3 Sheets—Sheet 1.

A. C. BLOUNT & E. D. GILBERT.

Piston Water-Meter.

No. 211,493. Patented Jan. 21, 1879.

Fig 1.

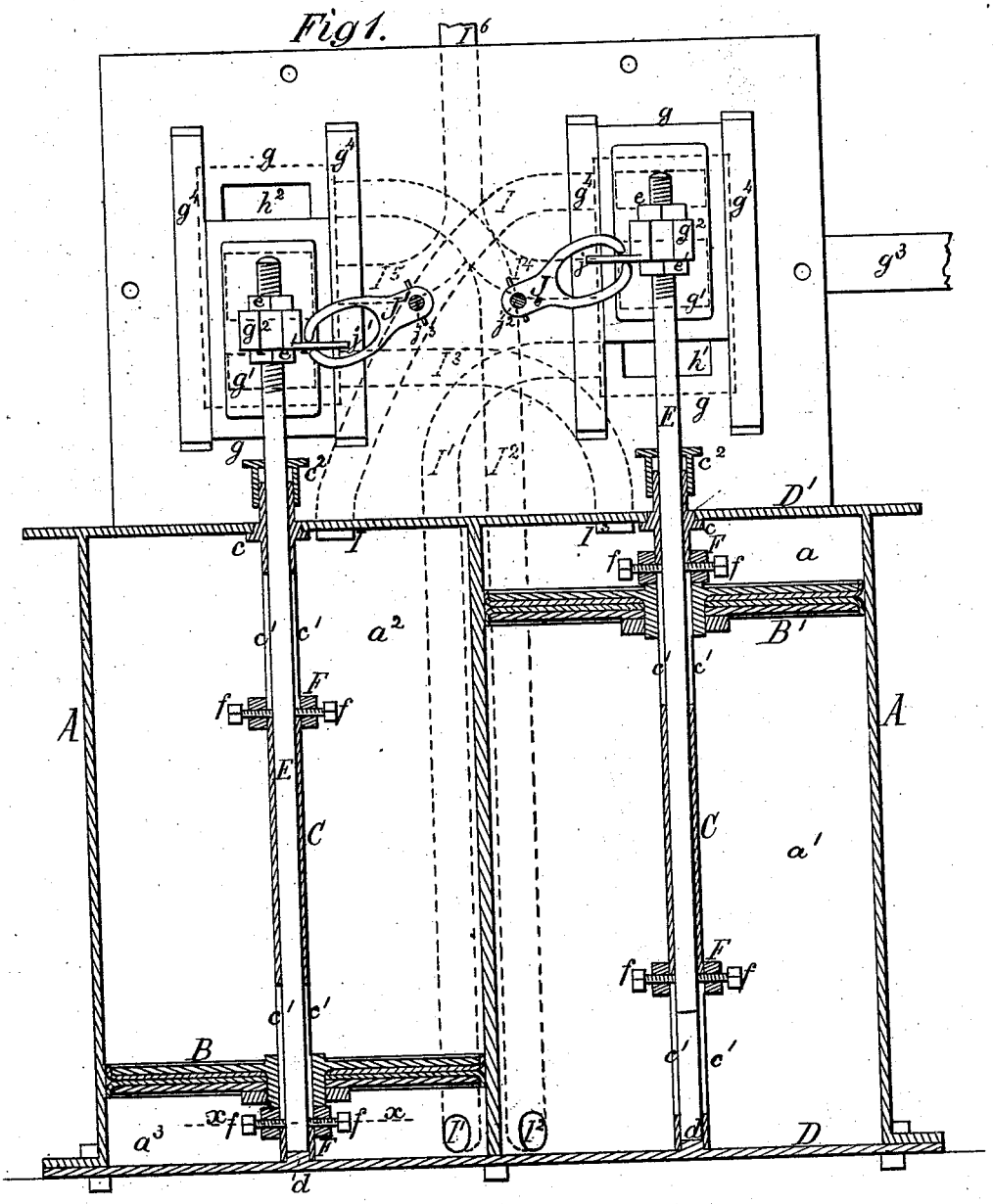

Fig 2.

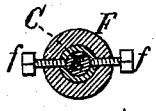

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Fig 3.

