

No. 680,406.

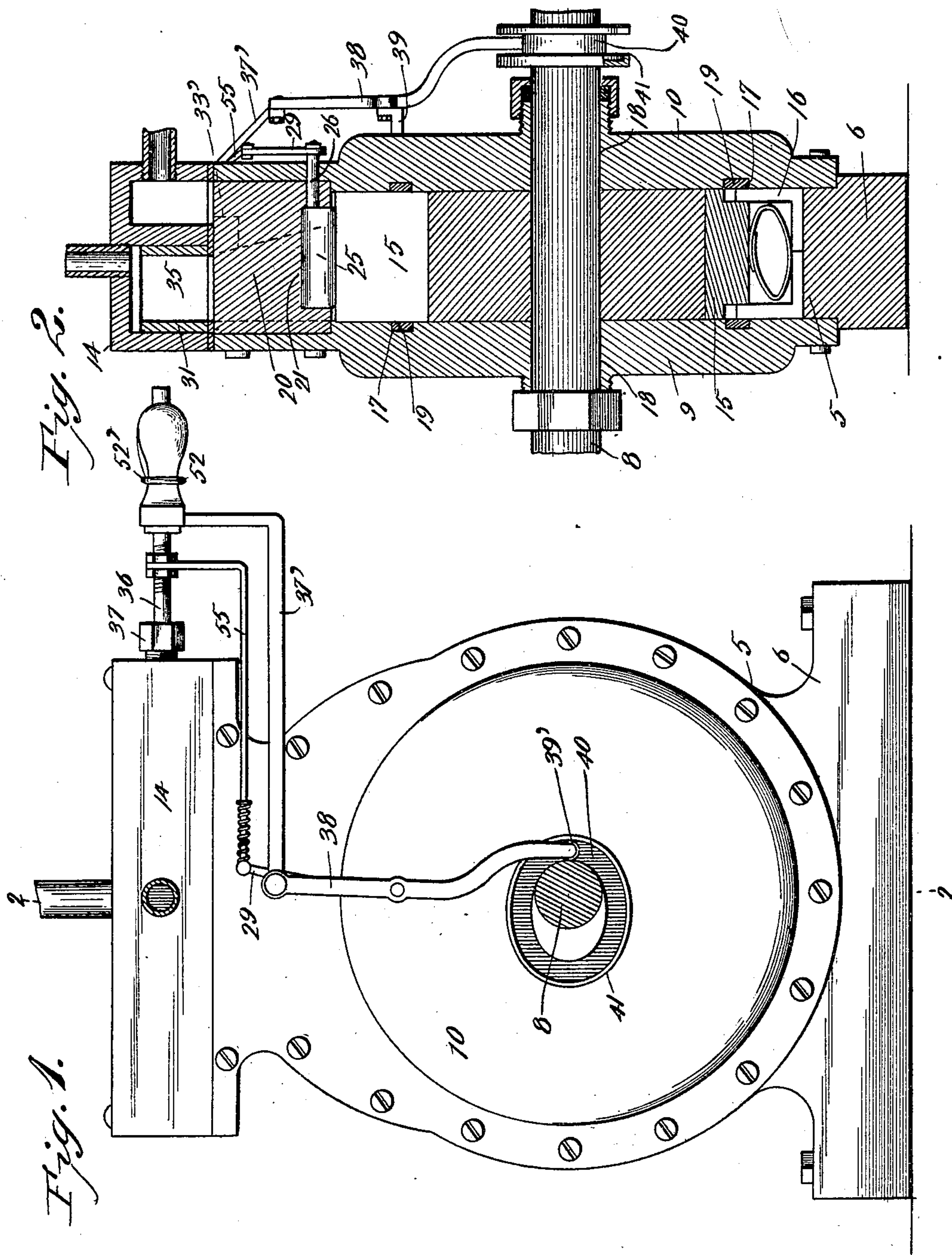
Patented Aug. 13, 1901.

