

G. W. GREENE.  
Rotary-Engines.

No. 213,562.

Patented Mar. 25, 1879.

Fig. 1.

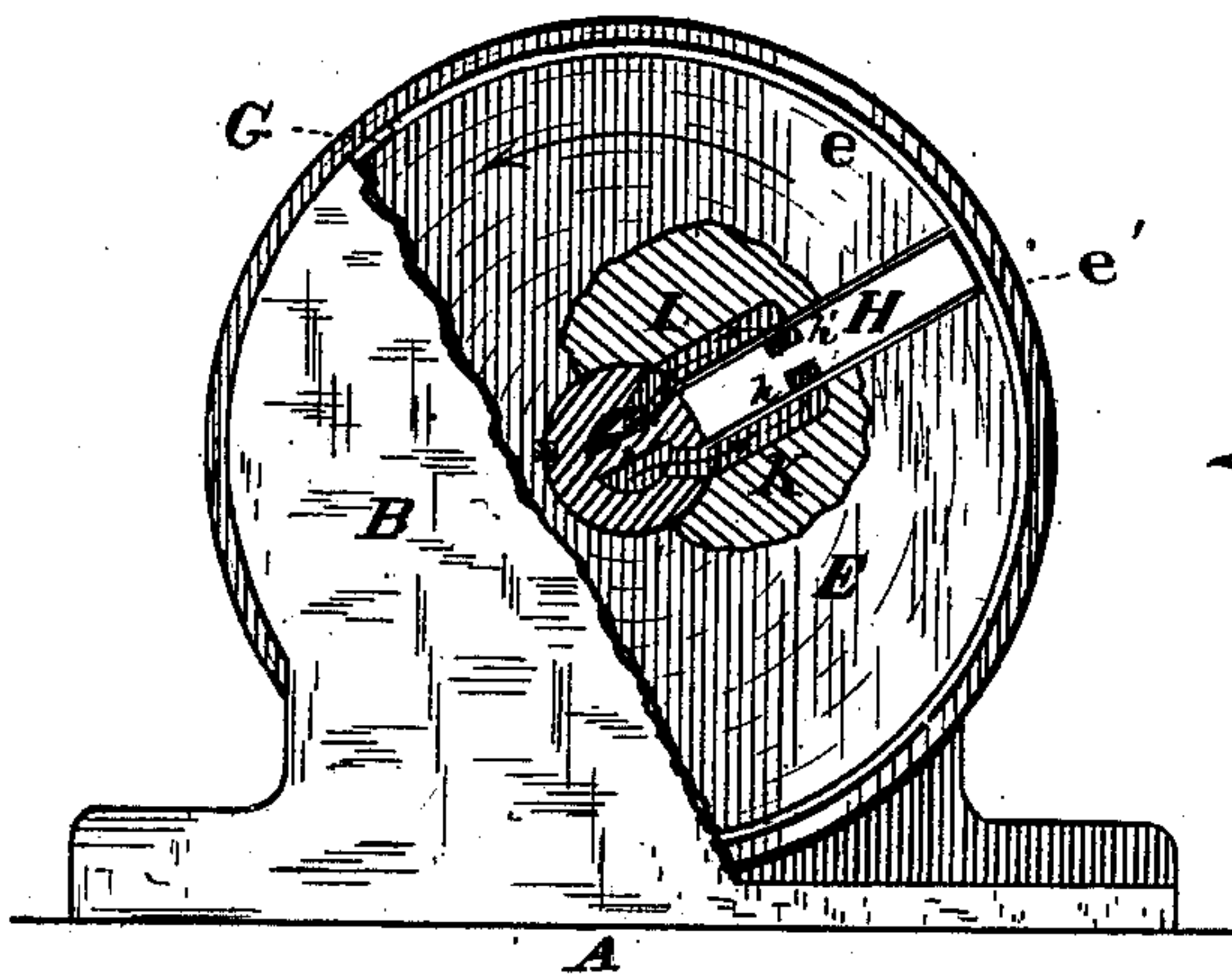


Fig. 2.

