(No Model.)

2 Sheets—Sheet 1.

R. C. BERRY.

ANGLE PISTON ENGINE.

No. 432,359. Patented July 15, 1890.

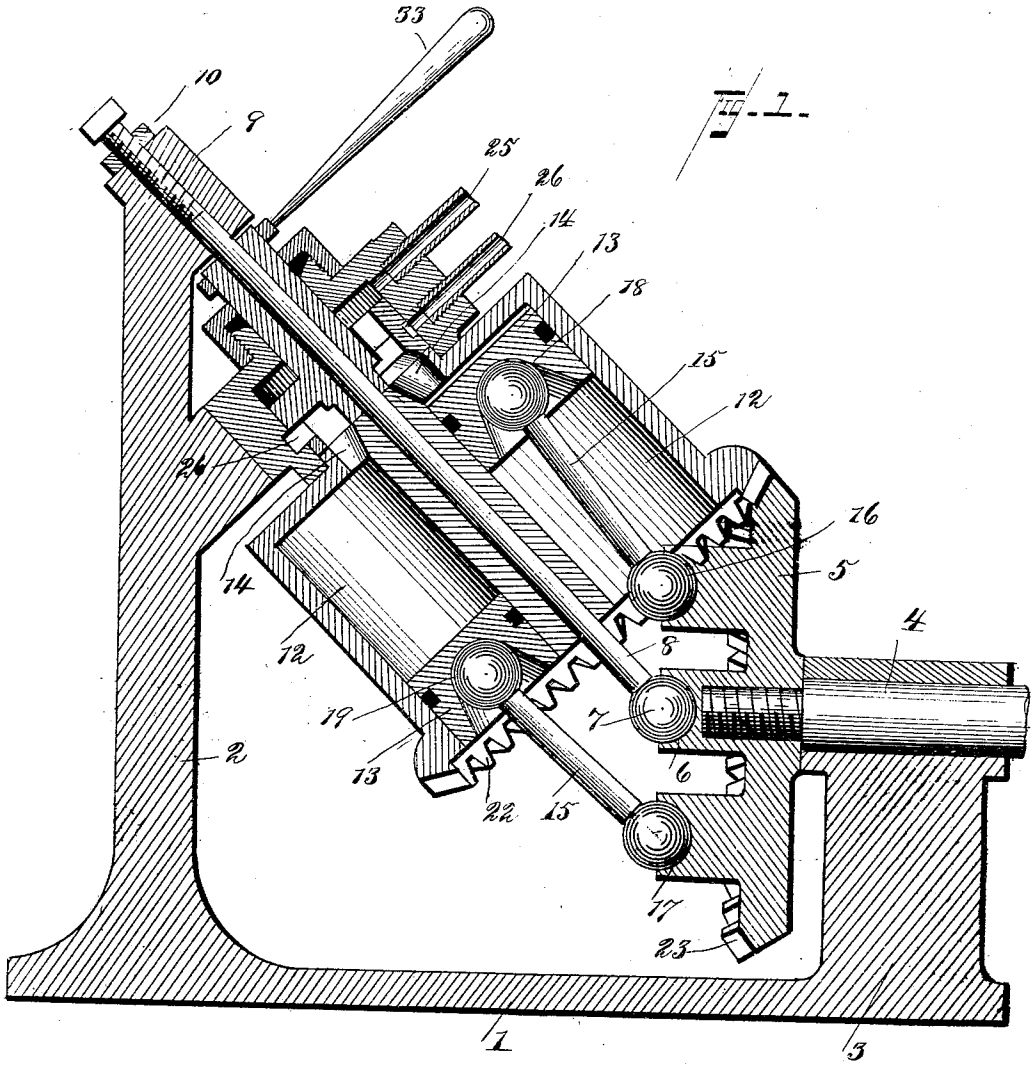


Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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ANGLE PISTON ENGINE.

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Fig. 2.