A. P. CHARLES.
STEAM ENGINE.

(Application filed Feb. 16, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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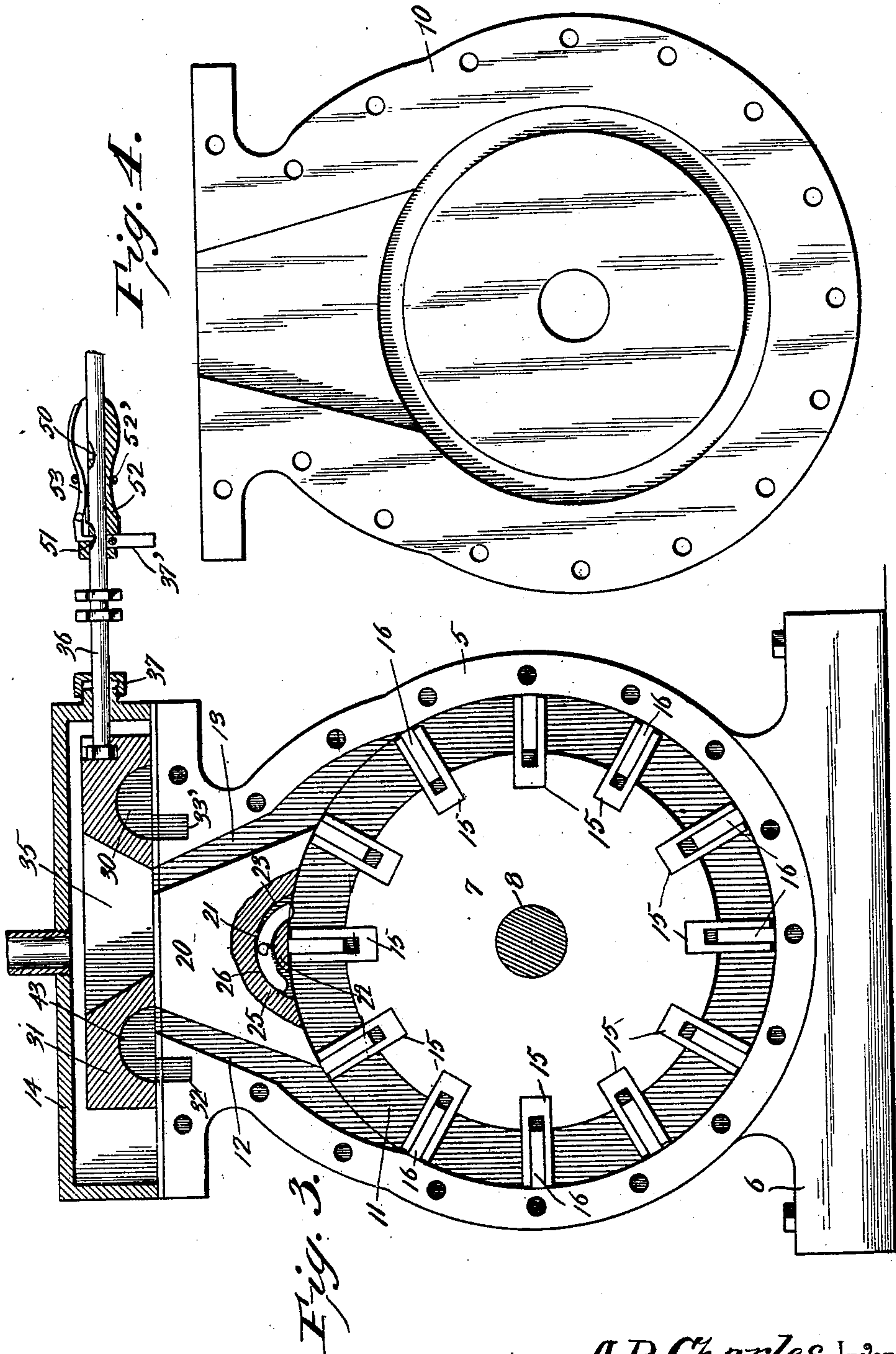
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UNITED STATES PATENT OFFICE.

ALBION P. CHARLES, OF IOLA, KANSAS.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 680,406, dated August 13, 1901.

Application filed February 16, 1901. Serial No. 47,612. (No model.)

