W. R DUNLAP.

Improvement in Balanced-Valves.

No. 132,526. Patented Oct. 29, 1872.

Fig.1.

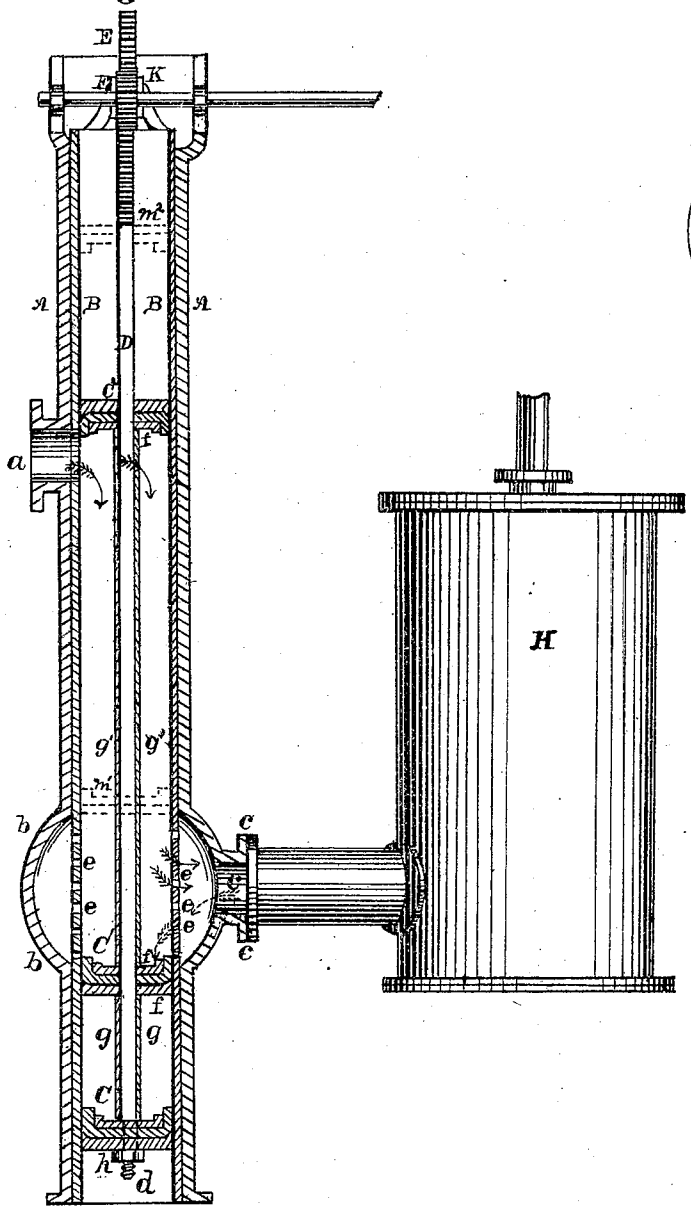
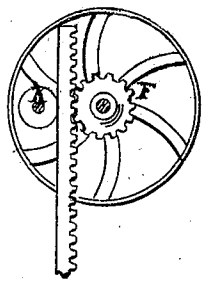


Fig.2.



Attest.

P. M. Shuey

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UNITED STATES PATENT OFFICE.

WILLIAM R. DUNLAP, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-HALF HIS RIGHT TO WARREN WARNER, OF SAME PLACE.

IMPROVEMENT IN BALANCED VALVES.

Specification forming part of Letters Patent No. **132,526**, dated October 29, 1872.

To all whom it may concern:

Be it known that I, WILLIAM R. DUNLAP, of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Improvement in Valves, of which the following is a specification:

My improvement consists of a cylinder containing three or more pistons secured to a rod in such relative positions to the ports of the cylinder as to sustain an equilibrium or counterbalance of pressure at all times and in whatever position or motion the pistons may be.

In the accompanying drawing, Figure 1 is a central longitudinal section of the valve, the cylinder of which has a double casing; and Fig. 2 is a view of the valve-gear.

A is the exterior casing, which may be cast in one piece with the branch-pipe *a* and the annular enlargement *b*, which terminates in an exit-pipe, *c*, communicating with a hydrostatic press or other reservoir, H. B is the inner casing, accurately fitted to the exterior, except within the annular enlargement or chamber *b*, and bored true on the inner surface to secure a water-tight movement of the pistons. *e e* are orifices, in consecutive diagonal rows, in the inner casing B within the chamber *b*. Through these orifices the current is conducted into the reservoir H, or discharged thence through the flume *d*. The pistons C, C^1, and C^2 are secured on the valve-rod in their proper position by means of pipes *g g'*, inclosing the rod between the pistons, collars *f*, and nut *h*. The relative positions of the pistons are governed by the size and location of the ports *a* and exit-pipe *c*. The distance between pistons C^1 and C^2 should not be less than the distance between the lower part of the chamber *b* and the upper side of the branch-pipe *a;* and the distance between the pistons C and C^1 should be sufficient to inclose between them all the orifices *e e*.

To illustrate the mode of operating my valve: In the position shown the pistons would permit an uninterrupted flow through the orifices *e* into the reservoir H, and the pressure would equiponderate the two pistons C^1 and C^2. Assuming the pistons C^1 and C^2 to be moved to the point indicated by the dotted lines m^1 m^2, respectively, thus making the piston C to occupy the former place of C^1, the flow will cease, but the equilibrium continues, as there will be an equal counter-pressure upon the adjacent faces of the pistons. In this position a discharge from the reservoir H through the flume *d* is prevented by the piston C, which permits and regulates this discharge by being moved past the orifices *e*, and in any position will sustain an equal counter-pressure with the under surface of the piston C^1. Thus it will be seen that in whatever position the pistons are placed within their limits in the cylinder there will be an equal counter-pressure upon any two adjacent faces of such pistons, and, consequently, an equilibrium of pressure upon the piston-rods.

What I claim is—

1. The pistons secured to a piston-rod within a cylinder, substantially as described, whereby the pressure through a port therein will counterbalance any two adjacent pistons between which such port is located.

2. The pistons C, C^1, and C^2, fixed to the piston-rod, in combination with the ports *a* and *c*, substantially as herein set forth, and for the purpose specified.

3. The pipes *g g'*, in combination with the piston-rod D and pistons C, C^1, and C^2, substantially as and for the purpose set forth.

4. The chamber *b*, in combination with the orifices *e* and pistons C and C^1, substantially as and for the purpose set forth.

5. The collars *f*, in combination with the pipes *g g'*, nut *h* or its equivalent, and pistons C, C^1, and C^2, for the purpose set forth, and substantially as herein described.

WILLIAM R. DUNLAP.

Witnesses:

B. STORER, Jr.,

JOHN E. HATCH.