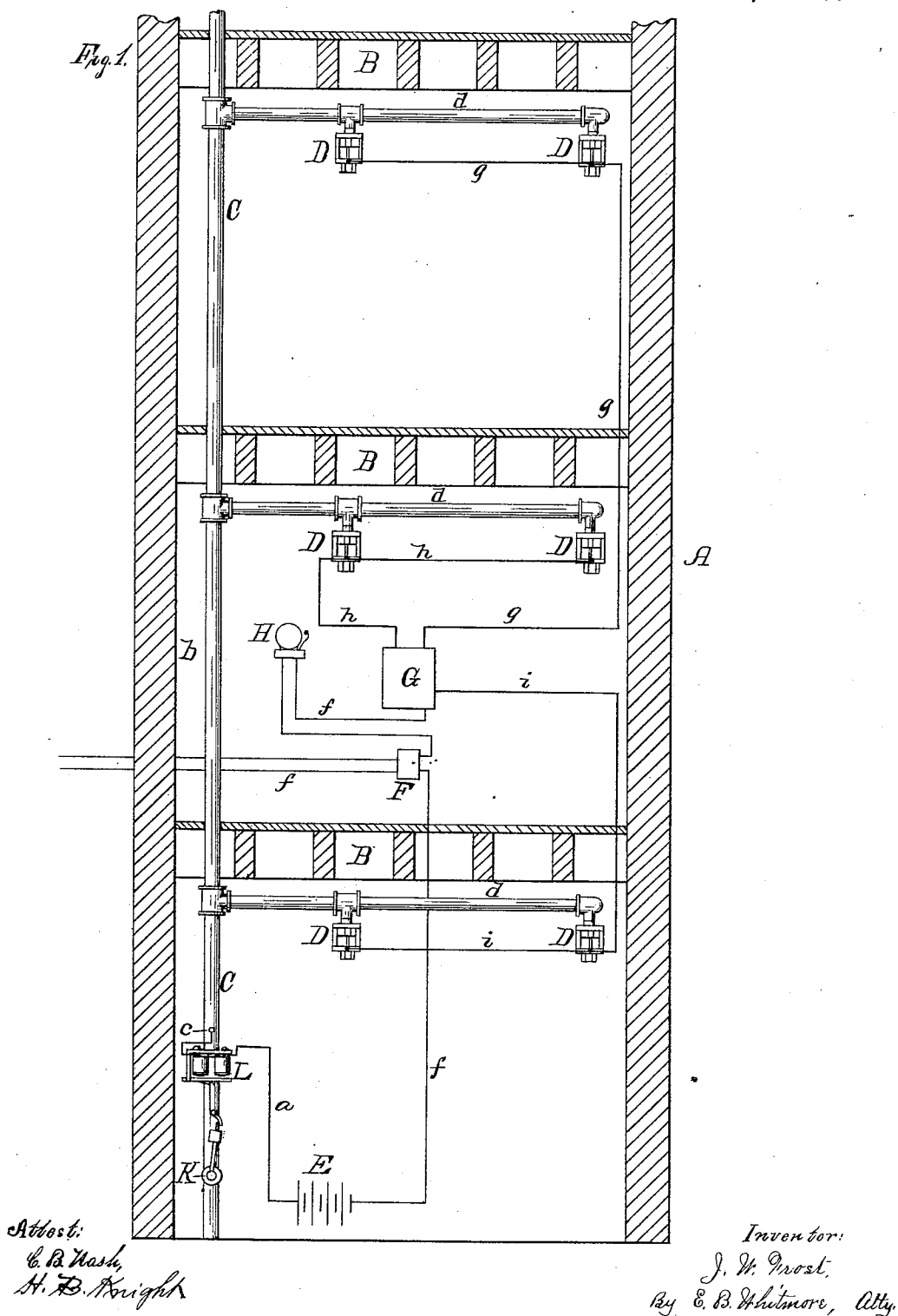


3 Sheets—Sheet 1.

ELECTRIC FIRE EXTINGUISHING AND ALARM SYSTEM.

Patented Oct. 5, 1886.



(No Model.)

