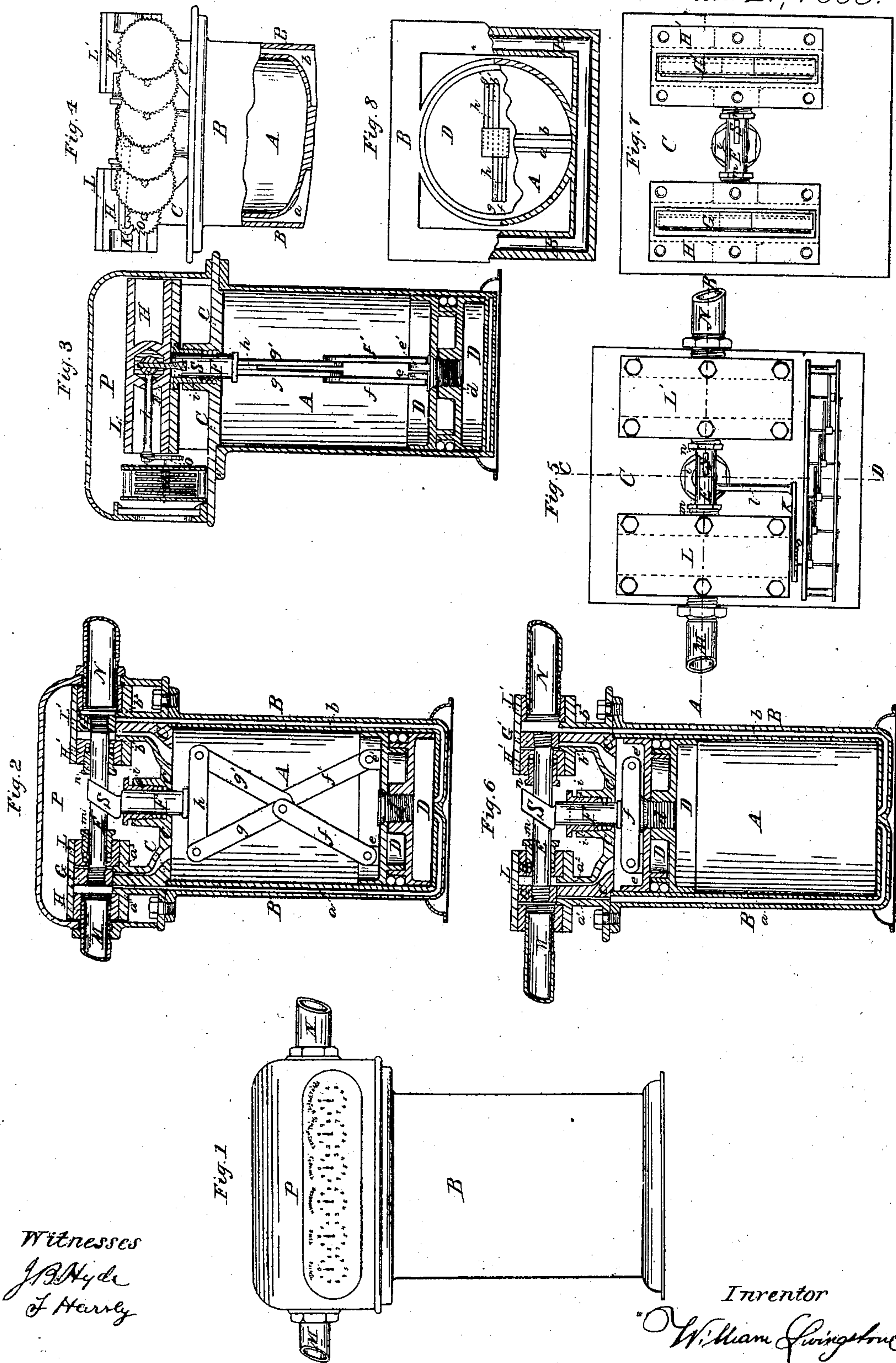


W. Livingstone.

Water-Meter.

N^o 73537

Patented Jan. 21, 1868.



Witnesses
J. B. Hyde
J. Harvey

Inventor

William Livingstone

United States Patent Office.

WILLIAM LIVINGSTONE, OF NEW YORK, N. Y.

Letters Patent No. 73,537, dated January 21, 1868.

IMPROVEMENT IN WATER-METERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM LIVINGSTONE, of the city of New York, in the county and State of New York, have invented a new and improved Apparatus for Measuring Water or other Fluids; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings making a part of this specification, and the letters of reference marked thereon.

Figure 1 is an elevation, showing the apparatus completely fitted up for erection, and the safety of all the working parts of it from being tampered with.

Figure 2 is a longitudinal section through A B in fig. 5, representing the interior of the apparatus when the piston is at the bottom of the stroke, and the respective position of the valves for the coming-up stroke of the piston.

Figure 3 is a transverse section through C D, in fig. 5.

Figure 4 is a part elevation without cover, showing the connection of the apparatus with the index.

Figure 5 is a plan without cover, showing, likewise, the connection of the apparatus with the index.

Figure 6 is a longitudinal section through A B, in fig. 5, showing the interior of the apparatus when the piston is at the top, and the relative position of the valves for the coming-down stroke of the piston.

Figure 7 is a plan showing valves, valve-chamber, and ports.

Figure 8 is a sectional plan of the cylinder and casing, showing the piston at the bottom of it, likewise the water-ways between the cylinder and casing, and their communication with the interior of the cylinder.

