No. 615,087. Patented Nov. 29, 1898.

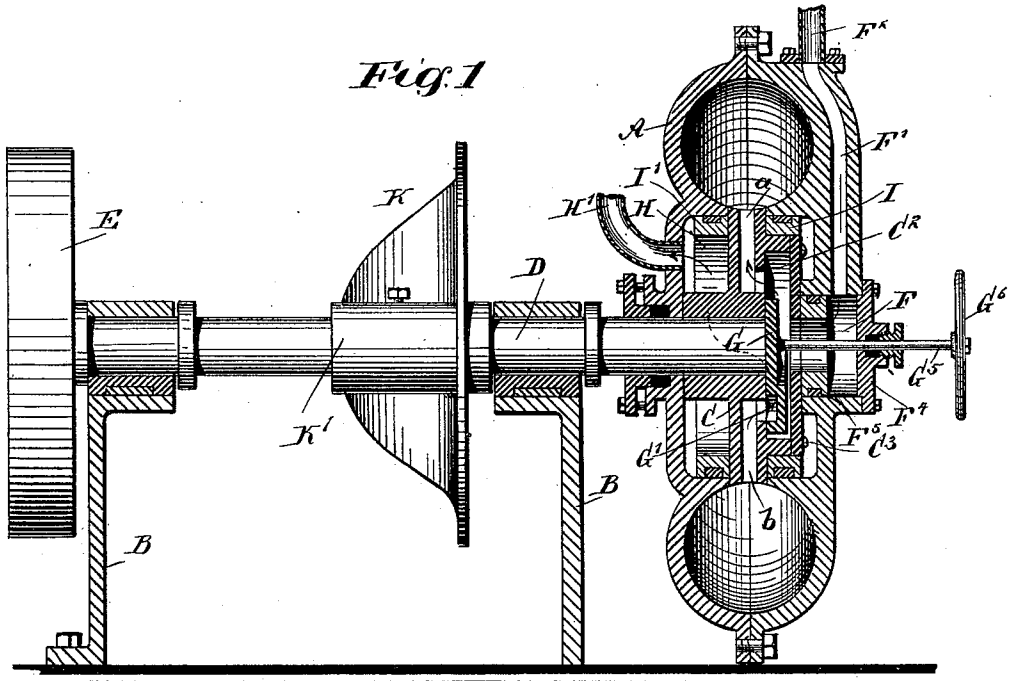
W. MOHR.

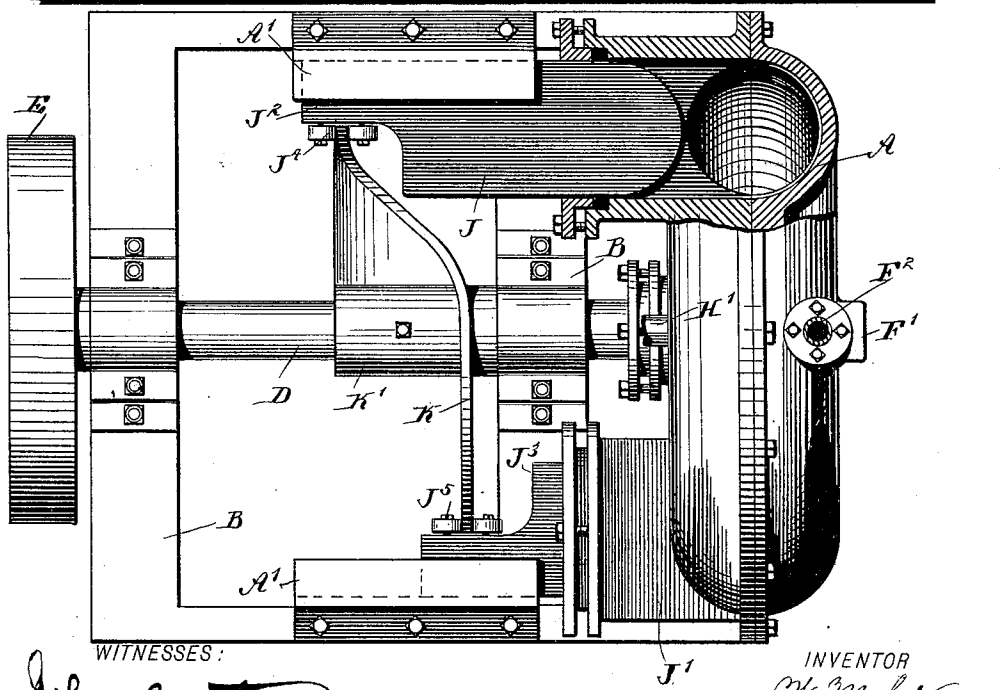
ROTARY ENGINE.

