

No. 776,376.

PATENTED NOV. 29, 1904.

J. A. S. BECKER.  
ROTARY ENGINE.

APPLICATION FILED OCT. 10, 1904.

NO MODEL.

3 SHEETS—SHEET 1.

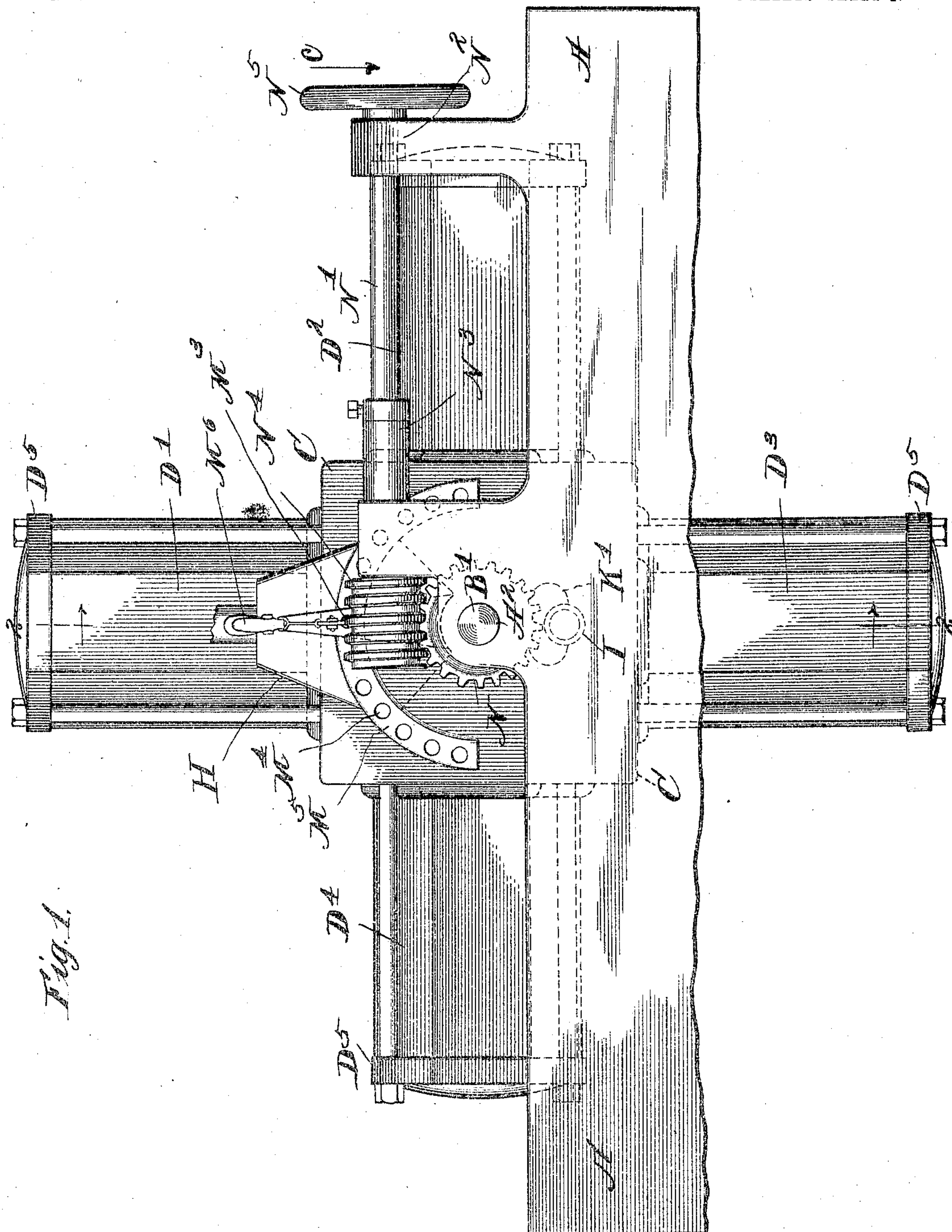


Fig. 1.

