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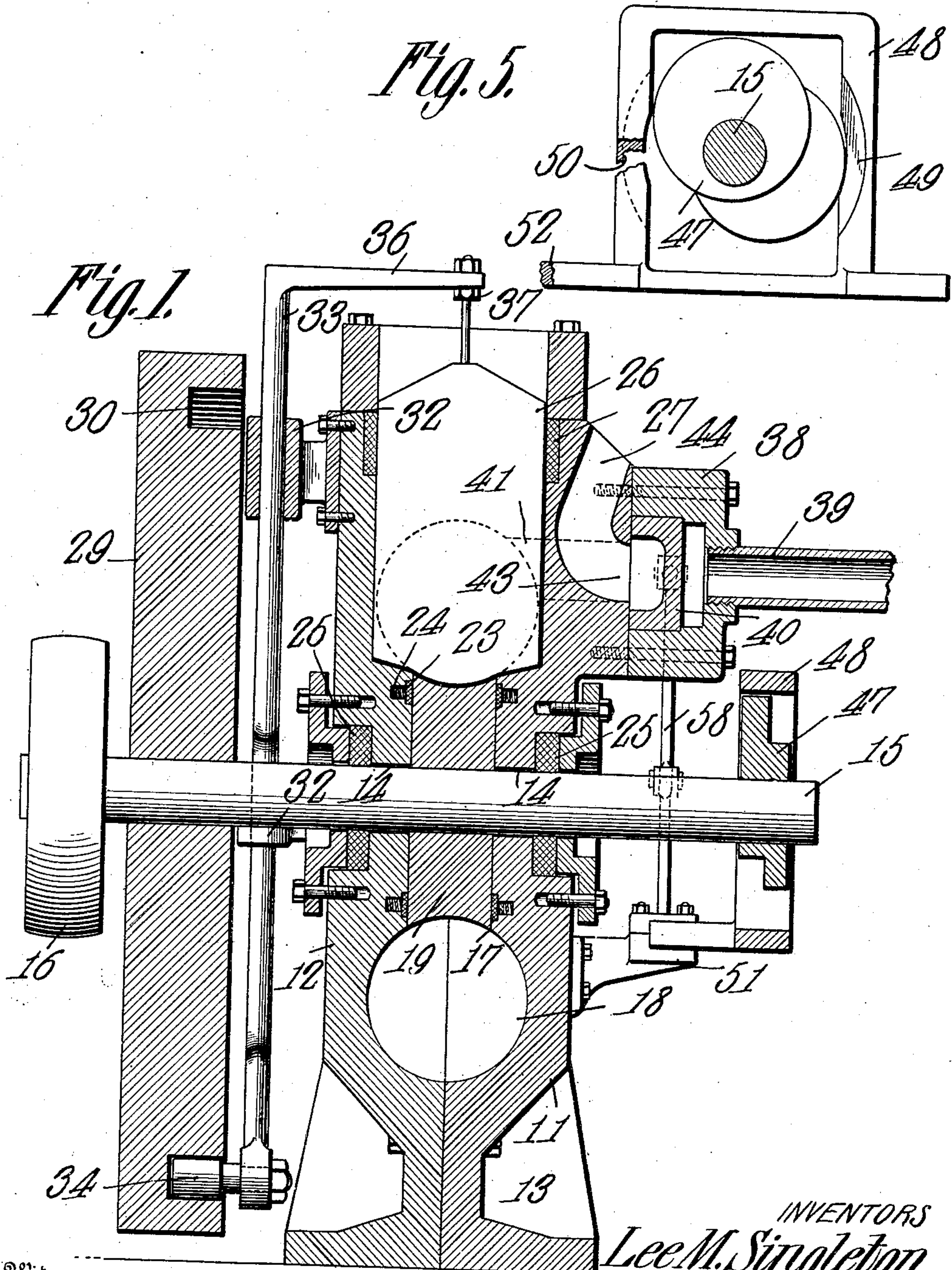
PATENTED SEPT. 8, 1908.

L. M. SINGLETON & C. E. MADDOX.

ROTARY ENGINE.

APPLICATION FILED MAR. 28, 1908.