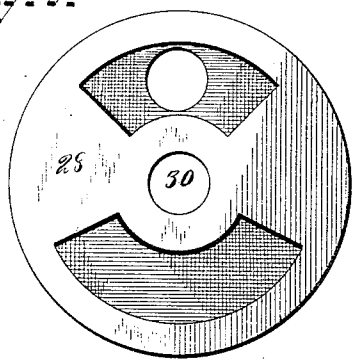


Fig. 3.

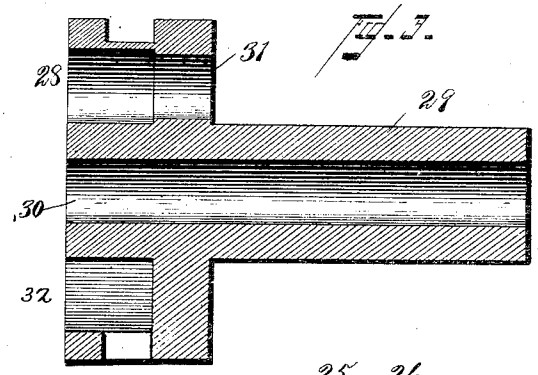


Fig. 4.

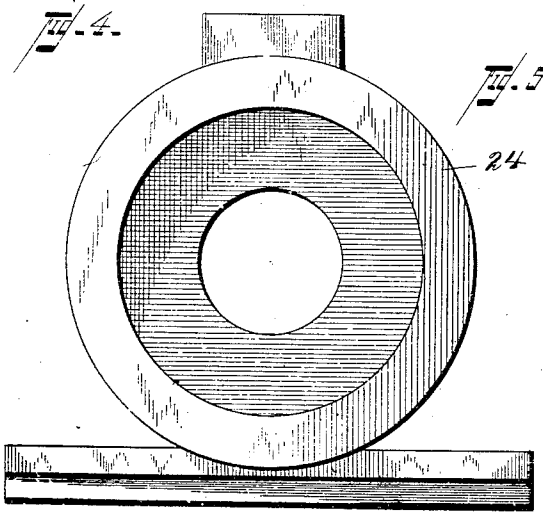


Fig. 5.

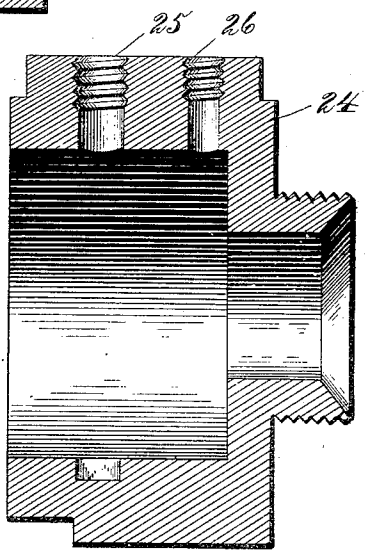
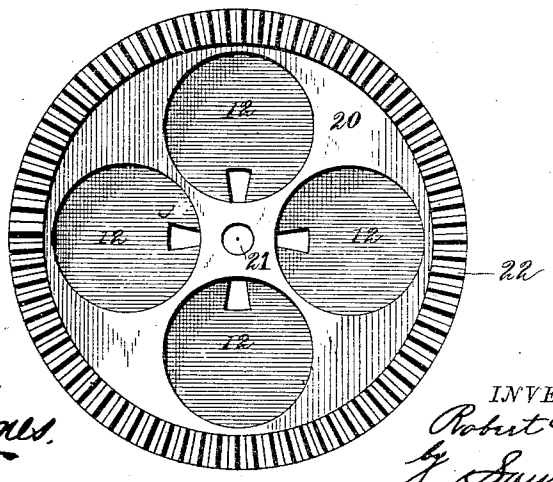


Fig. 6.



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UNITED STATES PATENT OFFICE.

ROBERT C. BERRY, OF LAFAYETTE, INDIANA, ASSIGNOR OF ONE-HALF TO HENRY W. COMSTOCK, OF SAME PLACE.

ANGLE-PISTON ENGINE.

SPECIFICATION forming part of Letters Patent No. 432,359, dated July 15, 1890.

