

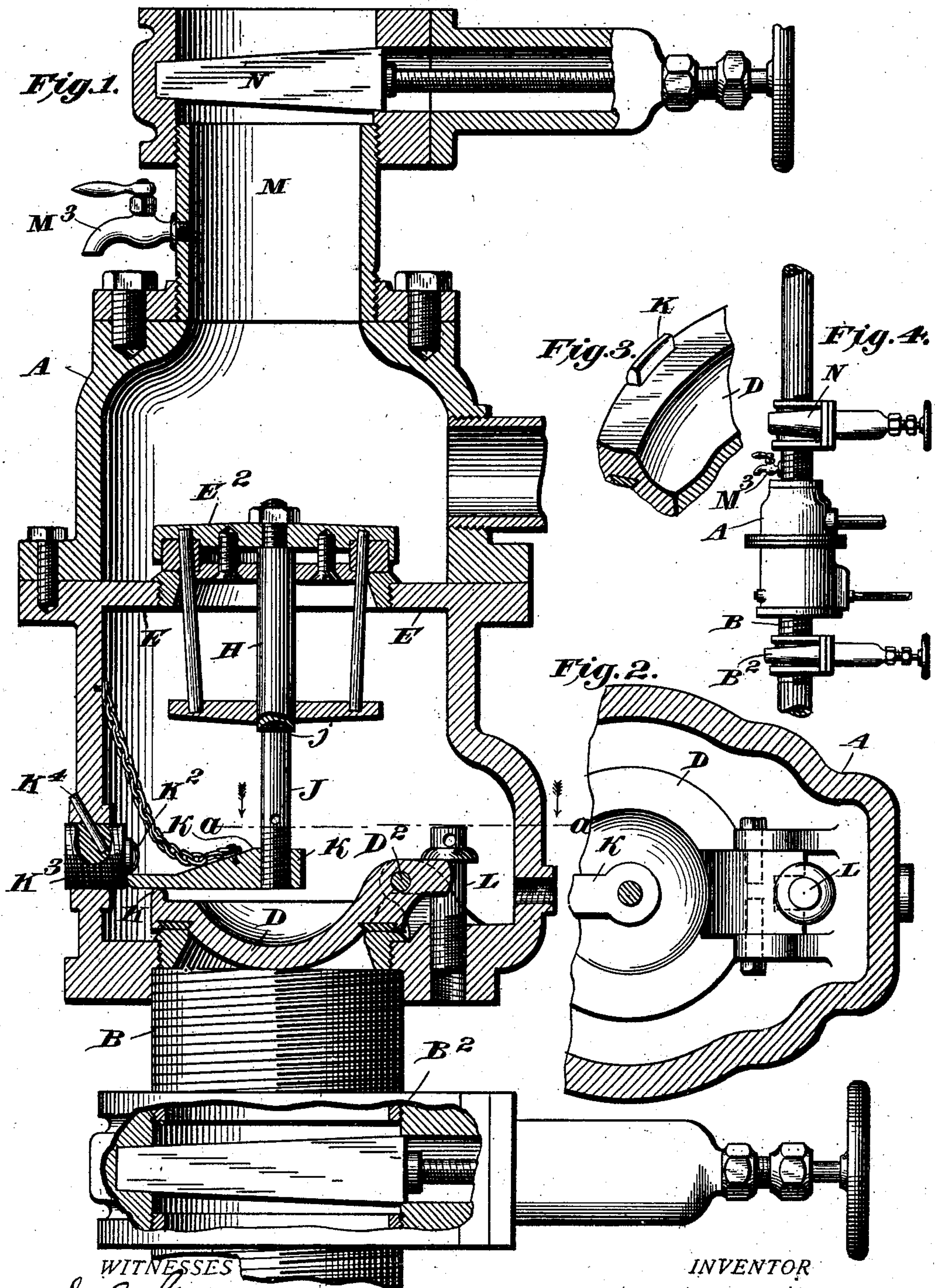
No. 693,321.

Patented Feb. 11, 1902.

F. GRAY.
VALVE.

(Application filed Feb. 14, 1899.)

(No Model.)



WITNESSES
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VALVE.

SPECIFICATION forming part of Letters Patent No. 693,321, dated February 11, 1902.

Application filed February 14, 1899. Serial No. 705,504. (No model.)

To all whom it may concern:

Be it known that I, FRANK GRAY, a citizen of the United States of America, and a resident of Chicago, Cook county, Illinois, have
5 invented a certain new and useful Improved Valve, of which the following is a specification.

