

No. 626,654.

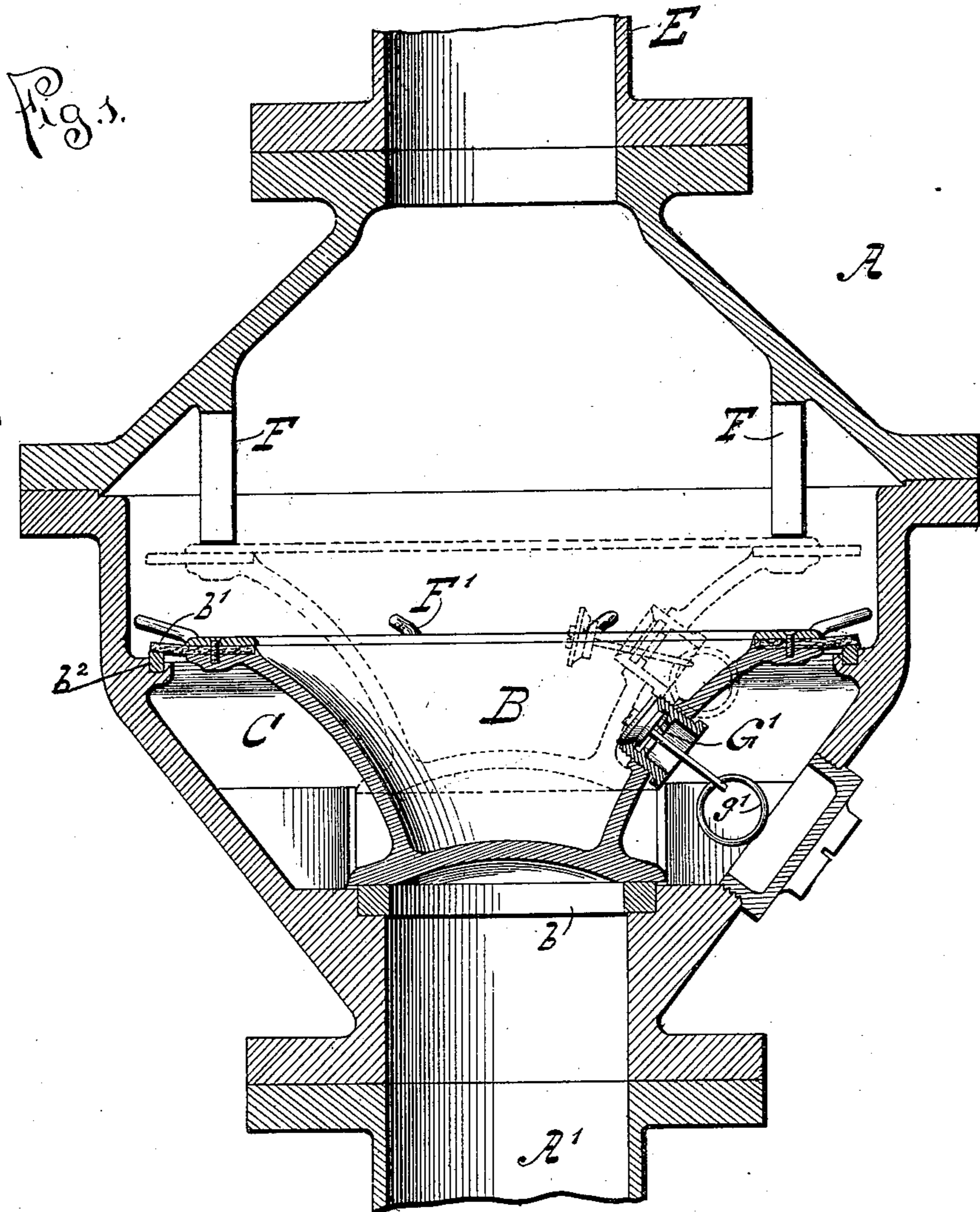
Patented June 6, 1899.