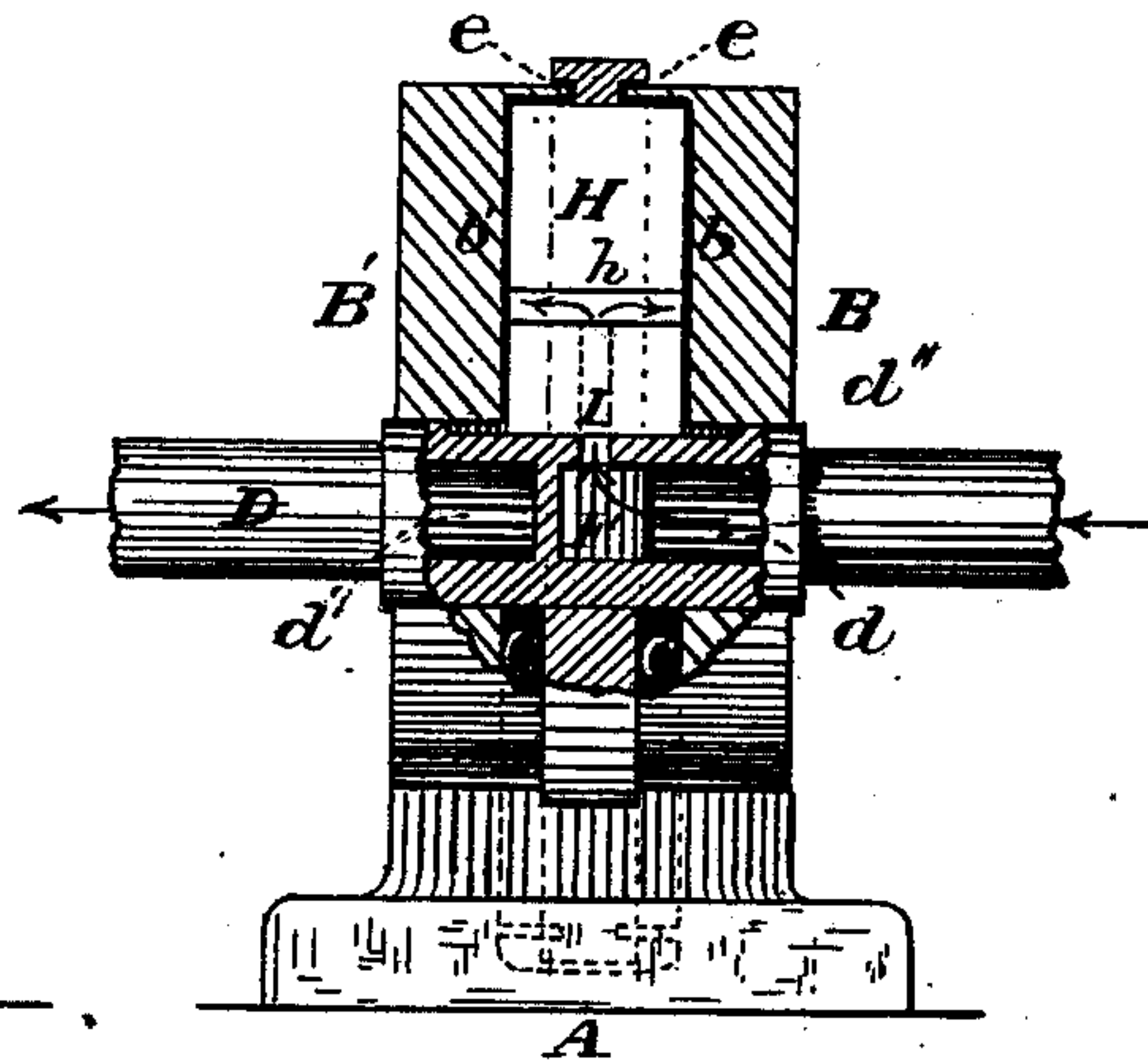


Fig. 3.

