(No Model.)

F. GRAY.

VALVE APPARATUS.

No. 585,094. Patented June 22, 1897.

Fig. 1.

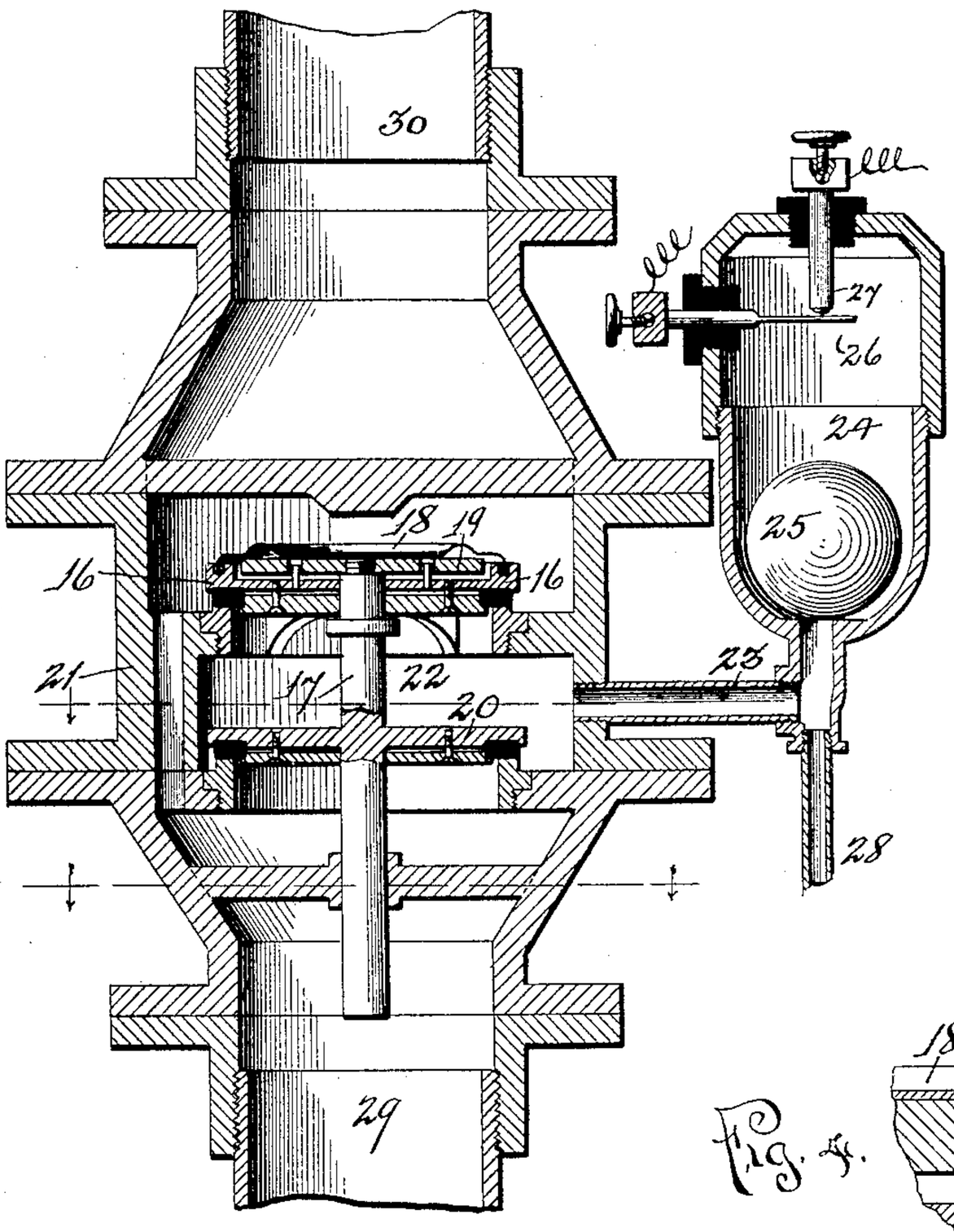


Fig. 4.

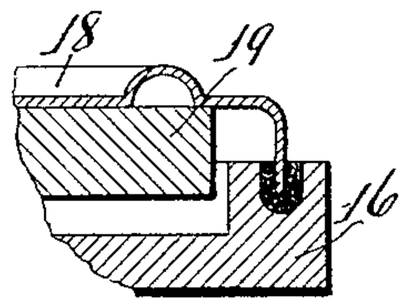


Fig. 2.