(Application filed Feb. 15, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1





WITNESSES:

John A. Bergstrom

Rud. F. Hoster

Fig. 2

INVENTOR

W. Mohr

BY

Munn & Co

ATTORNEYS.

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Fig. 3

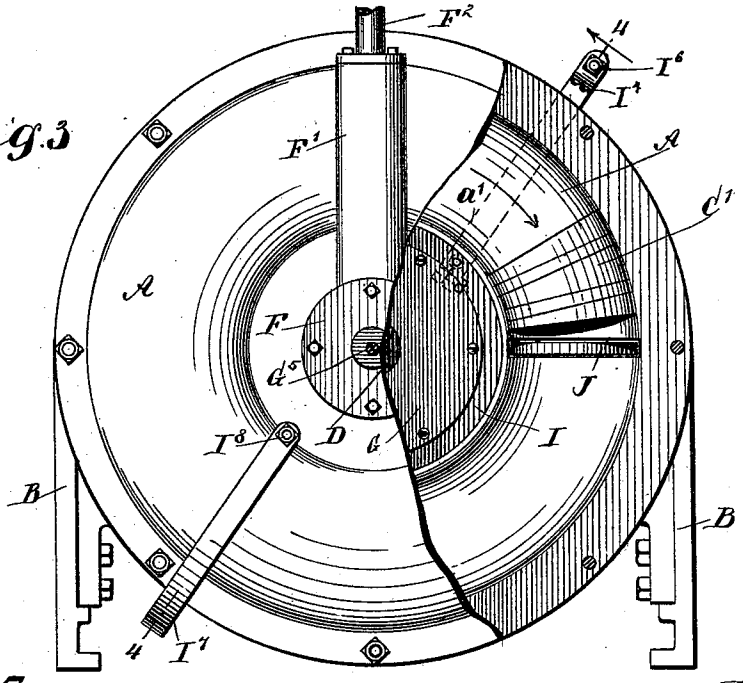


Fig. 5

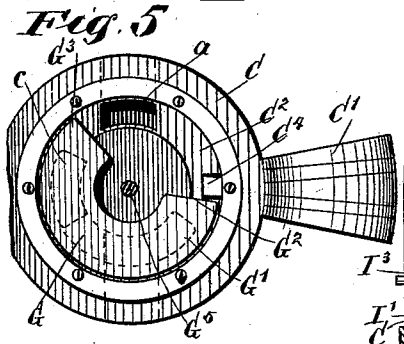
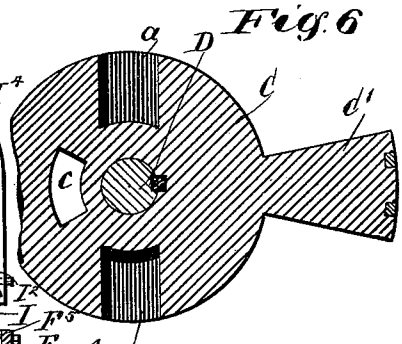


Fig. 6



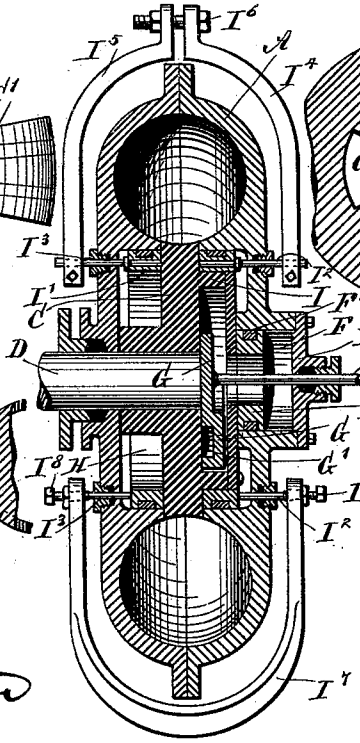


Fig. 7

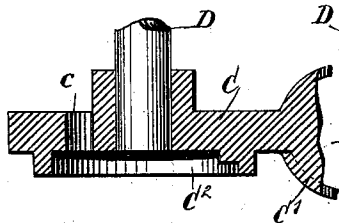


Fig. 8

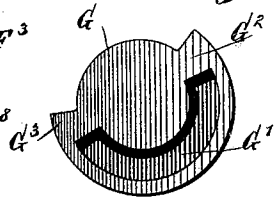


Fig. 4.

WITNESSES:

John A. Bergstrom

Rud. J. Hoster

INVENTOR

W. Mohr

BY Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLIAM MOHR, OF KURTZ, INDIANA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 615,087, dated November 29, 1898.