2 SHEETS—SHEET 1.



Witnesses

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INVENTORS  
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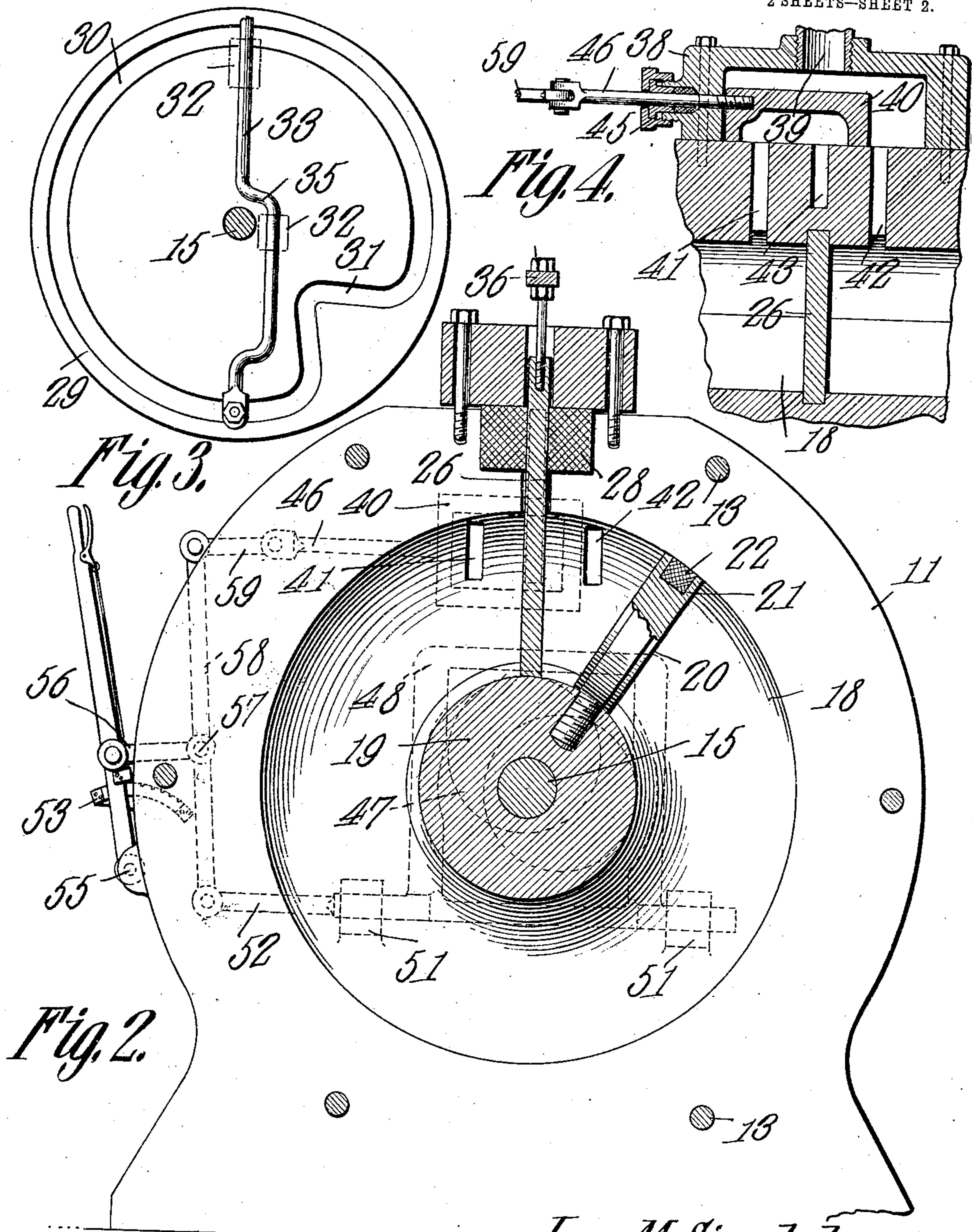
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# UNITED STATES PATENT OFFICE.

LEE M. SINGLETON AND CINCINNATUS E. MADDOX, OF ALPHARETTA, GEORGIA.

## ROTARY ENGINE.

No. 898,274.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed March 28, 1908. Serial No. 423,928.

*To all whom it may concern:*

Be it known that we, LEE M. SINGLETON and CINCINNATUS E. MADDOX, citizens of the United States, residing at Alpharetta, in the county of Milton and State of Georgia, have invented a new and useful Rotary Engine, of which the following is a specification.

