

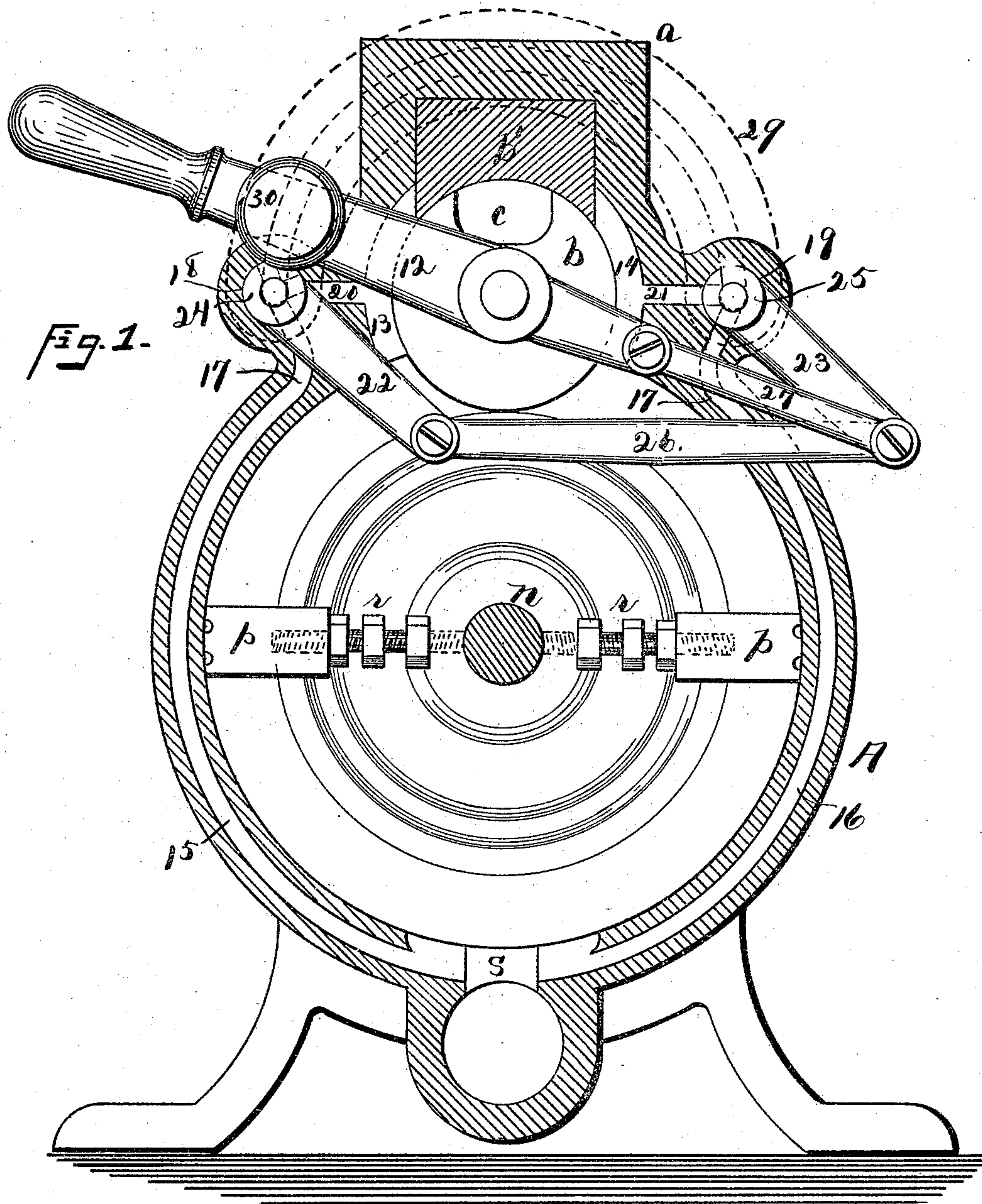
(No Model.)

2 Sheets—Sheet 1.

W. G. ADAMS.  
ROTARY ENGINE.

No. 542,456.

Patented July 9, 1895.



WITNESSES:

Chas. H. Marvin.

E. S. Borel.

INVENTOR

Willard G. Adams.