A is a cylinder, in a rectangular or other-shaped casing, B, the spaces between the outside periphery of the cylinder and the inside of the casing forming the water-ways, *a* and *b*, which run longitudinally from the top to the bottom, across the bottom of and emptying into the cylinder, figs. 2, 6, and 8. The top of the cylinder A and the casing B is closed by the cover C, figs. 2, 3, 4, 5, 6, and 7, the flanges of which are fastened by screws to the flanges of the casing B, and the packing between the flanges, and between the ring-shaped face of the cylinder A and the cover C, will produce a water-tight connection between the cylinder and the water-ways, and the water-ways and the exterior of the apparatus all around it, fig. 8. In the inside of the cylinder A is the piston D, consisting of two parts, fastened together by the screw *d*, and forming around the periphery a recess, for the packing to make a water-tight connection between the piston and the cylinder, figs. 2, 3, and 4. The top of the piston is jointed, by means of the projections *e* and *e'* and the links *f f'* and *g g'*, to the cross-piece *h*, which forms the lower end of the short rod F which passes through the stuffing-box *i* in the centre of the cover C, thereby producing a movable connection, between the piston inside of the cylinder, and certain parts hereafter to be described, outside of it, figs. 2, 3, and 6. The cover C has, diametrically opposite, two longitudinal projections, with two oblong holes in each of them. The outside holes *a'* and *b'* communicate with the water-ways *a* and *b*, and consequently with the interior of the cylinder below the piston. The two inside holes, *a''* and *b''*, communicate directly with the interior of the cylinder above the piston. The holes of one projection, viz, the holes *a'* and *a''*, are each of them equal in area to the supply-pipe, between which and the cylinder they will form a communication, either above or below the piston. The holes *b'* and *b''*, in the other projection, are of greater area, and will form a communication between the cylinder and discharge-pipe, from either above or below the piston opposite from the supply, figs. 2 and 6. On the faces of these projections move the slide-valves G and G', connected together by the rod E, figs. 2, 5, 6, and 7, which has, at equal distance from both ends of the valves, a slotted hole, in which the inclined piece S, forming the upper end of the short rod F, will slide up and down with F together, and thereby produce a horizontal movement of the rod E and the valves G and G', figs. 2, 3, 5, 6, and 7. The valve-boxes H and H' are fastened to these projections by flanges, and properly packed and closed at the top by the covers L and L', with the required packing between. The valve-box H is connected with the supply-pipe M, and the valve-box H' with the delivery-pipe N, figs. 2, 5, 6, and 7. Both valve-boxes are provided with stuffing-boxes, *m* and *n*, in which the valve-rod E will move water-tight, figs. 2, 6, and 7. To the valve-rod E is fastened the piece *l*, carrying the dog K, by means of which the ratchet-wheel *o*, fig. 4, will be made to revolve one tooth for every forward motion of the valves, and by transmission of motion to a series of pinions and wheels, in proportion of one-tenth the number of valve-strokes,

and consequently piston-strokes, representing either a unit or part of a unit, will be indicated on a dial in units, tens, hundreds, &c., of either gallons or cubic feet. The whole apparatus is enclosed by the cover P, figs. 1, 2, and 3, to be fastened in a suitable manner to the cover C.

The manner in which the apparatus is to work is as follows: Looking at fig. 2 of the accompanying drawing, and supposing the delivery-pipe N open, the water from the supply-pipe M will pass through the port a^1 and the water-way a , into the cylinder A, and, pressing against the bottom of the piston, raise the same and force the water above the piston, through the port b^1 , into the delivery-pipe N, to be discharged. In its ascent the piston will cause the links f and g , and f^1 and g^1 , to fold up, until all four will take a horizontal position side by side with the cross-piece h , and resting against it, when the piston, in its further upward way, will press against and lift links, cross-piece, and short rod F at the same time, whereby the inclined piece S will be made to work the valve-rod E, and reverse and have reversed the valves G and G' by the time the piston will have finished the up-stroke, as shown in fig. 6. The water from the supply-pipe will now pass through the port a^2 direct into the cylinder, and make the piston descend, at the same time forcing the water below the piston through the water-way b and port b^2 , into the delivery-pipe for discharge. The connection of the links with the cross-piece h , and with each other, being slack, and the short rod F moving in stuffing-box i , and water-tight packed, thereby offering a certain amount of resistance, it follows that in its descent the piston will unfold the links, without affecting the position of the rod F, until nearly at the bottom of the stroke, when the links will become fixed by closing against each other or against the projecting pieces e and e' , and the short rod F be moved downwards by its tightened connection with the piston, whereby the valves will again be reversed, and when the piston arrives at the end of the down-stroke the relative position of the different parts will be as shown in fig. 2. The connection of the apparatus with the index, by means of a dog, K, working in a ratchet-wheel, and a series of wheels and pinions, can be made in a suitable manner.

Claims.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The construction of a water or fluid-meter, consisting of a measuring-vessel or cylinder, enclosed in an outer casing or jacket, the intervening space or spaces forming the water-ways to and from the measuring-cylinder.

2. The combination of a piston with jointed plates or bars, or other proper flexible material, that will extend and close up with the motions of the piston, and give positive action to the valves at either end of the stroke.

3. The combination of a piston and intermediate flexible attachments with the valves, either slide-valves or other valves, by means of the rod F and its inclined plane S, working the valve-rod E, or, by means of a bell-crank or other lever, taking motion from the piston at certain points of the stroke, and transferring the same to the valves, substantially as described.

WILLIAM LIVINGSTONE.

Witnesses:

J. B. HYDE,
F. HARVEY.