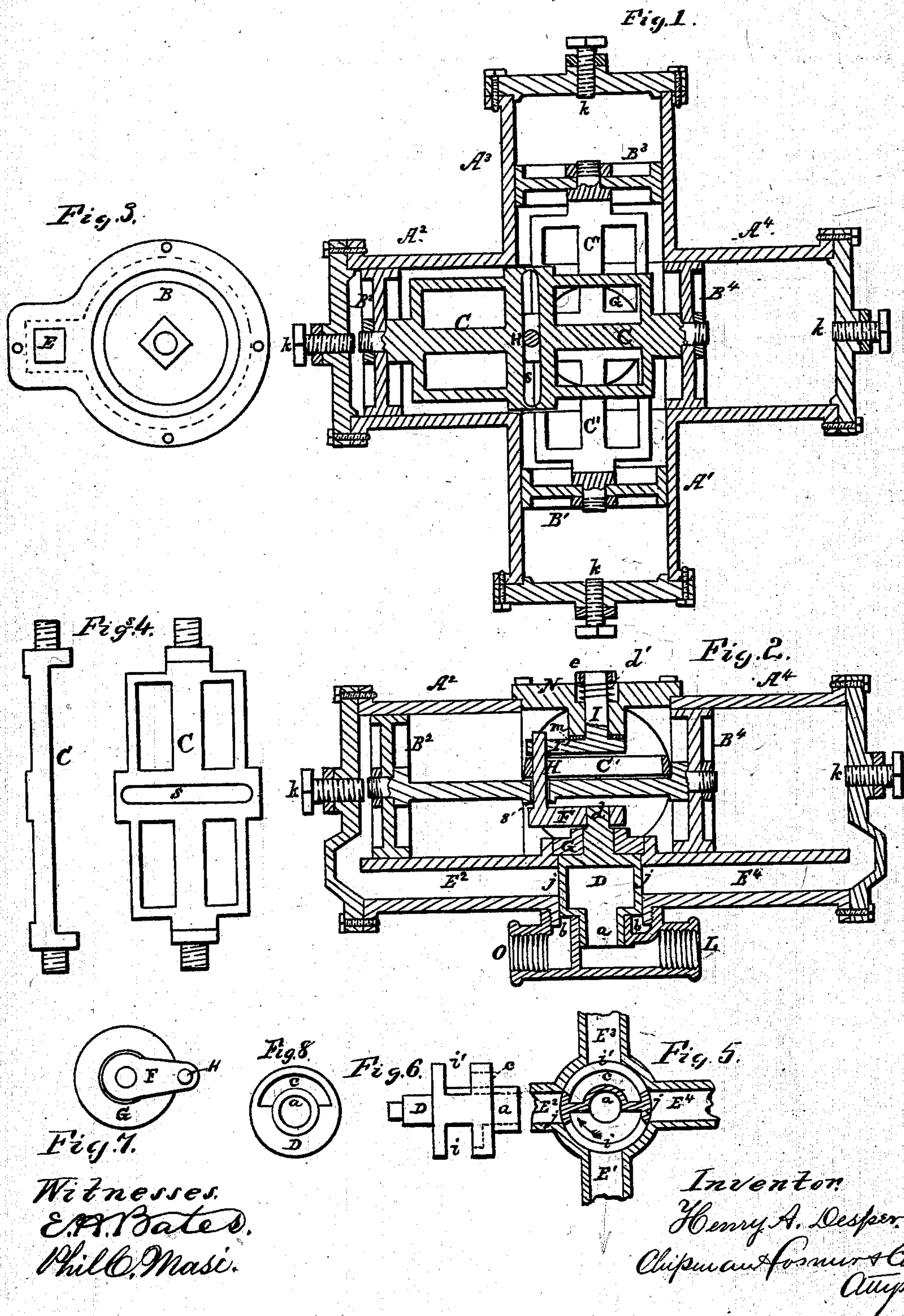


H. A. DESPER.
Fluid-Meters.

No. 144,747.

Patented Nov. 18, 1873.



UNITED STATES PATENT OFFICE.

HENRY A. DESPER, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN FLUID-METERS.

Specification forming part of Letters Patent No. **144,747**, dated November 18, 1873; application filed September 13, 1873.

To all whom it may concern:

Be it known that I, HENRY A. DESPER, of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and valuable Improvement in Fluid-Meters; 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 to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a horizontal section of my fluid-meter. Fig. 2 is a vertical transverse section of same. Figs. 3, 4, 5, 6, 7, and 8 are details of same.

