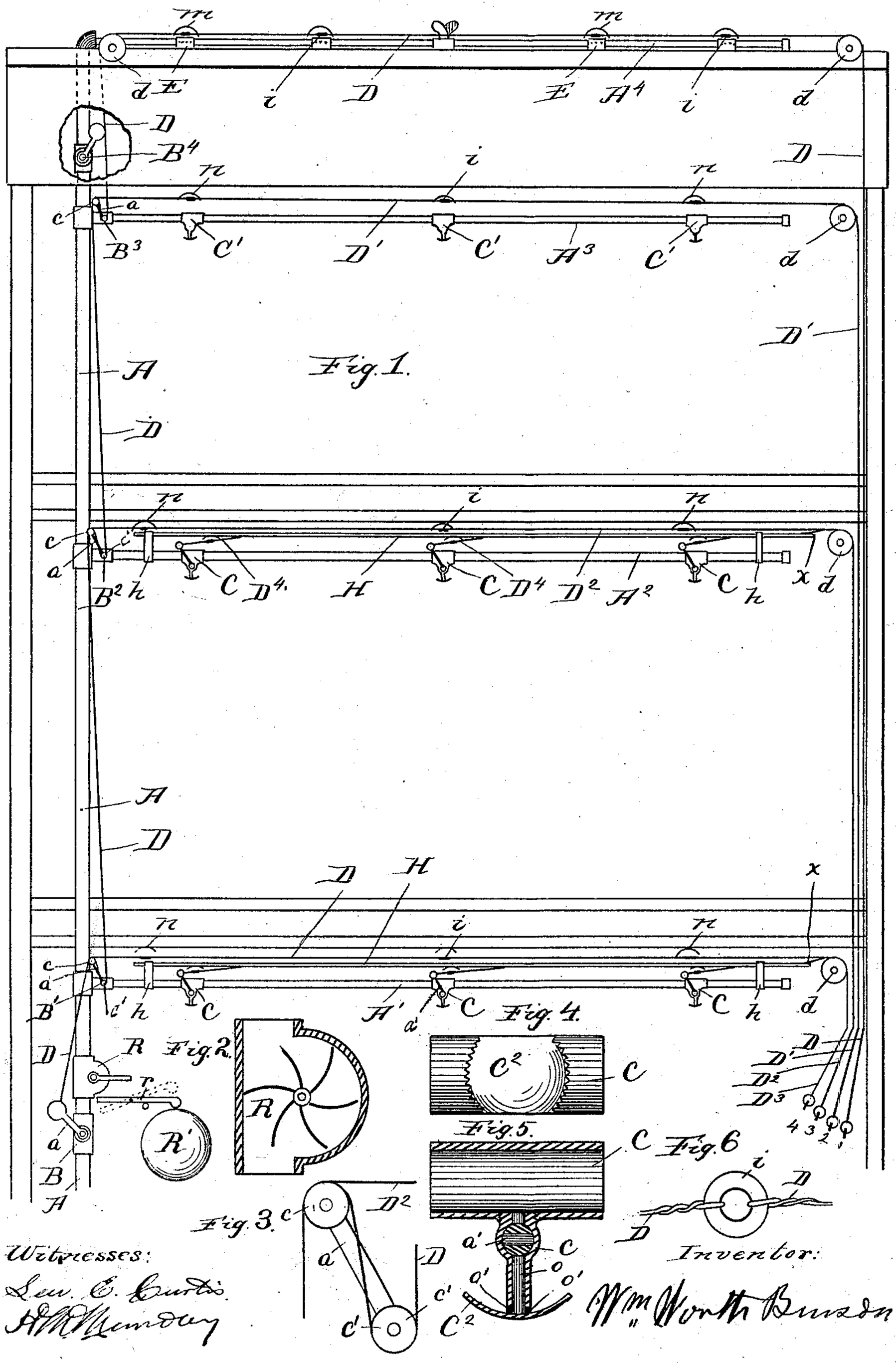
(No Model.)

W. W. BURSON.

AUTOMATIC FIRE EXTINGUISHER.

No. 550,820. Patented Dec. 3, 1895.



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AUTOMATIC FIRE-EXTINGUISHER.

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To all whom it may concern:

Be it known that I, WILLIAM WORTH BURSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Fire-Extinguishers, of which the following is a specification.

