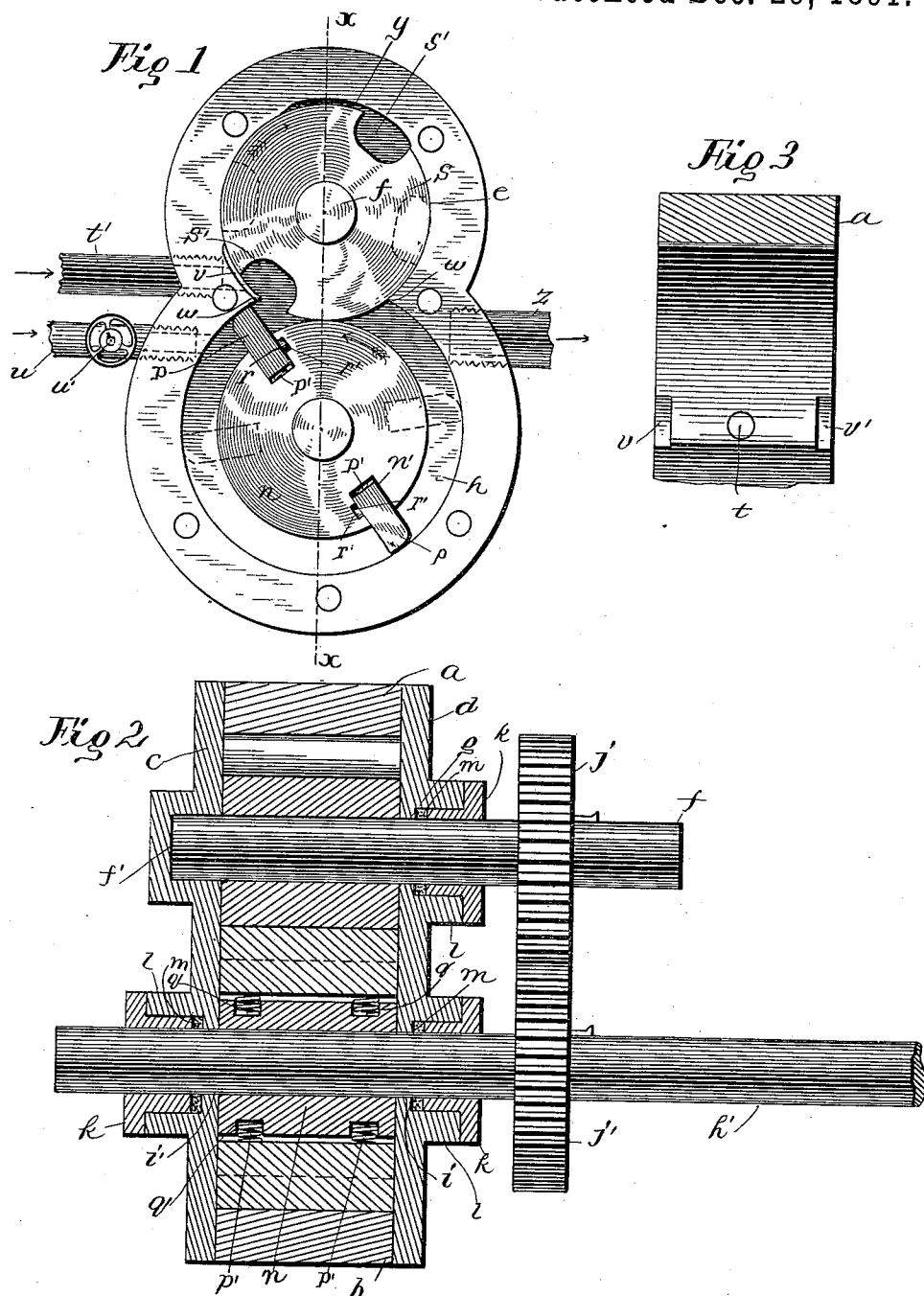


(No Model.)

W. J. PUTNAM.
ROTARY ENGINE.

No. 465,947.

Patented Dec. 29, 1891.



Witnesses
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UNITED STATES PATENT OFFICE.

WALTER J. PUTNAM, OF DEPOSIT, NEW YORK.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 465,947, dated December 29, 1891.

Application filed April 24, 1891. Serial No. 390,350. (No model.)

To all whom it may concern:

Be it known that I, WALTER J. PUTNAM, a citizen of the United States, residing at Deposit, in the county of Broome and State of New York, have invented certain new and useful Improvements in Rotary Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in rotary engines, and particularly to that class of rotary steam-engines wherein a rotary piston is provided with radial vanes, alongside of which is located a rotary valve, said piston and valve working, respectively, within separate chambers.

The object of my invention is to provide a simple, cheap, and practicable rotary steam-engine that will be comparatively noiseless and wherein an exceedingly high rate of speed may be obtained without using more steam than is absolutely necessary.

To these ends my invention consists in certain features of construction, to be hereinafter described, and then particularly pointed out in the claim.

In the accompanying drawings, Figure 1 is a rear view of my improved rotary engine with the rear plate removed. Fig. 2 is a vertical sectional view on the line *x x*, Fig. 1, showing the vanes of the piston in vertical position and the recesses of the valve located vertically above the same. Fig. 3 is a detail sectional view of the valve-chamber, looking toward the main steam-inlet pipe.

