

(No Model.)

2 Sheets—Sheet 2.

J. H. McGOWAN.
BACK PRESSURE VALVE.

No. 446,002.

Patented Feb. 10, 1891.

Fig. 4.

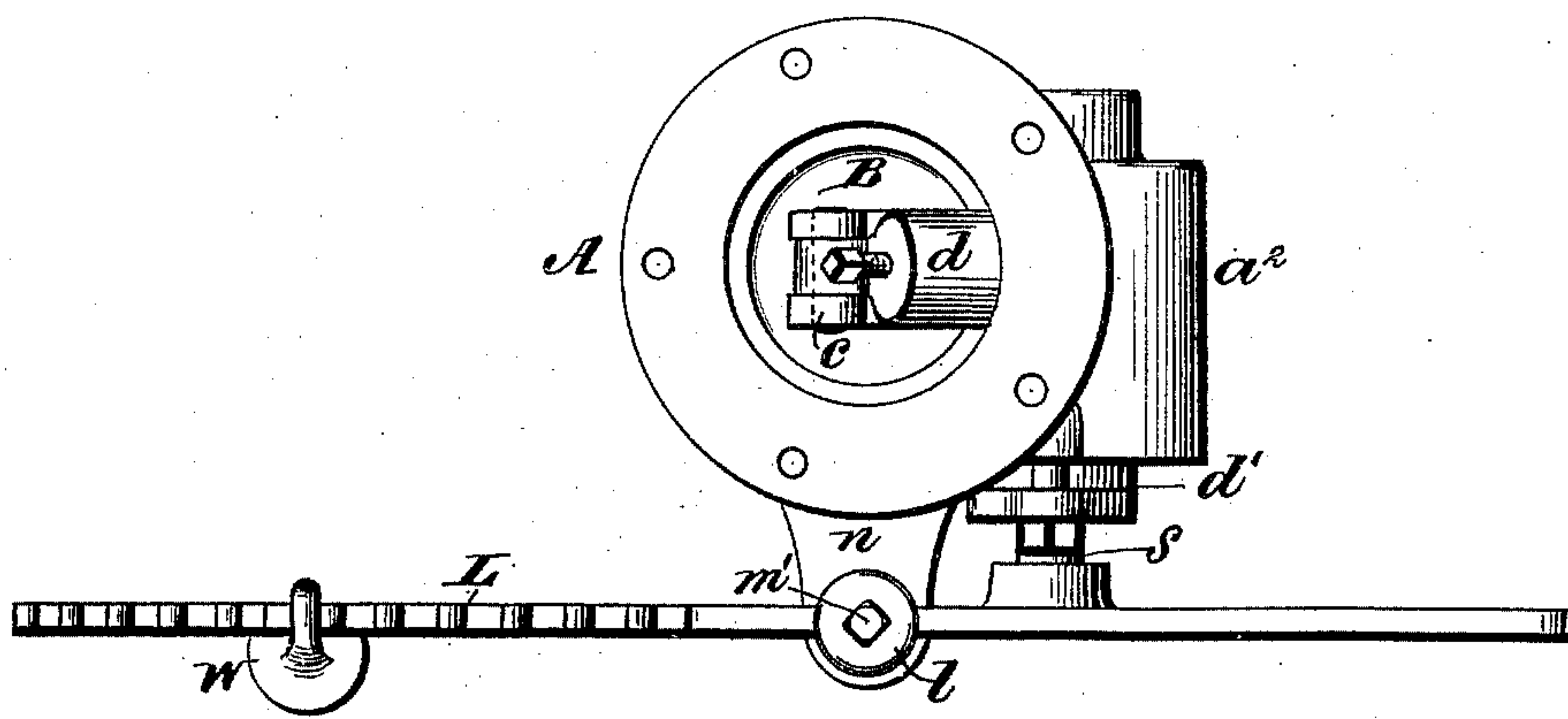


Fig. 5.