My invention relates to improvements in automatic fire-extinguishers in which a stand-pipe and lateral branching distributing-pipes provided with sprinkling-jets are employed; and the objects of my invention are, first, to provide a system of automatically-operating sprinkling-jets which shall be set in operation by the action of the fire; second, to provide a system capable of manual operation by an attendant; third, to provide a sprinkling-jet more certain to operate than has heretofore been in use, and other improved devices to be explained herein. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 shows a building fitted with my apparatus. Fig. 2 shows the alarm-wheel. Fig. 3 shows the wire-releasing device. Figs. 4 and 5 show sprinkling-jets C. Fig. 6 shows fusible coupling for the wire.

Similar letters and figures refer to the same parts throughout the several views.

In the drawings, A is a stand-pipe.

A′, A², A³, and A⁴ are lateral distributing-pipes connecting with the stand-pipe.

B is an inlet-valve, and B⁴ a stop-valve in the stand-pipe. B′, B², and B³ are respectively stop-valves in the distributing-pipes A′, A², and A³. All these valves are provided with weighted operating-levers.

C C are sprinkling-jets provided with stop-valves, Figs. 1, 4, and 5.

C′ C′ are open sprinkling-jets. C² are curved flanges on jets C.

D, D′, D², and D³ are wires provided with fusible couplings, which sustain the weighted levers of valves B, B′, B², and B³, respectively, and wires D³ D⁴ sustain the weighted lever of the valve in jet C. Wire D is fastened at one end to the lever of valve B, also to that of valve B⁴, and holds them both closed by the other end being held removably on pin 1. In like manner wires D′, D², and D³ are fastened to the levers of valves B³, B², and B′, respectively, and the other end held removably on the pins 2, 3, and 4. Wire D⁴ is fastened to the lever of valve C and the other end to the sliding bar H. These wires have flexible parts of cord or chain where required to pass about friction-sheaves; but for convenience they are spoken of as "wires" throughout the specification.

E E are open sprinkling-jets, which may be of any well-known form.

H H are bars or rods placed over the distributing-pipes A′ and A², attached to wires D² and D³ at *x*, to which wires D⁴ attach.

R is a water-wheel placed in the stand-pipe turned by the moving water when the inlet-valve is open.

R′ is a bell to be acted upon in connection with the movement of wheel R.

a is the weighted lever of the inlet and stop valves.

c c are friction-sheaves conveniently placed upon the weighted levers of valves B′, B², and B³ and serve the double purpose of sheaves for the cord and operating-weights for the valve.

c′ c′ are friction-sheaves on or near the axis of the valve-cylinder.

d is a friction-sheave for the sustaining-wires.

h h are supports for bars H.

i i are rings or links made of fusible solder placed at intervals in the lengths of the sustaining-wires.

n n are coverings for the fusible link.

m m are coverings for the open sprinkling-jet E, as also for the coupling *i* of wire D.

r is an arm on the axis of the wheel R.

r′ is a lever to be raised by the revolution of arm *r* and to strike the bell in falling.

x shows point of fastening of bars H to the retaining-wires.

My system of fire-protection is intended for what is known as the "empty-pipe" plan, but can be used with the "full-pipe" system with slight modification.

If the full-pipe system is desired through the entire building, the stop-valves B′, B², and B³ are omitted from the lateral distributing-pipes, or if a part of the building is to be protected with the full-pipe and a part with the empty-pipe system then the stop-valve is removed or left open for such of the lateral

pipes as are to be full of water and the rest remain as described, and the full-pipe and empty-pipe systems may both be used in different parts of the same building.

The stand-pipe A is connected with a water-supply having sufficient power to force the water through the distributing-pipes and sprinkling-jets. Lateral distributing-pipes A′, A², A³, and A⁴ connect with the stand-pipe and lead to all parts of the building needing protection. These pipes are provided at suitable intervals throughout their length with sprinkling-jets. For protection inside the building these jets are preferably closed by valves, Figs. 1, 4, and 5 which are readily opened by an incipient fire and at the same time give a double security against damage from water, for both the inlet and jet valves must be opened before the water can escape from the pipe. For outside protection the sprinkling-jets should be open and their play only limited by stop-valves in the stand-pipe or distributing-pipe.