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Inventor:  
John H. S. Becker  
By L. L. Woodward,  
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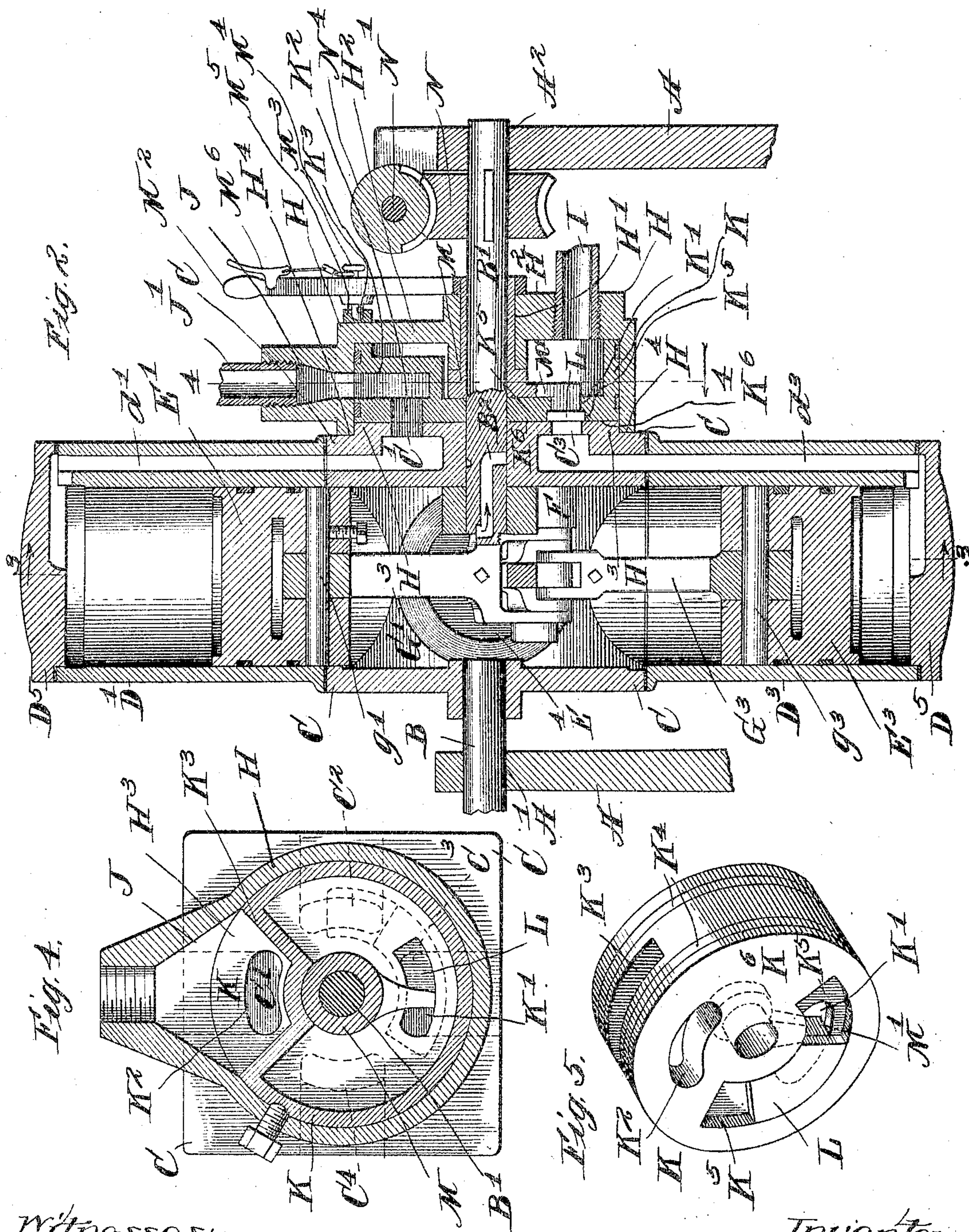
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3 SHEETS—SHEET 2.



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NO MODEL.

