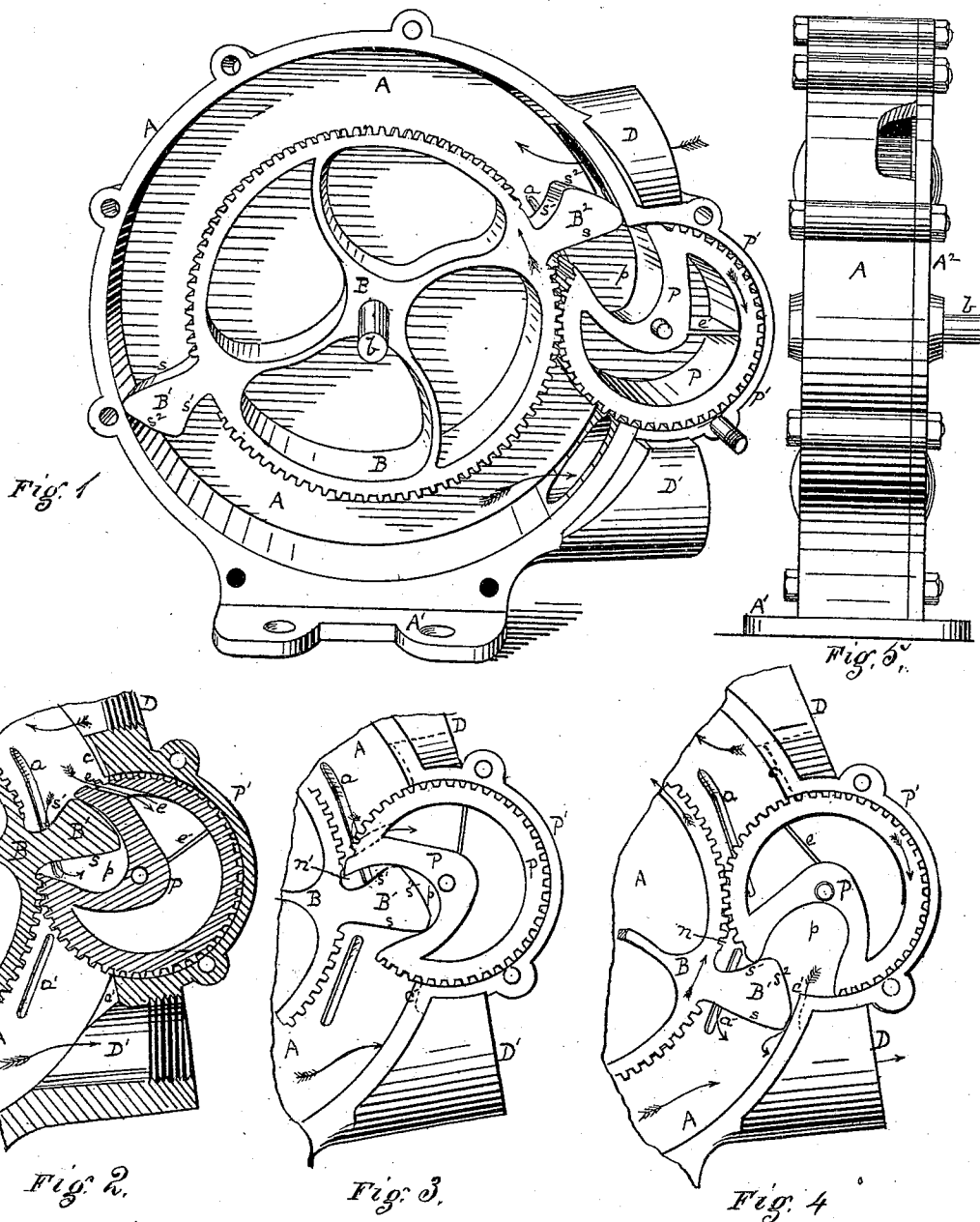


J. B. BUTTON.
WATER-METER.

No. 175,659.

Patented April 4, 1876.



Witnesses
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Claudius L. Parker

Inventor John B. Button.
By George H. Christy
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UNITED STATES PATENT OFFICE.

JOHN B. BUTTON, OF CLEVELAND, OHIO.

IMPROVEMENT IN WATER-METERS.

Specification forming part of Letters Patent No. **175,659**, dated April 4, 1876; application filed December 18, 1875.

To all whom it may concern:

Be it known that I, JOHN B. BUTTON, of Cleveland, county of Cuyahoga, State of Ohio, have invented or discovered a new and useful Improvement in Water-Meters; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a side elevation in perspective of my improved meter, with the cap or one side of the case removed. Fig. 5 is an end view thereof; Figs. 2, by a sectional view, and Figs. 3 and 4, by plan views, of a detached portion, illustrate its operation, as presently to be explained.