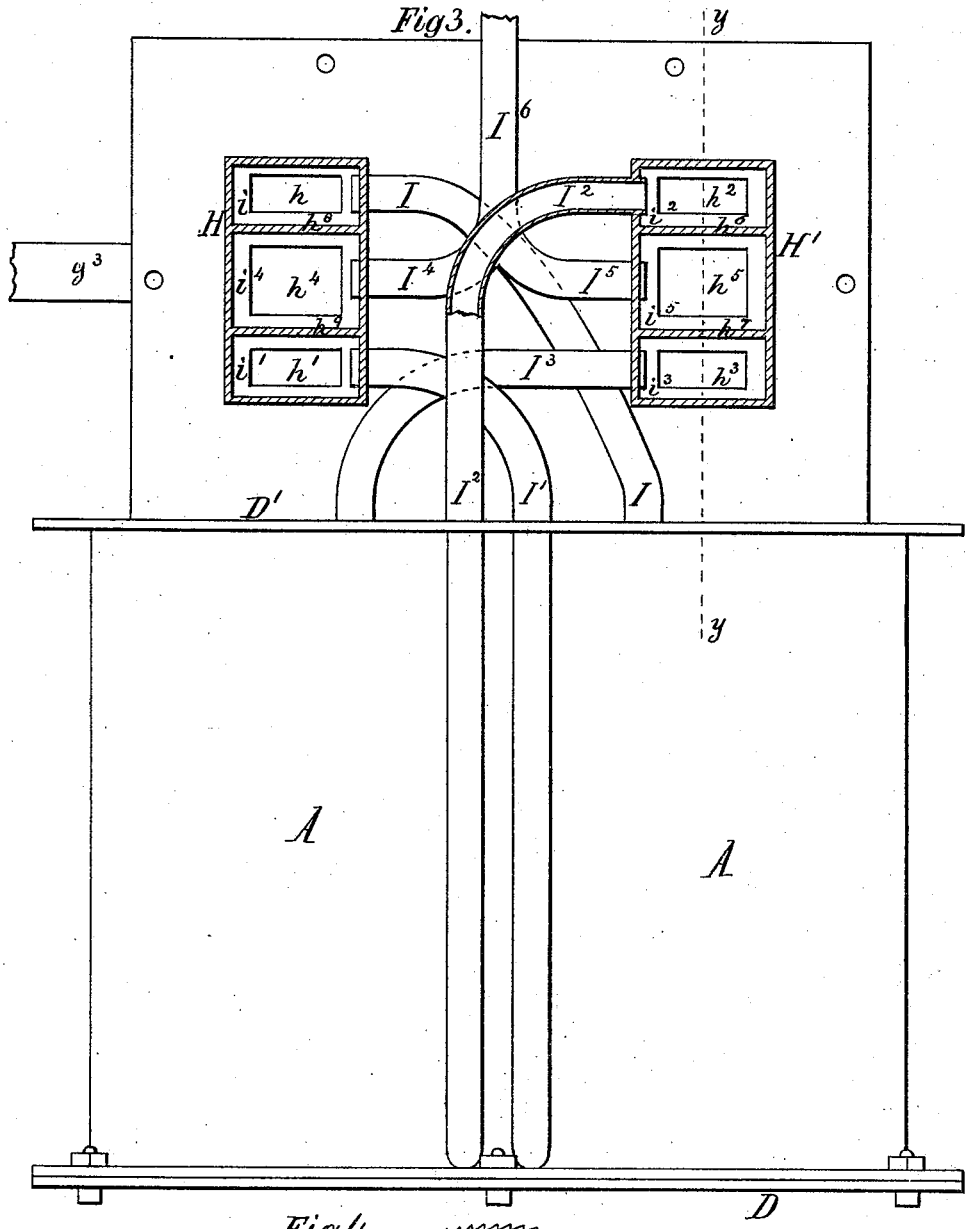

Fig 4.

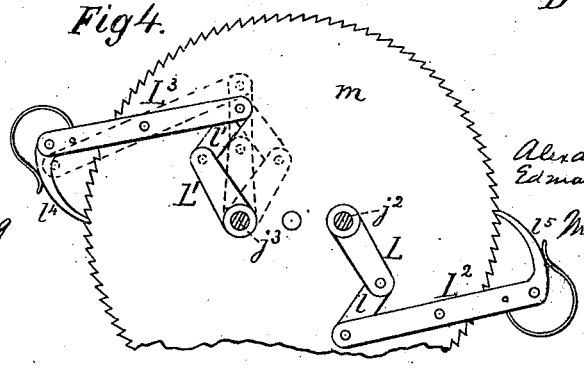

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Fig 5.