3 SHEETS—SHEET 3.

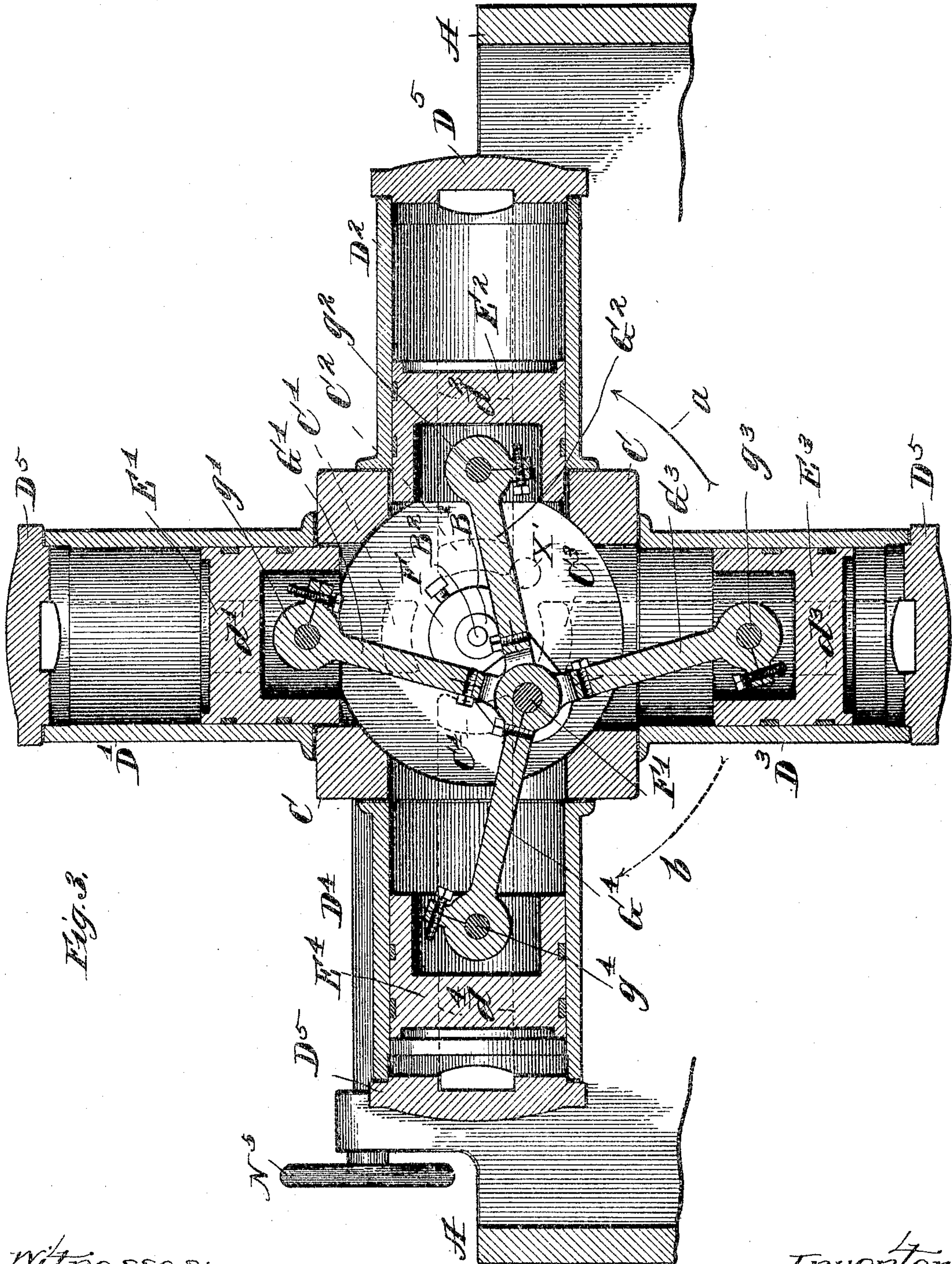


Fig. 3.

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## UNITED STATES PATENT OFFICE.

JOHN A. S. BECKER, OF FREEPORT, ILLINOIS.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 776,376, dated November 29, 1904.

