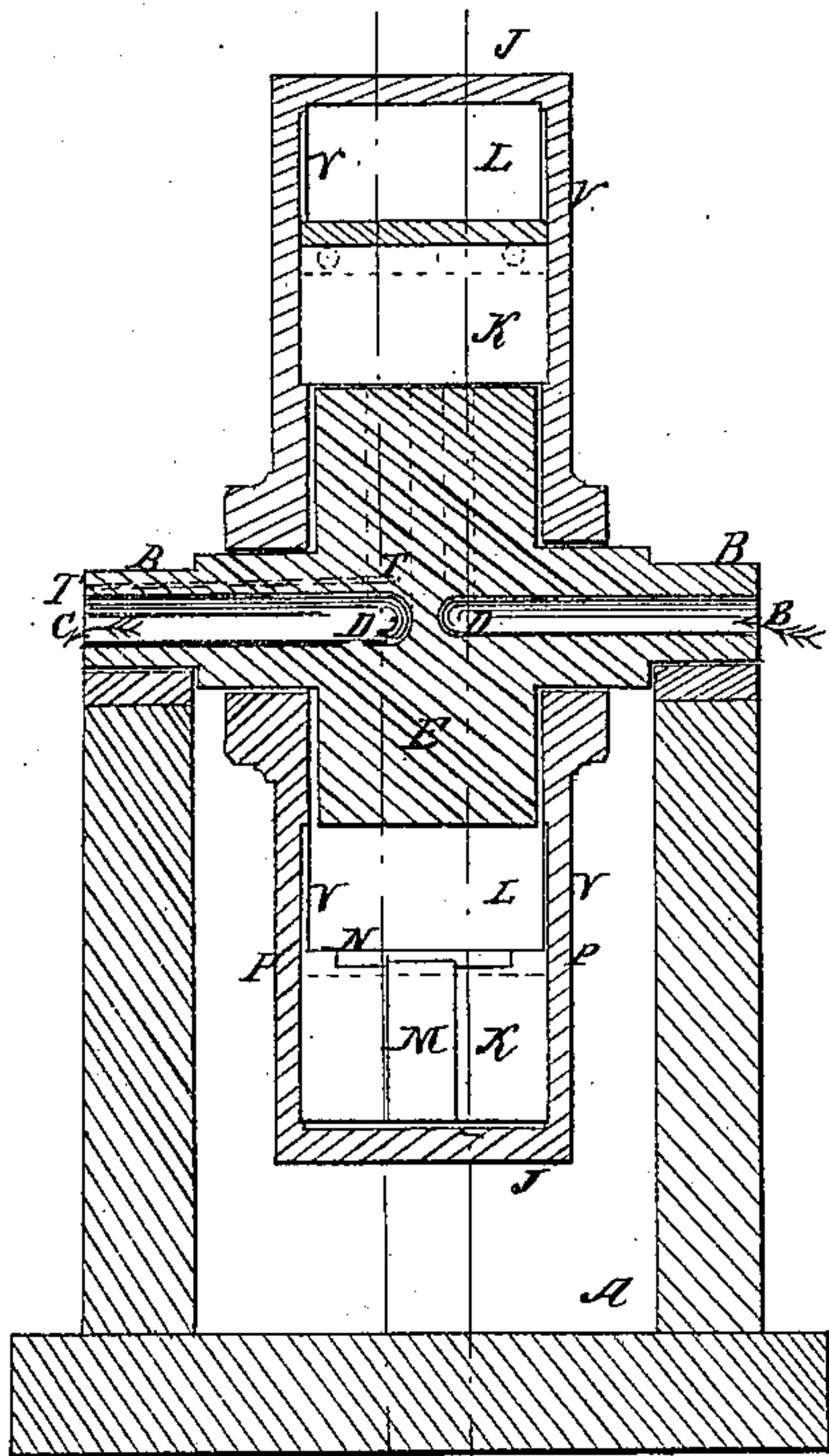


*R. Hughes,*  
*Rotary Steam Engine.*

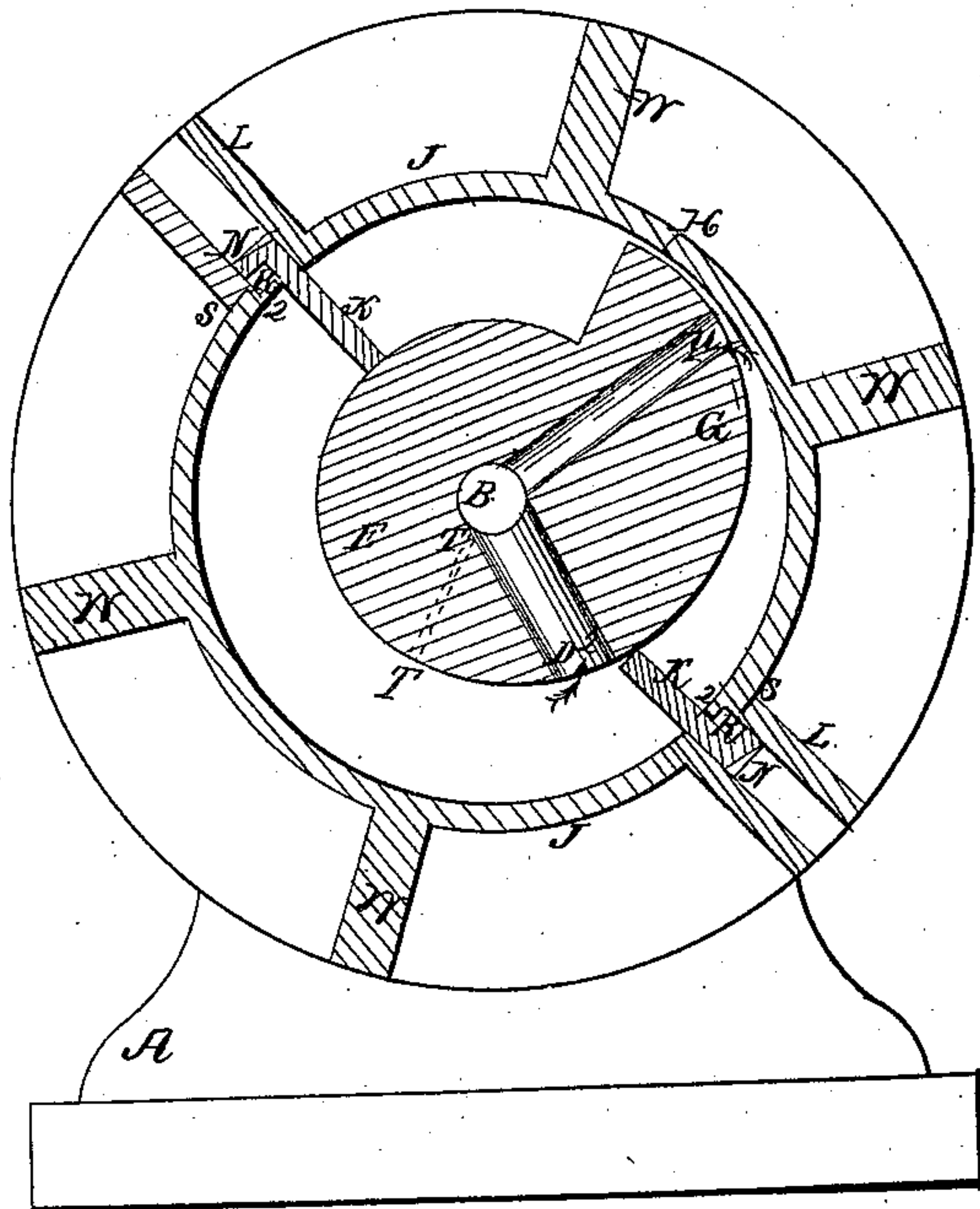
*N<sup>o</sup> 55,301.*

*Patented June 5, 1866.*

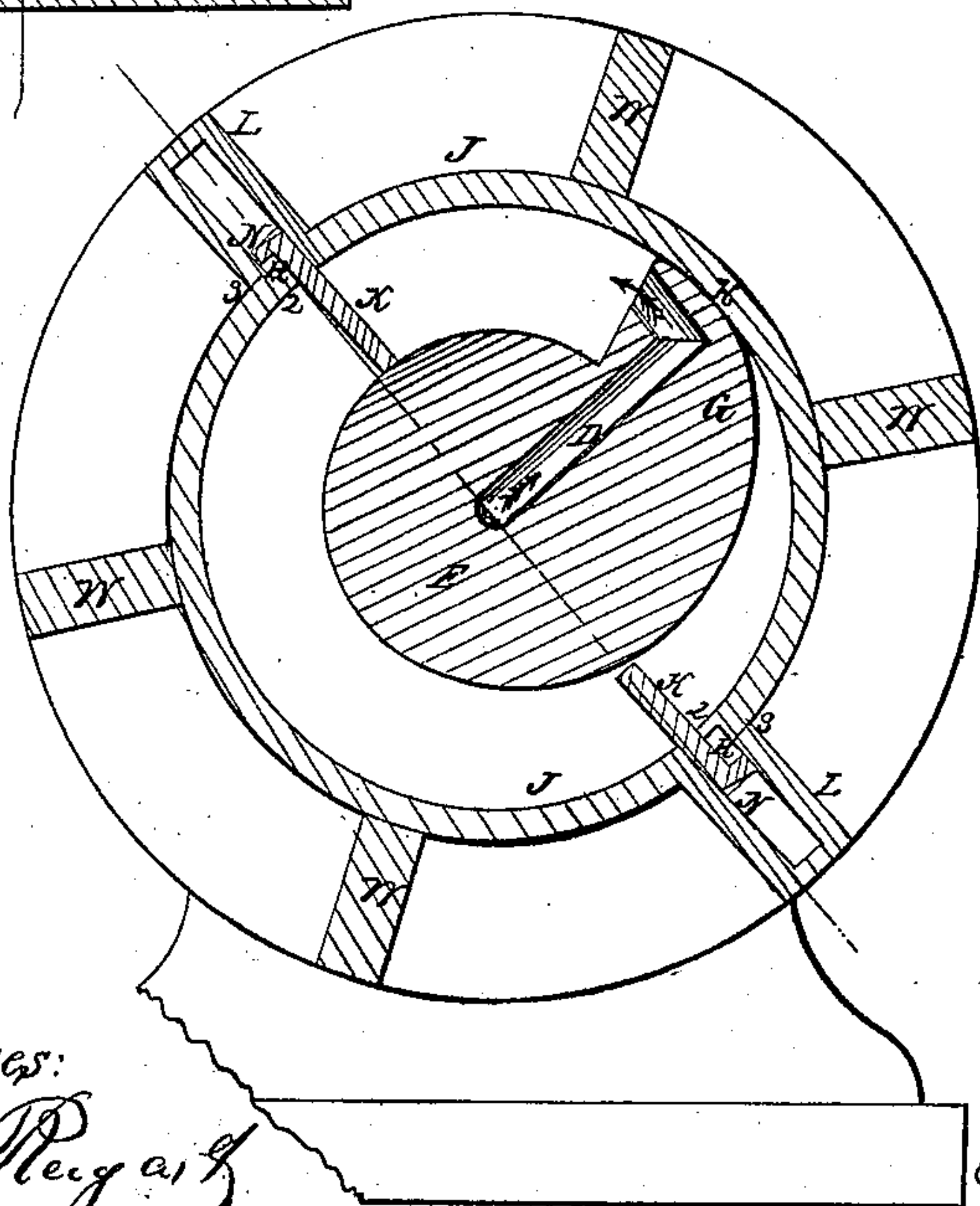
*Fig: 1*



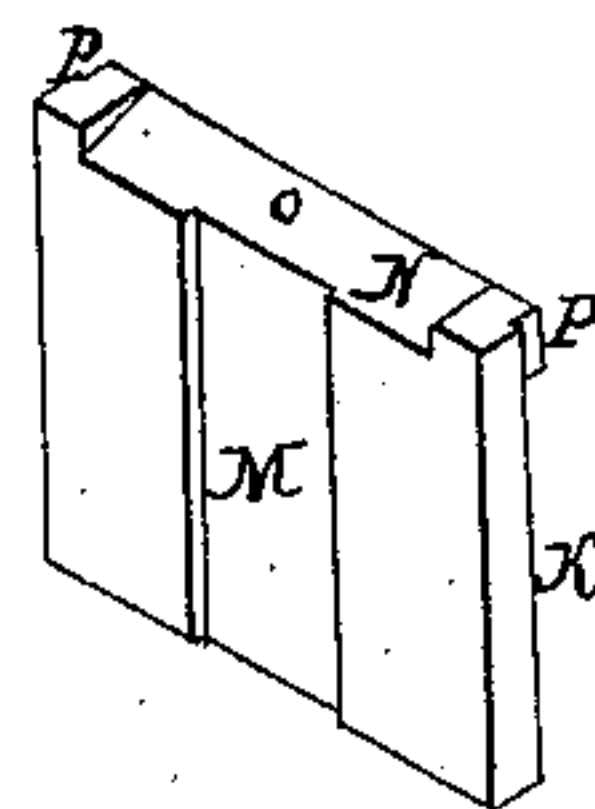
*Fig: 2*



*Fig: 3*



*Fig: 4*



*Witnesses:*  
*Franklin Peck*  
*M. A. Nobles.*

*Inventor:*  
*Robert Hughes.*



# UNITED STATES PATENT OFFICE.

ROBERT HUGHES, OF DANGERFIELD, TEXAS.

## IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. 55,301, dated June 5, 1866.

*To all whom it may concern:*

Be it known that I, ROBERT HUGHES, of Dangerfield, Titus county, State of Texas, have invented an Improved Rotary Engine; and I do hereby declare the following to be an exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification, in which—

Figure 1 represents a vertical cross-section; Fig. 2, a sectional side elevation, showing the valves and escape; Fig. 3, an opposite sectional side elevation, showing the feed-channel and center-head; Fig. 4, a perspective view of the valve.

The nature of my invention consists in a center head with steam or air channels and valves in a valve-box.