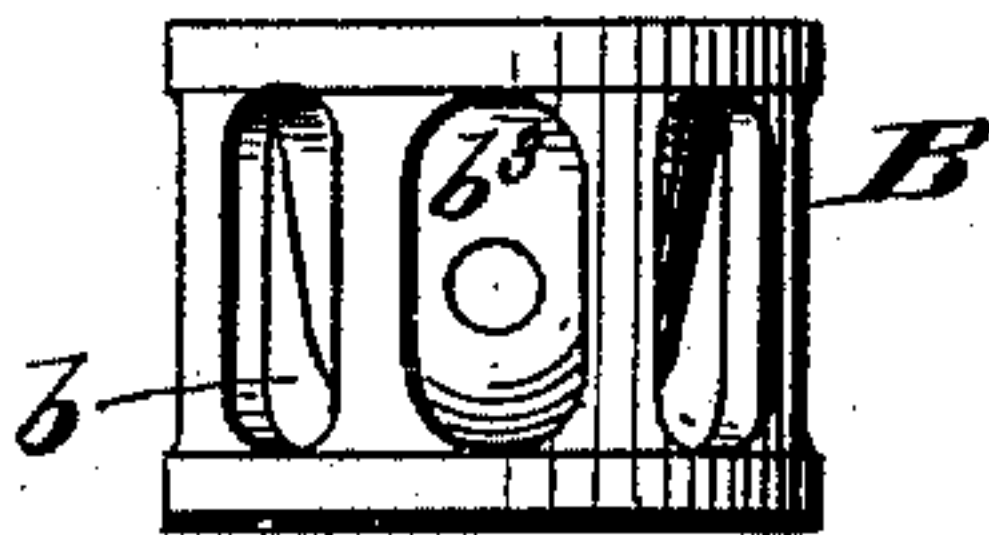
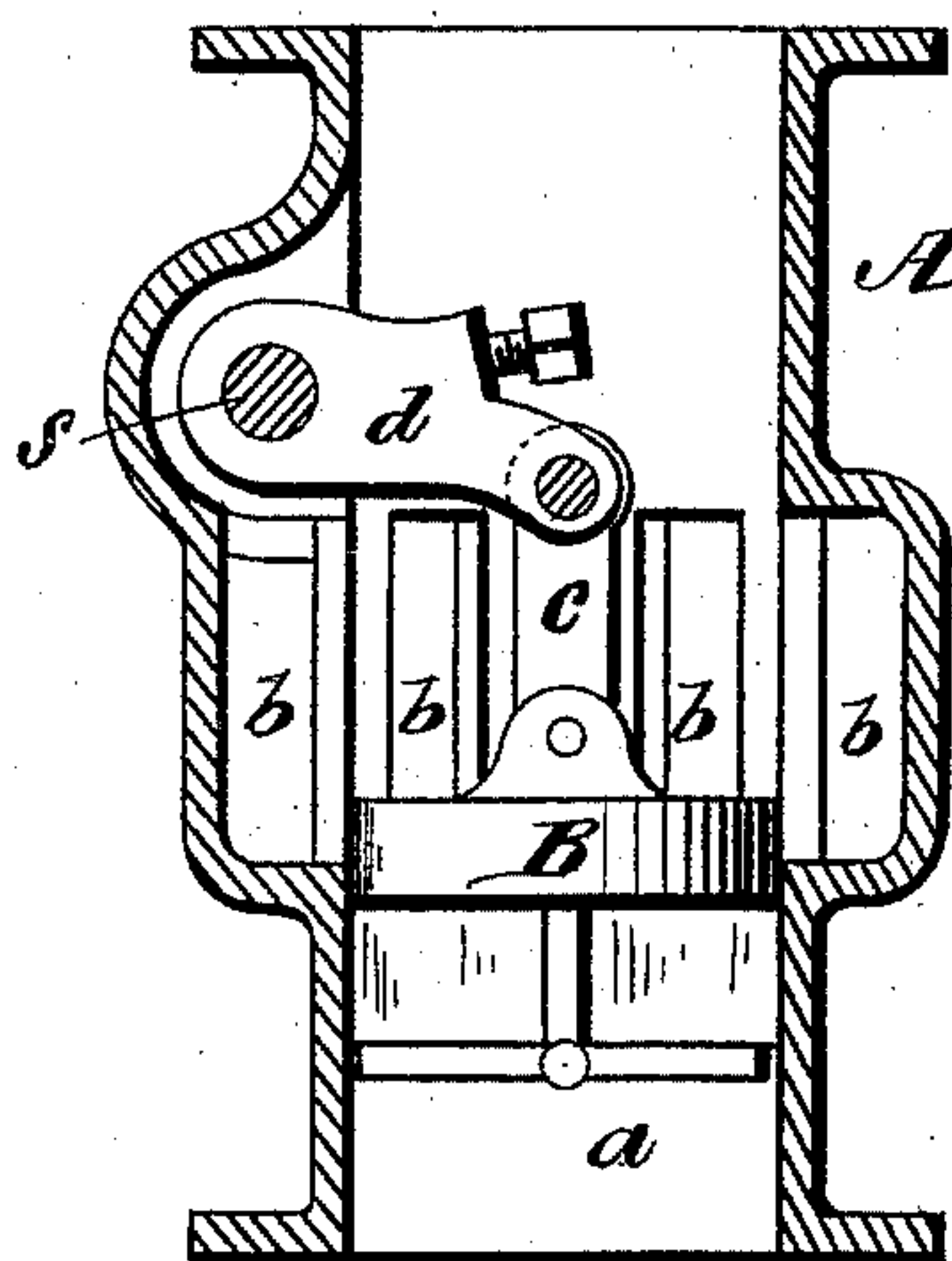