Application filed October 10, 1904. Serial No. 227,867. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN A. S. BECKER, a citizen of the United States of America, residing at Freeport, in the county of Stephenson and State of Illinois, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention relates to improvements in rotary engines; and it consists of the novel construction, arrangement, and combinations of parts hereinafter fully described, and specifically pointed out in the claims.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a side elevation of an engine embodying my invention. Fig. 2 is a transverse section at the dotted line 2 2 in Fig. 1. Fig. 3 is a central section of the engine at the dotted line 3 3 in Fig. 2. Fig. 4 is a section at the dotted line 4 4 in Fig. 2 of parts there shown. Fig. 5 is an isometrical detail view of the valve of the engine.

Like letters of reference indicate corresponding parts throughout the several views.

A is the frame of the engine and has circular bearings A' A<sup>2</sup> therein.

B is the driving-shaft of the engine and is mounted in the bearing A<sup>2</sup> in the frame A.

B' is the crank-shaft of the engine and is mounted in the bearing A' in the frame A and in a bushing, to be described hereinafter, inserted through and supported by a stationary part, also to be described hereinafter. The inner end portion of the shaft B' is also provided with a duct B<sup>2</sup>, extending longitudinally inward and thence transversely outward therethrough for the purpose of admitting oil to lubricate the same.

C is the crank-chamber of the engine and is provided with steam-ports C' C<sup>2</sup> C<sup>3</sup> C<sup>4</sup> and is fast mounted on the driving-shaft B and loose mounted on the crank-shaft B'.

D' D<sup>2</sup> D<sup>3</sup> D<sup>4</sup> are cylinders having steam-ducts d' d<sup>2</sup> d<sup>3</sup> d<sup>4</sup> therein communicating with the interiors thereof and connecting with the inner ends of the ports C' C<sup>2</sup> C<sup>3</sup> C<sup>4</sup> in the crank-chamber C and radially secured by their inner ends to the sides of and opening into the crank-chamber C and closed at their outer ends by means of heads D<sup>5</sup>.

E' E<sup>2</sup> E<sup>3</sup> E<sup>4</sup> are pistons freely slidable in their respective cylinders D' D<sup>2</sup> D<sup>3</sup> D<sup>4</sup>.

F is a crank fast by one end thereof to the crank-shaft B' and provided at its other or free end with a crank-pin F', Fig. 3.

G' G<sup>2</sup> G<sup>3</sup> G<sup>4</sup> are piston-rods pivoted by their inner ends to the crank-pin F' of the crank F and by their outer ends to the wrist-pins g' g<sup>2</sup> g<sup>3</sup> g<sup>4</sup> of the pistons.

H is a circular steam-chest having a central circular opening H', Fig. 2, in the head H<sup>2</sup> thereof, the circular projection H<sup>3</sup> on the crank-chamber C entering and serving as a closure for its open and inner end H<sup>4</sup>. The steam-chest H either rests on a separate stationary base (not shown) or may be connected with and form a part of the main frame A of the machine.

I is a pipe tapped in through the head H<sup>2</sup> of the steam-chest H for the admission of steam thereinto.

J J' are an outlet-chamber and connected pipe for the escape of exhausted steam from the engine.

K, Fig. 5, is a circular valve having an inlet-port K' and an outlet-port K<sup>2</sup> therein, the former port, K', being so arranged as to successively register with the ports C' C<sup>2</sup> C<sup>3</sup> C<sup>4</sup> in the crank-chamber C and also being in communication with the interior of the steam-chest H, wherein such valve K is stationarily seated, and the latter port, K<sup>2</sup>, opening into a radial chamber K<sup>3</sup>, which opens outward through the periphery of such valve K into the outlet-chamber J.

K<sup>4</sup> represents packing-rings set into the periphery of the valve K to insure a tight joint between the same and the wall of the steam-chest H.

K<sup>5</sup> is a segmental recess in the face K<sup>6</sup> of the valve K, through the bottom of which the inlet-port K' extends.

L is a gate included and adapted to slide endwise in the recess K<sup>5</sup> in the valve K, and thereby completely or partially close the inlet-port K' therein, according as may be desired.

M, Figs. 2 and 4, is a bushing mounted in the circular bearing H' in the steam-chest H, so as to be rocked therein, and itself furnish-



ing a bearing for the crank-shaft B' and also being provided with a transverse downwardly-extending preferably integral arm M', made fast at its lower end to the gate L.

