(No Model.)

J. F. MILLER.

DRY PIPE SPRINKLER SYSTEM.

No. 591,865. Patented Oct. 19, 1897.

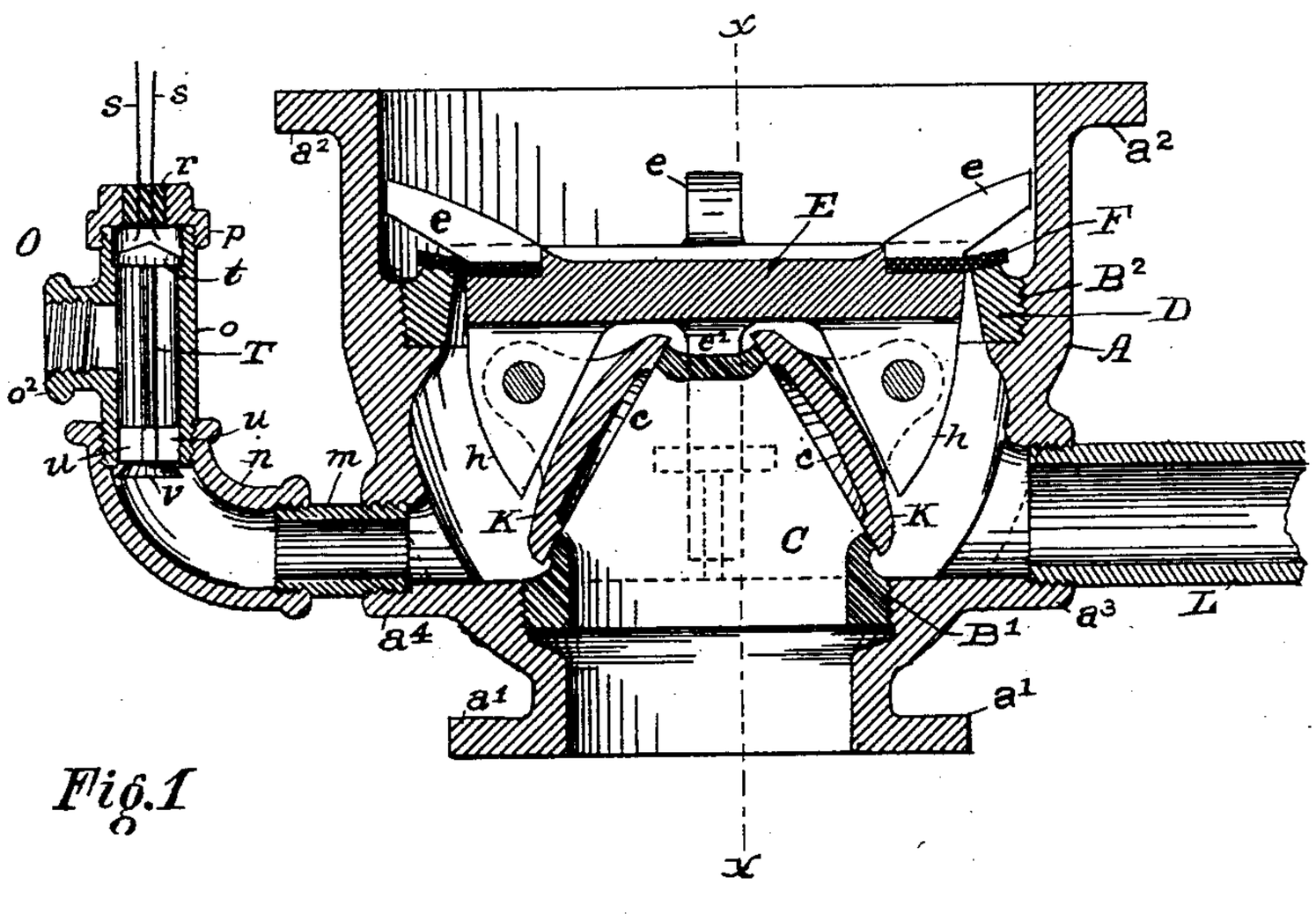

Fig. 1

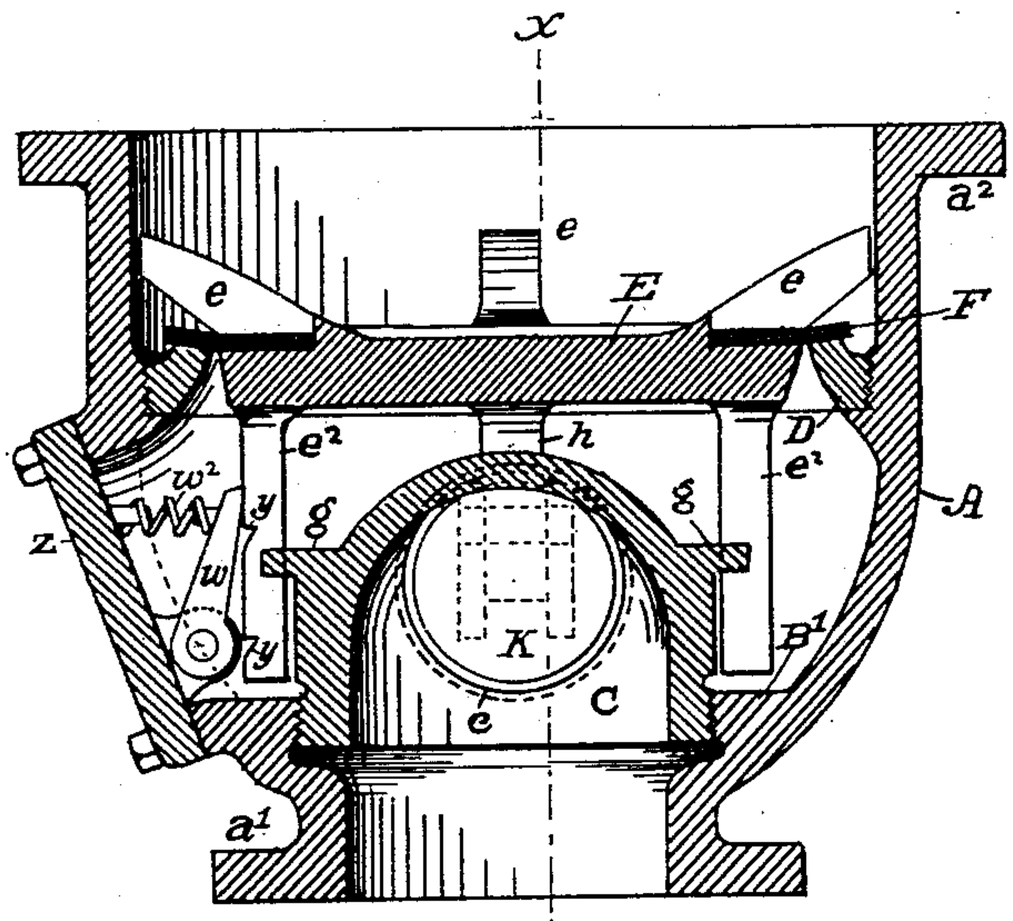

Fig. 2

WITNESSES

Lorenz Prentiss

J. B. Ryder

INVENTOR

Joseph F. Miller

by C. M. Moore

Attorney.

UNITED STATES PATENT OFFICE.

JOSEPH F. MILLER, OF CLEVELAND, OHIO.

DRY-PIPE SPRINKLER SYSTEM.

SPECIFICATION forming part of Letters Patent No. 591,865, dated October 19, 1897.

Application filed November 27, 1896. Serial No. 613,582. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH F. MILLER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Air-Valves for Dry-Pipe Sprinkler Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in air-valves designed especially for use in automatic hydraulic fire-extinguishing systems.

The object of the invention is to simplify and improve the construction of the valve and to increase its efficiency.

With this object in view the invention consists in the novel construction, combination, and arrangement of parts, as hereinafter described, and specifically set forth in the claims.

In the drawings, Figure 1 represents in vertical section my improved valve and its connections; and Fig. 2 is a similar section at right angles to the plane of section shown in Fig. 1, the plane of section in each figure being shown by the dotted line $x\ x$ on the other figure.

A represents the body or shell of the valve, having the flanges $a'\ a^2$ for connecting it in the line of piping in the usual manner.