Fig. 6.



Witnesses,
Robert Everett,

Dennis Sumby.

Inventor:
John H. McGowan,
Bu.

By
H. H. Moses.
Atty.

UNITED STATES PATENT OFFICE.

JOHN H. MCGOWAN, OF CINCINNATI, OHIO.

BACK-PRESSURE VALVE.

SPECIFICATION forming part of Letters Patent No. 446,002, dated February 10, 1891.

Application filed October 25, 1890. Serial No. 369,343. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. MCGOWAN, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Back-Pressure Valves, of which the following is a specification.

My invention relates to "back-pressure" valves used in various situations, a convenient illustration of which is found in the exhaust-pipes of steam-engines, where the exhaust-steam is utilized for steaming lumber, warming buildings, cooking feed, &c. In such cases it is found desirable to employ a back-pressure valve placed at a point in the outlet-pipe beyond the branch by which the steam is conducted to the radiators or other apparatus in which its secondary use is realized. As the steam is primarily exhausted from the engine in intermittent discharges of considerable force, an ordinary "lift-valve" resting upon a seat by gravity is objectionable, as the repeated lifting and reseating wears and injures the seat and valve, besides being noisy and liable to "stick" and fail to operate. Again, a spring to hold the valve to the seat is objectionable, because the rusting of parts is liable to interfere with its operation, and also because the constantly-repeated strains soon destroy its elasticity. A further condition which I have endeavored to provide for is that the parts should be of simple construction and operation, requiring little or no skill or attention to keep in perfect operative order, since the valve is usually located in places inconvenient of access and attention.

To these ends my invention consists in the valve and attachments, constructed and arranged as hereinafter more fully set forth, embodying as a preferred constructive principle a hollow cup or piston valve with side openings, having no seat upon which it rests, but held in position by a weighted lever arranged exteriorly to the valve-casing, with an adjustable elastic buffer engaging upon an abutment to regulate the ultimate position of the valve.

Mechanism embodying my invention is illustrated in the accompanying drawings, in which—

Figure 1 is a cross-sectional view of the valve-casing and valve, showing the operative

position of the parts and their attachments; Fig. 2, a side elevation from the rear side of Fig. 1; Fig. 3, a rear elevation; Fig. 4, a plan view; and Fig. 5, a side elevation of the valve detached; Fig. 6, a cross-sectional view illustrating a mechanical modification in construction.