This invention relates to rotary engines, and its object is to provide an improved form of such device wherein a piston is adapted to travel in a circular path, said path being arranged to receive a sliding head.

A further object of the invention is to provide means whereby the direction may be reversed at will.

A still further object of the invention is to provide in a device of this character a means for cutting off the live steam during a predetermined portion of the stroke.

The invention consists in general of a casing wherein is formed an annular bore, a piston mounted to rotate around said bore, a sliding cylinder head arranged for insertion in and detachment from said bore, and in securing novel forms of valve device.

The invention further consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and specifically claimed.

In the accompanying drawings:—Figure 1 is a longitudinal sectional view through the invention. Fig. 2 is a transverse sectional view thereof. Fig. 3 is a detail of certain of the parts connected with the removable head. Fig. 4 is a detail of the valve. Fig. 5 is a detail of the valve operating device.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The body of the invention comprises two substantially symmetric castings 11 and 12 held together by any suitable means, as by bolts 13. Through a bore 14 centrally located in these parts, passes a shaft 15 provided on one end thereof with a suitable power transmission means, here indicated by the belt pulley 16. Between the bearings 14, the walls of the two portions are spaced, as indicated at 17. Surrounding the spaced walls 17 is an annular opening 18 preferably circular in cross section.

Keyed or otherwise secured to the shaft 15 and closely fitting between the walls 17 is a disk 19, having fixed at one end thereof a piston 20, preferably attached thereto in the

manner shown in Fig. 2. The piston 20 is made of the same form as the cross section of the opening 18, and in the case here shown is cylindrical. There is provided in this piston a recess 21, wherein is held suitable packing strips 22 arranged to press tightly against the walls of the opening 18. Inasmuch as the parts thus described correspond closely to the ordinary cylinder and piston, it is preferred to designate throughout the remainder of the specification the opening 18 as the cylinder bore and the packing rings 22 as piston packing rings. In order to prevent leakage of the steam, there is provided in addition to the piston packing rings 22 annular packing 23, held between the disk 19 and the spaced wall 17 of the cylinder castings being pressed firmly thereagainst by means of springs 24 arranged in suitable recesses as indicated in Fig. 1. To prevent leakage of the steam around the shaft 15, stuffing boxes with suitable glands and packing are located in the castings 11 and 12, as indicated at 25. In a suitable place in the cylinder bore 18 there is provided a recessed portion, wherein is slidably mounted a piston head 26, and to prevent the escape of steam therearound, this head is packed on its edges, as indicated at 27, and on the sides thereof, as indicated at 28, by any suitable means.

Carried upon the shaft 15 to rotate therewith is a cam wheel 29, provided with a cam groove 30 the greater portion of which is concentric with the shaft, but having a portion 31 inwardly bent towards said shaft, as indicated in Fig. 3. Mounted in suitable bearings 32 is a rod 33 carrying a cam roller 34, near the end thereof, said cam roller being arranged to lie in the cam groove 30, as indicated at Fig. 1. This rod is bent to pass around the shaft 15, as shown at 35. The rod 33 is provided at the end with an arm 36 adjustably connected to the piston head 26, as shown at 37. It will now be observed that as the engine rotates, the piston head will be forced in and out by the action of the cam grooved portion 31 being held in its inward position by the portion of the groove indicated by the numeral 30. It is to be noted that the piston 20 is so arranged on the shaft that the cam groove 31 comes into operation just as the piston approaches the cylinder head 26, and ceases operation as the piston 20 moves away from the cylinder head.

At any suitable point on the cylinder cast-



ing is fixed a steam chest 38, receiving its steam from a boiler or like source of supply, by means of a pipe 39. Within the steam chest 38 is held a valve 40, and extending from the interior of the steam chest to the cylinder bore are ports 41 and 42. An exhaust passage 43 also opens from the interior of the steam chest and may be connected to a pipe to carry out the exhaust or may be allowed to open into the air, as shown at 44. It is preferred in this connection to use an ordinary form of D-valve, so proportioned that at all times one of the ports, as 41, and the exhaust passage 43 will be in communication through the under side of the D valve. In the steam chest 38 there is provided a suitable stuffing box and gland as shown at 45, and a valve stem 46 is arranged to pass therethrough, being connected to the valve 40. Mounted upon the shaft 15 is a double cam 47 operating in a frame 48 and arranged to reciprocate the same. The frame 48 is provided on one side with a groove 49 arranged to permit the passage of one of said cams without operating, and upon the other side a circular groove 50 permits the passage of the other cam in like manner. The frame 48 is mounted in bearings 51 to reciprocate back and forth therein, and is provided with a link 52 extending from one side thereof.

