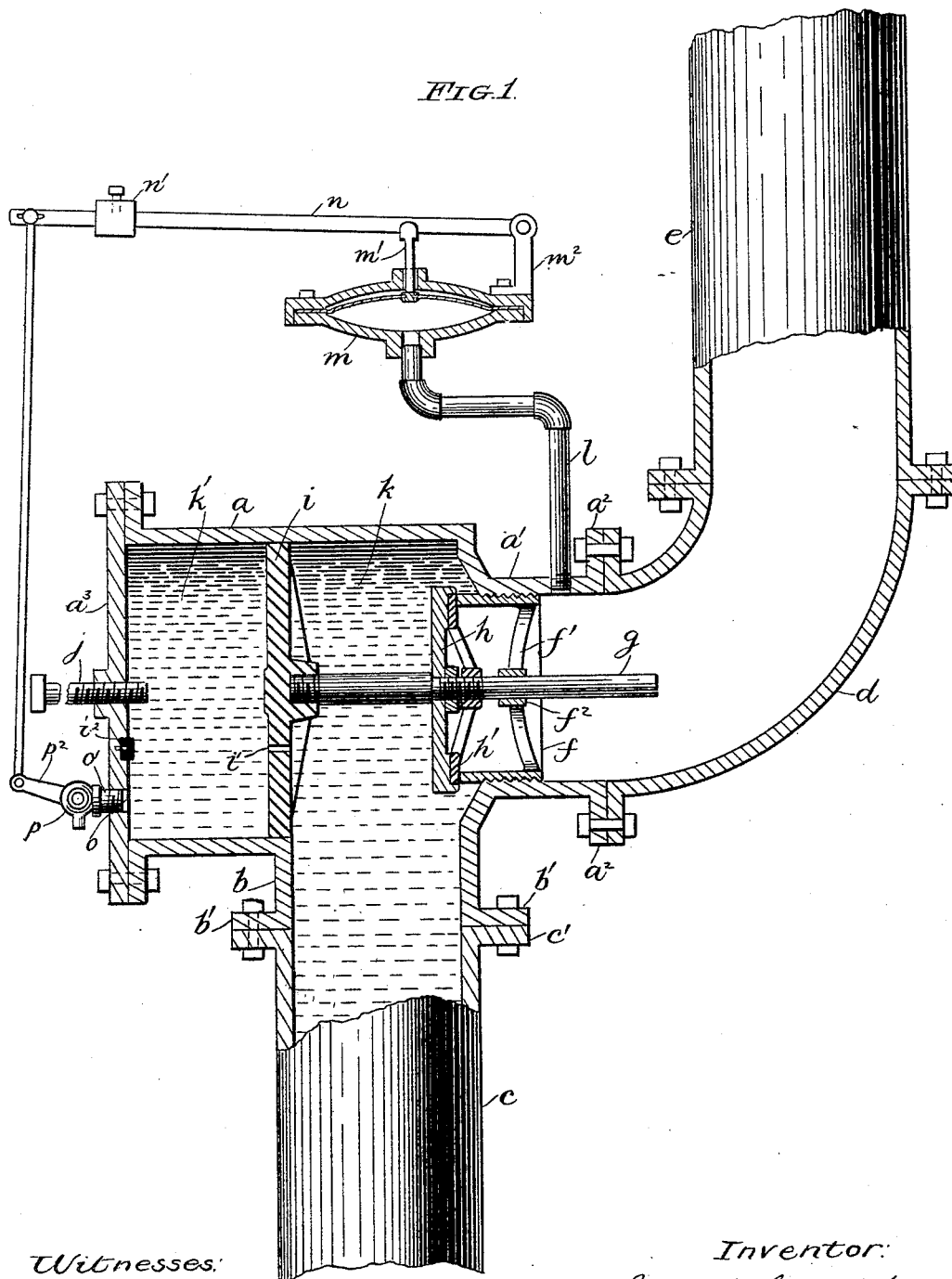


J. CLAPP.  
AUTOMATIC VALVE.

No. 459,198.

Patented Sept. 8, 1891.

FIG. 1.



