No. 630,400. Patented Aug. 8, 1899.

W. OLDHAM.

ROTARY ENGINE.

(Application filed Mar. 25, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig 1

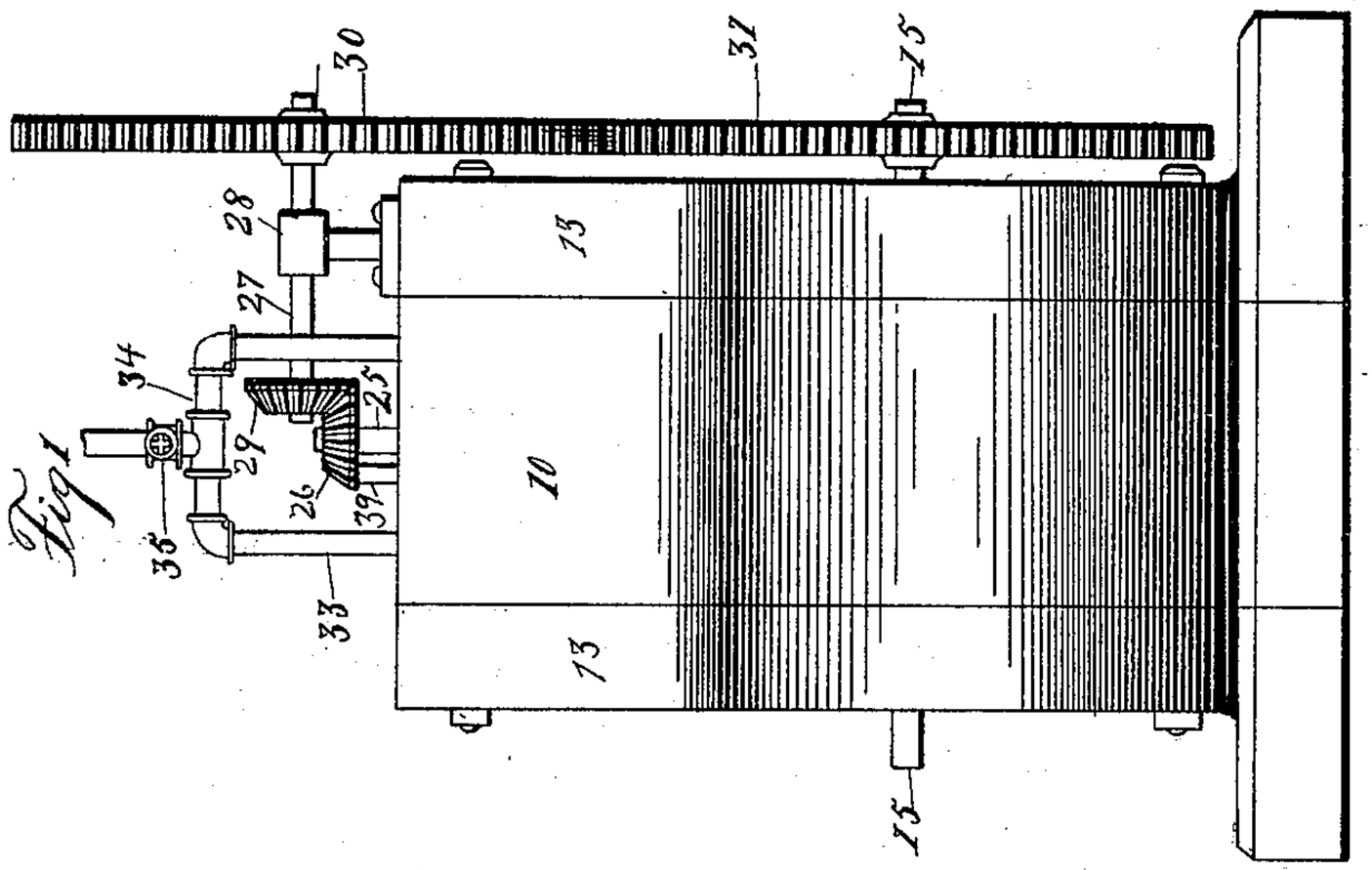
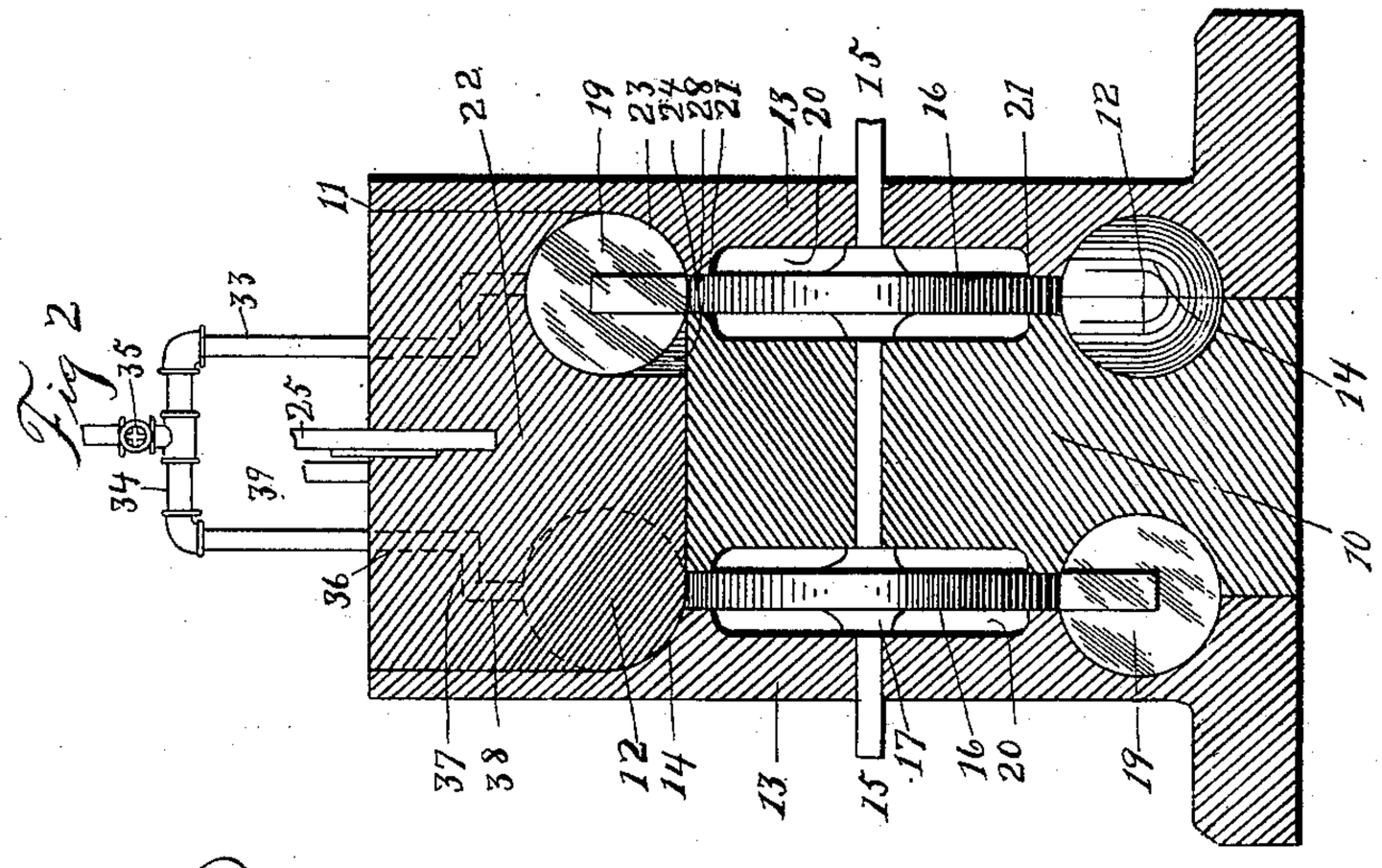