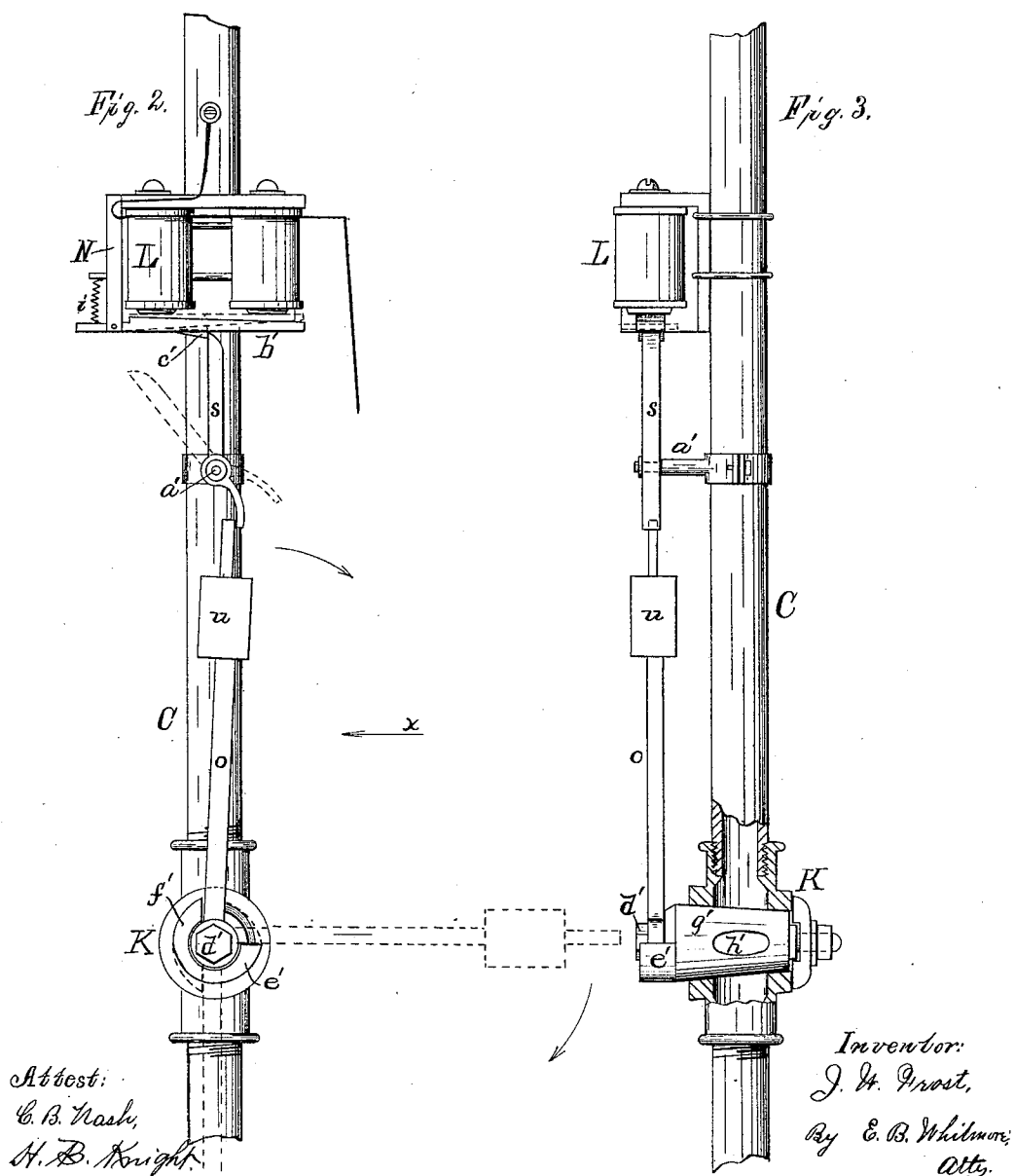
3 Sheets—Sheet 2.

J. W. FROST.

ELECTRIC FIRE EXTINGUISHING AND ALARM SYSTEM.

No. 350,126.

Patented Oct. 5, 1886.



(No Model.)

