

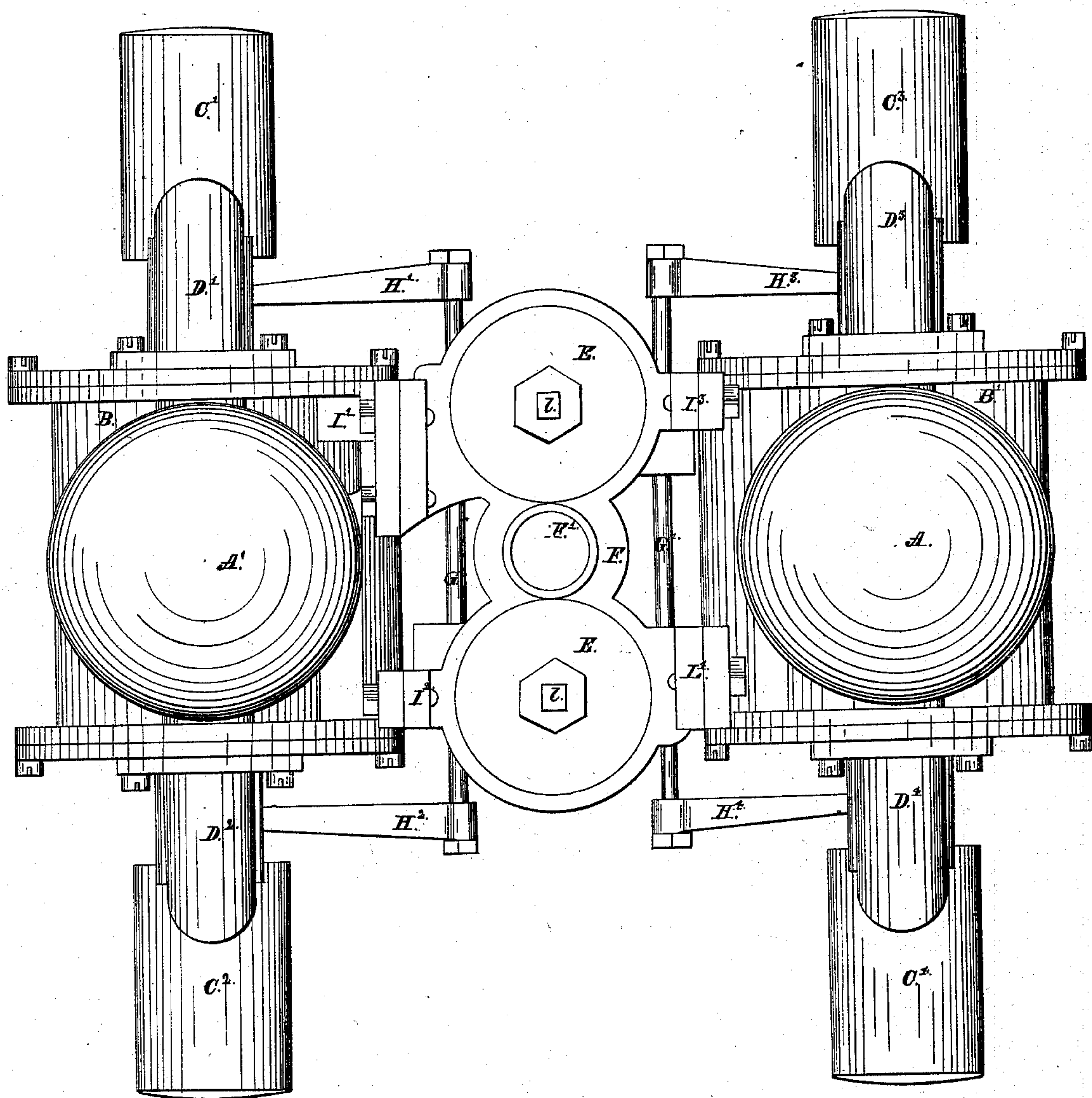
Sheet 1 of 4 Sheets.

M. Everett,

Hydraulic Engine,

N<sup>o</sup> 68,863.

Patented Sep. 17, 1867.