The casing of the engine is composed of segmental sides *a* and *b*, respectively, the side *a* at the top of the casing forming part of a smaller circle than does the lower side *b*. The rear of the casing consists of a back plate *c*, fitted to the sides *a*, secured thereto in any suitable manner, so as to form a steam-tight joint, and the front of the casing consists of a face-plate *d*, also secured thereto so as to make a steam-tight joint. Passing through the center of the valve-chamber *e*, formed at the top of the casing, is a shaft *f*, which at one end is stepped in the cavity of a hollow boss *f'*, formed in the back plate *c*, and which at the other end passes through and journals in an opening *g* in the face-plate *d*. Passing

through the center of the piston-chamber *h*, formed in the bottom of the casing, is a shaft *h'*, which journals in openings *i* and *i'* in the front and rear plates, respectively. Secured rigidly on the shafts *f* and *h'* are intermeshing gear-wheels *j* and *j'*, respectively. Steam-tight joints are made around the shafts by means of the stuffing-boxes *k*, which are inserted within the annular flanges *l*, surrounding the openings in which the shafts have bearings, packing-rings *m* being confined by said stuffing-boxes.

Fixed on the lower shaft *h'*, so as to rotate concentrically within the circular chamber *h*, is a circular piston *n*, provided in its periphery with diametrically-opposite transverse recesses *n'*. Fitting snugly within these recesses *n'* are radial vanes *p*, which are held normally in contact with the curved wall of the circular chamber *h* by means of spiral springs *p'*, which bear against the bases of said vanes and which are seated in cavities *q* at the bottoms of the recesses. At one side of each vane *p* is a transverse lug or flange *r*, which is received by a groove *r'*, which lug or flange is somewhat narrower than the groove in which it fits, so as to permit of the relative lateral movement of each vane to the piston and yet present lateral displacement of the vanes.

Above the piston *n* is a circular valve *s*, which is fixed concentrically on the upper shaft *f* and which fits snugly within the upper circular chamber *e*, so that it may rotate therein in contact within a wall thereof. Located diametrically opposite in the periphery of the circular valve *s* are transverse recesses *s'*.

Located to one side of the lower end of the valve-chamber *e* is a steam-inlet opening *t*, into which is fitted the inner end of the main steam-inlet pipe *t'*. Located below the main pipe *t'* at the same side of the lower chamber *h* is an auxiliary steam-inlet pipe *u*. This pipe *u* is located directly below the ledge *w*, just between the two chambers, and is provided with a cut-off valve *u'*. Below the ledge *w'* on the opposite side of the casing is the exhaust or steam outlet pipe *z*.

Made in the inner wall of the upper chamber *e* are parallel grooves or passages *v* and *v'*, arranged one on each side of the main

steam-inlet pipe t' and the opening t . The outer ends of these passages are open to the piston-chamber h , and their inner ends extend a short distance above the opening t .

5 Located at the upper end of the valve-chamber e and opposite to the steam-inlet opening t is a cut-away portion y , constituting a steam-space.

The operation of my improved engine is as follows: Steam is first admitted through the auxiliary inlet-pipe by the opening of the valve u' when the vanes are in position, as indicated by dotted lines in Fig. 1, so as to give the piston its initial revolution; but when the parts reach the position shown in full lines the valve u' is closed and steam admitted through pipe t' to operate the engine. After the piston has been started the valve u' is closed and steam is admitted through the main pipe t' into the piston-chamber through the medium of the recess s' , which communicates with opening t at the proper time to admit steam, which presses directly against the sides of the recess and against the vane p , which is contiguous to said recess. As the valve s is moved in the direction indicated by the arrow, which is caused by the pressure of the steam against aforesaid vane, the piston n will move in the opposite direction, indicated by the arrow thereon. The simultaneous opposite movements of the piston n and valve s are caused by the intermeshing gear-wheels j and j' . The supply of steam is admitted behind the vanes p through the medium of recesses s' of the valve s when they communicate with the piston-chamber h , and are contiguous to the steam-inlet opening t , an auxiliary supply being admitted through passages v and v' until said recesses pass the inlet-pipe. Thus the rotating of the piston is not dependent entirely upon the auxiliary supply through the side passages v and v' , but is aided by the expansion of the steam behind

the vanes. When the vanes and recesses in the valve reach the position indicated by dotted lines, the supply of live steam to the recess is cut off. The steam in the dead-steam space y at one side of the valve-chamber, to which the steam is conveyed by the recesses s' , constitutes a cushion and tends to press the valve closely in contact with the wall of the chamber e and prevents the escape of steam at undesirable points. The steam behind the vanes as the piston n rotates is exhausted through pipe z . The passage of steam between the piston n and valves s is prevented by causing the two to contact with and have bearing upon each other.

This engine, when operated to its fullest capacity, revolves at the rate of two thousand revolutions per minute.

I am aware that the main features of this engine are not new, and I do not claim the same; but

What I do claim as new and of my invention is—

The combination, in a rotary engine, of a piston and its vanes, the valve formed with peripheral recesses, and the casing provided with chambers to receive the piston and valve, said casing having an inlet-opening entering one side of the valve-chamber and also being formed with passages on each side of said opening open on one entire side, whereby when the valve rotates the steam entering the piston-chamber through the inlet-opening, the valve-recesses, and the passages will be gradually cut off as each valve-passage is brought opposite the inlet-opening, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WALTER J. PUTNAM.

Witnesses:

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