$a^3\ a^4$ are nipples on the shell A, and are threaded for pipe connections, as shown in Fig. 1. The shell A is provided internally with the threaded shoulders $B'\ B^2$, into the former of which is threaded a dome-shaped chamber C, whose larger opening corresponds substantially with the water-inlet opening at the lower part of the body A. At the upper part of the chamber C are two laterally-disposed inclined outlet-ports $c\ c$. Into the upper shoulder B^2 is threaded a soft-metal collar D, preferably made of tin.

A valve-plate E, which nearly fills the orifice of the collar D, is provided with a ring F of rubber or other suitable packing material, which ring projects sufficiently from the plate E to seat upon the soft-metal collar D, whereby an air-tight joint is made when the plate E is held firmly upon its seat by the air-pressure in the distributing part of the system. Lugs $e\ e\ e$ project from the plate E, serving as guides to prevent the tipping or tilting of the plate E and insure its proper seating. The plate E is still further guided and kept in correct position and alinement by arms e^2, which project from the under side thereof, as seen in Fig. 2, and engage corresponding notches in the ears $g\ g$, which project from the outside of the dome or chamber C. By this construction the valve-plate E is made to move in a direct line and is prevented from twisting or moving on its seat. On the under side of the plate E are also lugs $h\ h$, to which are pivoted caps K K, which fit upon and close the outlets $c\ c$. The valve is to be connected between the water-supply pipe, to which it may be connected by the flanges $a'\ a'$, and the water-distributing system, to the main pipe of which it may be connected by the upper flanges $a^2\ a^2$. The pipes of the water-distributing system (not shown) are provided at suitable points with the usual fusible devices for opening up the outlets of the water-distributing system. This system may be of any approved construction and forms no part of the present invention; but the system to be employed is intended to be one of the dry-pipe class in which the distributing system is normally filled with air under pressure which holds down the air-valve and thereby keeps back the water in the supply-pipe until the melting of the fusible devices, or one of them, relieves the air-pressure and allows the valve to open and water to flow in from the supply-pipe and through the distributing system.

Into the nipple a^3 there is screwed a waste-pipe L, which leads to any suitable discharge, such as a sewer, and is provided at a convenient point with a stop-cock. (Not shown.) Into the nipple a^4 is threaded a pipe m, leading to an elbow n, into the upper end of which is screwed an alarm O, constructed as follows: A small T o is provided at one end of its straight portion with a cap p, in which is inserted a plug r of electrical insulating material. The terminal wires $s\ s$ from any suitable electrical alarm are passed through the plug r with their extremities protruding into the T o, as seen in Fig. 1. A small plunger whose head t rests upon a shoulder just below the ends of the wires $s\ s$ carries at

the lower end of its stem a valve *v* which, when the plunger lifts, seats upon the lower end the T *o*, thereby closing the same. Normally, when the head *t* of the plunger rests upon the shoulder in the upper end of *o* the valve *v* is far enough below the lower end of *o* to permit any small amount of water which may leak through between the caps K K and their seats to rise through the T *o* and escape at the cross branch o^2 of T *o*. Guiding-lugs *u* are preferably formed upon the stem of plunger T to keep the same centered in its tube without obstructing the escape of leakage water, as described.

When the valve A is properly connected up, as above described, air is forced into the distributing system, the fusible outlets being of course closed, and a pressure is obtained sufficient to force the valve-plate E down upon its seat, causing the caps K K to seat firmly upon the outlets *c c* and the ring F to seat firmly on the soft-metal ring B. As the space above the caps K K is open to the air through the alarm O, the interior of the shell A is subject to atmospheric pressure. The water-pressure in the chamber C acts directly on the solid top of the dome C and chiefly laterally on the caps K K. In ordinary valves of this kind the water-pressure is direct, requiring a heavy air-pressure to keep the valves closed. By my invention, wherein the individual outlets are obliquely disposed, the direct pressure as well as the lateral pressure is resisted by solid metal and the small upward pressure is more easily controlled, while the free outlet of the water when the valve is open is not restricted, as the aggregate area of the outlets *c c* is equal to that of supply-pipe, and the enlarged body of the valve prevents the flow of water being checked.