F. GRAY & C. D. COX.
DRY SERVICE VALVE.

(Application filed Oct. 4, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:
J. B. Keir
Robert Weir

Inventors.
Frank Gray,
Charles D. Cox,
By Chas. C. Bulkley

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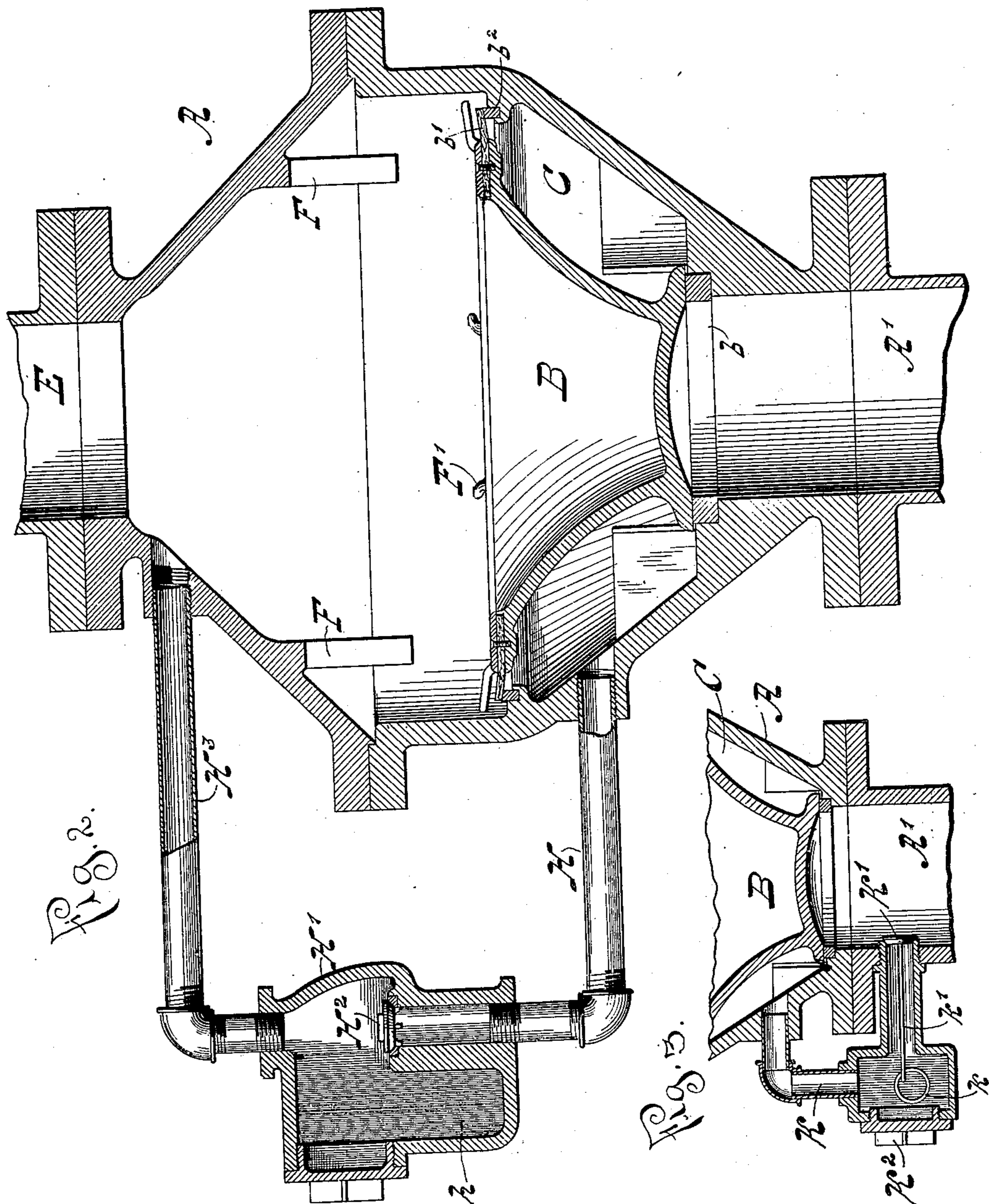
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Inspector's
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Charles D. Cox,
By Chas. C. Bulkley

UNITED STATES PATENT OFFICE.