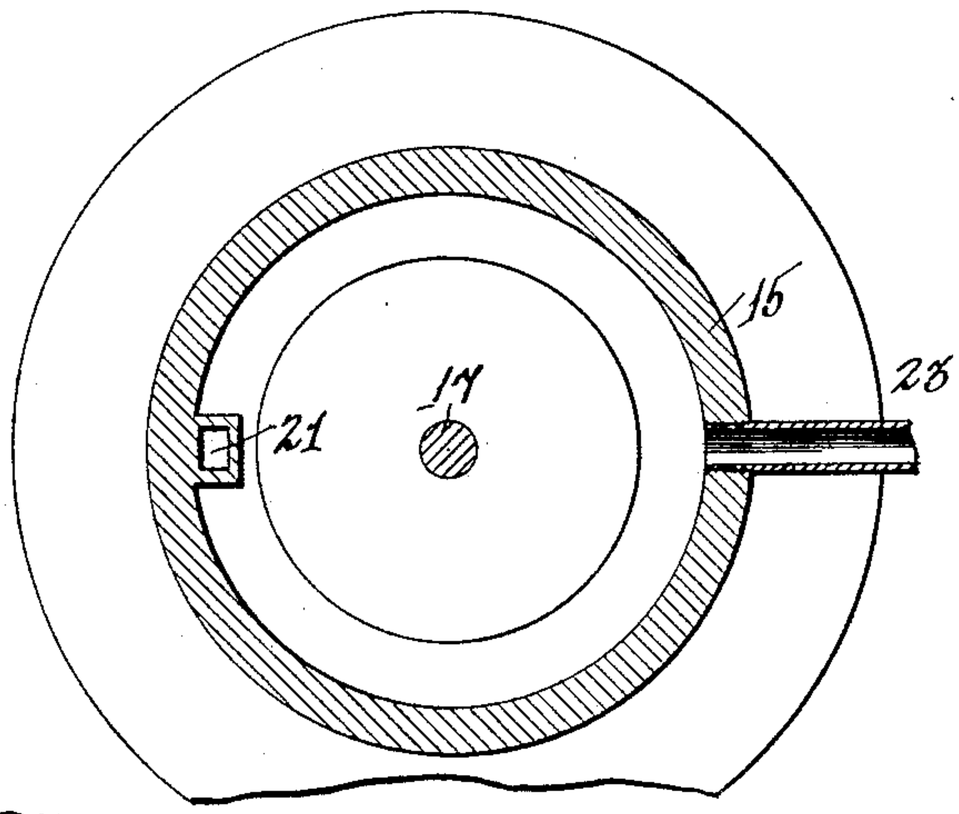
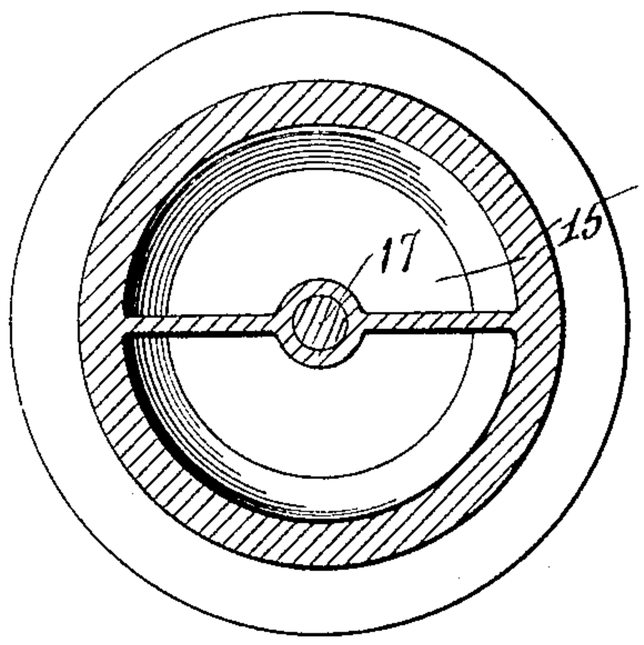


Fig. 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

FRANK GRAY, OF CHICAGO, ILLINOIS.

VALVE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 585,094, dated June 22, 1897.

Application filed January 4, 1897. Serial No. 617,906. (No model.)

To all whom it may concern:

Be it known that I, FRANK GRAY, 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 a Valve Apparatus, of which the following is a specification.

My invention relates to certain improvements in valve apparatus for controlling water or other pressure, and has for its object the provision of simple and compact construction and sensitiveness of operation.

A further object of my invention resides in the provision of means whereby the injurious effects of "water-hammer" are neutralized; further, to provide means whereby a double-seated valve may be caused to seat itself tightly, which has heretofore been difficult of accomplishment owing to expansion and contraction; again, further, in the provision of means whereby the space between two valve-seats is maintained at a normal pressure lower than upon the valves, whereby an electrical circuit maker or breaker may be employed to automatically open or close the circuit for any given purpose or the momentary pressure relieved without opening the valves fully. It will be evident that this type of valve and alarm is specifically adapted for use in conjunction with what are known as "automatic fire-sprinkler" systems either of the dry or wet pipe system.

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

Figure 1 is a section through the casing, showing the valve apparatus. Fig. 2 is a cross-section on the line $x\,x$ of Fig. 1. Fig. 3 is a cross-section on the line $y\,y$ of Fig. 1.