In the empty-pipe system of fire protection it is desirable to limit the ingress of water in case of a fire to such parts of the system as demand it for extinguishing purposes. This requirement is met in having a stop-valve in the stand-pipe and in each distributing-pipe, which connects the stand-pipe below such stop-valve, and so arranging the sustaining-wires that the parting of the sustaining-wires for any particular distributing-pipe shall act upon the stop-valve for said pipe and the sustaining-wire of the inlet-valve, but no other. These valves are of the well-known cylindrical kind, a section of which is shown in Fig. 5. They are each provided with a weighted lever upon the cylinder to be held upright by a sustaining-wire having fusible couplings.

When a fire occurs, it is desirable to give an alarm. This is conveniently done by placing the wheel R in the stand-pipe, upon the axis of which is the arm *r*, raising the balanced hammer *r′* by its revolution, and, falling, strikes upon bell R′. A slight modification of this arrangement would place the bell in any position desired, the hammer being connected with the movement of the wheel by a cord or wire.

The automatic features of my system are easily understood by reference to Fig. 1. The weighted lever *a* of inlet-valve B is held upright by wire D. The weighted lever of stop-valve B′ has the friction-sheave *c* on its outer end and sheave *c′* near its pivot. This weighted lever is held up by the sustaining-wire D′. Wire D, fastened to lever *a*, is passed over sheave *c*, back and under sheave *c′*, and then upward and ultimately to its fastening. The same construction of valves is had for pipes A² and A³, and wire D, passed around their sheaves in the same manner as already described, is fastened to the lever of valve B⁴ and passed over the sheaves *d d*, adjacent to pipe A⁴, and fastened at 1. In like manner wires D′, D², and D³ are fastened at 2, 3, and 4. Now if wire D³ is parted or released from its fastening at 4 it will allow the weighted lever of valve B′ to fall, thereby opening the valve and giving sufficient slack in wire D to allow lever *a* to fall and open the inlet-valve and thus admit water to distributing-pipe A′, but to no other one of the system. The same result would have been attained had either of the other wires controlling the other distributing-pipes been loosened.

Attached to wires D′ and D² at *x* are the rods or bars H, supported so as to admit of a free endwise movement. To these rods are fastened the wires D⁴, sustaining the weighted levers of the valves C. All these sustaining-wires are provided at suitable intervals of their length with the fusible link or coupling *i*, Figs. 1 and 6. This link is conveniently made of a piece of solder, melting at a low heat, in which is a hole large enough for the insertion of both wires. Any other fusible splice may be used which will part the wire by melting. Since these fusible parts depend for their successful operation upon the action of hot air, it is necessary to protect them from cold water. A covering *n* is placed over such fusible part, which should be of such form as to effectually protect it from cold water, while freely admitting hot air to it. A larger cover *n′* is placed over the open jets E to protect them from sleet and snow, which might prevent their proper working.

As here shown, the system is capable of either automatic or manual action. If it is desired to sprinkle the roof, wire D is loosened from its fastening at 1, which permits the weighted levers of both valves B and B⁴ to fall and admits the water to the stand-pipe and roof-pipe and by the action of the sprinkling-jets wets the roof without admitting water to any other part of the system. The same result is obtained by the melting of one of the fusible fastenings of the wire. In the same manner if wire D³ be loosened from its fastening at 4 it will permit bar H to move toward the stand-pipe A, thereby permitting the valves C to open the same as if wires D⁴ were parted and also permitting the lever of valve B′ to fall, which will give enough slack in wire D to permit lever *a* of inlet-valve B to open the valve and admit the water to distributing-pipe A′, and since all the sprinkling-jet valves C are attached to bar H they will all be opened by the movement described.

When it is not desired to have the system under manual control, the sustaining-wires can be fastened near the ends of the distributing-pipes, and thus will operate only in connection with heat in melting the fusible links.

When fire breaks out, the heat will melt one of the fusible couplings of the sustaining-wire—say D′—and at the same time one or more of wires D⁴, which will admit the water to the distributing-pipe, as just described, and extinguish the fire through the sprink-

ling-jets. The fusible part is small and hence sensitive to heat and is protected from the action of the water from the other sprinklers when a part is open, by which it might be prevented from melting.

