

W. A. GRAHAM.  
Rotary Engines, &c.

No. 149,391.

Patented April 7, 1874.

Fig. 1

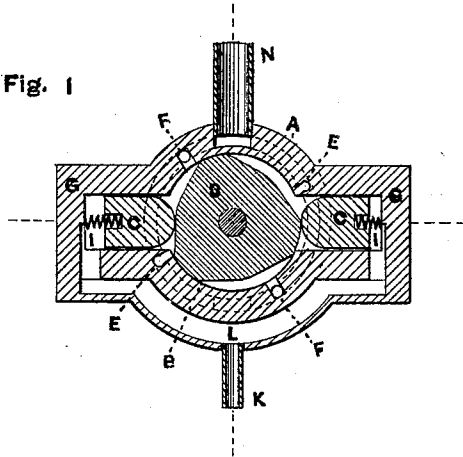


Fig. 2

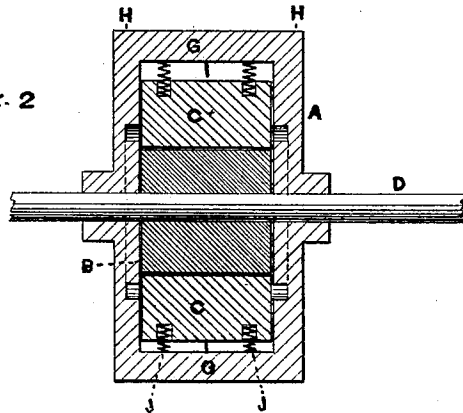
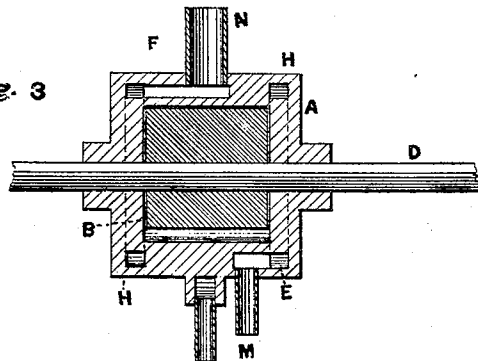


Fig. 3



Witnesses  
Oliver Drake  
John C. Tenbridge.

Inventor  
Wm. A. Graham  
By O. Drake, Atty

# UNITED STATES PATENT OFFICE.

WILLIAM A. GRAHAM, OF CARLISLE, PENNSYLVANIA.

## IMPROVEMENT IN ROTARY ENGINES, &c.

Specification forming part of Letters Patent No. **149,391**, dated April 7, 1874; application filed September 26, 1873.

*To all whom it may concern:*

Be it known that I, WILLIAM A. GRAHAM, of Carlisle, in the county of Cumberland and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Engines, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

This invention, which is designed for either a steam or other vapor-motor engine, a water-meter, or pump, and of which Figure 1 is a vertical section, Fig. 2 a horizontal section, and Fig. 3 a transverse section, consists of a cylinder or casing, A, the interior surface of which is bored truly cylindrical to receive the winged revolving piston B, and is further provided with the wings G, in which work sliding abutments C. This casing further contains the induction-ports E and eduction or exhaust ports F. The ends of said casing are closed by heads or covers H H, which are provided with passages connecting the ports with each other, and with the induction-pipe M and exhaust-pipe N. These passages may be either open grooves, as in the drawings, in which case the edges of the cylinder and ends of the abutments serve to complete the passages and confine the steam to the proper channel, or they may be cast entirely within the heads and openings made to correspond with the induction and exhaust passages in the main casing. The piston B, which has two or more wings, each wing having the function of a separate piston, is fastened securely to the shaft D, and, by the pressure of the steam or water on these wings alternately, is caused to revolve, carrying with it the shaft D, and by it transmitting the power of the steam to the machinery to be driven. The abutments C slide back and forth, following the shape of the piston, which is so formed that it will, while revolving, push the sliding abutments C C into the spaces in the wings of the casing provided for that purpose. The pressure of steam or water in the spaces I serves to keep the abutment pressed against the piston, to prevent the es-

cape of steam or water between them. The steam or water has access to these spaces I I through pipe K and channel L. The induction and exhaust ports are so placed, in relation to each other and to the abutments, that while the pressure of the steam or water is exerted on one side of a wing of the piston the space on the other side of said piston is open to the exhaust. The pressure being thus on one side only of the wing causes it to move in the opposite direction, or toward the exhaust-port, which it covers and passes as the motion continues. As this wing passes the exhaust-port, and so allows the steam to escape, the following wing of the piston, having passed the abutment and the induction-port, takes the pressure in the same manner as before, and is again followed by the next wing, making continuous motion. The opposite induction and exhaust ports act in the same manner as the wings revolve.

As a water-meter, the water, passing in at the induction-pipe M, and causing the piston to revolve in its passage through the machine, passes out at the eduction or exhaust pipe N. As a definite quantity of water will pass at each revolution, a registering apparatus attached to the shaft will indicate the quantity.

To use this machine as a pump, apply the power to revolve the shaft D connecting the pipe M as the suction-pipe, and N as the delivery. The motion of the wings of the piston will then draw in the water at M and force it out of the pipe N, as before described.

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

In a rotary engine, the combination of the piston B, the sliding abutments C, with the steam and exhaust passages E E and F F, and passage L, all arranged and operating substantially as described, and for the purposes set forth.

In testimony that I claim the foregoing, I have hereunto set my hand and seal this 22d day of July, 1873.

WILLIAM A. GRAHAM. [L. s.]

Witnesses:

OLIVER DRAKE,  
JOHN C. TUNBRIDGE.