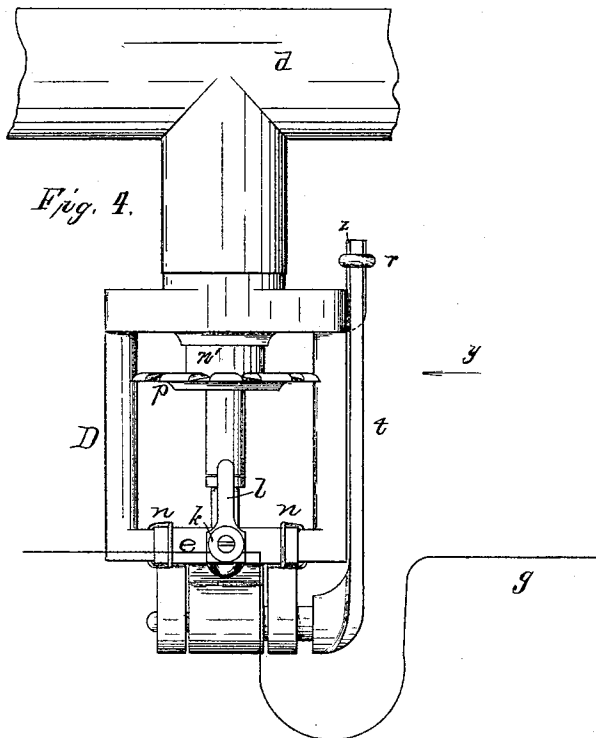
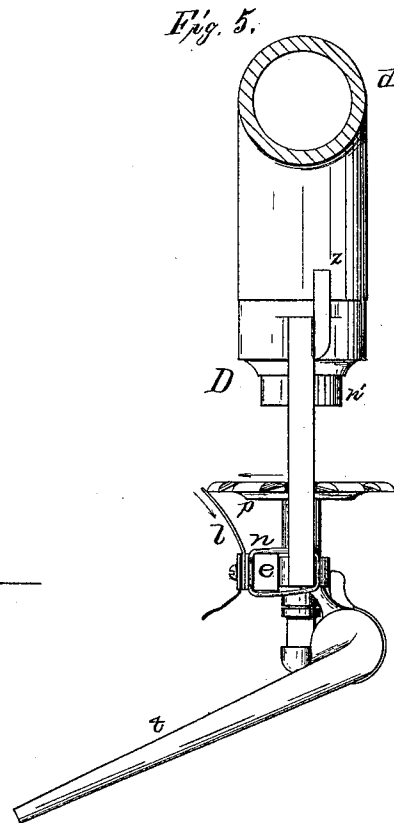
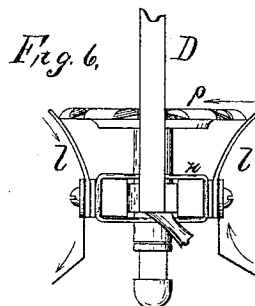
3 Sheets—Sheet 3.

J. W. FROST.

ELECTRIC FIRE EXTINGUISHING AND ALARM SYSTEM.

No. 350,126.

Patented Oct. 5, 1886.



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UNITED STATES PATENT OFFICE.

JOSEPH W. FROST, OF ROCHESTER, NEW YORK.

ELECTRIC FIRE EXTINGUISHING AND ALARM SYSTEM.

SPECIFICATION forming part of Letters Patent No. 350,126, dated October 5, 1886.

Application filed February 6, 1886. Serial No. 191,006. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH W. FROST, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Electric Fire Extinguishing and Alarm Systems, which improvement is fully set forth in the following specification and shown in the accompanying drawings.

This invention relates to that class of fire-extinguishing devices in which the melting of fusible material causes a sprinkler to fall and allow a flow of water; the said sprinkler in so doing also closing or opening an electric circuit, whereby an alarm is sounded. In some instances devices more or less similar have been employed to turn cocks for letting a supply of water flow to the sprinkler.

This invention consists in certain devices for insuring reliable action in automatically opening the cock; also, in the combination of said devices with the falling sprinkler and other parts which co-operate in closing the circuit; also, in the combination of a series of sprinklers and co-operative parts with wires, pipes, an annunciator, and an alarm, whereby the falling of a sprinkler will cause the annunciator to announce the story where the fire occurs, and both the local alarm and district alarm to be sounded, all substantially as hereinafter set forth and claimed.