Application filed February 15, 1898. Serial No. 670,418. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MOHR, of Kurtz, in the county of Jackson and State of Indiana, have invented a new and Improved Rotary Engine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved rotary engine arranged to readily start at any point of the piston revolution under full pressure of the motive agent, the latter being used to the greatest advantage.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a plan view of the same with part in section. Fig. 3 is an end elevation with parts of the cylinder broken out. Fig. 4 is a sectional side elevation of the cylinder and parts contained therein. Fig. 5 is a face view of the piston and the reversing-valve. Fig. 6 is a sectional face view of the piston. Fig. 7 is a sectional plan view of the same, and Fig. 8 is an inner face view of the reversing-valve.

The improved rotary engine is provided with a continuous cylinder A, secured on a suitable frame B and containing a piston-head C′, formed radially on a piston C, extending into an annular slot formed in the inner face of the cylinder, the said piston being secured on the main driving-shaft D, journaled in suitable bearings on the frame B and carrying at one end a pulley E for transmitting the rotary motion of the shaft to other machinery.

In the web of the piston C are arranged two diametrically-arranged ports *a b*, opening into a chamber C^2, formed on the outer face of the piston and having an apertured cover C^3, closing part of the said chamber, said cover having an opening leading to a steam-chest F, connected by a port F′ with a steam-supply pipe F^2, connected with a boiler or other suitable source of motive-agent supply. The steam-chest F and the port F′ are formed on the outer face of the cylinder A, the chamber being closed by a suitable cover F^4. In the chamber C^2 is arranged a disk valve G, formed on its inner face with a segmental cavity G′, (see Fig. 8,) to connect with either of the ports *a* or *b* and to connect said ports with an exhaust-port *c*, formed transversely in the piston C and opening into an exhaust-chamber H, arranged on the side of the piston opposite the chamber C^2, as is plainly illustrated in Figs. 1 and 4. An exhaust-pipe H′ leads from the chamber H for carrying off the exhaust-steam. The valve G is formed with two shoulders G^2 G^3, adapted to be engaged by a lug C^4, formed on the piston C within the chamber C^2, so that the valve G is carried around with the piston, according to the direction in which the piston is running.

On the valve G is secured a stem G^5, extending through the steam-chest F and through a stuffing-box in the cover F^4, to carry on its outer end a wheel G^6 under the control of the operator for turning the disk valve G, so that its shoulder G^2 engages the lug C^4 for connecting the port *a* by the cavity G′ with the exhaust-port *c* and for uncovering the port *b* whenever it is desired to reverse the engine. When this takes place, the lug C^4 engages the other shoulder G^3 to carry the disk valve G around with the piston C. In order to pack the latter at the slot in the cylinder A, I provide two packing-rings I I′, engaging the piston at opposite faces, the packing-ring I being arranged externally of the chamber C^2 and the packing-ring I′ being arranged within the exhaust-chamber H.

The rings I I′ are pressed inwardly against the piston C by pins I^2 I^3, respectively, carried by clamping-arms I^4 I^5, respectively, extending outside of the cylinder A and connected with each other by a suitable set-screw I^6 for moving the clamping-arms with more or less force inwardly toward each other to press the packing-rings with a corresponding force against the piston at the slot of the cylinder A. If desired, one single clamping-arm I^7 may be employed, as shown at the lower portion of Fig. 4, in which case set-screws I^8 are employed for pressing the pins I^2 I^3 inward to hold the packing-rings in proper contact with the piston for packing purposes.

Two abutments J J′ are arranged to slide

diametrically opposite each other in the cylinder A, and the outer ends of said abutments are formed with extension-slides J^2 J^3, respectively, fitted to slide in suitable bearings A', secured to the main frame A. The slides J^2 J^3 carry pairs of friction-rollers J^4 J^5, respectively, engaging the peripheral surface of a cam-wheel K, having its hub K' secured to the main driving-shaft D. The cam K is so shaped that when one of the abutments is in an innermost position the other is in an outermost position, as is plainly shown in Fig. 2, and after one abutment has been moved into an innermost position at the time the other is still in the same position then this abutment remains in this position a short time before moving outward, so that both abutments are for a short time within the cylinder. Thus the inwardly-moving abutment must be at the end of its inward stroke before the other moves outward, so that the full steam-pressure is on this first-named abutment before the other moves off to allow the steam to escape by way of the exhaust-port *b*, the cavity G', and the exhaust-port *c* to the chamber H.

When the engine is reversed, as previously explained, the port *a* becomes the exhaust-port, while the port *b* is the inlet-port, but the action is otherwise exactly the same as above mentioned, except that the piston travels in the inverse direction. It is understood that in order to produce the movement of the abutments referred to it is necessary to extend the straight portion of the cam K somewhat beyond one-half of the periphery of the cam, as indicated in Fig. 1.

A packing-ring F^5 is arranged in the live-steam chest F for abutting against the cover C^3 and preventing leakage at this point.

The cylinder A is preferably made in two halves, bolted or otherwise fastened together, as indicated in the drawings.