The cylindrical case A rests on any suitable base, A¹, and the open side of Fig. 1 is closed by a cap, A², Fig. 5. In the axial line of the case, with suitable packing at the bearings, is a shaft, b, which carries the main wheel B, the latter having on its periphery two or more pistons, B¹ B². This wheel and its pistons are designed to fit closely in the case, so as to work freely, but without serious loss by leakage. D is the receiving and D' the discharge port, made with suitable connections for supply and discharge pipes. The case A has between the ports D D' a semi-cylindrical enlargement, P', in which is a rotating valve, P, for closing water-communication on that side of the case, and opening a piston-communication at the proper time. This valve P has, in the main, a cylindrical form, and its diameter is a little in excess of one-half the diameter of the wheel B. The length of its cylindrical periphery is equal to the distance between the pistons B¹ B² measured on the periphery of the wheel, and both are provided with gear-teeth, as shown—the valve around the cylindrical part of its periphery and the wheel between its pistons. The valve P has a recess, p, in one side, of suitable form to receive each piston as it comes around and passes through the space intermediate between ports D' and D. In the bottom of the case A are two ports, a a'; also in its inner cylindrical face are two ports—one, e, leading from the supply-port D to the valve-

chamber P', the other, e', leading from the other side of the valve-chamber P' to the discharge-port D'. There is also a port, e, bored through the valve P, as shown, and a diaphragm, e', within the latter. The forms of the pistons B¹ B² are, preferably, that shown, the face s, against which the supply-pressure is intended to be operative, being radial, or nearly so, and the opposite face s¹ s² being full toward the middle, somewhat like a cam or eccentric.

The operation of this apparatus is substantially as follows: Starting with the wheel and valve in the position shown in Fig. 1 the liquid-pressure acts against the face s of the piston B¹ and water passing through the ports a or e, or both, into the recess p, balances the pressure on B² until the latter passes the port D, and then it receives the supply-pressure on its face s. Such pressure causes the wheel B to revolve and receive and discharge, as is usual in similar machinery, till the piston B¹ comes around to the position shown in Fig. 4. The gearing has by this time brought the recess p around to the proper position for receiving the piston B¹. The water in the recess p now escapes by the port e', and the water inclosed in the space n escapes by the port a'. Hence there is no material resistance to overcome at this point. The piston B¹ enters the recess p, and as soon as the gearing lets go it bears against the forward side of the recess and rotates the valve P, as illustrated in Figs. 3 and 2, so as to cause the gear-teeth again to mesh. As the piston B¹ comes to the position shown in Fig. 3 a space, n', is formed, which is filled by water through the port a. As the piston B¹ moves forward pressure on its face s is cut off, as shown in Fig. 2, and the face s¹ becomes subject to pressure from the supply. In order that the motion may not thereby be retarded I balance this piston by admitting water back of it through the port a, and the face s then presenting the larger area subject to pressure the tendency will be to propel it forward. The fluid-pressure, also acting through the port e against the diaphragm e', tends to aid the motion of the valve P. The motion is thus continuous without material inequalities of pressure on any part, and therefore

uniform. A definite amount of fluid will be discharged at each half revolution, and this being known the usual registry apparatus may be employed to indicate it.

The relative proportions of the parts may be considerably varied without departing from the scope of the invention. Both faces of the piston may be straight, though the cam or eccentric forward face is preferable.

The machine may be used for a pump or a water-wheel; but in so far as any changes may render it better adapted for such uses it will form the subject-matter of other applications; and while I have described the machine with particular reference to its use with water it may be employed in connection with other fluids, particularly petroleum and its distillates.

With an increase in the number of buckets the number of recesses in the valve must be increased or the valve decreased in diameter; but the mode of operation will remain the same.

It will be observed that the gearing does not extend continuously around either the wheel B or the valve P, but is segmental on both, and that so much of the motion of the

valve P as is not effected by the gearing is effected by the piston acting against the walls of the recess in the valve, and that while such piston is so acting it is balanced as against water-pressure by the use of ports, as described, the full effective water-pressure then acting against the other piston to produce the continued motion.

I claim herein as my invention—

1. In combination with wheel B, one or more pistons, B¹ B², and valve P, the port or ports *a' c'* opening from the inclosed spaces directly into the discharge, substantially as set forth.

2. In combination with wheel B, pistons B¹ B² and valve P, one or more ports, *a c*, for admitting fluid-pressure to the spaces inclosed, substantially as set forth.

3. In combination with valve P, a port, *e*, and diaphragm *e'*, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JOHN B. BUTTON.

Witnesses:

P. H. KAISER,
ALEX. HADDEN.