Referring to the drawings, Figure 1, Sheet 1, represents a vertical section of a building, showing several stories provided with sprinklers attached to water-pipes near the ceilings thereof, leading from the basement, with a battery, an alarm-bell, and other parts of an electrical fire-alarm system, stop-cock in the main pipe in the basement, &c.; Fig. 2, Sheet 2, an enlarged view of a portion of the pipe in the basement, with the stop-cock and apparatus for operating the same, parts being shown in two positions by full and dotted lines; Fig. 3, a side view of the parts shown in Fig. 2, taken at right angles to said Fig. 2 from the side seen as indicated by arrow *a*, a part of the pipe and stop-cock being vertically centrally sectioned; Fig. 4, Sheet 3, a side elevation of one of the sprinklers showing the circuit-closing device and other parts of the electrical system attached; Fig. 5, a view of the parts shown in Fig. 4, save that the lever is shown as being turned down to allow the

sprinkler-disk to drop for the purpose of opening the pipe and at the same time closing the circuit; and Fig. 6, a view of parts of the device shown in Fig. 5, showing a modification in the manner of forming the circuit.

Referring to the parts, A are the walls of a building; B, the floors thereof; C, a system of water-pipes composed of a main pipe, *b*, and lateral pipes *d* for the respective floors, said main pipe extending downward through the basement of the building, to connect with the street-main.

D shows some suitable form or kind of sprinkling devices—such, for instance, as the one shown in Patent No. 287,071,—attached to the lateral pipes near the ceilings of the rooms of the respective stories.

E is an electrical generating-battery, preferably located in the basement of the building.

F is a trip-box, G an annunciator, and H an alarm-bell, all substantially of common kind.

K is a stop-cock for the water in the main pipe, located low in the basement of the building at a point below the frost.

L is an electro-magnet secured to the pipe or otherwise in position to operate said cock by means more fully described hereinbelow.

a is a current-wire leading from one pole of the battery to the electro-magnet, and thence joined to the water-pipe at *c*, said system of pipes constituting the remainder of the circuit-conductor for that pole of the battery.

f is the circuit-wire leading from the opposite pole of the battery running to the trip-box F, thence to the central office or other point, as may be desired, returning through the trip-box to the bell H, and to the annunciator G.

g is a current-wire attached to and insulated from the sprinklers of the upper story of the building, carried thence downward, and joined to a post or spool of the annunciator.

h is a circuit-wire similarly connected with the sprinklers D of the middle story, and made to join a second spool or post of the annunciator, and *i* a third wire, similarly joined to the sprinklers in the basement-story, and conducted to a third post or helix of the annunciator. From this construction and arrangement of parts it will be seen that if an electrical connection be made between the wire *g*, for instance, and the water-pipe through

one of the sprinklers in the upper story the annunciator will announce the story, the local bell will strike an alarm, and the district central office alarm will also be sounded.

5 *e*, Sheet 3, are insulator blocks, of rubber or other material, held to the respective frames of the sprinklers by clamping-wires *n*, or other means, each insulator being provided with a button, *k*, to which, respectively, are attached
10 the wires *g*, *h*, and *i*. The water-pipes and all parts of the sprinklers are electrically connected with one pole of the battery, as stated, so that a contact between any part thereof and either of the wires *g*, *h*, or *i* completes the circuit.
15 Under each of said buttons is secured a metallic circuit-closing tongue, *l*, electrically connected with the circuit-wire in position to be touched by the sprinkling-disk *p* when it is dropped to open a pipe, as shown in Fig. 5.
20 This makes a connection between the poles of the battery at the sprinkler, and causes the alarm to sound, as above described. The stop-cock *K*, for the water, is formed with a tapering plug, *g'*, fitted to the interior of the shell or case, there being a hole, *h'*, formed diametrically through the plug at right angles to the axis of the latter, which hole, when the plug is
25 turned so the axis of the hole corresponds with the axis of the pipes, forms a continuous communication between them above and below the stop-cock; but when the plug is turned upon its axis so that the axis of the hole is at right angles to the axis of the pipes communication between the pipes above and below is cut off,
30 and the flow of water through the pipes stopped. In this invention it is designed to have the plug stand normally in position to close the passage in the pipe, to prevent the water in the street-main from passing into the
35 pipe to which the sprinklers are attached, and arrange a device by means of which the plug may be turned automatically to open communication in the pipe when the sprinkler-disk drops and closes the circuit.