FRANK GRAY AND CHARLES D. COX, OF CHICAGO, ILLINOIS.

DRY-SERVICE VALVE.

SPECIFICATION forming part of Letters Patent No. 626,654, dated June 6, 1899.

Application filed October 4, 1897. Serial No. 653,915. (No model.)

To all whom it may concern:

Be it known that we, FRANK GRAY and CHARLES D. COX, citizens of the United States, and residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Dry-Service Valves, of which the following is a specification.

In fire-protecting apparatus for buildings and structures sprinkling-pipes are run along the ceiling, having perforations closed by fusible plugs which melt at any predetermined degree of heat abnormal to the temperature of the room or store, releasing a body of air, which up to the moment has held closed a valve connecting the system with the street-service pipes. In apparatus of this kind which has been introduced in recent years this valve, which may be termed the "main" valve for the purpose of this specification, is intended to be held open by a mechanical catch after it is once forced open by the rush of water; but in practice this catch has proven unreliable for several reasons, one of which is that the water rushing into the sprinkling-pipe forces out the air rapidly, and being unable to pass through the same aperture at the same speed as the expelled air it is suddenly obstructed and rebounds, closing the valve, assisted by the gravity of the valve, before the catch has time to act or before it is fully and securely engaged, other defects lying in the imperfect action of any mechanical catch, especially when it has for a long time been exposed to moisture or out of use. In the present invention it is proposed to establish a subsidiary water connection between one of the system-pipes and a chamber located intermediate of the two seats of the differential main valve, which connection shall be opened concurrently with the release of air in the sprinkling-pipes and the attendant inflow of water shall remain open until intentionally closed.

The invention therefore consists in combining with the main valve in a sprinkler system or dry-service system means automatically operated by the blowing out or releasing of a plug in the system-pipes, whereby continuing water communication is opened between each side of the valve, and in vari-

ous other combinations and details of construction hereinafter described and claimed.

In the drawings, Figure 1 is a vertical central section through a valve-box and valve constructed according to our invention. Fig. 2 is a similar vertical central section through an alternative construction thereof, and Fig. 3 represents, on reduced scale, a modification.

Referring to the first figure of the drawings, A represents the valve-box, and A' the service-pipe from the street. B is the main valve, closing the water-inlet, fitting down upon a suitable seat *b*. This valve is of a hollow truncate form, its upper rim being provided with a rubber or other suitable packing or valve-ring *b'*, engaging with a seat *b²*, which may be of any appropriate material for the purpose and is of greater area than the other seat. Between the flaring sides of this main valve and the valve-box and included between the upper and lower seats of the valve is an intermediate space or chamber C, and it is the object of this invention to establish such communication between this intermediate chamber and the system-pipe on one side of the valve that as soon as the main valve opens a subsidiary water-channel is established which shall endure continuously until purposely closed, notwithstanding water-hammer or closing of said main valve. From the valve-chamber leads the sprinkling-pipe E, which, it will be understood, may branch in a number of arms.

F designates stops which check the rise of the main valve, as represented by dotted lines in the first figure of the drawings, and F' are guide-fingers on the valve, which determine its play in vertical lines.

So long as the valve is not called into action, the air-pressure in the sprinkling-pipes will be the same to each square inch on the upper surface of the main valve as the water-pressure beneath—that is, the water-pressure may be one hundred pounds to ten square inches of exposed surface and the air-pressure on the opposite side will be at least sufficient to hold the valve closed against the water-pressure, so that the sprinkling-pipes will be empty; but to the extent that the plugs are fused or blown out of the sprinkling-pipes the air will escape, releasing the valve, and the water will