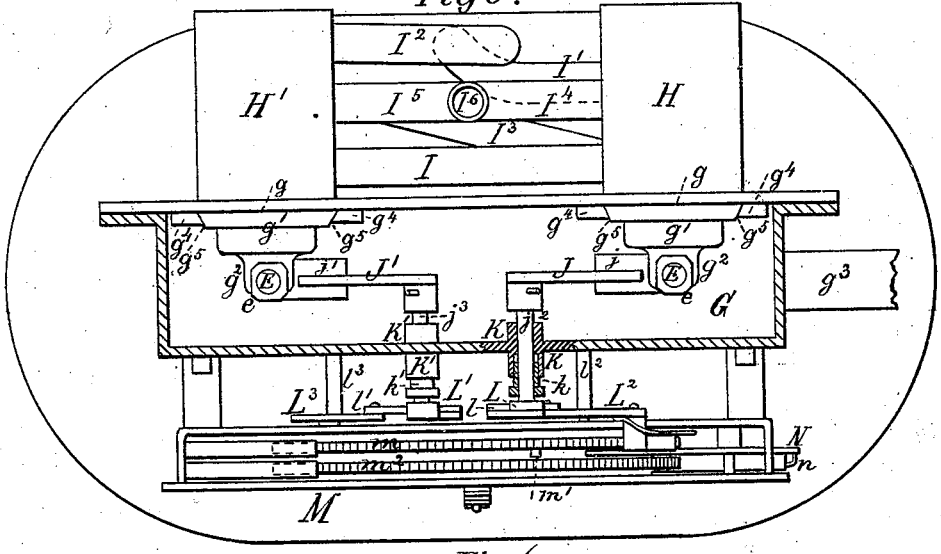
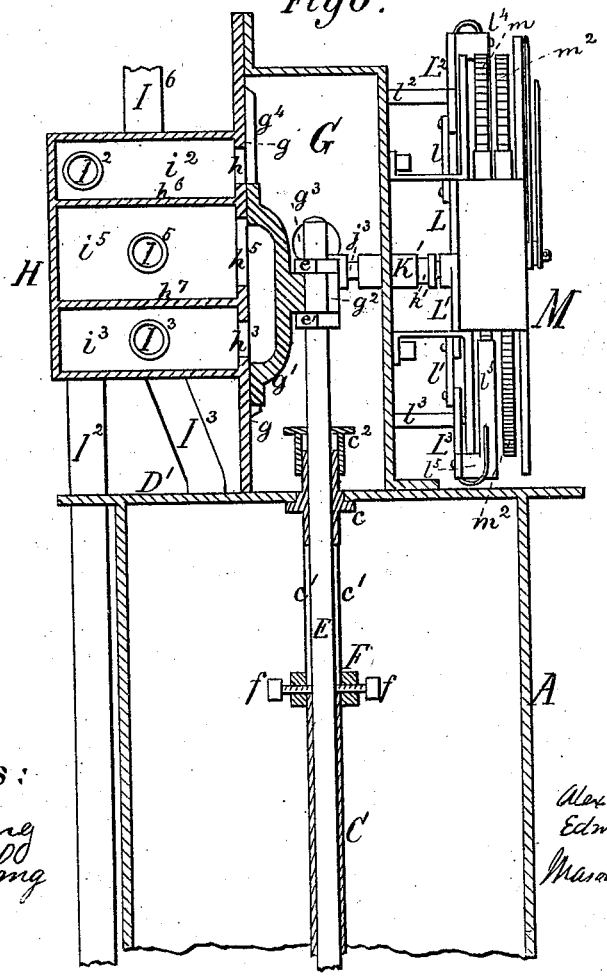


Fig 6.



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UNITED STATES PATENT OFFICE.

ALEXANDER C. BLOUNT, OF PENSACOLA, FLORIDA, AND EDMUND D. GILBERT, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN PISTON WATER-METERS.

Specification forming part of Letters Patent No. **211,493**, dated January 21, 1879; application filed November 1, 1878.