When a fire occurs, the relieving of the air-pressure above valve E allows the water-pressure in chamber C to force outward the lids K K and lift the valve E. As the valve E rises a dog *w* (seen in Fig. 2) engages the notches *y y* in one of the arms e^2 and holds the valve E in its raised position. At the same time the flow of water suddenly filling the elbow *n* lifts the valve *v* and brings the plunger-head *t* in contact with the wires *s s*, thereby making electrical connection between them and causing the alarm to sound. The dog *w* is actuated by a spring w^2, and in order to reset the valve again the hand-hole plate *z* (shown in Fig. 2) is removed, thus allowing access to the interior of the valve, so that it can be cleansed if necessary. On replacing the hand-hole plate after the valve E has been reseated, the dog *w* again assumes the position shown in Fig. 2.

By the inclined position of the outlets *c c* a double advantage is gained: the direct upward pressure of the water against the air-pressure is reduced; the lateral pressure of the water on the lids K K is met by the solid lugs *h h* and does not react against the air-pressure, while at the same time a sufficient direct upward pressure is retained to insure a quick opening of the valve when the air-pressure in the distributing system is relieved.

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

1. In a valve for dry-pipe automatic fire-extinguishing apparatus the combination with the valve-shell of a water-chamber communicating with the water-supply and having oblique ports, a valve-plate seating in the valve-shell and carrying beneath it obliquely-disposed caps which seat upon the oblique ports of the water-chamber when the valve-plate seats, substantially as described.

2. In a valve for dry-pipe automatic fire-extinguishing apparatus the combination with the valve-shell of a water-chamber communicating with the water-supply and having oblique ports, a valve-plate seating in the valve-shell above the water-chamber and carrying beneath it obliquely-disposed caps which seat upon the oblique ports of the water-chamber when the valve-plate seats, substantially as described.

3. In a valve the combination of the shell, a water-chamber communicating with the water-supply and having oblique ports, a valve-plate seating in the valve-shell and carrying beneath it pivoted caps which seat upon the oblique ports of the water-chamber when the valve-plate seats, substantially as described.

4. In a valve the combination of the shell, a water-chamber therein having diagonal ports, a valve-plate seating in the shell and having rigid lugs corresponding with the water-chamber ports, and caps pivotally secured to said lugs and adapted to seat upon and close the ports of the water-chamber when the valve-plate seats, substantially as described.

5. In a valve the combination with the shell, a water-chamber having oblique ports, a valve-plate seating in the shell above the water-chamber and having rigid depending lugs corresponding with the water-chamber ports, obliquely-disposed caps secured to said lugs and seating on said ports, guiding-arms on said valve-plate engaging grooves on the water-chamber, and a dog adapted to engage a notch on said guiding-arm when the valve-plate lifts to hold it in the open position, substantially as described.

6. In a valve the combination with the shell, a water-chamber having oblique ports, a valve-plate seating in the shell above the water-chamber and having rigid depending lugs corresponding with the water-chamber ports, obliquely-disposed caps pivotally secured to said lugs and seating on said ports, guiding-arms on said valve-plate engaging grooves on the water-chamber, and a dog adapted to engage a notch on said guiding-arm when the valve-plate lifts to hold it in the open position, substantially as described.

7. In a valve the combination with the shell, a water-chamber therein having oblique ports,

a valve-plate seating in the shell and having rigid lugs corresponding with the water-chamber ports, caps pivotally secured to said lugs and adapted to seat upon and close the port of the water-chamber when the valve-plate seats, and an alarm actuated by the lifting of the valve-plate, substantially as described.

8. The combination of the valve-shell having a drip-outlet, a water-chamber having oblique ports, a valve-plate seating in the shell and having lugs corresponding to the water-chamber ports, caps pivotally secured to said lugs and seating on said ports, and a plunger playing in the drip-escape and adapted when forced forward by the rush of water when the valves open to close an electric circuit and sound an alarm.

9. The combination of the valve-shell having waste-outlet and drip-outlet, a water-chamber having oblique ports, a valve-plate seating in the shell and having lugs corresponding to the water-chamber ports, caps secured to said lugs and seating on said ports, and a plunger playing in the drip-escape and adapted when forced forward by the rush of water when the valve opens to close an electric circuit and sound an alarm, substantially as described.

In testimony whereof I hereto affix my signature in presence of two witnesses.

JOSEPH F. MILLER.

Witnesses:
J. R. RYDER,
LOREN PRENTISS.