The object of this invention is to employ four cylinders, which radiate from a common center, and in which four pistons reciprocate, that are connected together in pairs, and arranged in the same plane; also, to connect the two right-angular piston-rods of the four pistons directly to a rotating inlet and outlet valve by means of a crank, the wrist-pin of which plays in slots made transversely across the connecting-rods.

The body of the meter consists of four cylinders, $A^1 A^2 A^3 A^4$, which radiate from a common center, and form four right angles. These cylinders are all in the same plane, and through the center of each one of the heads an adjusting-screw, k , is tapped, as shown in Figs. 1 and 2. Inside of the cylinder A^1 is fitted a piston, B^1 , which is connected, by means of a broad open rod, C , to a piston, B^3 , working inside of the cylinder A^3 ; and inside of the cylinder A^2 is fitted a piston, B^2 , which is connected, by a corresponding rod, C , to a piston, B^4 , working inside of the cylinder A^4 . It will thus be seen that there are four pistons, which are connected together in pairs by two rods arranged at right angles to each other. The axes of the pistons are all in the same plane, and the piston-rods $C C'$ are halved together, so that they cross each other above and below said plane without interference. This is represented in Fig. 2, and the construction of the rods is more clearly represented by Fig. 4, wherein it will be seen that one longitudinal half of each rod is cut away. The connecting-rods have slots s made transversely through them at the middle of their length, through

which slots passes freely the wrist-pin H of a crank, F . This crank F is keyed on the upper solid stem d of a cylindrical valve, D , and when the meter is in operation the alternate reciprocating movement given the pistons will cause the transverse slots s through the connecting-rods $C C'$ to communicate directly a regular rotary motion to the valve D . A corresponding rotary motion is also communicated to a stem, I , which passes water-tight through a cap, N , and whose axis of motion is concentric to the axis of the valve D , as shown in Fig. 2. The lower end of the stem I has a crank, I' , on it, through the end of which the wrist-pin H passes; consequently the rotary motion communicated to the stem I is received directly from the connecting-rods $C C'$. The stem I is packed at m , and is held up to its seat by means of a spring, d , which is applied in a recess made into the cap N . (Shown in Fig. 2.) The stem I has a spur-wheel, e , keyed on its upper end, which actuates a train of wheels that move the registering hand or hands. The registering mechanism may be constructed in any well-known manner. The valve D is cylindrical, and is located at the bottom of the cylinders at the intersection of four water-ways, $E^1 E^2 E^3 E^4$. (Shown in Fig. 5.) Two slots are made horizontally across the valve D , on opposite sides of its axis, which have two cut-offs, $J J$, for the said water-ways. One of the slots i' communicates at certain times with an outlet-chamber, b , through a nearly semicircular passage, c ; and the other slot i communicates with the water-ways which lead into and from the cylinders, and receives the supply of water from a nozzle, L , through a hollow stem, a . The valve D is held down in its place upon the walls of the inlet-nozzle passage L by means of the cap G , through which the solid stem d of the valve passes, as shown in Fig. 2.

The water enters through the nozzle L , and passes up through the center of the valve at a on one side of the partition therein; thence out through the slot i , through the water-way E^1 , and into the outer end of the cylinder A^1 , thereby driving the piston B^1 and the opposite piston B^3 toward the outer end of the cylinder A^3 , and forcing water out of this cylinder through passage E^3 into the opposite side of valve D , and thence out of the nozzle O

through passages *i* and *c*. The drawing represents the pistons B^3 and B^4 as having just completed their stroke in the direction of the cylinder A^2 ; consequently the valve is closed for these two cylinders, but the other two pistons B^1 B^2 are on their half-stroke, and are operating the valve D in the direction of the arrows in Fig. 5, so as to supply water to the passage E^2 , at the same time opening the discharge from the passage E^4 , and thereby reversing the motions of the pistons B^3 and B^4 . By a continued repetition of the movements of the pistons, as above described, the connecting-rods revolve the valve D , which supplies water successively to the four water-ways, and discharges it therefrom. The set-screws *k* through the cylinder-heads, as above referred to, afford adjustable abutments for stopping the pistons at the outer terminations of their strokes at such points as will allow them to discharge the proper amount of water.

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

1. The combination and arrangement of the four cylinders A^1 A^2 A^3 A^4 , the pistons B^1 B^2 B^3 B^4 , and the rotary cylindrical valve D , provided with communicating slots *i* *i'* and passages *a* *c*, substantially as and for the purposes set forth.

2. The connecting-rods C C' , slotted and halved together, as described, in combination with four pistons, whose axes are all in the same plane, as and for the purposes described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

HENRY A. DESPER.

Witnesses:

W. E. DESPER,

DAVID W. POND.