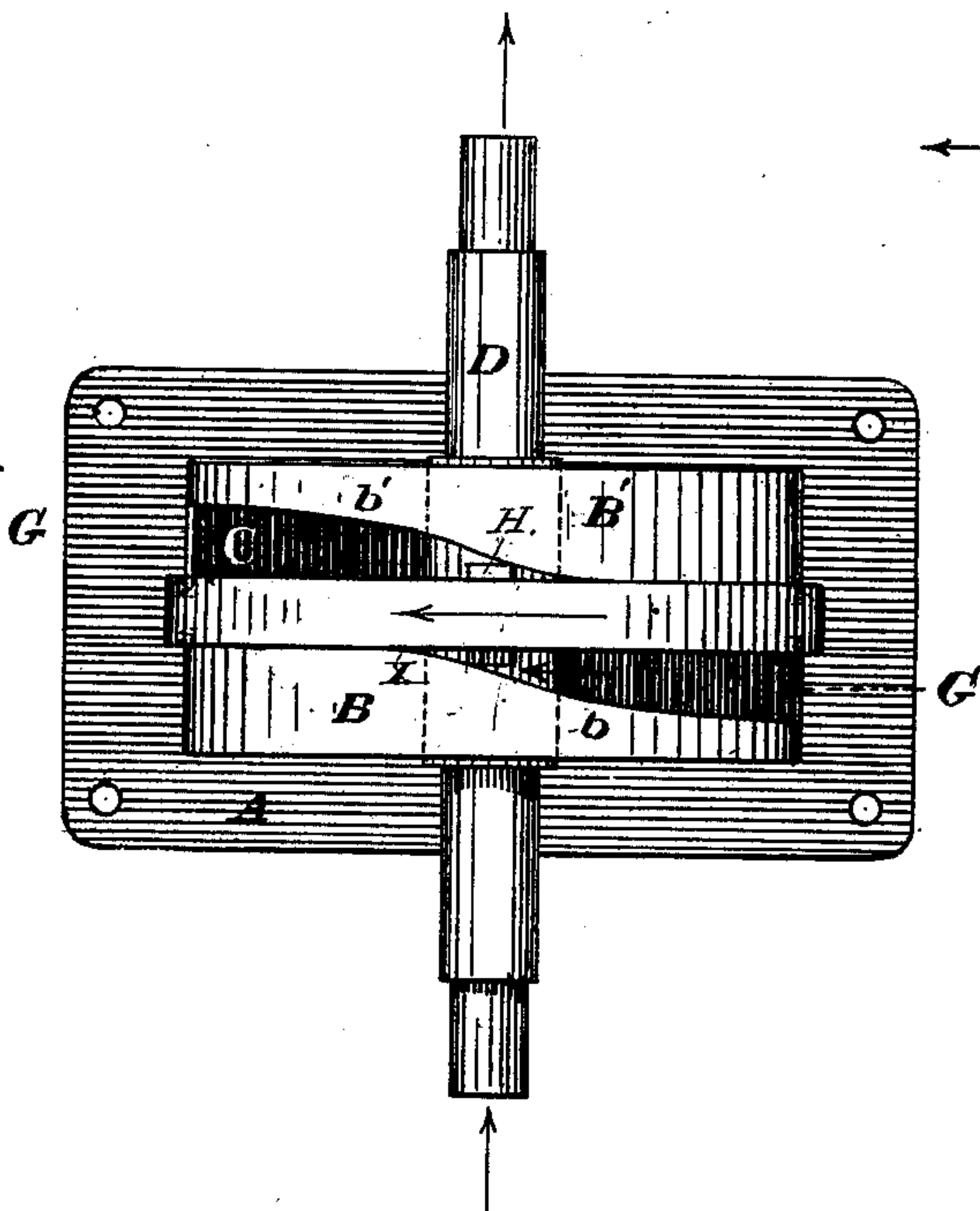


Fig. 4.

