

H. R. Worthington,
Water Metre,
No. 13,320, Patented July 24, 1855.

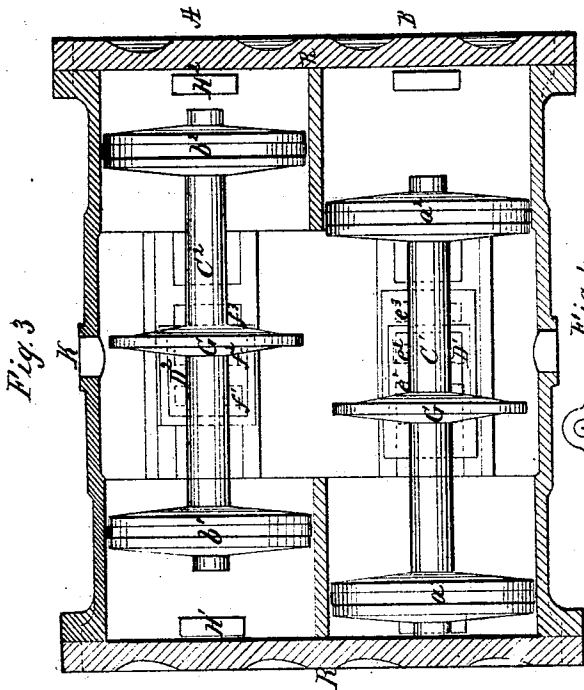


Fig. 3

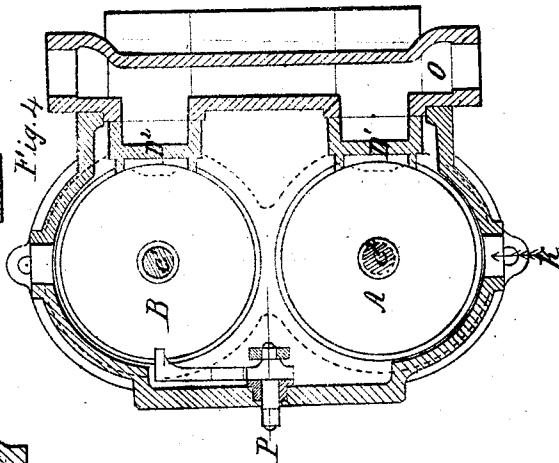


Fig. 4

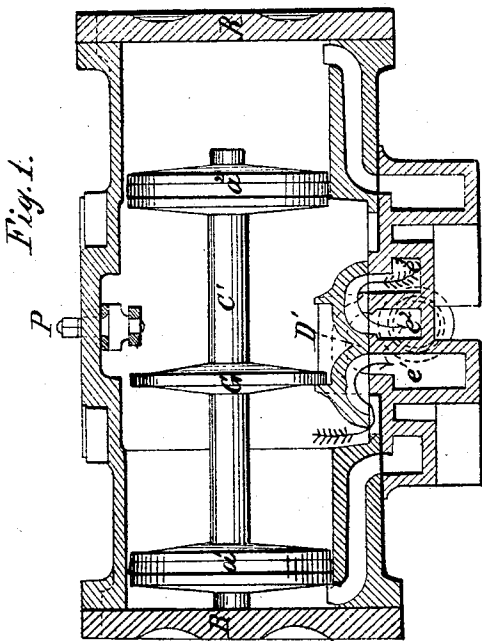


Fig. 1

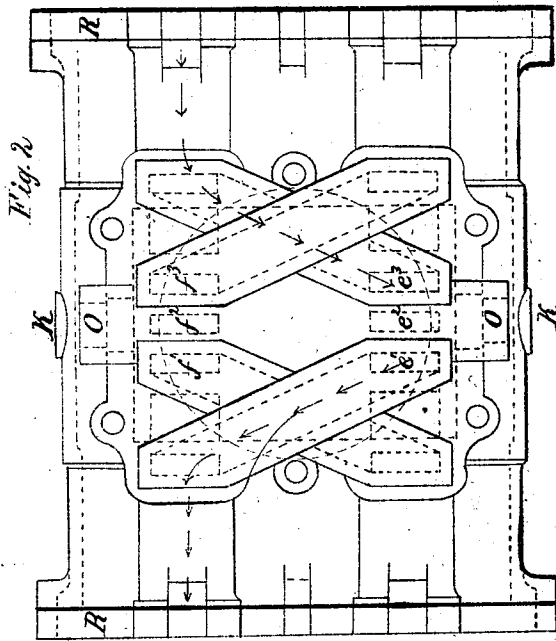


Fig. 2

Witnesses
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HENRY R. WORTHINGTON, OF BROOKLYN, NEW YORK.

WATER-METER.

Specification of Letters Patent No. 13,320, dated July 24, 1855.