Attest:

John Ellis  
Wm. J. Dennis

Inventor:

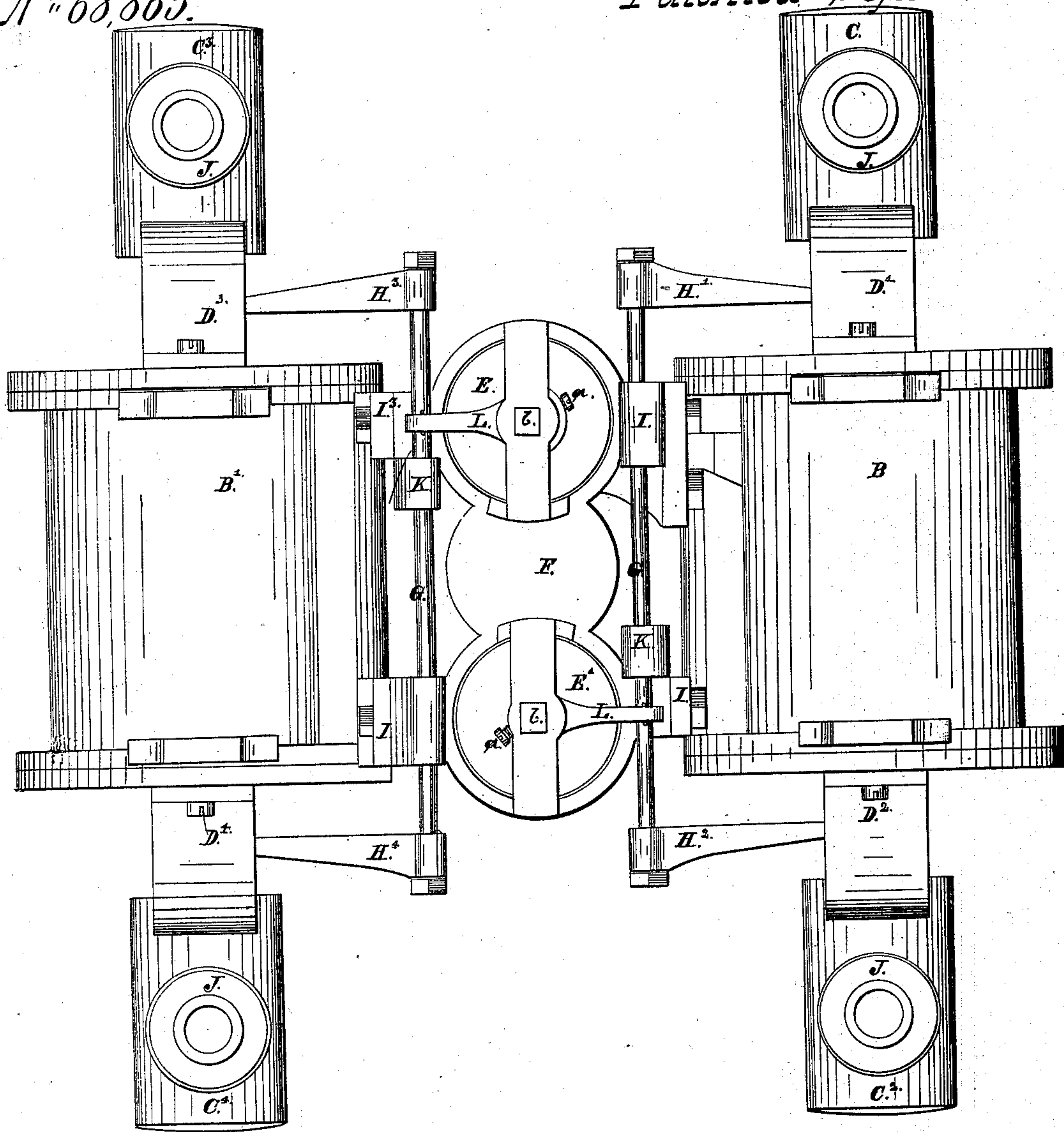
Markon Everett

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Attest:

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G. M. ...

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Marked ...

