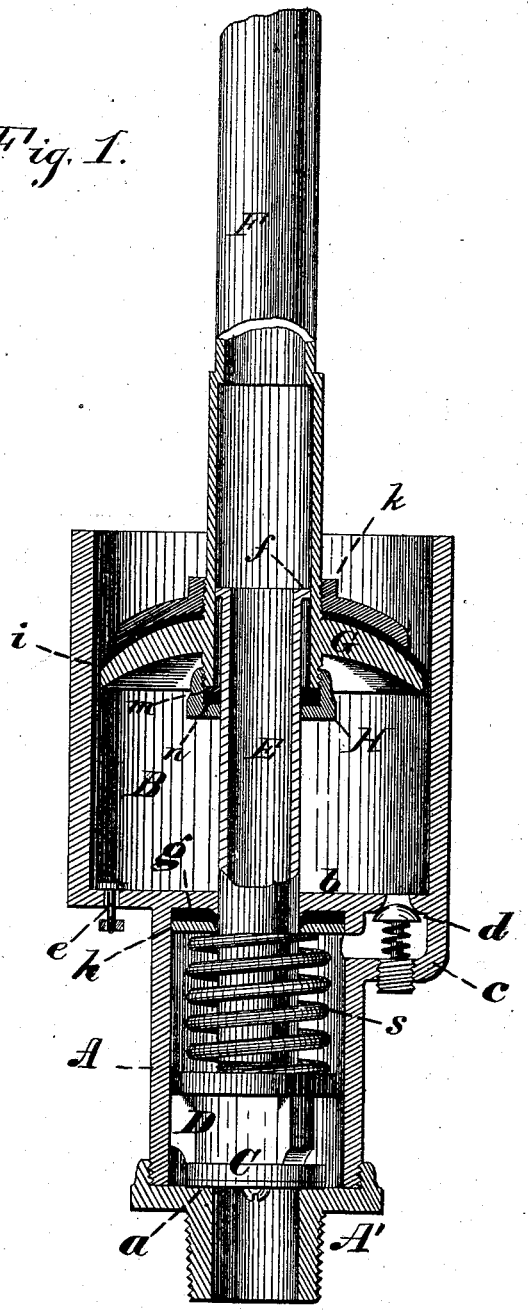
W. PORTEOUS.
HYDRANT-VALVES.

No. 194,615. Patented Aug. 28, 1877.

Fig. 1.



Witnesses
Thos. Bingham
James J. McTighe.

William Porteous, Inventor.
By Connolly Bros. & McTighe
Attorneys.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM PORTEOUS, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN HYDRANT-VALVES.

Specification forming part of Letters Patent No. **194,615**, dated August 28, 1877; application filed August 1, 1877.

To all whom it may concern:

Be it known that I, WILLIAM PORTEOUS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Hydrant-Valves; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a vertical middle section, showing the valve closed and the piston in the act of driving out the waste.

This invention relates to the construction of hydrant-valves; and consists in the combination, with the valve, of an air-cylinder and piston, arranged and operating in such manner that the act of closing the valve being continued causes the piston to compress the air and drive it into the outlet, so that, after the valve is closed, the water remaining in the outlet is forcibly ejected, and this through the regular bib or nozzle above ground; and the invention further consists in the construction and arrangements of parts, as hereinafter fully described and claimed.

I construct as follows: The body or casing consists of two portions, which may be made separately and joined; but I prefer to make them in one piece. They are, the valve-chamber A, having the valve-seat *a* and inlet-connection A′ screwed thereto, and the air cylinder or chamber B, preferably of larger bore than chamber A.

The two chambers A and B are separated by a diaphragm, *b*, having a central opening for the passage of the combined valve-stem and outlet-pipe, as will be described. The chambers A and B communicate by a hollow elbow, *c*, opening into chamber B through its overhanging base, and into chamber A through it side, as shown. The opening into B is provided with an automatic check-valve, *d*, of any of the usual forms, which permits air to pass out of B, but prevents the return or ingress of it or water. To facilitate setting and adjustment, I perforate the bottom of elbow *c*, and insert a screw-plug, after having placed valve *d* and its spring in position, the plug having a pin projecting into the core of the spring. At another point in the bottom of chamber B I place an air-valve, *e*, as shown, which allows air to be drawn into the cylinder, but prevents its egress.