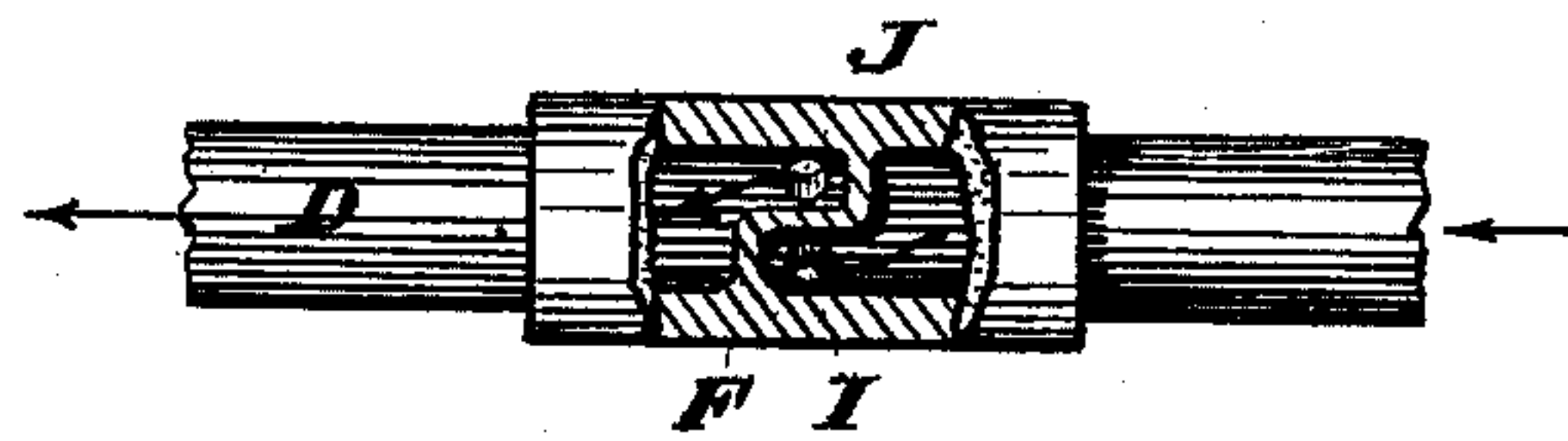
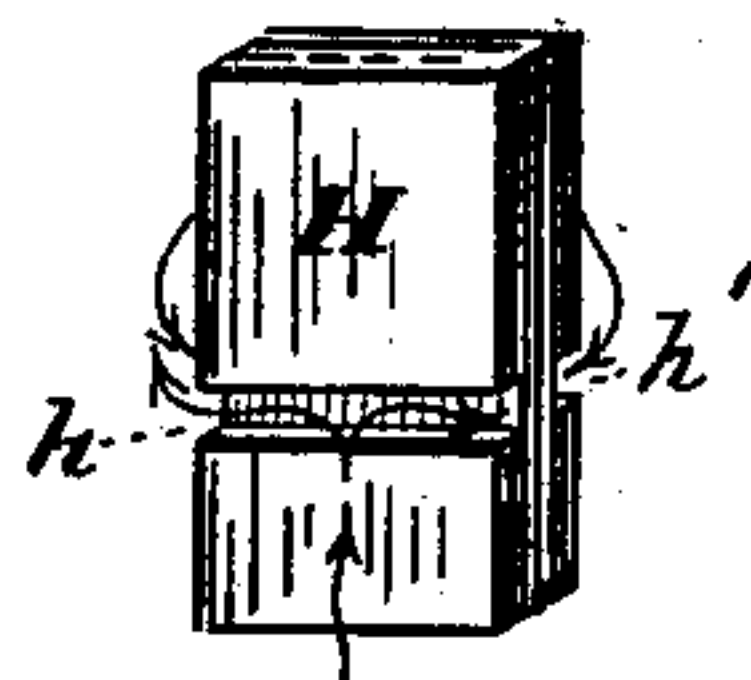


Fig. 5.



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Walter Knight.  
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Geo. W. Greene  
By Knight Bros.  
Attys.



# UNITED STATES PATENT OFFICE.

GEORGE W. GREENE, OF ABINGTON, ASSIGNOR OF ONE-HALF HIS RIGHT  
TO WM. R. TEEGUARDEN, OF CLIFTON, INDIANA.

## IMPROVEMENT IN ROTARY ENGINES.

Specification forming part of Letters Patent No. **213,562**, dated March 25, 1879; application filed  
September 20, 1878.

*To all whom it may concern:*

Be it known that I, GEORGE W. GREENE, of Abington, Wayne county, Indiana, have invented a new and useful Rotary Engine, of which the following is a specification:

My invention relates to a construction of rotary engine which consists, essentially, of three members, to wit: a stationary member having two cylindrical heads whose opposing surfaces are of correspondingly undulating contour, so as to present a waving annular passage or chamber for the sweep of the piston; a tubular shaft journaled in said stationary member at its axis, and having a collar which is of slightly greater diameter than said member, and of such thickness as to just touch on each side and at diametrically-opposite points of the circumference the crowns of the cam-formed undulating faces of the heads; finally, a sliding piston plate, blade, or wing, which, occupying a radial slot in the collar, snugly fills the undulating annular passage at whatever part of the latter's circuit it may for the time being be, and which, as the shaft and collar revolve, is compelled by the cam-surfaces of the annular passage to shift or reciprocate from side to side twice at each revolution. Each of these three principal members has certain details of construction, which will be explained in the sequel.