BY

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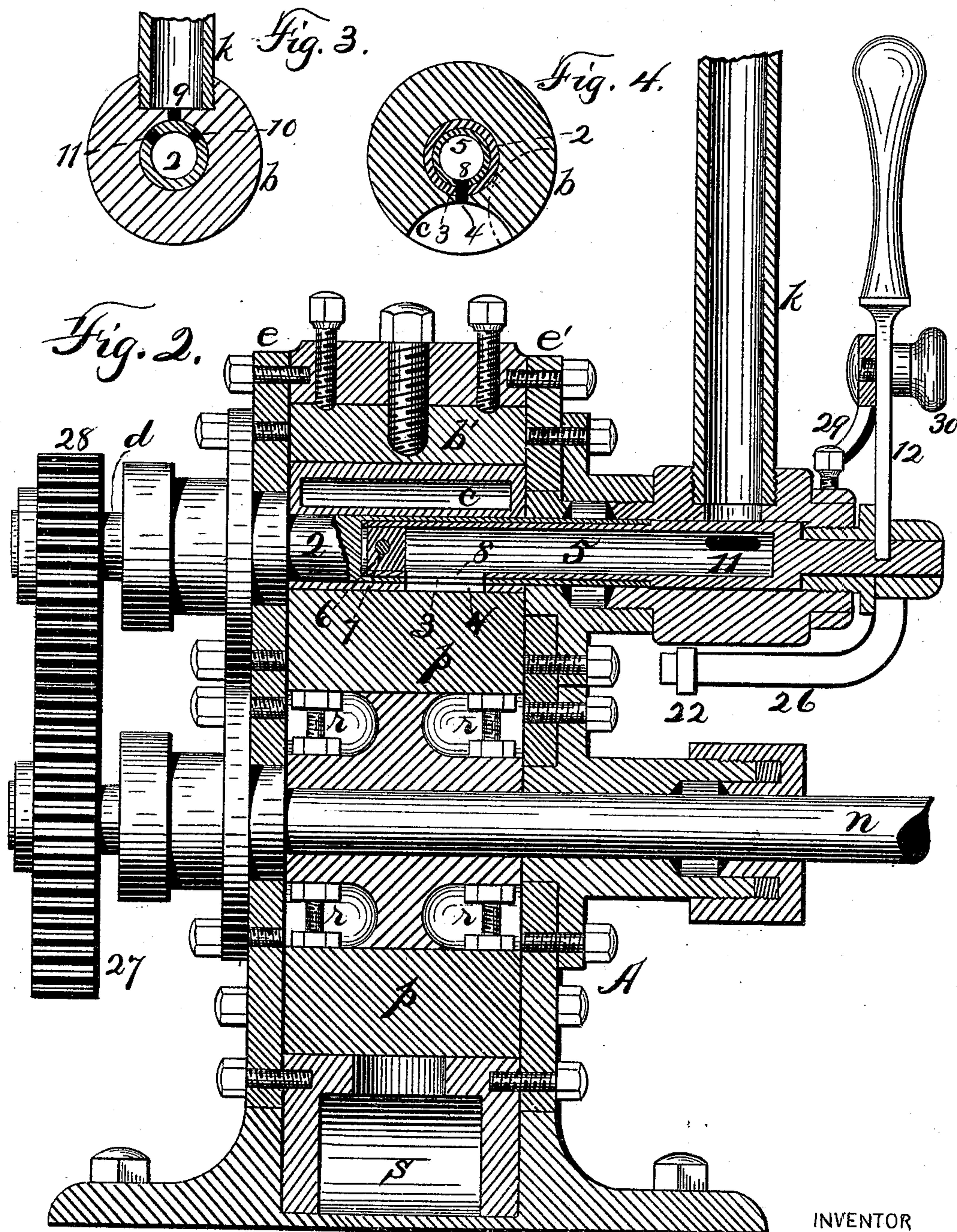
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ROTARY ENGINE.

No. 542,456.

Patented July 9, 1895.



WITNESSES:  
*Charles W. Morin.*  
*June E. Murray*

INVENTOR  
*Willard G. Adams.*  
BY  
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# UNITED STATES PATENT OFFICE.

WILLARD G. ADAMS, OF WEEDSPORT, NEW YORK.

## ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 542,456, dated July 9, 1895.

Application filed November 8, 1894. Serial No. 528,203. (No model.)

*To all whom it may concern:*

Be it known that I, WILLARD G. ADAMS, of Weedsport, in the county of Cayuga, in the State of New York, have invented new and useful Improvements in Rotary Engines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to rotary engines.