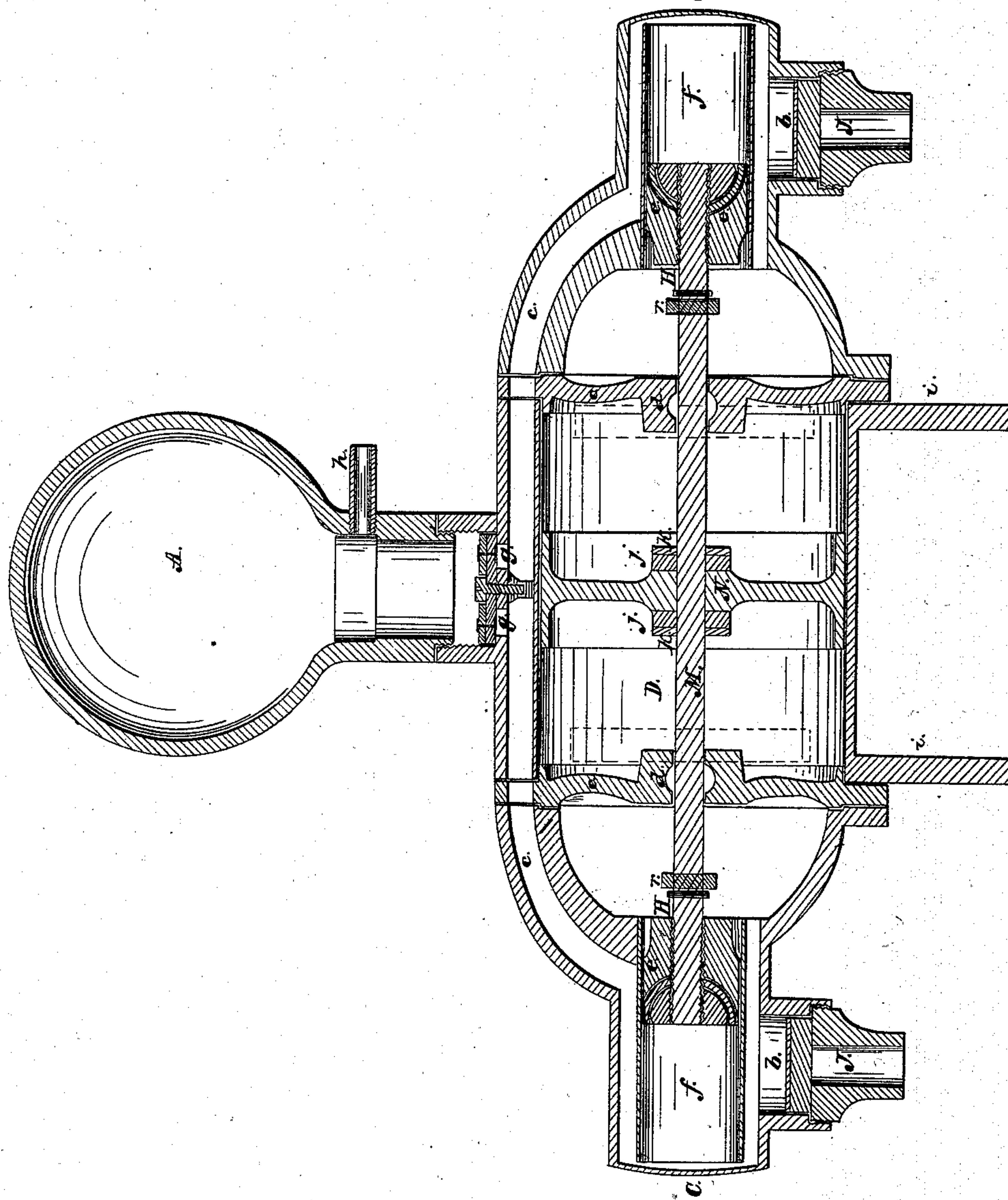


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Attest:

John C. Dennis

Inventor:

Morton Everett

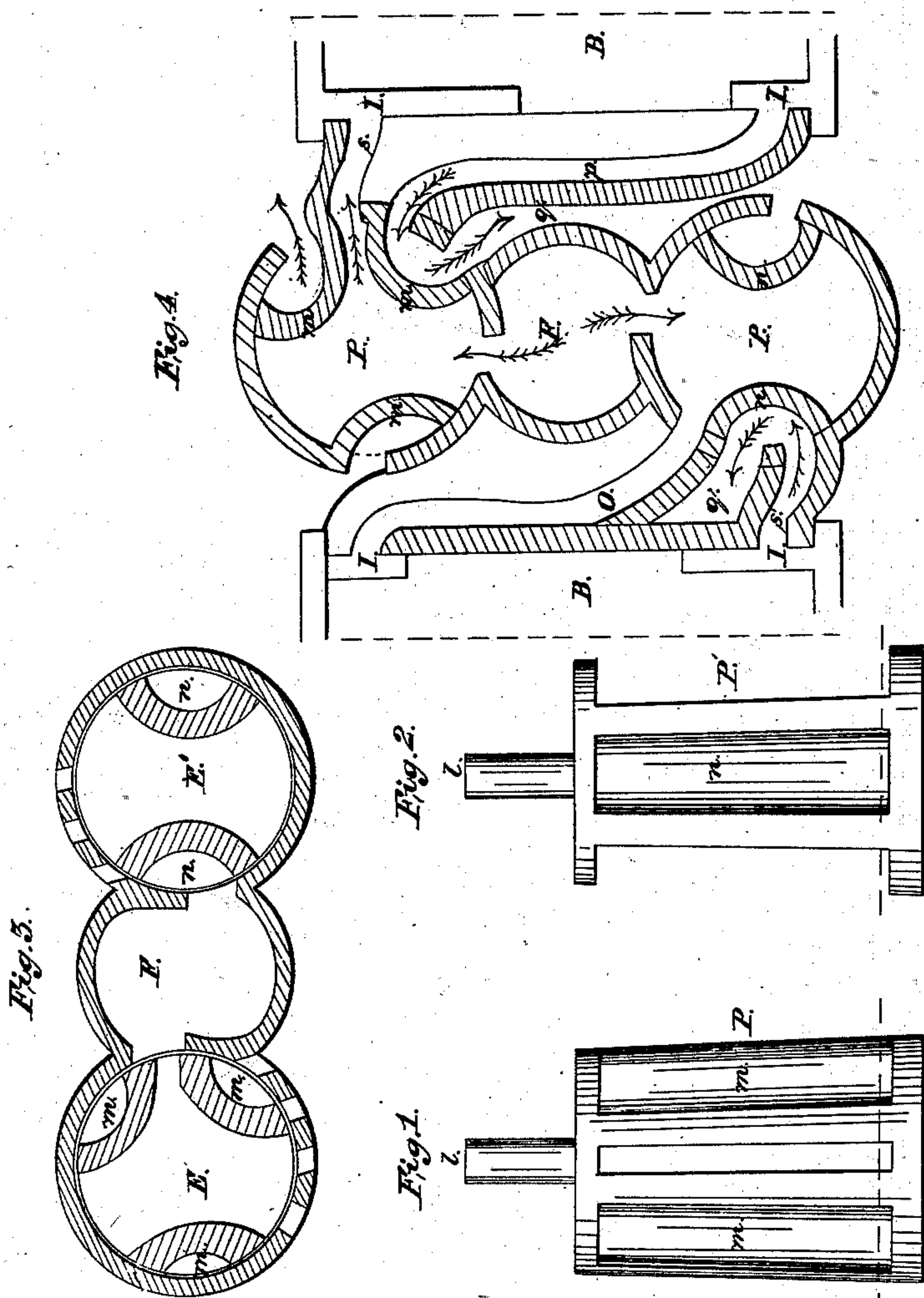


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G. M. B. Ennis

Inventor:

Mahlon Everett,



# United States Patent Office.

MAHLON EVERETT, OF KALAMAZOO, MICHIGAN, ASSIGNOR TO HIMSELF  
AND HENRY F. COCK, OF SAME PLACE.

Letters Patent No. 68,863, dated September 17, 1867.

## IMPROVEMENT IN HYDRAULIC ENGINES.

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, MAHLON EVERETT, of the village of Kalamazoo, and State of Michigan, have invented certain new and useful Improvements in Water Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which accompany this application, and form a part thereof.

The nature of my invention consists of arranging two force and lift-pumps side by side, so connected and operated as that the piston of one pump shall, by its motion, work the supply-valve of the other, and *vice versa*, thus producing an automatic and continuous motion. In the drawings—

Plate 1, Figure 1, is a top view of my double water-engine.

Plate 2, Figure 1, is a bottom view of the same.

Plate 3, Figure 1, is a vertical section of one pump.

Plate 4, Figure 1, is a plan of an oscillating valve having three longitudinal bars or divisions.

Figure 2 is a plan of an oscillating valve having two bars or divisions.

Figure 3 shows a horizontal sectional view of said valves connected with the water-chest.

Figure 4 is a sectional horizontal view of the oscillating valves, water-chest, and side pipes, and their connection with the cylinders.

In plate 1, fig. 1, A A' are air-chambers surmounting the cylinders B B', and connected therewith by an opening at their junction. C<sup>1</sup> C<sup>2</sup> C<sup>3</sup> C<sup>4</sup> are tubular receivers, attached to and connected with the cylinders B B' by means of side pipes D<sup>1</sup> D<sup>2</sup> D<sup>3</sup> D<sup>4</sup>. The arm-rods G G' are attached to the cylinders B B' by the lugs I<sup>1</sup> I<sup>2</sup>, through which they move. The arms H<sup>1</sup> H<sup>2</sup> H<sup>3</sup> H<sup>4</sup> are secured to the rods G G', and are actuated by them. The lugs I<sup>1</sup> I<sup>2</sup> I<sup>3</sup> I<sup>4</sup> serve to connect the cylinders B B' with the valve-cylinders E E', and are made hollow. F is a water-chamber of circular form, and connected with the valve-cylinders E E' by suitable openings, as seen in fig. 4, plate 4. F' is the supply pipe, through which water is conducted to the water-chest. In fig. 1, plate 2, J J J J are suction-valves, through which water is drawn for distribution, attached to the lower side of the ends of the receivers C<sup>1</sup> C<sup>2</sup> C<sup>3</sup> C<sup>4</sup>. The valve-arms L L are attached to the valve-stems l l, and turn the oscillating valves P P', plate 4, figs. 1 and 2, backwards and forwards as they are operated by the arm-rods G G', by means of pins or other suitable device. The arms L L are secured in their proper position upon the valve-stem l by means of the set-screws a a.