Positioned on one of the castings is a quadrant 53 and a latch lever 54 is pivotally mounted as at 55 in such manner that the latch will contact with the teeth of the quadrant. Upon this latch lever is pivotally mounted a link 56 and at the outer end thereof is formed a pivot 57 whereon is mounted a lever 58 connected at its lower end to the link 52, and at its outer end by means of a link 59 to the valve stem 46. The fulcrum point of the lever 57 is thus arranged to act as a shifting pivot. In order to understand the operation of the device, it will be assumed that the piston 20 in Figs. 2 and 4 is traveling in the same direction as the hands of a watch. When the piston 20 is traveling in this direction, the latch lever 54 will be held in the position indicated in Fig. 2, and as the piston moves around its circular path, the shaft 15 will be revolved carrying with it the cam wheel 29 and the double cam 47. During this part of the operation, steam is admitted through the pipe 39, steam chest 38, and port 42, and forces the piston around, the head 26 being located in the bore. As the piston moves around and approaches the port 41, one of the double cams 47 will strike against the side of the reciprocating frame 48 and move the valve 40 to the position indicated by the dotted lines in Fig. 4, thus cutting off the supply of steam, but, at the same time, still allowing the exhaust port 41 to remain open. Synchronously the portion 31 of the cam groove 30 comes into play and lifts the piston head 26 clear of the cylinder

bore, thus permitting the piston 20 to pass that point. As soon as the piston 20 passes the cylinder head, the same is again forced into position and the other member of the double cam strikes the opposite side of the reciprocating frame 48 and moves the valve thereunder into the position shown in full lines in Fig. 4, when the cycle of operations begins anew.

Should it be desired to reverse the engine, it is simply necessary to move the latch lever 54 to the opposite end of the quadrant, and this will then become the exhaust port, and communication will be had from the port 42 to the exhaust passage 43, the port 41 being normally open for the admission of steam. This will reverse the operation of the engine, and as the cams 47 revolve in opposite directions, the valve 40 will be drawn at the proper time to cover port 41, the operation in other respects being the same as that previously described.

If it be desired to stop the engine without shutting off the steam at the ordinary throttle, it is simply necessary to move the latch lever 54 to such position as to cover both the ports 41 and 42 with the valve 40 and the engine will be readily stopped.

What is claimed is:—

1. In a rotary engine, a valve, a valve stem connected thereto, a shaft, a pair of revolving cams mounted thereon, a frame arranged to be moved alternately in one direction by one of said cams, and in the other direction by the other cam, a valve rod rigidly attached to said frame, and a lever movably pivoted intermediate of its ends and connected at those ends to the valve stem and the valve rod.

2. In a rotary engine, a combination of a valve, a valve stem connected thereto, a shaft, a pair of eccentric cams angularly disposed upon said shaft and arranged to revolve therewith, a frame arranged to be moved alternately in one direction by one of said cams and in the other direction by the other cam, a valve rod on said frame, a lever provided with a movable pivot and having its ends connected to the valve rod and valve stem, and means for shifting the position of the movable pivot and locking the same in the shifted position.

3. In a rotary engine, a cylinder having an annular bore and provided with an exhaust port continuously open and an admission port, a valve arranged to cover said admission port at predetermined periods, a shaft held to rotate concentric to said angular bore, a piston attached to said shaft held to move in said bore, a head held in said bore, cams mounted on said shaft, and means operated by said cams synchronously to withdraw said head and close said admission port and replace said head and open the port comprising a cam rod connected to said head



and actuated by one of said cams, a frame  
arranged to be moved alternately in one di-  
rection by one of the remaining cams, and  
in the other direction by the other remaining  
5 cam, and means to connect said frame with  
the valve, comprising a valve stem, a valve  
rod connected to said stem, and a movably  
pivoted lever connecting said valve rod and  
stem.

In testimony that we claim the foregoing 10  
as our own, we have hereto affixed our  
signatures in the presence of two witnesses.

LEE M. SINGLETON,  
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Witnesses:

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W. H. SPENCE.