My object is to produce an improved engine comprising an outer casing, a head within it carrying the pistons, an abutment also within the case in contact with said head and notched to create a steam-chamber, and also to receive the pistons successively as the head rotates, and in which chamber said pistons first take steam; a tubular shaft consisting of sections, one being partly solid and partly tubular, and inclosing the other section, which is tubular and closed at its ends, the abutment being mounted upon the outer section and rotated by its rotation, both sections being provided with steam-ports adapted to register with each other and with the abutment-recess and to cut off the steam at the abutment by the non-registering of the ports of said shaft-sections, incident to the rotation of the outer section around the inner one, said inner section being also at its outer end connected to a reversing-lever, and with ports near its outer end adapted to always have one in register with the steam-inlet port and to remain so until said lever is operated to partially rotate the sections and bring the other one into register with said inlet-port, and at the same time this rotation of said inner section shifts the discharge-port therefrom, so that when the rotation of the other section and abutment brings its port into register therewith the steam will be admitted into the chamber in the abutment, so as to bear upon the opposite side of the pistons and drive the head in the opposite direction, the reversing-lever being also connected to valves which are mounted in vent-passages in the casing and extending down to the exhaust from the recesses in the sides of the abutment-seat, whereby all packing of air or vapor ahead of a piston is prevented, and so that when said lever is operated one vent-valve will be closed and the other opened.

My invention consists in the several novel

features of construction and operation hereinafter described, and which are specifically set forth in the claims hereunto annexed.

It is constructed as follows, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical sectional elevation on a line diametrical to the case, showing the head and pistons and the reversing-lever and links connecting it to the vent-valves in the anti-packing recesses. Fig. 2 is a vertical sectional elevation on a line diametrically transverse to the shaft. Fig. 3 is a vertical section transverse to that section of the abutment-shaft which is rotated to reverse the engine and particularly showing the arrangement of the steam-port. Fig. 4 is a transverse section of the abutment and that section of the abutment-shaft upon which it is mounted and showing the steam-ports connecting the recess in the abutment to the steam-chamber in the shaft.

For greater perspicuity I show my present invention applied to the rotary engine shown and described in the Letters Patent issued to me December 18, 1894, No. 530,982, as illustrating my principle, though it can be readily applied to many other classes of engines besides that class in which the piston-carrying head is concentric with the casing, and the pistons are not reciprocated in said head by its rotation, and I, therefore, give only a general description of those parts which are shown in said patent and specifically describe those parts which relate to and are connected with or embodied in this invention.

A is a cylindrical case provided with an offset *a*, in which the rotating abutment *b* is seated, and *b'* is an adjustable-bearing block engaging with it. A recess *c* is cut across the face of the abutment, which is mounted upon a shaft *d*, journaled in the face-plate *e* or in an ordinary stuffing-box. A shaft *n*, journaled substantially as shown, carries a piston-head concentric with the casing, and radial pistons *p* are mounted in said head and adjusted as to their projection by screws *r*, and *s* is an exhaust-port diametrically opposite to the abutment.

In the present invention the abutment-shaft is sectional, the section 2 being secured to the abutment to rotate it, and its inner end is



tubular and provided with a port 3 coincident with the port 4 through the abutment and opening into the recess *c*, and the section 5 is tubular and reduced exteriorly to fit into the section 2, is closed interiorly by a plug 6 and pin 7 through it, and is also provided with a port 8, adapted to register with the port 3, and further provided with ports 10 and 11 in alignment with the port 9 of the steam-inlet pipe. This section extends out through the face-plate *e'*, is rotatably journaled, its outer end being closed, and 12 is a reversing-lever secured thereon, suitable to rotate it when desired to reverse the engine. This section is stationary, except as rotated by said lever, and when the port 10 registers with the port 9 of the steam-inlet pipe *k*, the rotation of the abutment brings the ports 3 4 into register with the port 8, and then the steam will enter the recess *c*, so as to enter the recess 13 and bear upon the pistons in proper manner to drive the engine ahead, and then when the shaft-section 2 is rotated, so as to bring the port 11 into register with the port 9, such partial rotation will shift the port 8 into such position that when the ports 3 4 register with it the steam will be discharged into the recess 14, and bearing upon the pistons in the opposite direction the engine will be reversed. From this it will be seen that the abutment-shaft section 2 operates as a cut-off valve, or it may be said that the abutment itself operates as, and is in fact, the steam cut-off valve.