The casing is designated at 15, within which the valve apparatus is disposed, consisting of a double valve and conjunctively-operative means. The upper valve 16 is mounted loosely on the valve-stem 17. Mounted upon and secured at its edges to the valve 16 is a diaphragm 18, and the said diaphragm also rests upon a disk 19, secured to the upper end of the valve-stem 17. The lower valve 20 is secured to the valve-stem 17. A by-passage 21 extends from the chamber below the lower valve 20 to the chamber above the upper valve 16 in order to equalize the pressure upon the valves. It is therefore evident that a chamber 22 is provided between the upper and lower valves 16 and 20, in which the pressure is lower than the pressure on the valves. Opening out of this chamber 22 is a supply-pipe 23, leading to a cup-shaped contact-chamber 24, within which is a float 25, serving as a contact maker or breaker. In this instance I have shown the contact-spring 26 and contact-point 27 as adapted to close a circuit including an alarm or other working resistance.

Below the contact-chamber 24 is a drain 28, which is smaller in diameter than the supplying-pipe.

The inlet-pipe is designated at 29, and the outlet-pipe at 30.

It will be observed that the total area of the diaphragm 18 is greater than the area of the opening to the valve 20, and thereby the diaphragm 18 serves the purpose of maintaining the upper and lower valves closed, as the diaphragm rests upon the disk 19, secured to the valve-stem 17, to which the lower valve is also secured, and is secured to the upper valve 16, loosely mounted on the valve-stem 17. By this construction, also, it is evident that the upper and lower valves are practically independent so far as concerns the influence of expansion and contraction.

By the use of the double valves the intermediate chamber is provided, which is connected with the contact-chamber 24, whereby the pressure admitted by the lower valve 20 may enter the said chamber 24, raise the float 25, and close the circuit.

In the event of, for instance, water-hammer or momentary accumulation of abnormal pressure, the valve 20 slightly opens or momentarily opens and the excessive momentary pressure passes through the drain 28, which is of a smaller area relative to the supply-pipe 23, in order that when the valve 20 is fully opened an excess of volume may pass into the contact-chamber 24.

As previously stated, this type of valve and alarm is particularly adapted for either wet or dry pipe automatic fire-sprinkler systems. When used for the wet-pipe systems, the water is maintained at an equal pressure on either side of the valve by the by-passage 21, and the water therefore flows through the

valve only occasionally. In dry-pipe systems the pressure of the air on both sides of the valve is maintained uniform in like manner.

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

1. In a valve apparatus, a plurality of valves, an intermediate chamber or chambers between the valves which latter are held to their seats by pressure, a supplemental chamber containing a circuit making or breaking device which chamber is connected with the intermediate chamber whereby admitted pressure to the intermediate chamber operates the circuit maker or breaker.

2. In a valve apparatus, a plurality of valves mounted upon a common stem, a passage about said valve to maintain the pressure uniform on either side thereof, an intermediate chamber having a pressure therein maintained normally lower than the pressure upon the valves, a supplemental chamber and a circuit making or breaking device within said chamber which latter is connected with the intermediate chamber whereby pressure admitted to the intermediate chamber operates the circuit maker or breaker.

3. In a valve apparatus, a plurality of valves, an intermediate chamber or chambers between the valves which latter are held to their seats by pressure, a supplemental chamber containing a circuit making or breaking device and a float which chamber is connected with the intermediate chamber between the valves whereby pressure admitted to the intermediate chamber operates the float which in turn operates the circuit maker or breaker.

4. In a valve apparatus, a valve-stem a plurality of valves mounted thereon, a diaphragm connected with one of the valves and adapted to act upon the valve-stem, the area of the diaphragm or the diaphragm and the valve to which it is connected being greater than the opening to the other valve or valves and an intermediate chamber between the valves, together with a circuit maker or breaker operated by pressure admitted to the intermediate chamber between the valves and a passage leading to the circuit maker or breaker.

5. In a valve apparatus a plurality of valves one of which is fixed upon a valve-stem and the other loosely mounted upon the valve-stem and a diaphragm connected with one of the valves and acting upon the valve-stem.

6. In a valve apparatus a plurality of valves one of which is fixed upon a valve-stem and the other loosely mounted upon the valve-stem and a diaphragm connected with one of the valves acting upon the valve-stem, the area of the diaphragm, or the area of the diaphragm and valve connected therewith, being greater than the area of the opening to the other valve.

7. In a valve apparatus, a plurality of valves, an intermediate chamber or chambers between the valves, which latter are held in their seats by pressure, a supplemental chamber containing a circuit making or breaking device which is connected with the intermediate chamber whereby pressure admitted to the intermediate chamber operates the circuit maker or breaker, and a drain or release opening adapted to withdraw momentarily-admitted pressure without operating the circuit maker or breaker.

8. In a valve apparatus a plurality of valves, a passage about said valves to maintain the pressure uniform on either side thereof, an intermediate chamber having a pressure therein maintained normally lower than the pressure upon the valves and a release or drain opening adapted to withdraw pressure momentarily admitted to the intermediate chamber.

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

FRANK GRAY.

Witnesses:
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