Sprinkling-jet C is conveniently made of a stem screwed into the pipe or coupling having a water-passage *o* and outlets *o' o'* and a curved flange C^2 to scatter or spray the water from the outlets. The water-passage is opened and closed by the well-known form of cylindrical valve. The curved flange C^2 admits of being bent in such shape as to deflect the water in any direction desired, which is often quite an advantage. Sprinkling-jet C' is like C, except that it is open and has no valves. Jet E is a perforated pipe-coupling, desirable to use in some places.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the stand pipe A, the inlet valve B provided with the weighted lever *a*, the lateral distributing pipe A' connected with said stand pipe provided with the valve B' which has the lever *a* provided with the sheaves *c* and *c'*, the sprinkling jets C in said pipe provided with the weighted lever *a'*, the wire D provided with fusible connections attached to the lever of valve B extending over sheave *c* and under sheave *c'* of the lever of valve B' and thence upward and about to a fastening, the wire D^3 provided with fusible connections attached to the weighted lever of valve B' and extending along the distributing pipe to a fastening, and the wire D^4 with a fusible connection adapted to hold the valve C closed; the whole operating substantially as and for the purpose set forth.

2. A stand pipe A, valve B, with its weighted lever *a*, distributing pipe A^3, with its sprinkling jets C', stop valve B^3 with its lever *a*, having the friction sheaves *c*, and *c'*, wire D', with fusible couplings *i*, attached to the lever of valve B^3, and extending along pipe A^3, to a fastening, and wire D, attached to lever *a* of valve B, extending over sheave *c*, under sheave *c'*, and upward to a fastening, whereby the parting of wire D', shall open both valves B^3, and B, and admit the water to the jets as specified.

3. A stand pipe A, having valve B, with a weighted lever *a*, and a branch pipe A' with a stop valve B' and sprinkling jets C, having weighted lever valves, the wires D, D^3, and bar H, attached to wire D^3, and wires D^4 attached to bar H, the said bar being held by the wire D^3 so as to hold the jets closed, and adapted to slide in bearings when loosened, to allow the jets to open, at the same time valve B is also opened.

4. The combination of the sprinkling jet C provided with the lever-weighted valve to control the same, the sustaining wire D^4 provided with its fusible connection adapted to hold the valve closed, the cover *n* placed above the water pipe and fusible support of the valve adapted to concentrate the heat upon and to protect the fusible connection from falling water, and a distributing pipe; operating substantially as and for the purpose set forth.

5. The combination of the stand pipe A provided with the lever-weighted valve B, the lateral pipe A^4 provided with the open sprinkling jets E, the valve lever sustaining wire D provided with the fusible connections *i*, extending along the distributing pipe, and the cover *m* placed above the water pipe and fusible connection of the wire and adapted to protect the open jet and fusible connection for the wire and to concentrate the lower heat upon said fusible connection, substantially as set forth.

6. The combination of a water pipe, the valve B' provided with the operating lever *a* upon which is the sheave *c* serving as operating weight upon said lever, the sheave *c'*, and the sustaining wire D; operating substantially as and for the purpose set forth.

7. The combination of a water pipe provided with an inlet valve operated by a weighted lever, a distributing pipe provided with a sprinkling jet also provided with a valve controlled by a weighted lever, each of said levers held by a separate wire provided with a fusible coupling which is so placed as to melt from the same cause, but interposing a double protection against damage from water by the accidental breaking of either valve support, substantially as specified.

8. The combination of a water pipe, provided with a weight-controlled valve, a sustaining wire having a fusible coupling, a hood or cover for such coupling, a lateral distributing pipe provided with a sprinkling jet, said sustaining wire extending to a support adapted for manual control, whereby the sprinkling will be started, automatically, by the melting of the fusible coupling, or by manual operation when so desired; substantially as set forth.

9. The combination of a distributing pipe, provided with sprinkling jets, valves controlling the action of said jets which are operated by weighted levers, each held in position of rest by a support containing a fusible coupling, a bar having an endwise movement to which said lever supports are attached, and a wire or cord having fusible couplings, attaching said bar and extending to the inlet valve, adapted to open the valves by the melting of the couplings, or to open all the sprinkling jets of that pipe by the endwise movement of the said bar and wire; substantially as described.

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