Fig 2



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Inventor:
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Fig. 3

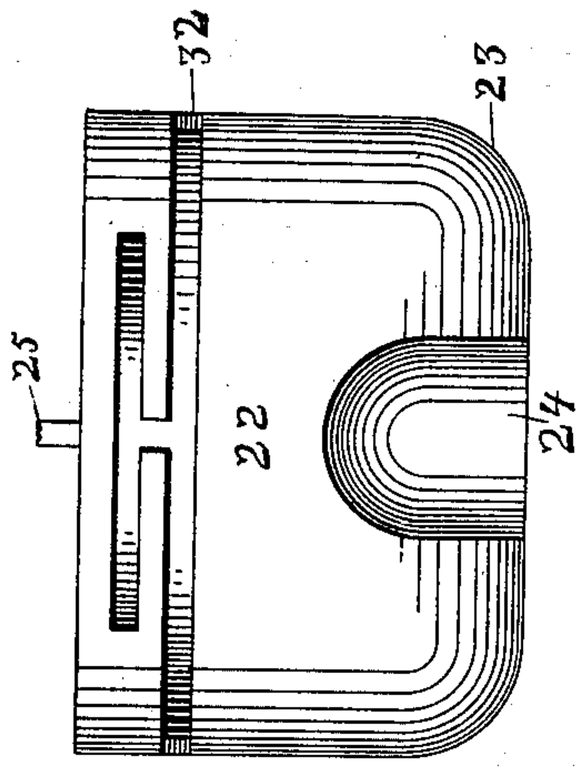

Fig. 4

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UNITED STATES PATENT OFFICE.

WILLIAM OLDHAM, OF OTTUMWA, IOWA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 630,400, dated August 8, 1899.

Application filed March 25, 1899. Serial No. 710,528. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM OLDHAM, a citizen of the United States, residing at Ottumwa, in the county of Wapello and State of Iowa, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

The object of this invention is to provide an engine of this class that shall be simple, durable, and inexpensive in construction and in which all of the parts move in a rotary direction to thereby avoid the shocks and jarring movements incident to reciprocating parts when running at a high speed.

A further object is to provide an engine of this class in which round packing-rings may be used to protect every joint which must be steam-tight throughout the engine, and, further, to provide an engine of this class that may be rapidly and quickly reversed and that will utilize all steam to its maximum capacity.

My invention consists in the construction, arrangement, and combination of two disk-shaped pistons and a rotary cut-off at the top so arranged as to work alternately in conjunction with each of the pistons, whereby the same cut-off is made to operate for both pistons; and my invention consists, further, in certain other features of construction, arrangement, and combination of parts whereby objects contemplated are attained, as hereinafter set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows an end elevation of the complete engine. Fig. 2 shows a vertical central section of the same. Fig. 3 shows a side elevation of the cut-off detached from the engine; and Fig. 4 illustrates, diagrammatically, an outline of the engine-casing, the various steam-pipes and exhaust-pipes and also the two expansion-chambers being shown in their proper positions within the frame by solid lines.

Referring to the accompanying drawings, I have used the reference-numeral 10 to indicate the central body portion of the engine-frame. This body portion is provided at its top with an opening at 11, adapted to receive the cut-off, which, as will hereinafter appear, is in general outline cylindrical, with its lower corners rounded, the side of the opening 11 being shaped to conform to the contour of this cut-off. In each of the faces of this central portion of the engine-frame I have provided a circular groove 12, which in cross-section is semicircular. The remainder of the frame comprises two side pieces 13, arranged to fit against the face of the part 10 and provided with grooves 14 to mate with the grooves in 12 to form with them a circular opening round in cross-section. The inner faces of these side pieces 13 are also cut away at their tops to receive the cut-off, as clearly shown in Fig. 2.

A shaft 15 is provided to extend transversely of the machine through the central portion, and fixed to this shaft are two disks 16. Each disk is provided with an enlarged central portion 17, and near the periphery of each face is a packing-ring 18. Attached to the periphery of each disk is a piston 19, which is disk-shaped and of such size that its edges engage the sides of the circular steam-chambers formed by the grooves 12 and 14. These disks are each placed on a line midway between the faces of the parts 10 and 13, and these parts are cut away at 20 to avoid frictional contact with the disks which touch the parts 10 and 13 only at the central portion and the point 21, where the said packing-rings engage therewith, and by this means excessive friction is avoided. These disks are fixed to the shaft 15, and it is to be understood in this connection that the piston 19 on one disk is arranged in a position diametrically opposite from the location of the piston 19 of the opposite disk.

The cut-off (indicated by the reference-numeral 22) is substantially cylindrical in shape, with its lower corners rounded at 23, the curve of this rounded portion being such as to enter the circular steam-chamber and completely close the said circular steam-chamber at the point of intersection. The said cut-off is sunk into the machine-frame until its under surface engages the top surface of the disks. On one side of the cut-off and at its lower edge is an opening 24. This opening is so shaped