My invention relates to certain improvements in that class of valves which are particularly designed for use in connection with
10 what are termed "dry-pipe" automatic fire-extinguishing systems. In these fire-extinguishing systems conducting-pipes extend throughout a building to be protected, and at
15 suitable intervals sprinkler-heads are located in the pipes, which are fused and opened automatically in case of emergency. In the wet-pipe system the water is maintained under pressure throughout the pipes of the system and immediately passes out through the
20 sprinkler-heads when they are fused. The dry-pipe system maintains an air-pressure above the main valve, and said valve is exposed to the excessive pressure of the water. In the main valve of the dry-pipe system the
25 air-pressure in the pipes of the system beyond the said valve is less than the water-pressure on the other side, and the valve is usually held closed by providing a double
30 valve-face of differential areas, which hold the valve closed until the air-pressure is reduced. The means at present used, however, for holding the valve closed tend to enlarge the valve and obstruct the water-passage. Resort has been had to many other devices for
35 holding the valve closed against the water-pressure and permitting it to open automatically upon the reduction of the air-pressure caused by the operation of the sprinkler-
40 heads.

The object of my invention in one particular is to provide a main valve to control the water-pressure in a dry-pipe system which shall be compact and small and of great
45 strength and rigidity and which shall afford the least opportunity for corrosion and present the least possible obstruction to the passage of the water.

It is necessary to frequently test the main
50 valve to determine whether it is operative. In doing so the pressure of air is reduced in the pipes of the system, and when the valve

opens the water enters into the pipes of the system, and it must be drained out before the valve can be reset. In cold weather and
55 in unheated buildings the water so admitted in making such tests frequently freezes before it can be drained.

A further object of my invention is to provide means for making such a test without
60 admitting the water into the dry pipes of the system.

Reference may now be had to the accompanying drawings, in which—

Figure 1 is a vertical section through my
65 improved valve. Fig. 2 is a section on the line *aa* of Fig. 1. Fig. 3 is a perspective view of a fragment of the hinged valve. Fig. 4 is a view of the exterior of the valve, showing the pipe connections.
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The valve-casing is designated at A, and within it the various parts of the valves are disposed.

As this type of valve is particularly adapted for use in conjunction with dry-pipe automatic fire-extinguishing systems, I shall describe its operation in such a system.
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The water-riser is designated at B, within which is an ordinary cut-off valve B², adapted for manual operation.
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The automatic valve comprises in construction the hinged valve D, hinged at D² and held on its seat in a manner to be described. Above the hinged valve is a partition E within the casing, which provides a seat for the
85 valve E². The automatic valve may be considered as a two-part valve comprised of the hinged valve D, and the valve E² and these valves are connected together separably when closed by certain connecting means, which I
90 shall now describe.

A rod H depends from the upper valve E² to a point midway between said valve and the hinged valve D. An elbow-lever J is interposed between the lower end of the valve-rod
95 H and the hinged valve D, the upper end of the arm *j* of said elbow-lever J bearing upon but not secured to the valve-rod H. An abutment or ledge K, Fig. 3, is formed upon the edge of the hinged valve D opposite its hinge D².
100 An abutment K² projects from the side of the casing at a point slightly above said ledge K. This abutment K² is formed upon a removable block K³, screwed into an opening in the

casing and held in place by means of a pin K^4 . By this means the abutment may be adjusted in the necessary position. The free end of the arm k of the elbow-lever J is held
 5 between the abutment K^2 and the ledge K , as shown in Fig. 1, with the upper end of the arm j of said lever engaged against the valve-rod H .

The arm j of the elbow-lever is screw-threaded into the arm k , and in order to adjust the valve D securely upon its seat on the side thereof engaged by the elbow-lever the arm j is manually rotated, and as it bears at one end upon the rod H and at the other is screw-threaded into the arm k the lever bears down upon the valve D . To adjust the other side of the valve D securely upon its seat, I provide a pin L , which engages the valve D at its upper end and is screw-threaded into the
 10 valve-casing at its lower end.

The operation of this portion of my device is as follows: The hinged valve D is locked and held in a closed position by means of the elbow-lever J , which is in turn held by the
 15 upper valve E^2 . Upon a reduction of air-pressure above the valve E^2 the said valve opens and in its upward movement carries the rod H , releasing the elbow-lever J . The excess water-pressure below the valve D now attacks and raises it on the hinge D^2 , throwing the freed elbow-lever to one side. The elbow-lever is held from escape by means of a chain.