To all whom it may concern:

Be it known that we, ALEXANDER C. BLOUNT and EDMUND D. GILBERT, the former of Pensacola, in the State of Florida, and the latter of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Water-Meters; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part thereof, in which—

Figure 1 is a vertical central section through the cylinders and an elevation of the valve-chamber, the cover of the valve-chamber being removed. Fig. 2 is a horizontal section of the piston-rod in the line *x x* of Fig. 1. Fig. 3 is a rear elevation of the meter-cylinders and a section of the rear water-chambers, which connect with the valve-chamber and pipes of the cylinders. Fig. 4 is a diagram of the pawl-actuating mechanism of the register. Fig. 5 is a horizontal section through the valve-chamber and a plan view of the parts below the line of section; and Fig. 6 is a vertical transverse section in the line *y y* of Fig. 3, showing the register in elevation.

The nature of our invention consists in certain constructions, combinations, and arrangements of parts in a double-cylinder water-meter, which is provided with two slide-valves, connected with a registering mechanism, whereby, first, an alternate motion of the pistons is produced, and an uninterrupted flow of water from the meter is effected; second, the friction of the pistons is prevented from moving the valves before the pistons have made their full strokes, and a full stroke of the valves is secured; third, the length of the stroke of the piston is adjusted, and the amount of water measured and controlled; and, fourth, the registering mechanism is operated by the motion of the valves and pistons without any undue strain upon the connections between the valves and said mechanism.

In the accompanying drawings, A represents the shell of a double cylinder, having pistons B B′, which slide on central tubes, C. The bottom D of the shell A is provided with two central pins, *d*, upon which the tubes C are fitted. The upper parts of the tubes C extend through the top D′ of the shell A, and are kept steady between top and bottom by means of collars *c*.

The tubes C are provided with inner rods, E, and with slots c^1. The rods E are fitted into the tubes C, and are packed at the upper end of said tubes by means of stuffing-boxes c^2, of ordinary construction.

Above and below the pistons B B′ collars F are provided, which fit loosely upon the tubes C, and are fastened to the rods E by means of set-screws *f*, which latter pass through the slots c^1 of the tubes.

The top D′ is provided with a valve-chamber, G, having an outlet-pipe, g^3, two valve-faces, *g*, and two slide-valves, g^1. The slide-valves g^1 have forked lugs g^2, through which the rods E extend, and to which they are fastened by means of an upper nut, *e*, and a lower one, *e′*.

The valve-faces *g* are provided with vertical guide-strips g^4, between which the valves g^1 are inserted, so as to form a dovetail-joint connection, g^5, which prevents them from being lifted from their valve-seats. (See Fig. 5.)

The valve-faces *g* have supply-ports *h* h^1 h^2 h^3 and exhaust-ports h^4 h^5, similar to those of a steam-engine, and each such port is connected with a chamber behind the valve-face, as seen at *i* i^1 i^2 i^3 i^4 i^5 in Fig. 3. These chambers are formed by partitions h^6 h^7 h^8 h^9 within two closed chests, H H′, and each chamber is provided with a communicating-pipe in the following manner, reference being made to the meter as shown in position in Fig. 1: Chamber *i* is connected, through pipe I, with the upper space, a^2, of the left-hand cylinder. Chamber i^1 is connected by a pipe, I^1, with lower space, a^3, of the same cylinder. Chamber i^2 is connected by a pipe, I^2, with the lower space, a^1, of the right-hand cylinder. Chamber i^3 is connected by a pipe, I^3, with the upper space, *a*, of the same cylinder. The chamber i^4 is connected by a pipe, I^4, to an exhaust-pipe, I^6; and the chamber i^5 is connected to the same exhaust-pipe by a pipe, I^5. This exhaust-pipe I^6 is connected with a hydrant or water-cock of a dwelling.

The lugs g^2 are provided with plates *j* j^1, which are loosely clasped by the curved ends of two

forked levers, J J′, the shafts j^2 j^3 of which pass through suitable bearings K K′ in the back of the valve-chamber, and are packed by stuffing-boxes k k', as seen in Fig. 5. In Fig. 5 the line of section is lowered at one of these shafts, and a separate horizontal section along the center line of the shaft j^2 illustrates the construction of the said bearings and stuffing-boxes.

The shafts j^2 j^3 are provided with levers L L^1 outside the valve-chamber and behind a registering apparatus, M, which levers are connected by links l l^1 with two pawl-levers, L^2 L^3, swinging on suitable pins l^2 l^3, and having spring-pawls l^4 l^5, whereby the first counting-wheel, m, of the register is operated.