To all whom it may concern:

Be it known that I, ALBION P. CHARLES, a citizen of the United States, residing at Iola, in the county of Allen and State of Kansas, have invented a new and useful Steam-Engine, of which the following is a specification.

This invention relates to engines in general, and more particularly to that type known as "rotary" engines; and it has for its object to provide a simple and efficient construction wherein the direction of rotation of the piston may be readily reversed and wherein accidental reverse rotation of the piston will be prevented.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a side elevation showing the complete engine. Fig. 2 is a section on line 2 2 of Fig. 1, the rocker and shaft, as well as other parts, being shown in elevation. Fig. 3 is a side view of the engine with one of the cylinder-heads removed, parts being shown in section. Fig. 4 is an elevation of the removable cylinder-head and showing the groove for the packing-ring.

Referring now to the drawings, the present engine consists of a cylinder 5, mounted upon a base 6, and within which cylinder is disposed a piston 7, fixed upon a shaft 8 and rotatable between the cylinder-heads 9 and 10, which latter are held in place in the usual manner. In the upper portion of the cylinder and leading to the piston-chamber 11 are steam-passages 12 and 13, which communicate with a steam-chest 14 upon the upper side of the cylinder. These steam-passages 12 and 13 diverge downwardly and are arranged tangent to the periphery of the piston 7.

Secured to the piston 7 and extending radially thereof is a series of piston-heads 15, which in the present instance are twelve in number, and these piston-heads are provided with packing-strips 16, which engage the inner walls of the cylinder and the cylinder-heads to prevent escape of steam past the piston-heads. The inner faces of the cylinder-heads are provided with circular grooves 17, concentric with the shaft-bearing 18, and in these grooves are disposed packing-rings 19, as shown.

Between the passages 12 and 13 is a truncated triangular partition 20, the inner face

of which coincides with the curvature of the bore of the cylinder, and in this inner face is a recess 21, across the mouth of which is a bridge 22, resulting in the formation of an arcuate passage. In this recess or passage 21 is disposed an arcuate rocker 25 upon a spindle 26, which is passed outwardly through the end of the upper portion of the cylinder and through the medium of which the rocker is operated to project its ends alternately into the path of rotation of the piston-heads, said shaft being oscillated by means of a crank 29, attached to the outer end thereof, which is in turn operated in a manner to be hereinafter described.

In the steam-chest 14 is disposed a slide-valve 31, having a central vertical passage 35, which is adapted to communicate with the passages 12 and 13 under different conditions, which will be presently explained. In the under face of the slide-valve 31 are formed recesses 30 and 43, of which the recess 30 coöperates with the passage 13, while the recess 43 coöperates with the passage 12, said recesses being adapted also to coöperate with exhaust-ports 32 and 33, opening through the bottom of the steam-chest and adjacent to the passages 12 and 13. These passages or ports are so disposed that the slide-valve may be moved to partially cover and to uncover the passage 12 without communicating said passage with the outlet-port 33, and at the same time the valve will be moved to partially cover and uncover the passage 13 while maintaining communication between it and the port 32. If the slide-valve be moved inwardly, it may be reciprocated to maintain communication between the passage 12 and the port 33 and to partly cover and uncover the passage 12 and at the same time to destroy communication between the passage 13 and port 32 and also partly cover and uncover the passage 13, while permitting constant communication of the passage 13 with the passage 35 and therethrough with the steam-chest.

In order to reciprocate the slide-valve 31, a valve-rod 36 is passed inwardly of the steam-chest through a stuffing-box 37 and is connected at its inner end with the valve. With the outer end of the rod 36 is connected a rod 37, the opposite end of which is pivoted to a lever 38, pivotally mounted upon a bracket next to the cylinder-head 10, and the oppo-

site end of which lever 38 is provided with a roller 39, which lies within a cam-groove 40 of a cam-wheel 41, whereby as the shaft 8, upon which the cam-wheel is mounted, rotates the lever 38 will be rocked and will correspondingly move the slide-valve 31 to cut off the steam-supply in whichever of its extreme positions the valve may be in.