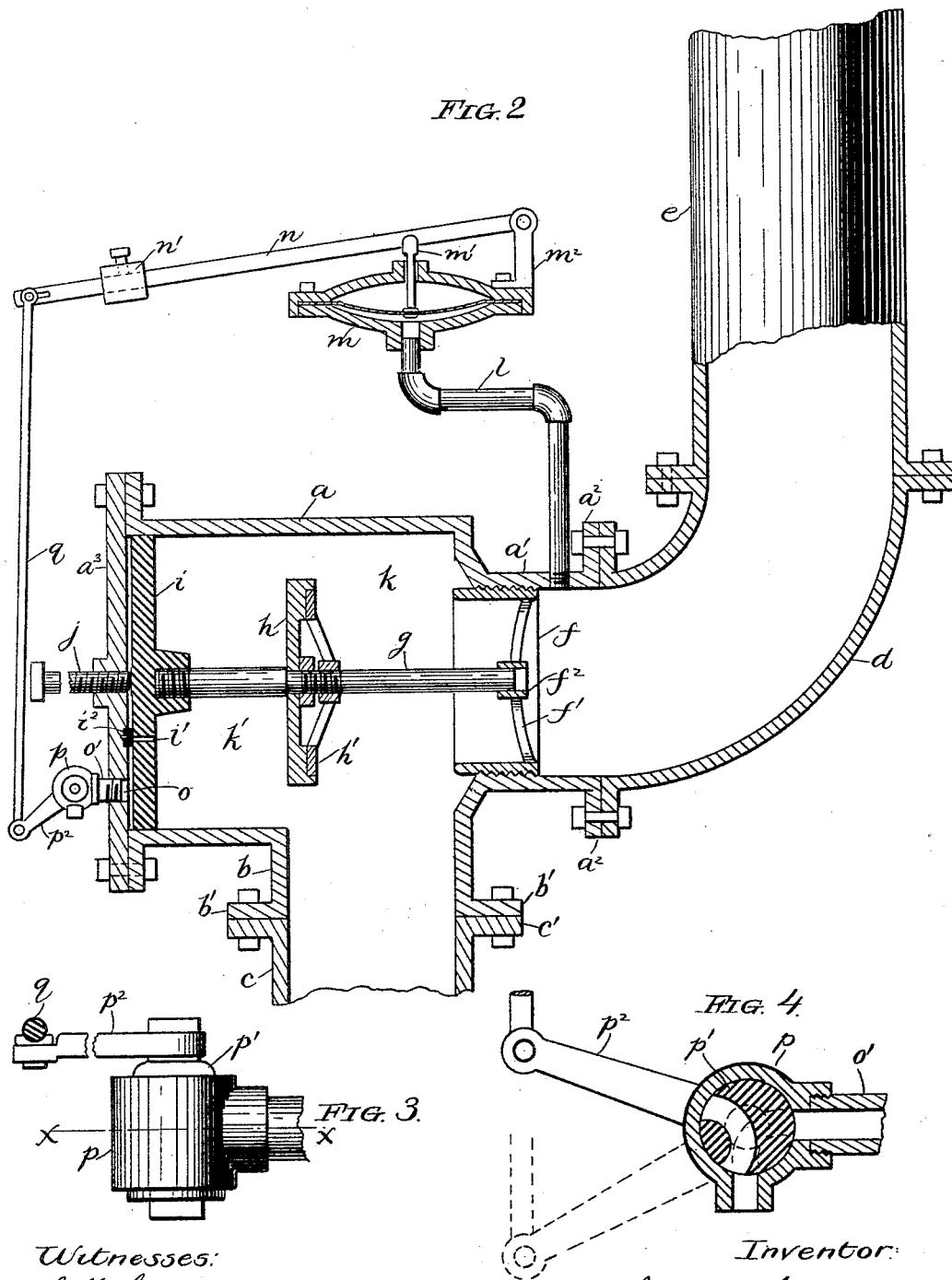
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R. W. Champion

Inventor:  
Joseph Clapp,  
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# UNITED STATES PATENT OFFICE.

JOSEPH CLAPP, OF EVANSTON, ILLINOIS, ASSIGNOR OF ONE-HALF TO  
WILLIAM E. LOWE, OF NEW YORK, N. Y.

## AUTOMATIC VALVE.

SPECIFICATION forming part of Letters Patent No. 459,198, dated September 8, 1891.

Application filed February 19, 1891. Serial No. 382,017. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH CLAPP, of Evanston, in the county of Cook and State of Illinois, have invented certain new and useful  
5 Improvements in Automatic Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in which—

10 Figure 1 is a vertical sectional view of my improved valve connected with the usual induction and eduction pipes and showing the operative parts in their respective normal positions. Fig. 2 is a like view showing said  
15 parts in abnormal positions. Fig. 3 is a plan view of the outlet-valve, and Fig. 4 is a sectional view thereof taken upon the line  $x x$ , Fig. 3.

Corresponding letters of reference in the  
20 different figures indicate like parts.

The object of my invention is to provide a simple, durable, and effective automatic valve for fire-extinguishing purposes, to be used more particularly in connection with what is  
25 commonly known as the "dry-pipe" system.

To this end my invention consists in providing a perforated or notched piston in connection with a piston-chamber separated from the service-pipe by means of said piston, a  
30 valve in operative connection with said piston and having a lesser area than the latter, and means for allowing the escape of water from the piston-chamber upon the release of air from the distributing-pipes, all of which is hereinafter more particularly described and  
35 claimed.