5 M<sup>2</sup> is a lever fast by its lower end to the bushing M, which it serves to rock to and fro in its bearing H' to operate the gate L, which regulates the amount of steam to be admitted through the inlet-port K' or excludes it there-  
10 from altogether, according as desired.

M<sup>3</sup> is a spring-actuated detent mounted in the lever M<sup>2</sup> and adapted to engage any of the sockets M<sup>4</sup> in the segmental plate M<sup>5</sup> and therethrough lock its lever M<sup>2</sup> and the gate  
15 L, connected intermediately therewith, in any desired positions.

M<sup>6</sup> is a hand-lever of the ordinary form for disengaging the detent M<sup>3</sup> from the sockets M<sup>4</sup> to release the lever M<sup>2</sup>.

20 N is a worm-wheel fast mounted on the crank-shaft B'.

N' is a shaft mounted in the bearings N<sup>2</sup> N<sup>3</sup> on the frame A of the engine.

N<sup>4</sup> is a worm meshing with the worm-wheel  
25 N and fast mounted on the shaft N'.

N<sup>5</sup> is a hand-wheel for operating the shaft N'.

In Fig. 3 the parts of the engine are in proper positions, if steam be admitted there-into, to cause the same to be rotated in the  
30 direction indicated by the arrow *a*. If the crank-shaft B' be turned by rotating the hand-wheel N<sup>5</sup> in the direction indicated by the arrow *c* until the crank-pin F', Fig. 3, occupies the position indicated by the dotted circle X, the engine will reverse its motion and  
35 rotate in the direction indicated by the arrow *b*.

Supposing all parts of the engine to be in the positions shown in the drawings, its mode of operation will be as follows: Steam enter-  
40 ing the steam-chest H from the pipe I passes therefrom through the inlet-port K' in the valve K and thence through the port C<sup>3</sup> and duct *d*<sup>3</sup>, Fig. 2, into the cylinder D<sup>3</sup>, thereby causing the engine to turn about one-fourth  
45 of a revolution or until the inlet-port K' in the valve K registers with the port C<sup>4</sup> in the crank-chamber C, and so on, the port K' next successively registering with the ports C' and C<sup>2</sup> in the cylinders D' D<sup>2</sup>. If the inlet-port  
50 K' of the valve K is opened to its fullest extent, it will continue to admit steam to the port it is leaving after it has begun to register with and admit steam to the port it is approaching. Such adjustment of the gate L  
55 will obviously result in the generation of great power. When little power is required, the gate L should be so adjusted as to admit but little steam and that to but one port of the engine at a time.

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

1. In a rotary engine, in combination, a sup-  
65 porting-frame, a driving-shaft and a crank-shaft mounted therein, a crank-chamber pro-

vided with a plurality of steam-ports—cor-responding in number with the cylinders to be employed therewith and fast mounted on the driving-shaft and loose mounted on the crank-  
70 shaft, a plurality of cylinders, having steam-ducts therein—communicating with the interiors thereof and connecting with the inner ends of the ports in the crank-chamber—and radially secured, by their inner ends, to the  
75 sides of and opening into, the crank-chamber, and closed at their outer ends, a plurality of pistons freely slidable in their respective cylinders, a crank, fast by one end thereof to the crank-shaft and provided, at its other end,  
80 with a crank-pin, piston-rods pivoted, by their inner ends, to the crank-pin of the crank on the crank-shaft, and, by their outer ends, to the wrist-pins of their respective pistons, a circular steam-chest receiving, in its open end,  
85 and being supported by a circular projecting closure on the crank-chamber, conduits for the admission of steam into and its exit from the steam-chest, a circular valve, having an inlet-port and an outlet-port therein, the former  
90 port being so arranged as to successively register with the ports in the crank-chamber and also being in communication with the interior of the steam-chest, and the latter port opening into the radial chamber which opens out-  
95 ward through the periphery of such valve into the discharge-conduit for exhausted steam, and a gate included and adapted to slide end-wise in a recess, in the circular valve, and thereby completely or partially close the in-  
100 let-port therein, and means of operating such gate, substantially as and for the purpose specified.