Above the main valve and in the dry-pipe riser M is located a cut-off valve N , and below this valve and above the main valve is a test drain-cock or release M^3 .

In order to effect a test of the main valve to determine whether it is operative, it is simply necessary to first close the cut-off valve N and then open the release-cock M^3 and withdraw the air-pressure from above the main valve, when said valve, if operative, opens and admits the water-pressure, which pressure, however, is checked by the closed cut-off valve M and prevented from entrance into the dry pipe of the system. The main valve then closes by gravity. The main cut-off valve of the system (designated at N) is preferably closed when the test is made, and therefore but a small water-pressure operates the main valve. The construction and arrangement of the main valve are such as to permit of a free passage for the water and also render the apparatus more compact and rigid.
 55 The action of the valve is immediate and instantaneous upon a reduction of air-pressure above it. The upper valve-face withdraws the engagement of its rod from the elbow-lever, which latter may be generally termed a "locking" member, and upon said withdrawal the lower hinged valve-face is immediately operated by the excessive water-pressure to throw off the engagement of the locking member. The hinged valve-face is adjusted at its hinge upon the seat by means of the ad-

justable member bearing upon it, and it is also seated firmly at the side opposite to the hinge by the locking member, which also serves to hold the face closed against the excessive water-pressure when the locking member is engaged with the upper valve-face.
 70 The pipe O , leading from above the valve E^2 , is connected in such a way as to serve as a drain-pipe.

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

1. In a valve apparatus for dry-pipe fire-extinguisher systems, an upper and lower valve, the former exposed to the air-pressure and the latter exposed to the water-pressure, and a lever, one arm of which is normally in contact with the upper valve member and the other arm separably engaged with the lower valve member and an adjacent stationary part to hold it closed, the movement of the upper valve member, upon reduction of air-pressure, causing a separation between the upper and lower valve members and the said lever whereby the lower valve member is released.
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2. In a valve apparatus for dry-pipe fire-extinguishers, an upper valve and a lower valve, the former exposed to the air-pressure and the latter exposed to the water-pressure, and an elbow-lever, one arm of which is normally in contact with the upper valve member and the other arm separably engaged with the lower valve member and with the valve-casing to hold it closed, the movement of the upper valve member, upon reduction of air-pressure, causing a separation between the two valves and the elbow-lever whereby the lower valve member is released.
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3. In a valve apparatus for dry-pipe fire-extinguisher systems, an upper and lower valve, the former exposed to the air-pressure and the latter exposed to the water-pressure, a rod extended from said upper valve member and an elbow-lever, one arm of which is normally in contact with the said rod and the other arm separably engaged with the valve-casing and the lower valve member to hold it closed, the movement of the upper valve member, upon reduction of air-pressure, causing a separation between the lower valve member and the elbow-lever whereby the lower valve member is released.
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4. In a hinged valve, an adjusting device adjacent to the hinge of the valve and engaging said valve to set the same on its seat, at this point, locking means engaging said valve approximately opposite to the hinge and means for adjusting the locking means to set the valve on its seat at this point.
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5. In a valve apparatus for dry-pipe fire-extinguishing systems, the combination of a dry-pipe valve exposed to the air-pressure tending to close it, a shut-off or cut-off valve above the dry-pipe valve and a release-opening between the two said valves for the air-pressure whereby the operativeness of the
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dry-pipe valve may be tested without permitting the water to pass through said valve into the sprinkler-pipe.

6. In a valve apparatus for dry-pipe fire extinguisher systems, a valve-casing, an upper valve exposed to the air-pressure, a lower valve exposed to the water-pressure, means for locking the lower valve closed consisting of an elbow-lever having its upright arm in engagement with the upper valve and its lateral arm in engagement with the lower valve, the extremity of this lateral arm extending laterally beyond the valve, and a lug or stop on the valve-casing separably engaging said extremity.

7. In combination, a valve-casing, a lower valve, an upper valve adapted to be held

closed by pressure from above, and means for locking the lower valve consisting of an elbow-lever, one arm of which is separably in contact with the upper valve and the other arm of which is in separable engagement with the lower valve and with the valve-casing, to hold the lower valve closed, and a device, as a chain, for loosely connecting the locking member to the valve-casing at a point between the two valves, for the purpose set forth.

Signed by me at Chicago, Cook county, Illinois, this 11th day of February, 1898.

FRANK GRAY.

Witnesses:

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L. M. BULKLEY.