

No. 868,841.

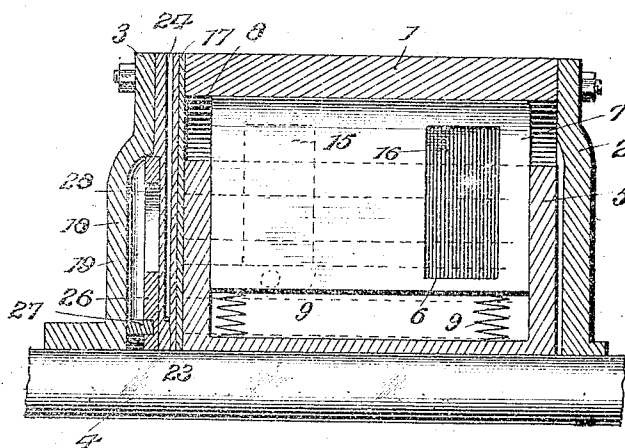
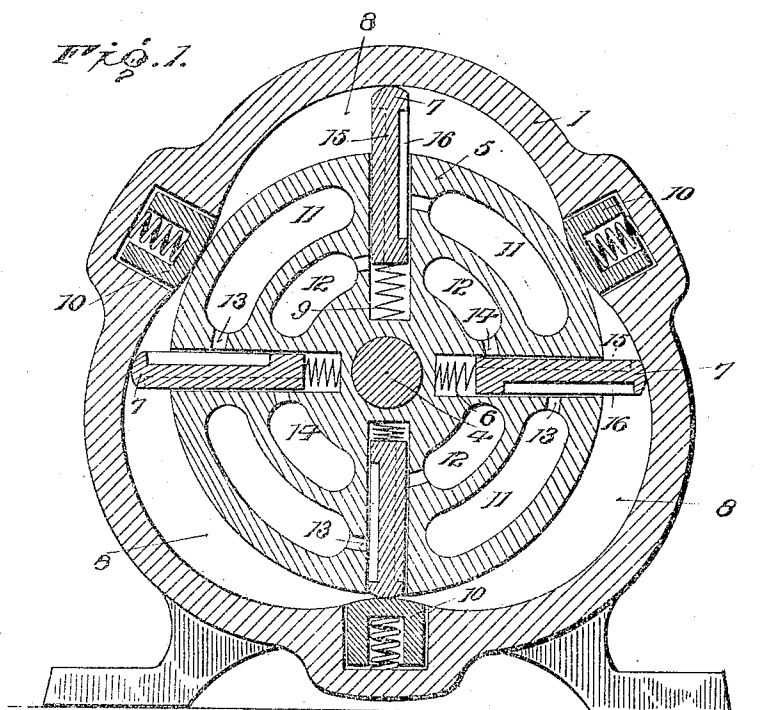
PATENTED OCT. 22, 1907.

H. H. CALKINS.

ROTARY ENGINE.

APPLICATION FILED JUNE 3, 1907.

2 SHEETS—SHEET 1.



Inventor  
H. H. Calkins.

Witnesses  
*[Signature]*  
*[Signature]*

*[Signature]*  
Attorney

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2 SHEETS—SHEET 2.

FIG. 2.