Referring now to the drawings, A designates the valve-casing, and B the valve. The casing is tubular, having its lower portion *a* bored to a true cylindrical internal surface, and its upper portion *a'* enlarged into a passage-chamber, said upper portion being further enlarged at one side *a²* to receive the pivotal stud *s* of the lever system, presently to be described.

The valve B is a piston in cup form of sufficient depth to form its own guide, having side openings *b*, closed top *b'*, and an open bottom *b²*. The piston B is turned exteriorly to fit easily the cylinder *a* of the valve-casing and to act as a valve by lifting past the upper margin of the cylinder *a* into the enlargement *a'* until its side openings *b* permit the steam entering the valve-casing from below in the direction of the arrow, Fig. 1, to pass outward through said side openings *b* into the enlarged chamber *a'* and thence through the casing outward. The upper limits of the side openings *b* are narrowed gradually to regulate the outward flow of steam and thereby ease the movements of the valve.

The top plate of the cup-valve B is formed with a depression *b³*, in which is pivoted a short link *c*, pivoted in turn to a short arm or crank *d*, carried upon a rotating stud *s*. The latter has a socket-bearing in one side or end of the enlargement *a²* and projects through a stuffing-box and gland *d'* at the other and carries at its outer extremity a lever-arm L. The lever-arm L may be provided with an adjustable weight *w*, and is further provided with a socket enlargement *l*, in which is placed a buffer-block *m*, preferably of india-rubber or other slightly-elastic material, engaging upon a shelf or bracket *n*, formed upon the casing A. A set-bolt *m'*, threaded into the cavity of the socket enlargement *l*, bears against the buffer *m* and adjusts its position, and by consequence the relative position of the valve B. The lever-arm L may be ex-

tended on the opposite side of its pivot *s*, as a means by which the valve may be held to its open position when out of use.

In operation the pulsations of steam lift the valve *B* against its own weight and that of the weight *w* until the excess of pressure is relieved and the valve sinks as far as permitted by the buffer *m*.

It will be seen from the construction that the parts may be cast complete, requiring only the drilling of bolt-holes, boring of the cylinder *a*, and turning off of the stud *s* and valve *B*, and consequently the entire apparatus may be produced at little cost. It will be observed, also, that the nature of the moving parts is such as to involve but slight frictional resistance and the wearing parts are all within the steam-space and lubricated by the steam. In practice the weight is so adjusted as to give the required pressure in the branch conduit (not shown) and produce a slight oscillation of the lever *L* at each pulsation of the discharge. The continual motion thus keeps the wearing parts always bright and smooth and reduces friction to a minimum and entirely avoids all tendency to bind or to in any way fail to act. The apparatus is thus durable and requires no special attention.

It will be obvious that an ordinary piston-valve operating in connection with graduated side openings of the casing, as illustrated in the modification shown in Fig. 6, will produce the same results; but I prefer the construction first described.

I claim as my invention, and desire to secure by Letters Patent of the United States—

1. In a back-pressure valve, a piston-valve, a cylindrical valve-casing provided with an

enlargement, an external oscillating valve-lever mediatly and operatively connected with the valve and provided with a buffer, and a limiting-abutment against which the buffer engages to determine and regulate the closure of the valve, combined and operating substantially as set forth.

2. The combination of a valve-casing having a cylindrical portion terminating in an enlargement, an inverted-cup piston-valve having side delivery-openings, lever connections for said valve within the casing, a rotating projecting stud, an external weighted valve-lever, and an elastic buffer and abutment limiting the play of the lever and valve, substantially as set forth.

3. In a back-pressure valve, the combination of the casing *A*, valve *B*, link *c*, arm *d*, stud *s*, lever *L*, buffer *m*, and bracket *n*, substantially as set forth.

4. In a back-pressure valve of the character described, the combination of a cylindrical valve-casing, a piston-valve operating in relation to side openings, an external valve-lever mediatly connected with said valve, a fixed abutment limiting the movement of the lever, and an adjustable buffer determining the relation of the lever to the abutment and of the valve to its cut-off position, substantially as set forth.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

JOHN H. MCGOWAN.

Witnesses:

L. M. HOSEA,
ELLA HOSEA.