rush in; but as the fluidity of air is greater than that of water the aperture through which the air rushes will not freely release the body of water following it and there will be a shock or rebound. To overcome the effects of this rebound or water-hammer and for the time assimilate the differential valve to an ordinary valve, we form a supplemental valve between the intermediate chamber before referred to and the space on the upper or air side of the main valve. This supplementary valve may be a simple pop or blow-off valve G, as shown in Fig. 1, closing a port G' in the side of the main valve directly between it and the intermediate chamber, so that it will be thrown out of its seat with the first rush of water. In this construction it is shown as provided with a spindle g, having on its end a ring g', which prevents the entire escape from the seat, but allows it to fall away into such a position that counter-pressure of water will not restore it to the seat, so that it will always be open when the water is running, and in fact until the water is cut off by a stop-cock interposed on the street-main side and the supplemental valve closed by hand.

In the alternative construction shown in Fig. 2 a pipe H leads from the intermediate chamber to a supplemental valve-box H', containing a blow-off valve H², communicating by another pipe H³ to the space above the valve. The operation in this latter or alternative construction is practically the same as that in the first described, except that if the valve H² is blown off by the pressure of water instead of being held by a ring or other stop it will fall into a pocket h or into any other suitable receptacle, leaving the passage permanently open.

In the modification represented in Fig. 3 the duct or port K is made to connect the intermediate chamber with the outside system-pipe or that representing the street-service pipe. The supplementary valve K' is or may be the same in construction as that shown in Fig. 2 and is exposed to the pressure in said outside or exterior system pipe, or that one on the opposite side of the main valve from the sprinkling-pipes, and is held closed by such pressure; but whenever the main valve lifts the water from the exterior or supply pipe of the system enters the intermediate chamber and balances the supplemental valve, which thereupon opens or falls away from its seat. A plug K² gives access to the supplemental valve to restore it after the system has been in service. A ring k, connected with the valve-stem k', prevents the valve from falling into the pipe and being lost. It is evident that by the employment of this intermediate or supplemental valve in whatever form it may be developed, so long as it falls or is thrust away from its seat in such manner as to remain open and not to be reclosed thereon un-

less by intentional agency, a temporarily permanent water-channel is established immediately between the upper and lower sides of the main valve upon the melting of a fuse, leaving the valve responsive and sensitive to flow of water from the street-pipes, so that the main valve will reopen if accidentally closed.

Having thus described our invention, we desire it to be understood that we do not confine ourselves to any special or particular construction of the supplemental valve, nor to any fixed or definite location for it, so long as it is interposed between one of the system-pipes and the lower side of the main valve in such manner that it remains open and cannot thereafter be closed except by design and manipulation, leaving the water communication between the upper and lower sides of the valve through the duct or port to which it appertains free and uninterrupted; but

What we claim, and desire to secure by Letters Patent, is—

1. The combination with the main valve in a dry-service system, of a chamber intermediate of the two seats of the main valve and a supplemental valve communicating between said chamber and one of the system-pipes, said supplemental valve being normally closed by the pressure in the service-pipe and adapted to be thrown out of working relation with its seat when disengaged therefrom, to open a water-channel enduring until it is intentionally closed.

2. The combination with the main valve in a dry-service system, of an intermediate compartment between said valve and the service-pipe of the system and a supplementary valve adapted to fall away permanently from its seat when disengaged, and communicating between said compartment and one of the system-pipes whereby the fusing of a plug releases said supplementary valve and establishes continuing water communication between the upper and lower sides of the said main valve.

3. The combination of a double-seated main valve, the upper seat of which is of greater area than the lower, a chamber between the upper and lower seats, a duct connecting one side of said valve with said chamber, a supplemental valve normally closed to said duct under the pressure of the fluid column on the side exterior to said chamber but adapted to fall away from working relation to its seat when opened, and a stop connected to said supplemental valve in such manner as to retain it, thus neutralized, in proximity to said seat.

In testimony whereof we hereunto set our hands this 1st day of October, A. D. 1897.

FRANK GRAY.
CHARLES D. COX.

In presence of—

J. B. WEIR,
ROBERT WEIR.