set forth.

2. A system of distributing-pipes, in which the extinguishing-fluid is present under pressure, and which is provided with sprinklers constructed to be opened by heat, combined with mechanism constructed and arranged to be made operative upon a diminution of said pressure, and an alarm constructed and arranged to be sounded by said mechanism when the latter is set in operation, substantially as herein set forth.

3. In apparatus for the extinguishment of fires, a system of distributing-pipes, stand-pipe, tank, or other structure in which water or other extinguishing-fluid is stored under pressure, combined with mechanism constructed and arranged to be made operative upon a diminution of said pressure, a local-alarm apparatus arranged to be sounded by said mechanism, and a remote alarm arranged to be made operative simultaneously with the sounding of the local alarm, substantially as herein set forth.

4. A system of distributing-pipes in which the extinguishing-fluid is present under pressure, and which is provided with sprinklers constructed to be opened by heat, combined with mechanism arranged to be made operative upon a diminution of said pressure, a local alarm constructed and arranged to be sounded by said mechanism, and a remote alarm arranged to be made operative simultaneously with the sounding of the local alarm, substantially as herein set forth.

5. A system of distributing-pipes in which the extinguishing-fluid is present under pressure, and which is provided with sprinklers constructed to be opened by heat, combined with mechanism constructed and arranged to be made operative upon a diminution of said pressure, and mechanism controlling the main water-supply, arranged to be made operative by the first-named mechanism, substantially as herein set forth.

6. A system of distributing-pipes in which the extinguishing-fluid is stored under pressure,

and which is provided with sprinklers constructed to be opened by heat, combined with mechanism constructed and arranged to be made operative upon a diminution of said pressure, an alarm arranged to be sounded by said mechanism, and mechanism controlling the main water-supply, also arranged to be made operative by the first-named mechanism, substantially as set forth.

7. A system of distributing-pipes in which the extinguishing-fluid is stored under pressure, and which is provided with sprinklers constructed to be opened by heat, combined with mechanism arranged to be made operative upon a diminution of said pressure, a local-alarm apparatus arranged to be sounded by said mechanism, a remote alarm arranged to be made operative simultaneously with the sounding of the local alarm, and mechanism controlling the main water-supply, also arranged to be made operative by the first-named mechanism, substantially as set forth.

8. A system of distributing-pipes in which the extinguishing-fluid is present under pressure, combined with mechanism constructed and arranged to be made operative upon a diminution of said pressure, a local alarm arranged to be sounded by said mechanism, an electric circuit, and a remote alarm constructed to be operated simultaneously with the local alarm by means of the first-named mechanism acting through said electric circuit, substantially as shown and described.

9. A system of distributing-pipes in which extinguishing-fluid is stored under pressure, and which is provided with sprinklers constructed to open by heat, combined with mechanism arranged to be made operative upon a diminution of said pressure, an alarm apparatus arranged to be sounded by said mechanism, and an air-chamber arranged to accelerate the flow of the extinguishing-fluid from the pipe system when a sprinkler or sprinklers fuse, substantially as herein set forth.

10. The combination, with the distributing-pipes containing extinguishing-fluid under pressure, and provided with fusible sprinklers, of the main water-supply valve  $V'$ , means for releasing the same, and the air-chamber B, the whole arranged as shown, and for the purpose set forth.

11. The combination, with the distributing-pipes containing extinguishing-fluid under pressure, and provided with fusible sprinklers, of the valves V and  $V'$ , means for controlling the same, and the air-chamber B, located between said valves, substantially as and for the purpose set forth.

12. The combination, with the pipe P, provided with sprinklers, as explained, of the unwinding mechanism A, and alarm apparatus  $h$ , the whole operating substantially as set forth.

13. The combination, with the pipe P, provided with sprinklers, as explained, of the unwinding mechanism A, valve  $V'$ , and alarm mechanism  $h$ , substantially as set forth.



14. The combination, with the pipe P, provided with sprinklers, as explained, of the unwinding mechanism A, hammer *h*, bell *b*, wires *z z*, and contact *q*, substantially as set forth.

15. A sprinkler having openings arranged to discharge opposing streams, combined with a closing device which will burst by the action of heat, substantially as set forth.

16. A sprinkler having openings arranged to discharge opposing streams, held normally closed by devices constructed to be burst by the action of heat, combined with means for adjusting said devices against a water-pressure, substantially as set forth.

17. The combination, with the sprinkler F, having openings D D, of the plates *f f*, intermediate device constructed to release said plates by the action of heat, and the hollow screw *g*, for adjusting said plates and inter-

mediate device against a water-pressure, substantially as set forth.

18. In apparatus for extinguishing fires, a system of distributing-pipes, a stand-pipe, tank, or other water-supply under pressure, in combination with means adapted to act by a diminution of said pressure to produce a definite number-signal, and to make operative an electric circuit to produce a definite alarm-signal at a remote station.

19. A sprinkler or nozzle for fire-extinguishing purposes, having openings arranged to deliver opposed streams, and held closed by fusible devices located upon the exterior of the sprinkler or nozzle, so as to be quickly affected by the heat of a fire, substantially as shown.

CHARLES E. BUELL.

Witnesses:

A. C. BUELL,

GEO. M. LOCKWOOD.