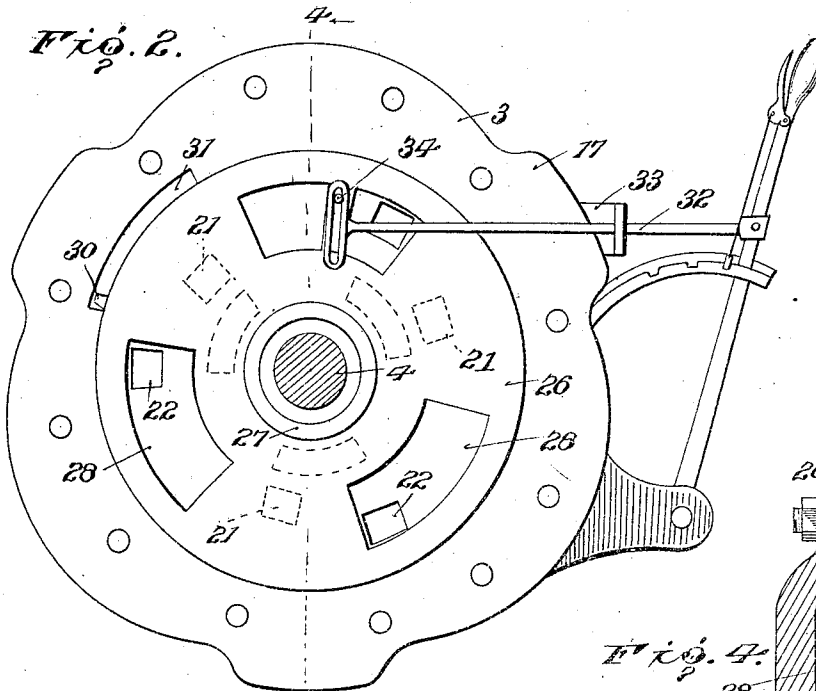


FIG. 4.

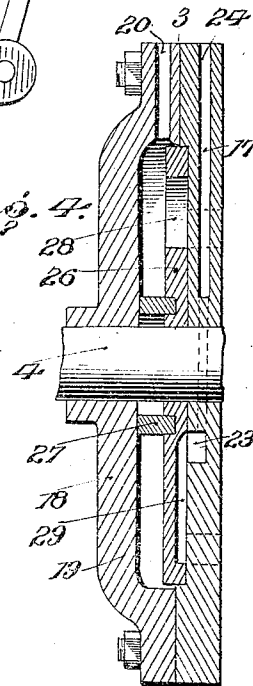
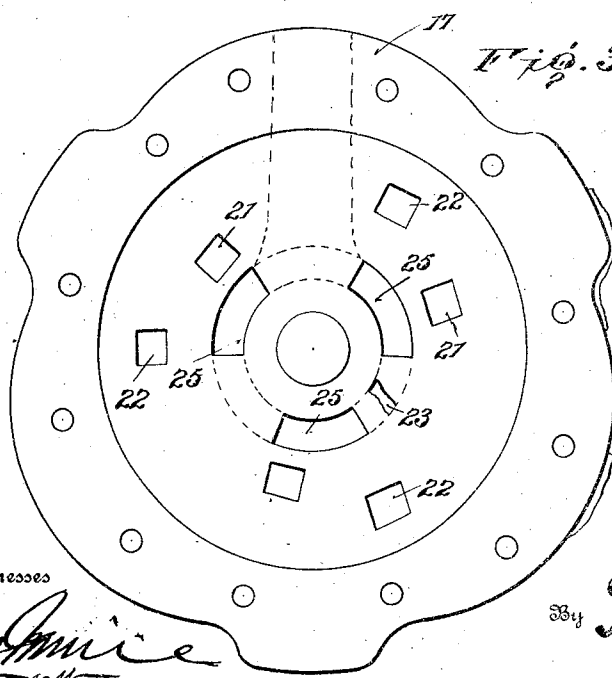


FIG. 3.



Inventor  
H. H. Calkins

Witnesses

*J. M. Rice*  
*W. M. Woodman*

By *Phanoray*  
Attorneys

# UNITED STATES PATENT OFFICE.

HOMER H. CALKINS, OF BLOOMFIELD, INDIANA.

## ROTARY ENGINE.

No. 868,841.

Specification of Letters Patent.

Patented Oct. 22, 1907.

Application filed June 3, 1907. Serial No. 377,921.

### To all whom it may concern:

Be it known that I, HOMER H. CALKINS, a citizen of the United States, residing at Bloomfield, in the county of Greene and State of Indiana, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

The present invention relates to certain new and useful improvements in that type of rotary engines which embody a revolving drum provided with sliding pistons or abutments against which the steam or other fluid medium expands.

The primary object of the invention is to design an engine of this character which is simple in its construction and will utilize the force of the steam to the fullest possible extent.