as to receive the disk-shaped pistons in their movement and maintain a steam-tight joint against the edges of said piston while the piston and cut-off are in the position in which the piston is at the top of its movement. By this means it is obvious that the piston may rotate without danger of admitting steam past the cut-off when the piston is passing that point. A vertical shaft 25 is fixed to the central portion of this cut-off to project upwardly and a bevel-gear 26 is fixed to its top. A short shaft 27 is mounted in the bearing 28 at the top of the machine to extend horizontally, and a bevel-gear 29 on its end is meshed with the said gear 26. On the outer end of this shaft 27 is a cog-wheel 30, meshed with the cog-wheel 31, which latter is keyed to the shaft 15. The cog-wheels 30 and 31 are of the same size, and the bevel-gears 26 and 29 are also of the same size. Hence each time the cut-off is turned one complete revolution each of the pistons will move a complete revolution within the circular steam-chamber. Therefore when the piston on one side is at the top of its movement the opening 24 in the cut-off will be in position to receive the piston and to travel with it while the piston is at the top of its movement, and then before the piston on the opposite side has reached the top of its movement the said cut-off will have rotated a half-revolution and the opening 24 will be in position to receive the remaining piston.

I have provided means for admitting steam to the steam-chambers as follows: Upon the surface of the cut-off 23 and near the top thereof I have provided a groove 32 to extend horizontally around the cut-off and of a length somewhat less than half the circumference of the cut-off. At a point near each corner of the top of the engine I have provided an induction-pipe 33, and the two pipes 33 on one side of the engine are connected by means of pipe 34, which is supplied with a globe-valve 35. A passage-way 36 leads downwardly from each pipe 33 and then inwardly to an opening in which the cut-off stands. It then follows along the edge of the cut-off opening, with which opening it communicates at the point 37, and then extends downwardly at 38 into the circular steam-chamber. A considerable space is left between the downwardly-projecting portions 38 of these induction-openings on the same side of the engine. It is obvious that when one of the valves 35 is open a constant steam-pressure is maintained through both passage-ways to the interior of the circular chamber, and hence the pistons on each side are driven by means of steam-pressure as required to apply power to the shaft 15. Near the central portion of each side of the top portion of the engine-frame is an exhaust-opening 39, leading downwardly and then straight inwardly to an opening in which the cut-off is situated. The lower end of this opening 39 communicates with the groove 32 in the cut-off, and hence during that portion of time when the groove of the cut-off is passing the opening 39 and also the horizontal portion 37 of the opening above described it is obvious that the steam from the circular steam-chamber may exhaust and that this opening 39 will be cut off at all other times.

In practical operation it is obvious that the engine may operate at a very high rate of speed without jar or shocks incident to the reciprocating movement, and, further, that all of the parts may readily and easily be packed by means of ordinary packing-rings to prevent the escape of steam through the working surfaces, and, further, that the machine may readily and quickly be reversed to operate in either direction.

After thus describing my invention, what I claim, and desire to secure by Letters Patent of the United States therefor, is—

1. In a rotary steam-engine, the combination, of a suitable frame, two circular steam-chambers therein each round in cross-section and extending in planes parallel with each other, a shaft extended through the machine-frame, two disk-shaped pistons on a shaft extended in opposite directions and situated within the said grooves, a cut-off in the top of the engine-frame with its lower edges rounded as set forth and having an opening in one side to receive the said pistons alternately, means for gearing the shaft of the pistons with the said cut-off so that they will rotate in unison, and means for admitting steam to the steam-chambers and exhaust-ports leading from the steam-chambers for the purposes stated.

2. In a rotary steam-engine, a combination of a suitable frame, two circular steam-chambers each round in cross-section within the frame on the same plane, a shaft running through the frame concentrically of the steam-chambers, a cut-off in the frame to intersect the said circular steam-chambers and to completely close the portion of same in which it rests, two disk-shaped pistons on the shaft, one in each circular steam-chamber, and extending in opposite directions, the said cut-off being provided with an opening 24 to receive the pistons, and also with a groove 32 and steam passage-ways leading through the engine-frame to a point where they will communicate with the groove 32 when the cut-off is at a certain position in its movement, and steam passage-ways in the engine-frame arranged to connect the circular steam-chambers with the groove 32 when at a certain position of its movement, all arranged and combined substantially as set forth and for the purposes stated.

3. A rotary steam-engine, comprising in combination a frame composed of the parts 10 and 13, the two circular steam-chambers on opposite sides of the frame, a shaft 15, the disks 16 on the shaft, the pistons 19 on the

disks extended in opposite directions in the said circular steam-chambers, the cut-off 23 having an opening 24 and groove 32, the steam-induction openings comprising the parts 33, 36, 37 and 38 the eduction-ports 39 to communicate with groove 32 and means for gearing shaft 15 with the cut-off so that they will operate in unison, all arranged and combined substantially in the manner set forth and for the purposes stated.

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