Recesses 13 14 are provided in the abutment-chamber on opposite sides to receive the steam, the recess 13 being on the go-ahead side and 14 on the reversing side.

In the case vent-passages 15 16 are created by coring, opening into the valve-chambers 18 19, curved as at 17, and opening inward from said chambers into the recesses 13 14 through passages 20 21. Tubular cut-off valves 24 25 are seated in said chambers and exteriorly connected by links 22 23 to the rod 26, which is connected to the reversing-lever 27.

As shown in Fig. 1, the valve 24 is closed and the valve 25 is open, and the engine is in position to run ahead, the steam entering the recess 13; and then when a piston passes the exhaust-port *s* all of the air or vapor carried ahead of it will flow freely into the recess 14 and through the passage 21, valve 25, and passage 16 back to the exhaust. So when the lever 27 is shifted the valve 25 is closed, the valve 24 is opened, and then as the steam enters the recess 14 the engine is reversed and all the air or vapor then carried ahead of a piston is forced into the recess 13 through the passage 20, valve 24, and passage 15 to the exhaust, so that whichever way the engine runs all packing or compression of air or vapor ahead of a piston is absolutely prevented.

As will be readily seen, the rotation of the piston-head through the gearing 27 28 rotates the abutment, and that as the steam is cut

off at the abutment instead of at the inlet-pipe I save at each revolution of said abutment the amount of live steam which is in the section 5.

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

1. In a rotary engine an abutment provided with a steam port and mounted upon a tubular shaft provided with a port registering with that of said abutment, a steam pipe within said shaft provided with a port adapted to register with said shaft and abutment ports, and means to rotate said steam pipe independently, to change the engagement of its port with the other, ports in combination.

2. In a rotary engine, an abutment provided with a steam port and mounted upon a tubular shaft provided with a port registering with that of said abutment, a steam pipe within said shaft provided with a port adapted to register with said shaft port, and means to rotate said steam pipe independently, to change the engagement of said ports, in combination with recesses in the walls of said abutment-chamber and on opposite sides thereof.

3. In a rotary engine, the combination with a case, a rotating piston-head concentric therewith and provided with suitable pistons, an exhaust port, passages within and upon opposite sides of the case connected to the exhaust port and valves in said passages, of a sectional tubular shaft, a rotating abutment upon one section thereof, ports through said shaft and abutment opening into the steam chamber in said abutment, the other or steam-pipe section being rotatable independently of the abutment section and having in its inner end a port adapted to register with those of the abutment section and abutment when the abutment shaft-section is rotated, and in the other with ports, one of which is always in register with a steam-inlet pipe, a hand-lever mounted upon the steam-pipe section and links connecting it to the valves in the casing passages, whereby, when said pipe is rotated by said lever, one of said valves is closed and the other opened, and the engine reversed.

4. In a rotary engine, an abutment, a tubular and sectional shaft, one section carrying said abutment and rotating with it, the other section constituting a steam-pipe having a continuous connection to a steam-inlet pipe, an inlet pipe, a hand lever mounted upon the outer end of the steam-pipe whereby said steam-pipe is rotated, and suitable ports in said shaft sections adapted to register when the abutment section of the shaft is rotated, in combination with a piston head concentric with its casing and suitable pistons therein.

5. In a rotary engine, the combination with a steam-inlet pipe, of a rotatable steam pipe provided at one end with inlet ports, always registering therewith and at the other end with a discharge port, suitable to register with



the abutment, a rotating abutment and means to rotate said steam pipe to throw said discharge port into position to register with the port of said abutment to discharge steam into the steam chamber therein.

6. In a rotary engine, the combination with a case, a piston-head therein, an abutment in said case, a steam inlet-pipe, a rotatable steam pipe provided at one end with inlet ports, one of which is always in register with said inlet pipe and at the other end with a discharge port, suitable to register with the abutment and means to rotate said steam pipe, to throw one of said inlet ports into register, and the

other out of register with said inlet pipe, of an exhaust port in the case, recesses in and upon opposite sides of the abutment chamber, passages in the case connected at one end to the exhaust port and at their other ends to said recesses, and means to close the valve in one passage and open the other when said steam pipe is rotated to reverse the engine.

In witness whereof I have hereunto set my hand this 23d day of October, 1894.

WILLARD G. ADAMS.

In presence of—

JESSIE E. MURRAY,  
HOWARD P. DENISON.