To all whom it may concern:

Be it known that I, HENRY R. WORTHINGTON, of the city of Brooklyn, county of Kings, and State of New York, have invented a new and useful Meter for Measuring the Quantity of Flowing Liquids; and I do hereby declare that the following is a clear, full, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a longitudinal vertical section through one of the cylinders; Fig. 2, a bottom view, showing the arrangement and direction of the water passages; Fig. 3, a horizontal section through the middle of both cylinders; Fig. 4 a transverse section.

The general principle upon which the meter depends is the motion of a piston back and forth in a cylinder. As the motion of a meter requires to be positively exempt from all liability to stoppage at a point where it cannot again start, it has heretofore been found necessary in all reciprocating meters to adopt an arrangement analogous to the quarter crank of a steam engine, wherein one piston helps the other over the dead point, or else dispensing with cranks entirely to have an independent power such as a weight or spring for operating the valves which produce reciprocation. But in my improved arrangement I am enabled to dispense with all weights and springs while retaining the direct action of a piston, without crank or other device for producing rotary motion.

Instead of one cylinder and piston, as ordinarily used, I employ the two cylinders A, B as shown in the Figs. 2, 3 and 4. They may be cast together or placed side by side. Into these cylinders, properly bored out, are fitted the four pistons a^1 , a^2 , b^1 , b^2 , connected together in pairs by the rods C^1 C^2 . These pistons being single acting and moving in pairs each pair is to be considered as one piston. The cylinders also in which they traverse, are considered and described as two only, although separated and appearing like four, for the accommodation of the water valves between them.

Between the pair of pistons b^1 b^2 is placed a valve D^2 similar in form of construction and general principle of action to an ordinary steam slide valve. Between the pair a^1 a^2 is also placed a slide valve D^1 differing only from the last mentioned in having two cavities in its face instead of one.

This difference causes it to admit and discharge the fluid in a direction exactly contrary to what the last mentioned valve would if employed in the same place. These directions of the fluid are shown by arrows.

Three openings appear under each valve, e^1 e^2 e^3 being under the valve marked D^1 , and f^1 f^2 f^3 being under valve D^2 . They correspond to the well known induction and eduction ports over which an ordinary steam slide valve is worked in the case of locomotive engines.

The fluid to be measured is admitted under pressure to the space between the pistons a^1 a^2 b^1 b^2 through the opening K making equal pressure upon the interior faces of them all. As delineated in the drawing the pair a^1 a^2 is supposed to have just completed a stroke from right to left. The projection or disk G on the piston rod C^1 having been brought into contact with the valve marked D^1 has pushed it to the left far enough to admit the fluid into the passage e^1 . But this passage instead of communicating with the end of cylinder B in the middle of which the valve D^1 is located, is carried across diagonally into the end of cylinder A (as shown by the arrows in Fig. 2) which it enters at H^1 in Fig. 3. At the same time the delivery or discharged water shown by the arrow in Fig. 1 to be flowing from e^3 into e^2 and thence through the delivery passage O is flowing from cylinder A through opening H^2 Fig. 3 in the diagonal passage indicated by the arrows in Fig. 2. The pressure of the influent water having been thus established through the opening H^1 Fig. 3 upon piston b^1 , and an escape afforded for the fluid behind piston b^2 , through opening H^2 . This pair will move in a direction from left to right. The disk G coming in contact with the valve D^2 beneath it will push it across the openings. Similar diagonal passages to those before explained connect these openings to either end of cylinder B. They are clearly exhibited in Fig. 2. When the admission and discharge of fluid is thus again obtained for cylinder B the pair of pistons therein must of course return from left to right. On their way they in turn actuate the valve for cylinder A. Thus by mutual action upon the valves of the other, both pairs of pistons are compelled constantly and surely to reciprocate.

It is plainly easy to substitute an arrangement of levers for that of the valves

and diagonal openings herein shown, maintaining the peculiarity of reciprocal action upon the two valves. Neither is it necessary that the different pairs of pistons should be of the same size, nor arranged in the same position and relation in regard to each other so long as the one pair is made to actuate the valve or valves of the other and vice versa.

10 The counter or register is not shown in the drawing, not being essential to the machine. It may be constructed in any way well known and attached to a rod projecting through a stuffing box as at P, Fig. 4.

15 The cylinders A and B are furnished with heads R, R, properly packed.

Having thus described my invention and exhibited a practical way of carrying the same into useful operation, what I claim as

new therein and desire to secure by Letters Patent is,—

The employment of two cylinders which may be distinguished as cylinders Nos. 1 and 2 with pistons working in the same, so arranged and combined with regard to each other as that the motion of the piston in cylinder No. 1 shall actuate the supply and delivery valve of cylinder No. 2, while in like manner the motion of the piston in cylinder No. 2 actuates the supply and delivery valve of cylinder No. 1, thus producing a positive and direct motion as herein fully set forth.

HENRY R. WORTHINGTON.

Witnesses:

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