The arrangement of the levers L L^2 and L^1 L^3 is such that the levers L L^2, when operated by the valves, are caused to move back and forward over their dead-centers, and thus every movement of the valves is separately registered by the action of their respective pawls. The wheel m is made to count one hundred strokes of the pistons B B′, and is provided with a pin, m^1, whereby it operates a pawl-lever, N, with a spring-pawl, n, which latter operates a second counting-wheel, m^2, of the register, which wheel counts one hundred revolutions of the wheel m. The said wheels are each connected with a corresponding dial-finger in front of a doubly-graduated dial attached to the front plate of the register, and by this means 100×100 piston-strokes may be registered; and by adding another counting-wheel and correspondingly operating pawl and dial-finger, $100 \times 100 \times 100$, or one million, piston-strokes may be registered, and so on.

When the hydrant with which the exhaust-pipe I^6 is connected is opened, the water in the main or service pipe which is connected with the inlet g^3 enters the valve-chamber G and passes through the open port h^2, the chamber i^2, and pipe I^2 into the space a^1 of the right-hand cylinder, and moves the piston B′ up. Near the termination of its upward stroke the piston B′ comes in contact with the collar F and pushes it upward, thereby moving the rod E and the thereto-attached valve g^1 up until the set-screws f arrive at the end of the slot c^1. The port h^1 is now open, and the water passes from the valve-chamber through it and through the chamber i^1 and pipe I^1 into the space a^3 of the left-hand cylinder, causing the piston B to rise, while the piston B′ remains stationary. The piston B in terminating its stroke moves the collar F, rod E, and thereto-attached valve g^1 up, and thus exposes the port h^3. The water now passes through the said port, the chamber i^3, and pipe I^3 into the space a of the right-hand cylinder, and causes the piston B′ to descend, while the piston B remains stationary. The water below the piston B′ is, by the descending piston, expelled from the space a^1 and caused to pass through the pipe I^2, chamber i^2, port h^2, valve g^1, and port h^5 into the chamber i^5, and from thence through the pipes I^5 I^6 into the hydrant.

The piston B′, in finishing its downstroke, pushes the lower collar, F, the rod E, and the therewith-connected valve g^1 down, and thus the port h becomes exposed. The water in the valve-chamber now passes through the port h, chamber i, and pipe I into the space a^2 of the left-hand cylinder and forces the piston B down, while the piston B′ remains stationary. The water below the piston B is thereby caused to pass through the pipe I^1, chamber i^1, port h^2, valve g^1, and port h^4 into the chamber i^4, and from thence through the pipes I^4 I^6 to the hydrant.

Each stroke of the valves g^1 is recorded, as described, by the register.

The motion of the valves is such that when one begins to cut off its supply the other begins to open its supply, so that the steady flow of water through the hydrant is not interrupted by means of a partly-closed port.

The stroke of the pistons may be adjusted longer or shorter by changing the position of the collars F upon the rods E, and thus the quantity of water to be delivered by each piston-stroke may be controlled perfectly.

The valves g^1 being so arranged that each one operates the piston to which the other is attached, a full stroke is always secured for the valves, as well as a continuous steady operation of the meter.

The tubes C serve as central guides for the pistons and protect the rods E against premature operation, which would be caused by the friction of a piston if made to slide upon the tubes E.

Having described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. The two cylinders provided with the chambers G H H′ and pipes I I^1 I^2 I^3 I^4 I^5, applied as described, in combination with two valves, g^1 g^1, and two pistons, B B′, the valves and pistons being connected together by valve-rods E E, which carry abutments F, upon which the pistons operate directly for opening and closing the valves, substantially as and for the purpose described.

2. In a water-meter, the combination of a piston with a stationary guide-tube, C, having slots c, and a valve-rod, E, having collars F and set-screws f, substantially as and for the purpose set forth.

3. The combination of the two cylinders, the chambers G H H′, pipes I I^1 I^2 I^3 I^4 I^5, valves g^1 g^1, rods E E, tubes C C, and pistons B B′, substantially as and for the purpose described.

4. The combination of the register M with the valves g^1 by means of the forked levers J J′, plates j j^1, and shafts j^2 j^3, substantially as and for the purpose set forth.

ALEXANDER C. BLOUNT.
EDMUND D. GILBERT.

In presence of—
HENRY C. HAWKINS,
W. M. PACKER.