45 *o* is a weighted arm, fitted to turn upon a pivot, *d'*, secured to the larger end of the plug in position to correspond to the axis thereof. The plug is formed with longitudinal projections *e'* and *f'*, in position to be encountered by
50 the arm *o* as it swings one way or the other upon its pivot. The opposing faces of these projections are of such distance apart that the arm is permitted to swing between them through an arc of about ninety degrees, said
55 projections being so related to the hole *h'* in the plug that when the face of the projection *e'*, for instance, is horizontal the hole in the plug will also be horizontal and the flow of water stopped. When the face of the plug *e'* is horizontal, the
60 arm *o* may be turned to a position about vertical, as shown.

u is a weight secured adjustably to the arm *o*, on account of which the arm may be caused to fall with more or less force, and when it falls,
65 as indicated in Fig. 2, and comes in contact with the face of the projection *e'* the plug will be carried around so as to open communica-

tion through the pipe. By this means the falling of the weighted arm opens communication through the pipes and allows the water to flow
70 upward to the sprinklers.

s is a stop-lever or detent for the arm *o*, pivoted to a fixed pin, *a'*, secured, as a matter of convenience, to the pipe *C*. The lower end of this stop is constructed to engage the upper
75 end of the weighted arm *o*, holding the latter in a slightly-inclined position in the direction in which it is intended to fall. The upper end of the stop *s* is fitted to be engaged by a projection, *e'*, on the under side of the armature
80 *b'* of the electro-magnet *L*. Now, it will be understood that when the parts are arranged as shown the weighted arm will be held to the position shown in full lines, and the stop for
85 the water will be closed; but when an electrical current is passed through the electro-magnet *L* the armature *b'* will be drawn upward and allow the stop *s* to trip and the weighted arm to swing downward and open the stop-cock. The helices of the magnet *L* are held in a frame,
90 *N*, which is fastened to the pipe, as a matter of convenience. A slender spring, *v'*, tends to hold the armature down against the stop *s*.

In the style of sprinkler shown the water-spreader *p* is held up against the end *n'* of the
95 pipe, to close the same, by means of a lever, *t*. This lever is held in a vertical position by means of a soft-metal loop or ring, *r*, placed over the free end thereof, and a stud, *z*, rigid with the frame of the sprinkler. This metal ring is in-
100 tended to melt at a comparatively low degree of heat, and thus release the lever, allowing the water-spreading disk to drop, as above stated, on account of which a connection is formed with the tongue *l* between the poles of the battery,
105 causing the alarms to be sounded, the annunciator to act, and the stop-cock *K* to be opened, all as above described.

Instead of employing the system of water-pipes as a part of the circuit-conductor, and a
110 parallel wire secured to the sprinkler to form the remainder of the circuit, two circuit-wires may be used, the pipe forming no part of the conductor. It is only a matter of choice or
115 convenience whether the system of pipes or wires only are used as conductors for the electrical currents. Where two wires are used for the opposite poles of the battery, it is convenient to place them on opposite sides of the frame of the sprinklers, securing them to but-
120 tons held by similar insulating-blocks *e*, as shown in Fig. 6, there being a tongue, *l*, on either side of the sprinkler-frame connected with the respective circuit-wires, each of which tongues being touched by the disk *p* a current
125 connection is formed at once through said disk.

What I claim as my invention is—

1. In a fire-extinguishing device, in combination with a water-pipe, a stop-cock therefor having a plug or stop for the flow of water
130 provided with a pivot-pin, *d'*, a weighted arm held to turn upon said pivot-pin, pivoted stop *s*, for said arm, an electro-magnet to release said stop, and a projection of said plug to re-

ceive said arm, substantially as and for the purpose set forth.

2. A vertically-movable sprinkler, a fusible attachment which prevents it from falling, a tongue arranged below said sprinkler to be struck by the latter when it falls, circuit-wires attached to said sprinkler and tongue, an electro-magnet in the circuit with said wires, an armature for said magnet formed with a detent, a pivoted stop, *s*, held by said detent until the armature is attracted; a weighted lever, *o*, engaged by said stop, and a plug or cut-off arranged in the pipe which supplies the sprinkler, and having the lever attached to it, for the purpose set forth.

3. In combination with the vertically-movable sprinklers and the tongues arranged below them, the wires *ghi*, annunciator G, alarm H, and the water-pipes which form part of the circuit, in order that on the falling of one of the sprinklers the annunciator may announce the story, the local bell may strike an alarm, and the district central-office alarm may also be sounded, substantially as set forth.

J. W. FROST.

Witnesses:

E. B. WHITMORE,
H. B. KNIGHT.