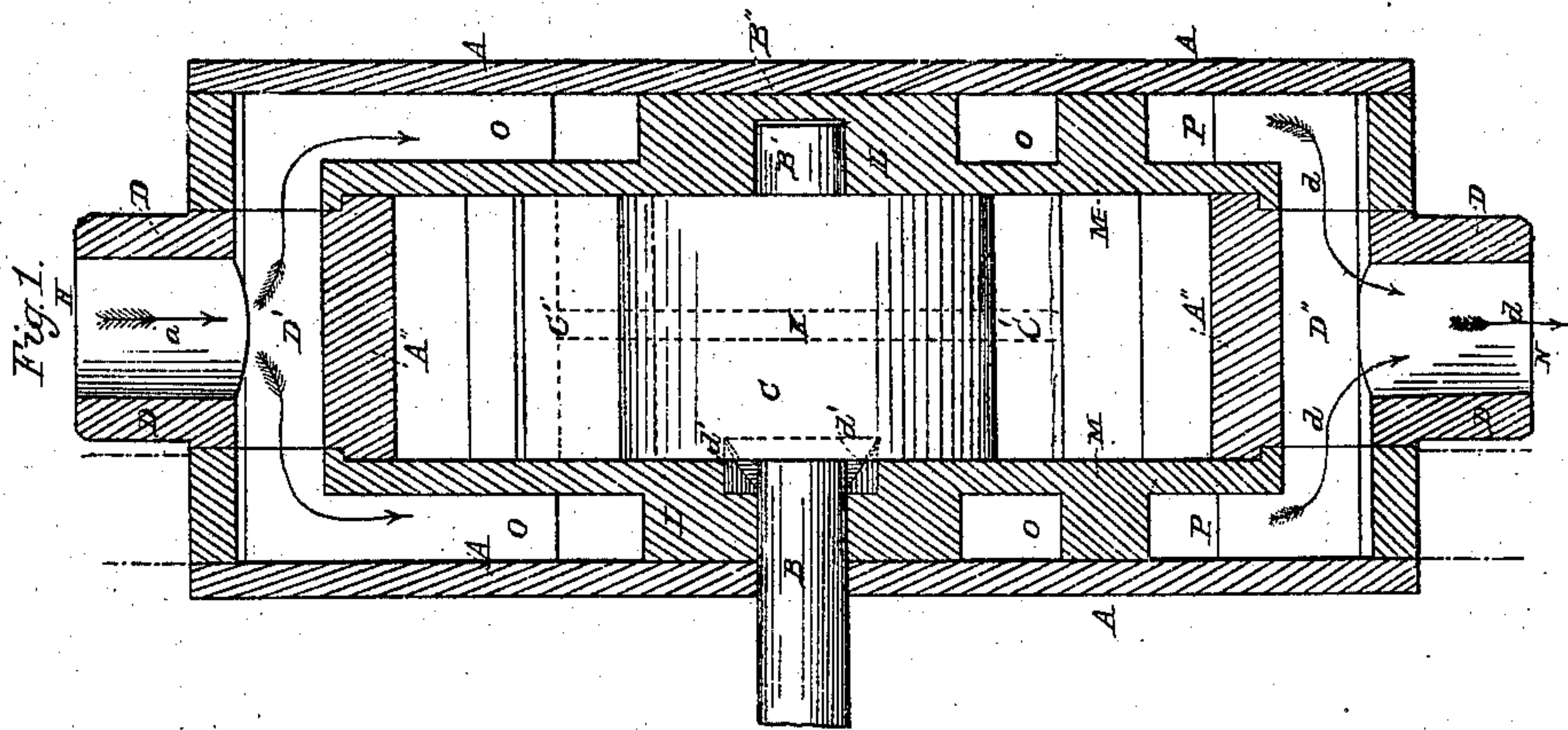
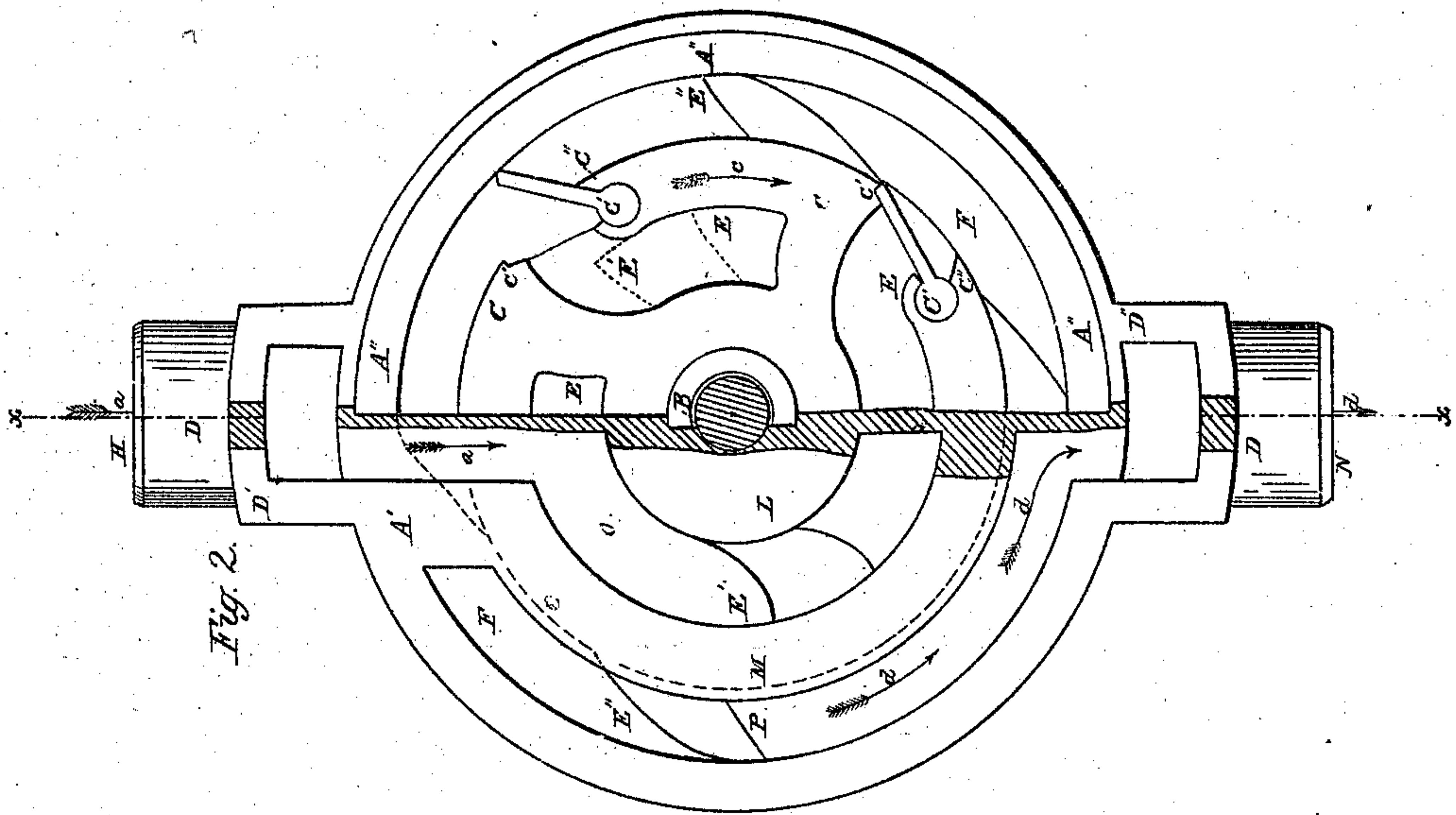