The hydrant-valve C is here of the compression class, (though it may be of other form,) and is attached to the skeleton or open cage D, part of whose edges fits the chamber A, and serves as guide for the valve. The cage, in turn, is screwed to the tubular stem E, which passes through its top, and extends upwardly into chamber B, and has at its upper end a flange or collar, *f*. The passage of stem E through diaphragm *b* is packed by a gasket, *g*, supported by a washer, *h*, which is then supported by a strong coiled spring, *s*, which bears upon the top of cage D. The valve-rod F is tubular to form an outlet, and at its lower extremity is enlarged in bore to admit of the reciprocation therein of the tubular stem E, said enlargement being in length slightly less than the stroke of the rod F, and having at its upper end a square stop or shoulder. The lower end of outlet and rod F flares in a drooping flange, G, (integral or separate,) over which a cup-leather, *i*, is held by a nut, *k*, the cup-leather tightly fitting the cylinder B, the whole acting as a piston. As a stop for the flange *f* below, I place a washer, *m*, against the end of outlet F, pack it by a gasket or packing, *n*, and secure the two by screwing on a stuffing-box, H, as shown. The tubular valve-rod F is at its top attached to a lever or handle, which may itself constitute the hydrant-bib, or otherwise, as desired by the maker.

The above description will be better understood by the operation, which is as follows: The valve itself is self-closing by reason of its powerful coiled spring *s*. To open it the rod F must be drawn up till the washer *m* catches the flange *f*, after which a slight further pull opens the valve, and the water passes it, enters hollow stem E, thence into F, and out at the nozzle. In this movement upward of the outlet F its piston rises in chamber B, and draws air in through valve *e*. When the tubular rod F is depressed to close valve C, at the first part of its stroke the valve flies to its seat, and shuts off the pressure; but there still

remains a column of water in the outlet. By pushing down the outlet or valve-rod F its piston descends in chamber B, compresses its contained air till the valve *d* yields, when it at once rushes out into chamber A and outlet E F, driving all the water ahead of it, and ejecting every drop remaining above the valve, and causing it to flow off through the regular outlet of the hydrant. The speed of discharge depends, of course, on the impulse given the piston and on the relative areas of piston and outlet.

The next time the hydrant is used the act of opening places the air-chamber and piston in condition again for ejecting the waste, or, rather, what would in other hydrants be waste. There should be a catch for the handle, so as to hold the valve open in case it is desired to keep the water running any length of time.

I have herein described a specific construction, which I believe to be the best and cheapest; but I wish it distinctly understood that the scope of my invention is not limited to any particular construction or arrangement of parts. For instance, the operating-rod may be independent of the outlet, as indeed may for some purposes be found desirable. In that case the check-valve would be located differently. A skillful mechanic would be able to arrange the principle of operation in several different ways. The chief characteristic of my invention is an air-chamber and piston, operating after the closure of the valve to forcibly eject the column in the outlet.

What I claim as new and desire to secure is as follows:

1. The combination of a hydrant-valve with an air-cylinder and piston, whereby the waste is forcibly expelled, substantially as described.

2. The combination of an air-cylinder and piston with the outlet-pipe of a hydrant-valve, whereby the waste may be forcibly expelled through the regular bib or nozzle, substantially as specified.

3. The combination, substantially as described, of an air-cylinder and piston with a hydrant-valve, the piston and valve being connected and co-operating, so that the act of closing shall operate to seat the valve and expel the waste.

4. The combination, specifically, of tubular outlet F, carrying a piston, tubular valve-stem E, carrying a valve, and the chambers B and A, separated and communicating, substantially as and for the purposes shown and described.

5. The combination of chamber A and open cage D with tubular valve-stem E, substantially as and for the purpose set forth.

6. In combination with the tubular stem E, having flange *f*, the enlarged outlet F, having washer *m* secured thereto, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 26th day of July, 1877.

WILLIAM PORTEOUS.

Witnesses:
A. V. D. WATTERSON,
A. HANAUER.