A represents the frame that supports the engine; B, the stationary axis in which the steam enters at one end and escapes at the opposite end at C, as shown by the arrows passing through the channels D; E, the stationary head or abutment, which is located permanently on the stationary axle B, the head being circular, with a curved or cam point, G, projecting in a curve from the periphery of the head, that may either be solid with the center E or attached by a firm joint, if necessary to be packed, the point at H being curved to fit the circle or concave side of the cylinder or revolving wheel, J. There are two valve-boxes, opposite each other, with a valve, K, operating in each box L.

The valve K has a long groove, M, across the center of one side, and an incline-shaped head, N, at top, sloping upward, to allow the steam to pass up, press upon the head, and force the valve K down, the head projecting in a square or angular-shaped side, P, to fill the box, while the valve K does not entirely fill the box, and the corresponding square or angular-shaped projection Q, at the lower side of the box, with P, forms a chamber, R, with apertures S, that prevent a vacuum when the valve K rises, or any resistance from compressed steam or air as the valve is forced down.

The steam enters the axis at B, and passes through the channel D at one side of the center of the head E, and as it reaches the groove M it passes up the groove and upon the head of the valve K, forcing the valve down upon the center head, E, until the steam escapes, prop-

elling the cylinder around more than half the distance of its circumference, where the valve reaches the escape-channel D<sup>2</sup>, when the valve falls back into its box L, if not by its gravitation, will be forced into the box by the curved back of the cam G.

After one valve has thus passed half around the opposite valve takes its place and operates the same as the former. When the engine is running and the second valve is past the point of the cam the first one comes in contact with another channel, T, which has a check-valve at its receiving-orifice, through which the steam passes along the axis B and through a pipe intended to connect with a separate reservoir, until it forms an equilibrium, when the check-valve closes, and by means of which I utilize a large amount of steam and nearly one-fourth of the power of the engine to propel other machinery.

There is also an aperture or an escape, U, near the back of the cam, that likewise connects with the escape-channel D<sup>2</sup> through the axis.

The sides of the valves K operate in grooves V as guides in the outside plates of the cylinder, and the radial stays W strengthen the cylinder, or may be used as arms for a wheel.

I intend to operate this engine by steam, water, or air, as an engine, pump, or blower, and I make the cylinder revolve and the axis and center head stationary, and it may be operated either vertically or horizontally, and the escapes may be made at any or all points back of the center of the cylinder to the top of the back of the cam.

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

1. The construction of the stationary center head, E, with curved point G, and its steam-channels D and T, as herein described.
2. The construction of the valves K, arranged in the valve-box L, as herein described.
3. The arrangement and combination of the valves K, center head, E, cam G, and channels D and T, to operate in a cylinder as a rotary engine, whereby to utilize the exhaust-steam and operate other machinery, as herein set forth.

ROBERT HUGHES.

Witnesses:

J. FRANKLIN REIGART,  
W. H. NOBLES.