W. Hamilton & W. Hamilton, Jr.

Rotary Motor.

N^o 87,665.

Patented Mar. 9, 1869.



Witnesses.
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Letters Patent No. 87,665, dated March 9, 1869.

IMPROVEMENT IN ROTARY MOTOR AND METER.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, WILLIAM HAMILTON and WILLIAM HAMILTON, Jr., of the city of Toronto, in the county of York, Province of Ontario, Dominion of Canada, have invented a new and useful Improvement in Rotary Motors or Meters; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which are made a part of this specification.

Our invention consists in the construction of a rotary engine, in such a manner that the steam or other fluid may be introduced through the rotary piston, and its pressure equalized upon the different sides of the piston or rotary cam, as hereinafter described, thus dispensing with the need of a separate valve-gear, and, further, saving an immense amount of friction, and consequent wear of the machinery, which necessarily occurs in those rotary engines where the pressure is upon one side.

In order that those skilled in the art may be enabled to make our improved rotary engine, we subjoin the following description, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure 1 represents a longitudinal section of the cylinder, divided upon the line $x-x$, fig. 2, with the piston or revolving cam complete.

Figure 2 represents a plan view of the motor, with a portion of the cylinder removed, showing part of the rotary piston or cam.

A shows the outer shell of the cylinder, which is close, and, when complete, and fastened together with the other parts, A' and A'' , forms a hollow chest, with concave bottom and top, and flat sides, as shown in fig. 2.

A'' is the main body of the cylinder or chest thus formed, and corresponds in shape, inside, with the circular form of the rotary piston or cam, only being of a sufficiently-increased diameter over it to allow the wings C' to press outwardly, when acted upon by the steam or other motive-power, presenting an oblique surface, to receive the expansion of the steam, air, or force or resistance of the water.

This main body A'' is furnished, on its inner surface, upon sides diagonally opposite from each other, taking the pipes D as the base, or horizontal, with abutments or segmental pieces, F , having their inner surfaces made slightly concave at the centre, to correspond exactly with the convexity of the rotary piston or cam, and the space between the point of contact with the cam on either side, to the outer ends of the segments, being curved inward, toward the arc of the circle, and outward, toward the ends of the segment, as seen in fig. 2.

The sides A' are constructed with flat inner surfaces, to fit smoothly upon the sides of the cam or rotary piston.

They are, upon the outer sides, supplied with induction-

tion-pipes or passages, O , to admit the steam or fluid, and eduction-pipes or passages, P , to permit its egress at the opposite end.