It is understood that when the several parts are in the position shown in the drawings the live steam can readily pass from the steam-chest F into the chamber C^2 and from the latter through the port *a* into the cylinder between the piston-head C' and the corresponding abutment J or J'. The pressure of the steam against the piston-head rotates the latter in the direction of the arrow *a'*, and when nearing the next following abutment the latter moves outward to allow the piston-head to pass, and when the inlet-port has passed the open abutment the latter now moves inward to confine the steam between this abutment and the advancing piston-head. Another impulse is thus given to the piston-head to rotate the same in the direction of the arrow *a'*.

When the operator turns the hand-wheel G^6 to turn the reversing-valve G, then the steam enters through the port *b* into the cylinder A to press on the piston-head C' in the inverse direction of the arrow *a'* and to cause a corresponding rotary motion of the piston.

The machine is very simple and durable in construction, is not liable to get out of order, is properly packed to avoid leakage of steam, and the motive agent is utilized to the fullest advantage.

As the steam-inlet port is part of the piston, it is evident that a full head of steam always exerts its pressure on the piston, while a free exhaust takes place in front of the piston to insure a full development of the power of the steam without, however, permitting expansion.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A valve mechanism for rotary engines, comprising a rotating valve-seat having radially-extending steam-ports therein, and an exhaust-port extending through it between the steam-ports, a valve therefor having a segmental annular exhaust-port in its contact-face adapted to connect either radial port with the through-port, and having a segment-notch formed in its periphery, and a lug upon the valve-seat adapted to engage the ends of said segment-notch.

2. A rotary engine, comprising a continuous cylinder, having a steam-chest and a separate exhaust-chamber, a piston mounted to rotate, and extending with its rim into an annular slot in the cylinder-wall, the piston being provided with oppositely-arranged ports, one of which is the inlet-port, a piston-head carried by the said piston and extending into said cylinder, abutments slidable in the said cylinder, and a reversing-valve on one face of the said piston, and arranged to uncover one of the piston-ports to the steam-chest, to allow the motive agent to pass through the uncovered port into the cylinder, the said reversing-valve being formed at its inner face with a cavity, for connecting the covered-up piston-port with an exhaust-port formed in the piston, and leading to the exhaust-chamber, substantially as shown and described.

3. A rotary engine, comprising a continuous cylinder, having a steam-chest and a separate exhaust-chamber, a piston mounted to rotate, and extending with its rim into an annular slot in the cylinder-wall, the piston being provided with oppositely-arranged ports, one of which is the inlet-port, a piston-head carried by the said piston and extending into said cylinder, abutments slidable in the said cylinder, a reversing-valve on one face of the said piston, and arranged to uncover one of the piston-ports to the steam-chest, to allow the motive agent to pass through the uncovered port into the cylinder, the said reversing-valve being formed at its inner face with a cavity, for connecting the covered-up piston-port with an exhaust-port formed in the piston and leading to the exhaust-chamber, and a cam-wheel for actuating the said abutments, rotating in unison with the piston and having its cam portion less than one-half of the straight portion of its periphery, substantially as shown and described.

4. A rotary engine, comprising a continuous cylinder, having a steam-chest and a separate exhaust-chamber, a piston mounted to rotate, and extending with its rim into an annular slot in the cylinder-wall, the piston being provided with oppositely-arranged ports, one of which is the inlet-port, a piston-head carried by said piston and extending into said cylinder, abutments slidable in the said cylinder, and a reversing-valve on one face of the said piston, and arranged to uncover one of the piston-ports to the steam-chest, to allow the motive agent to pass through the uncovered port into the cylinder, the said reversing-valve being formed at its inner face with a cavity, for connecting the covered-up piston-port with an exhaust-port formed in the piston and leading to the exhaust-chamber, the reversing-valve being also provided with shoulders adapted to be engaged by a lug on the piston, for carrying the valve around, said valve being free to be turned from the outside of the cylinder, for reversing purposes, substantially as shown and described.

5. A rotary engine, provided with a continuous cylinder formed with an annular slot in its wall, a piston extending with its periphery into the said slot, packing-rings engaging the said piston at the slot in the cylinder, a yoke embracing the cylinder and pins thereon engaging and holding the packing-rings in contact with the piston, substantially as shown and described.

6. A rotary engine, provided with a continuous cylinder formed with an annular slot in its wall, a piston extending with its periphery into the said slot, packing-rings engaging the piston at the slot in the cylinder, means for holding the packing-rings in contact with the piston, said means comprising a yoke embracing the cylinder slidable pins carried thereby and engaging the packing-rings, and devices for moving the pins inward and holding the same in position after adjustment, substantially as shown and described.

WILLIAM MOHR.

Witnesses:
WILLIAM ARMBRUSTER,
JOSHUA ENGLAND.