When the piston is to be rotated in one direction, the valve-rod 36 is drawn outwardly, and when it is to be reversed the valve-rod is pushed in, but the rod 37 must also be moved, else the adjustment of the mechanism would be destroyed, and, furthermore, the engagement of the roller 39 in the cam-groove 40 would not permit of such movement. The rod 37 must, therefore, be adjustably connected with the rod 36, and for this purpose the rod 36 is provided with notches 50 and 51, while the rod 37 is connected directly to a tubular handle 52, which is slidably mounted on the rod 36 and which is provided with a trigger 53, adapted for engagement with the notches in rod 36 interchangeably. When the rod 36 is moved inwardly, the trigger is engaged with notch 50 and holds rod 37 in proper position to give the correct reciprocations to rod 36 and the slide-valve connected therewith. When the rod 36 is drawn outwardly, the trigger is engaged with the notch 51 and holds rod 37 in proper relation to rod 36 in this position of the latter.

When the piston is rotating to the right, the rocker 25 is adapted to project its right-hand end into the cylinder to have a ratchet effect upon the piston-heads for engagement thereby when there is a tendency to reverse movement of the piston, while when the piston rotates in the opposite direction this rocker is adapted to project its opposite end into the cylinder for a like purpose. To move the rocker to its different operative positions to correspond to the direction of rotation of the piston, a rod 55 is attached thereto at one end and has its opposite end connected to the rod 36, the length of the rocker being such that when the rod 36 is operated to shift the cut-off valve inwardly or outwardly the rocker will be adjusted to the proper degree. As above stated, when the piston rotates to the right the right-hand end of the rocker is in the path of movement of the heads of the piston, which latter successively strike it and snap under it, and when the piston is rotated to the left the opposite end of the rocker projects and the piston-heads again snap under it. In this operation the piston-heads engage and press the rocker upwardly and permit it to drop behind them, and to insure this latter movement the rod 55 is formed telescopic and the sections are connected by a helical spring 56, that encircles them and is connected thereto, so that they may have telescopic movement and the rocker may yet be shifted when the rod 36 is shifted.

It will be noted that in connection with the packing-strip of each piston-head there is

shown a split-spring ellipse, which acts to force the strip outwardly in close contact with the cylinder.

What is claimed is—

1. In a rotary engine, the combination with a cylinder having a steam-chest and inlet-ports connecting opposite ends of the chest with the cylinder, of a slide-valve in the chest adapted for adjustment to operative relation to the ports interchangeably, a rocker adapted to project its ends into the cylinder and connected with the valve for movement thereby to project either end into the cylinder, a piston in the cylinder having heads for engagement with the inwardly-projecting end of the rocker, a lever having cam connection with the piston for oscillation thereby, and a locking device connected with the lever and adjustably connected with the valve for operating the latter.

2. In a rotary engine, the combination with a cylinder having a chest and inlet-ports connecting the cylinder and chest, said chest having also an outlet-port, a rotatable piston in the cylinder having heads, a slide-valve in the chest for communicating the inlet-ports with the chest and adapted for adjustment into operative relation with the inlet-ports alternately, a valve-rod connected with the valve and having recesses therein, a cam connected with the piston, a lever having a roller engaged with the cam, a connecting-rod attached to the lever, and a locking device attached to the connecting-rod and slidably mounted upon the valve-rod, said locking device including a trigger for engagement with the recesses of the valve-rod interchangeably when the rod is shifted, to operatively connect the rod with the eccentric in the different adjustments of the valve-rod.

3. In a rotary engine, the combination with a cylinder, of a rotatable piston mounted therein and having heads, a steam-chest having ports communicating with the cylinder to supply steam thereto, a slide-valve in the chest adapted for adjustment into operative relation to the ports alternately, a rocker disposed to project its ends into the path of the heads of the piston alternately, a telescopic and yieldable connection between the rocker and valve for shifting the rocker to correspond to the position of the valve and permit movement of the rocker by the engaging heads to pass therebeyond, a cam carried by the piston, a rod for the valve, and connections between the cam and rod and including an adjustable locking device for locking the rod in operative relation to the cam in the different adjusted positions of the rod.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ALBION P. CHARLES.

Witnesses:

M. MILLER,
B. F. CLARK.