Equally distant between the two ends, $D' D''$, are, upon each side, two perforations, E' , to admit the steam into the chambers E , as seen in fig. 2.

The induction and eduction-passages, being at opposite ends of the cylinder, are separated from each other by means of a circular partition, M , extending equally distant between the central circular boss, L , and the outer periphery of the cylinder A'' .

The entry-ports E' are within this partition, between it and the boss L ; the exhaust-ports E'' between it and the outer periphery of the cylinder A'' .

The ends of the sides A' are extended beyond the are described by the circular form of the cylinder, sufficiently to allow of a passage, for the steam, into the chamber E , through the openings $D' D''$, the passages O , and entry-ports E' .

O is the rotary piston or cam, hung centrally upon the shaft B .

This piston is supplied with the wings C' , fastened into the piston or cam by a hinge or knuckle-joint, as seen in fig. 2, or in any other proper manner.

It is also further supplied with chambers, E , in which the steam or fluid is received as it issues through the entry-ports E' , of which there are four.

These chambers extend from side to side of the piston or cam, from a point about equally distant from the centre and outer periphery of the same, in a slight curve, to the outer edge, as shown in fig. 2.

They are four in number, but may be divided by a partition, placed transversely through their centre, on the level, K , fig. 1, forming a head, to receive the steam from the entry-ports E' , on the opposite sides of the cylinder.

The number of chambers may be increased, however, or decreased, if desired, to any number capable of producing the same results as the number designated.

The outer ends of these chambers are closed by the wings C' , hinged as set forth, which, when in place, rest, with the outer edges, in the jambs c .

The shaft B may be supplied with the packing d , fig. 1, to prevent the escape of steam or other fluid.

The end, B' , of the shaft rests in the socket B'' , and consequently needs no packing. If, however, the shaft extends through and through, packing may be used upon this end as well as the other, in the ordinary manner.

The rotary piston or cam O being in position within the cylinder, place the outer-side shells A upon the sides A' , resting upon the body A'' , and fasten all securely together, in the usual way.

Now, in order to understand the workings and utility of my invention, suppose the steam to be admitted at H , figs. 1 and 2. It strikes against the solid partition A' , and is driven around it to either side, entering the

chamber at D', passing in the direction of the arrows *a a*, and enters the four chambers E by the four entry-ports E', upon opposite sides of the cam, at the same moment.

The expansion of the steam and centrifugal force open the wings C', throwing the outer edge against the inner surface of the cylinder.

These wings are kept from flying open wide enough to bend or cause friction, by the shoulders *c''*, fig. 2.

As the steam expands, the cam is naturally forced in the direction in which there is least resistance, which is in the direction shown by the arrow *c*, fig. 2.

As the cam moves, the space to be filled by the expanding steam increases until at last the chambers receiving the steam arrive opposite the eduction or exhaust-ports E''.

The steam now escapes through them and the passages P and D'', fig. 2, in the direction of the arrows *d*, and the wing, in passing the segmental piece or abutment F, is closed into its proper place once more, in readiness to receive the next influx of steam as soon as it comes opposite the entry-ports E'.

It will be noticed, that by the arrangement of our engine, the steam or other fluid is introduced through the rotary piston upon opposite sides of the shaft at the same time, thus avoiding the necessity of a separate appliance to open the valves, balancing the engine, equalizing the pressure, saving lateral strain, and attendant friction.

When there are four chambers upon each side of the piston, as shown in the drawings, for the reception of steam, two are filled with steam at the same time, and two are exhausted simultaneously with each other.

By this means, a uniform motion is obtained, and also great speed, when it is used as a motor, by reason

of the direct application of the steam upon opposite sides, but acting in a like direction, as before stated.

When used as a motor, propelled by compressed or hot air or water, the action is similar to that when driven by steam; and, when used for a meter, the motion may be imparted through the medium of the shaft, or by the fluid to be measured.

Having thus described our improvement,

What we claim as new, and of our invention, and for which we desire to secure Letters Patent, is—

1. The rotary piston O, provided with chambers E E E, in combination with the ports E' E' E' E'', abutments F F, and valves C' C' C' C', substantially as herein set forth.
2. The construction of the sides A' with the ingress-passages O and egress-passages P, as herein set forth.
3. The arrangement of the body A'', the sides A', and the outer sides A, as described.
4. In combination with the rotary piston or cam O C', the sides A A' O P, body A'' D' D' D'', the segmental pieces or abutments F F; the entry-ports E' E', and exhaust-ports E'' E'', all constructed and arranged substantially as set forth.
5. The arrangement, relatively to the piston O C' E K, of the passages D D' O O and D D' P P, the induction-ports E' E' E' E', eduction-ports E'' E'' E'' E'', and abutments F F, substantially as set forth.

To the above specification of our improvement in rotary engines, we have signed our hands, this 16th day of December, 1868.

WILLIAM HAMILTON.

WILLIAM HAMILTON, JR.

Witnesses:

WILLIAM OWEN,
GEORGE F. DOW.