2. In a rotary engine, in combination, a sup-  
105 porting-frame, a driving-shaft and a crank-shaft mounted therein, a crank-chamber pro-vided with a plurality of steam-ports—cor-responding in number with the cylinders to be employed therewith—and fast mounted on the  
110 driving-shaft and loose mounted on the crank-shaft, a plurality of cylinders, having steam-ducts therein—communicating with the interiors thereof and connecting with the inner  
115 ends of the ports in the crank-chamber—and radially secured, by their inner ends, to the sides of and opening into, the crank-chamber, and closed at their outer ends, a plurality of  
120 pistons freely slidable in their respective cylinders, a crank, fast by one end thereof to the crank-shaft and provided, at its other end, with a crank-pin, piston-rods pivoted, by their  
125 inner ends, to the crank-pin of the crank on the crank-shaft, and, by their outer ends, to the wrist-pins of their respective pistons, a circular steam-chest having a central circular opening in the head thereof and receiving, in  
130 its open end, and being supported by a circular projecting closure on the crank-chamber and provided with an outlet-chamber, opening through the periphery thereof, for the escape of exhaust-steam therefrom, a conduit for the



admission of steam into the steam-chest, a circular valve, having an inlet-port and outlet-port therein, the former port being so arranged as to successively register with the  
 5 ports in the crank-chamber, and also being in communication with the interior of the steam-chest, and the latter port opening into the radial chamber which opens outward through the periphery of the valve into the outlet-  
 10 chamber in the periphery of the steam-chest, a gate included and adapted to slide in a recess, in such valve, and thereby completely or partially close the inlet-port therein, a bushing mounted in the central circular opening in  
 15 the steam-chest, so as to be rocked therein, and itself furnishing a bearing for the crank-shaft of the engine and also being provided with a transverse downwardly-extending arm, fast by its lower end to the gate in the valve,  
 20 and a lever fast to such bushing and serving to rock the same to and fro to operate such gate, substantially as and for the purpose specified.

3. In a rotary engine, in combination, a supporting-frame, a driving-shaft and a crank-  
 25 shaft mounted therein, a crank-chamber provided with a plurality of steam-ports—corresponding in number with the cylinders to be employed therewith—and fast mounted on the driving-shaft and loose mounted on the crank-  
 30 shaft, a plurality of cylinders, having steam-ducts therein—communicating with the interiors thereof and connecting with the inner ends of the ports in the crank-chamber—and radially secured, by their inner ends, to the  
 35 sides of and opening into, the crank-chamber, and closed at their outer ends, a plurality of pistons freely slidable in their respective cylinders, a crank, fast by one end thereof to the crank-shaft and provided, at its other end,  
 40 with a crank-pin, piston-rods pivoted, by their inner ends, to the crank-pin of the crank on

the crank-shaft, and, by their outer ends, to the wrist-pins of their respective pistons, a circular steam-chest having a central circular opening in the head thereof and receiving, in  
 45 its open end, and being supported by a circular projecting closure on the crank-chamber and provided with an outlet-chamber, opening through the periphery thereof, for the escape of exhaust-steam therefrom, a conduit for the  
 50 admission of steam into the steam-chest, a circular valve, having an inlet-port and outlet-port therein, the former port being so arranged as to successively register with the  
 55 ports in the crank-chamber, and also being in communication with the interior of the steam-chest, and the latter port opening into the radial chamber which opens outward through the periphery of the valve into the outlet-  
 60 chamber in the periphery of the steam-chest, a gate included and adapted to slide in a recess, in such valve, and thereby completely or partially close the inlet-port therein, a bushing mounted in the central circular opening in  
 65 the steam-chest, so as to be rocked therein, and itself furnishing a bearing for the crank-shaft of the engine and also being provided with a transverse downwardly-extending arm, fast by its lower end to the gate in the valve,  
 70 a lever fast to such bushing and serving to rock the same to and fro to operate such gate, and the worm-gearing for adjusting the crank-shaft to reverse the engine, substantially as and for the purpose specified.

In testimony whereof I have signed my name  
 75 to this specification in the presence of two subscribing witnesses.

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Witnesses:

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