Application filed March 4, 1890. Serial No. 342,558. (No model.)

To all whom it may concern:

Be it known that I, ROBERT C. BERRY, a citizen of the United States, and a resident of Lafayette, in the county of Tippecanoe and State of Indiana, have invented certain new and useful Improvements in Angle-Piston Engines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in single-acting reciprocating steam-engines, and is what I denominate an "angle-piston engine"—that is to say, the cylinders and pistons are connected with a disk on the main driving-shaft at an angle thereto.

The invention consists in the novel construction and combination of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a central vertical sectional view of an engine constructed according to my invention. Fig. 2 is a plan view of the valve. Fig. 3 is a sectional view of the same. Fig. 4 is a plan view of the steam-chest. Fig. 5 is a section of the same. Fig. 6 is a front view of the cylinders.

In the said drawings, the reference-numeral 1 designates the bed of the engine, having two uprights 2 and 3, one of which 3 supports the driving-shaft, while the other forms a support for the upper part of the cylinders. The driving-shaft 4, supported in upright 3, is provided with a disk or driving-wheel 5, firmly secured thereto and having a central socket 6, in which works the balled end 7 of the shaft 8. This shaft extends upwardly at an angle to the plane of the driving-shaft. The upper end of this shaft has its bearings in a diagonal aperture 9 in the upper end of upright 2. Said socket is provided with a tension or binding screw 10 for adjusting and holding shaft 8 in place.

Concentrically mounted upon shaft 8 and revolving thereon or therewith is a series of two or more cylinders 12, each of which is provided with a single-acting reciprocating piston 13 and a steam-port 14.

15 designates the piston-rods connected with disk 5 by means of ball-and-socket joints 16 17, and are also connected with the pistons by similar joints 18 19. The cylinders are preferably four in number, and may be formed by taking a cylinder 20, Fig. 6, and boring a hole or aperture 21 centrally therethrough, and then forming the cylinders 12 at equal distances apart and concentric with shaft 8. Upon the front face of cylinder 20 are formed or provided the bevel gear-teeth 22, meshing with similar teeth 23 on the disk 5, so that said cylinder and disk move in unison with each other.

The numeral 24 designates the steam-chest, having the inlet and exhaust pipes 25 and 26, the former 25 communicating with the steam-space above the valve, while the latter communicates with exhaust-channel 27, formed by grooving or recessing the interior of the steam-chest, as seen in Fig. 3.

28 designates the valve having stem 29 and central bore or aperture 30 for passage of shaft 8. This valve is provided with inlet-openings 31 and exhaust-openings 32, and has a handle 33, by which its position can be changed to reverse the engine. This valve is stationary and never moves except in reversing.

The operation is as follows: The parts being in the position shown in Fig. 1, steam is admitted to the upper cylinder, which will cause the piston therein to be moved toward the end. This will cause disk 5, and consequently the driving-shaft, to be rotated, and as the disk is geared with the cylinders they will rotate in unison. By this revolution of the cylinders the ports therein are alternately brought into coincidence with the inlet and exhaust openings in the valve at the proper times. The cylinders are so arranged with relation to each other that one is always in working condition—that is to say, just as steam is being cut off in one cylinder it is being supplied to the next succeeding one, and thus a continuous rotary movement is kept up.

It will be seen that by reason of the space in the steam-chest above the valve wear of the latter is compensated for by the pressure of the steam and a tight joint always insured.

Having thus described my invention, what I claim is—

In a steam-engine, the combination, with

inclined shaft 8, connected with driving-disk 5 by ball-and-socket joint, and the upper end stepped or having its bearings in upright 2, the tension or binding screw 9, the cylinders 12, having ports 14, pistons 13, piston-rods 15, and bevel gear-teeth 22, and the driving-disk 5, having bevel gear-teeth 23, of the steam-chest 24, having exhaust-channel 27, and the stationary valve 28, having inlet and exhaust openings 31 32 and reversing-handle 33, substantially as described.

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

ROBERT C. BERRY.

Witnesses:
FREDK. O. EVANS,
CH. MERTZ.