Referring to the drawings,  $a$  represents the main shell of my improved valve, from which is extended an elbow  $b$ , provided with a flange  
40  $b'$ , which is bolted to a corresponding flange  $c'$  upon a service-pipe  $c$ . A neck  $a'$ , of a lesser diameter than the main shell, is formed upon the latter, said neck being provided with a flange  $a''$ , by which it is bolted to an elbow  $d$ ,  
45 which is in turn attached in like manner to the main distributing-pipe  $e$ . Within the neck  $a'$  is tapped a tube  $f$ , within which is formed a "spider"  $f'$ , having a hub  $f''$ , which is centrally bored for the reception of a valve-  
50 stem  $g$ , which serves the combined purpose of valve-stem and piston-rod. Rigidly attached

to said valve-stem is a valve  $h$ , provided upon its face with a suitable packing  $h'$ , adapted to fit the face of the ring  $f$ , which forms a valve-seat. The stem  $g$  is enlarged at the  
55 back of the valve  $h$  and extended to connect with a piston  $i$ , loosely fitted within a cylinder, as shown, extending laterally from the the main shell. A cylinder-head  $a^3$  is bolted to the end of the cylinder and is centrally  
60 bored for the reception of a screw  $j$ , which is tapped therein for the purpose hereinafter stated. The piston  $i$  is preferably provided with a small perforation  $i'$  to permit the water to pass slowly from the main chamber  $k$   
55 to what I term the "cylinder-chamber"  $k'$ . This opening is closed when the piston is in an abnormal position by means of a projection  $i''$ , of rubber, leather, or other suitable material, attached to the cylinder-head. In  
70 lieu of the perforation  $i'$  one or more notches may be formed in the periphery of the piston.

Communicating with the neck  $a'$  of the valve is a tube  $l$ , which is directly connected with a diaphragm-valve  $m$ , the projecting  
75 stem  $m'$  of which serves as a fulcrum for a lever  $n$ , the short end of which is loosely attached to a lug  $m^2$ . An adjustable weight  $n'$  enables the pressure upon the diaphragm to be regulated.  
80

Within an opening  $o$  in the cylinder-head  $a^3$  is inserted a tube  $o'$ , which is held normally closed by means of a two-way valve  $p$ , the plug  $p'$  of which (better shown in Figs. 3  
85 and 4) is provided with an arm  $p^2$ , which is loosely connected by means of a rod  $q$  to the free end of the lever  $n$ . An opening  $p^3$ , Fig. 4, in the plug  $p'$  serves to open the valve when the lever is depressed and the arm  $p^2$   
90 is in the position shown in Fig. 2 and indicated in dotted lines in Fig. 4.

The operation of my improved valve is as follows: The distributing-pipes being filled with compressed air, the diaphragm-valve  $m'$  is inflated, the lever  $n$  raised to the position  
95 shown in Fig. 1, thereby closing the valve  $p$ . The valve  $h$  is placed against its seat and held primarily against the piston by means of the set-screw  $j$ , which is pressed firmly  
100 against the piston. As soon as a sufficient amount of water shall have passed through the opening  $i'$  to fill the chamber  $k'$ , the screw

*j* is withdrawn to the position shown in Fig. 2, and as the water-pressure in both chambers is obviously the same the pressure upon the piston *i* is balanced, thus leaving the water free to act upon and press against the back of the valve *h* with a pressure proportionate to the area of the valve. As the air-pressure in the distributing-pipes is presumably much less than that of the water, the valve remains securely closed and is not liable to be in any way affected by "water-hammer" or otherwise. Upon the escape of air from the distributing-pipes upon the opening of a sprinkler-head the valve *m* collapses, the weight *n'* falls, the valve *p* is opened, the water escapes from the chamber *k'* much more rapidly than it is permitted to enter through the opening *i'*, and the pressure against the piston *i* being as much greater than that upon the valve *h* as the area of the one exceeds that of the other the valve *h* is caused to open against the water-pressure, and the water is allowed to flow to the distributing-pipes.

The advantages of my improved device are that it is simple and cheap in construction, it cannot be displaced by water-hammer, and it is not liable to leak, for the reason that it is the more securely closed as the water-pressure increases, and its action is positive and certain. Moreover, the position of the lever *n* serves to indicate whether or not the valve is open or closed.

I am aware that it is not new in a hydraulic elevator to secure to a common stem a valve and a piston of greater area than the valve and to move the valve in one direction by the pressure of fluid upon its back, the piston being balanced, and in the other direction by pressure of the fluid upon one side of the pis-

ton, the pressure upon the other side having been removed.

Having thus described my invention I claim—

1. In an automatic valve, the combination, with a cylinder communicating directly with the service-pipe, an opening at one end of smaller diameter than the cylinder, a valve for normally closing the same arranged to open against the water-pressure, a piston mounted upon the same rod or stem with the valve and arranged to normally separate the cylinder into two compartments, one communicating directly with the service-pipe and the other separated therefrom by said piston, an opening in the piston, a valve communicating with the secondary chamber, and means for opening said valve upon the escape of air from the distributing-pipe, substantially as set forth.

2. The combination, in an automatic valve, of a piston and a valve of differential area mounted upon the same stem, the latter being arranged to close with the water-pressure, a service-pipe connection between said piston and valve, a chamber back of said piston into which the piston may recede, means for a limited water communication between said chamber and the space between said piston and valve, and means for automatically releasing the water from behind said piston, substantially as set forth.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses, this 1st day of December, 1890.

JOSEPH CLAPP.

Witnesses:

D. H. FLETCHER,  
J. B. HALPENNY.