The construction of parts affords a single-shafted rotary engine of extremely few members and singular simplicity and cheapness, without valve or steam chest, and adapted to receive the continuous and uniform action of the steam or other motive fluid when employed as a motor, or to impart a continuous motion to water or other fluid when used as a pump or blower.

In the accompanying drawings, Figures 1 and 2 are, respectively, a partly-sectioned end and side elevation of an engine embodying my invention. Fig. 3 is a top view from which the upper half of the concave has been removed. Fig. 4 is a partly-sectional view of the shaft viewed at right angles to its position in Fig. 2. Fig. 5 shows the piston-plate detached.

A may represent any suitable base or bed plate, to which are firmly cast or otherwise attached my pair of cylindrical heads B B', whose

opposing faces *b b'* have the represented cam or waving contour in direction of their circuit, so as to constitute an undulating annular passage, C, of uniform transverse section, in which the crown or most protuberant portion of one surface is exactly opposed to the most depressed portion of the other surface, and vice versa.

Journaled axially in the cam-heads B B' is a tubular shaft, D, which has keyed fast or otherwise rigidly secured to its mid-length a wheel, disk, or collar, E, of somewhat greater diameter than the heads B B'.

A septum, F, separates the interior of the shaft D into two parts, either of which may be used as the steam-supply passage, the other then serving as the steam-discharge passage.

Each face of wheel E has near to and parallel with the periphery a groove, *e*, for the edge of concave G, constituting the outer wall of the steam-spaces formed between the wheel E and the cam-heads B B'.

A radial slot, *e'*, in wheel E, and a channel, *d''*, in the shaft D, are occupied by my piston-plate, shifting blade, or wing H, whose dimensions exactly correspond with the transverse section of the annular chamber C, included between the two cam-heads B B', the shaft D, and the concave G.

Two ports—one, I, from compartment *d*, and the other, J, from compartment *d'*—communicate, respectively, with the portions of the annular chamber separated by the traveling transverse partition or piston plate H, each port for this purpose communicating with its appropriate channel, K or L, in the wheel E, which communicates with channel, *h* or *h'*, in the piston-plate H, and thence with the piston-chamber, as indicated by the arrows.

The various wearing parts may be so formed and attached as to be capable of being set toward one another from time to time as their surfaces become reduced by friction, and they may be provided with any suitable packing.

When used as an engine, steam is introduced into compartment *d* of shaft D, and, traversing passages I, K, and *h*, enters both of the sections behind the piston, and, pressing against the latter, operates to rotate the wheel E, as indicated by the arrows.



In the position indicated in Figs. 2 and 3, both wings of the piston-plate have an equal effective area exposed to the steam, and are therefore doing equal service; but it is manifest that the right wing (marked H in Fig. 3) will thence—for a quarter-circuit—increase in area at the expense of the left wing, until the latter, reaching the point *x*, disappears wholly within the wheel, to again emerge from it after passing the most salient part of the cam *b*. At this instant the entire space on the left side of the wheel is brought in communication with the advancing face of the piston-plate, and instantly commences to empty off its steam through the passages *h'* L J *d'*. This is succeeded by a similar operation at the right wing, the two wings acting alternately, so as to maintain a constant and uniform velocity without the use or need of any valve other than the piston-plate itself, which member, it will be seen, thus unites the functions of both piston and valve.

I have not thought it necessary to show the mode of coupling the steam and discharge pipes to the hollow shaft D, nor to show any cocks or other familiar appliances.

It is obvious that the steam and discharge pipes may communicate with a manifold cock, which, being turned to the right, will place the end *d* in communication with the steam, and the end *d'* in communication with the discharge, as in the present illustration, and which, being turned to the left, will precisely reverse these conditions, and, consequently, reverse the rotations of the engine.

I claim as new and of my invention—

In a rotary engine, the stationary cam-formed heads B B', traversed by tubular shaft D, having the central partition, F, ports I and J, channel *d''*, and wheel E, whose annular groove *e* receives the shell G, and whose radial slot *e'*, channeled at K and L, receives the piston-plate H *h* *h'*, the whole being combined and operating as set forth.

In testimony of which invention I hereunto set my hand.

GEORGE W. GREENE.

Attest:

GEO. H. KNIGHT,  
I. W. GREGG.