In fig. 1, plate 3, M is a piston-rod, working in the centre of the cylinder B, through piston-heads o o, provided with stuffing-boxes d d, said piston-rod being provided at each end with a plunger, e, working in the plunger-tubes f f. The openings c c' conduct the water raised up through the suction-valve chambers J J, and propelled by the plungers e e, through the openings g g, into the air-chamber A; and from thence through the discharge pipe h. The piston N is situated in the centre of the cylinder B, and operated by the piston-rod M, to which it is attached by the hubs j j and the jam-nuts k k. The nuts r r are adjustable on the piston-rod M, and serve to regulate the throw of the arms H<sup>1</sup> H<sup>2</sup> H<sup>3</sup> H<sup>4</sup>, the inner ends of which terminate in loops, through which the piston-rod passes, working loosely. i i are the legs supporting the frame upon which the apparatus rests.

In fig. 1, plate 4, is shown the oscillating valve P, the head of which is circular, and the circumference, composed of three longitudinal bars, flush with the circle of the heads, and the bars divided by semicircular recesses, as shown at m m m, fig. 3. P', fig. 2, plate 4, is a second oscillating valve, similar in construction to P, fig. 1, with the exception of having only two bars and two recesses, as seen at n n, fig. 3, plate 4. These valves are each provided with a stem, l l, to which the arms L L are attached, as seen in fig. 1, plate 2.

In fig. 4, plate 4, o is the pipe conducting the water from the valve P' to the cylinder B, while p is a similar pipe, leading from the cylinder B' to the recess in the valve P, and thence to the discharge-port q of the valve-cylinder E. The pipe s conducts the water from the valve P to the cylinder B', while the pipe s' conducts the water from the cylinder B to the discharge-port q', through the recess of the valve P', the direction of the currents of water being shown by the arrows.

The operation of my engine is substantially as follows: The water-chest F and valve-cylinders E E' being



filled with water under full pressure of the column, and the ingress-port I' of the cylinder B being open, the water flows behind piston N, causing its stroke, in which the nut *r* on the piston-rod M, when said piston is finishing its stroke, to carry the arm H<sup>1</sup> far enough to turn the valve P by means of the valve-arm L, operated by the arm-rod G. The water then flows into cylinder B' behind its piston, producing the stroke of said piston, and which, nearly at the finish, carries the nut *r* forward, striking the arm H<sup>3</sup>, which, by means of the arm-rod G and valve-arm L, turns the oscillating valve P, and the water is thus turned into cylinder B, producing the return stroke of the piston in said cylinder, said piston carrying with it, by means of the nut *r*, the arm of the valve P; and, while piston N is making its stroke in return, the water which was in cylinder B is being discharged through the port *g* of valve-cylinder E. The egress and ingress-ports of the valve-cylinders E and E' are opened simultaneously, respectively; and, as the piston moves backwards and forwards, the water which is behind the plungers *e e* is raised up into the receivers C<sup>1</sup> C<sup>1</sup> C<sup>1</sup> C<sup>1</sup>, and the water which is forward of the plungers is forced up into the air-chambers A A', and is prevented from returning by the check-valves placed in the openings *g g*, while the water in the receivers is prevented from returning to the well or spring by the suction-valves *b b b b*.

It will be seen that the pistons follow each other in their reciprocating motions, the one remaining at rest until the other has nearly completed its stroke, which peculiar movement thus secures regular and continuous motion in the engine, and it can only be stopped by extraneous matter coming in contact with its working parts.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

The valves P and P', the valve-arms L L, and the arms H<sup>1</sup> H<sup>2</sup> H<sup>3</sup> H<sup>4</sup>, in combination with the arm-rods G G and piston-rod M, all arranged and operated as and for the purposes herein set forth.

MAHLON EVERETT.

Witnesses:

JOHN COBB,

WM. F. DENNIS.