The invention also aims to provide for reversing the direction of motion of the engine through the medium of a novel valve mechanism.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a transverse sectional view through a rotary engine embodying the invention. Fig. 2 is an end view, a portion of the casing being removed. Fig. 3 is a similar view with the valve member and a portion of the casing removed. Fig. 4 is a transverse segmental view through the valve chest. Fig. 5 is a longitudinal sectional view through the upper portion of the engine.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

This engine embodies an outer shell or casing having a drum mounted therein, the said drum being provided with sliding pistons, and a novel mechanism for delivering live steam to the pistons and exhausting the dead steam therefrom. The shell 1 is closed by means of the end pieces 2 and 3 upon which the engine shaft 4 is journaled. The drum 5 is keyed upon or otherwise made rigid with the shaft 4 and is provided with a plurality of radial openings 6 within which the pistons 7 are slidably mounted. A plurality of depressions 8 are formed in the periphery of the shell 1 and constitute chambers within which the live steam expands and acts upon the pistons 7. These pistons 7 are normally pressed outwardly by means of the springs 9 and the portion of each of the chambers 8 upon one side of the piston is in communication with an inlet port while the space upon the opposite side of the piston communicates with an exhaust. In order that one of the pistons may always be in an operative position, thereby avoid-

ing dead centers, there are preferably a greater number of pistons 7 carried by the drum than chambers 8 in the shell, and in the present instance four pistons and three chambers are provided. A spring pressed partition 10 is mounted upon the shell 1 between each pair of the chambers 8 and normally bears against the periphery of the drum 5 so as to prevent the steam from passing from one chamber to the next adjacent chamber.

A pair of recesses 11 and 12 is formed in the drum 5 between each of the pistons, the said recesses being spaced radially from each other, and the several inner recesses 12 being arranged in one concentric circle while the outer recesses 11 are arranged in a second concentric circle. The outer recess 11 of each pair communicates upon one side with one of the openings 6 by means of the duct 13 while the inner recess 12 communicates with the opening 6 by means of a similar duct 14.

Channels 15 and 16 are formed in opposite faces of the pistons 7, one of the channels 15 being designed to establish communication with the inner recess 12 through the medium of the duct 14 while the opposite channel 16 communicates with the outer recess 11 through the duct 13. Owing to the fact that the channels 15 and 16 have their mouths located upon opposite sides of the pistons it will be readily apparent that when live steam is admitted to the recesses 11 the recesses 12 are thrown into communication with the exhaust, the live steam will pass into the chambers 8 through the channels 15 and will expand against one side of the pistons 7 while the dead steam upon the opposite side of the pistons will pass into the exhaust through the channels 16. By reversing this condition and using the outer recesses 11 as exhausts and delivering live steam to the inner recesses it will be readily apparent that the drum will be caused to rotate in the opposite direction.

The end 3 of the shell 1 is in the nature of a valve casing and is shown as comprising the two sections 17 and 18 inclosing a steam space 19 to which the steam or other fluid utilized for motive power is admitted through the inlet 20. The section 17 of the valve casing fits closely against one end of the drum 5 so as to close the recesses 11 and 12. This section 17 is provided with a plurality of pairs of openings, the inner openings 21 being disposed in a concentric circle corresponding to the inner recesses 12 in the drum 5 while the outer openings 22 are disposed in a second concentric circle corresponding to the outer recesses 11. The central portion of the section 17 of the valve casing is formed with an annular exhaust chamber 23 communicating with the exhaust passage 24 and also provided with a plurality of slots 25,

there being one of the said slots for each set of openings 21 and 22.

A rotary disk or valve member 26 is mounted within the steam space 19 and fits closely against the section 17 of the casing while it is held spaced from the section 18 by means of a collar or annular rib 27. A plurality of slots or steam openings 28 corresponding to the pairs of openings 21 and 22 in the section 17 of the valve casing is formed in the valve member 26, and radially elongated depressions 29 are located intermediate of the slots 28. The rotary movement of the valve member 26 is limited by means of a lug 30 operating within a cut away portion 31 of the valve casing and the said valve member is designed to be operated through the medium of a rod 32 passing through a suitable stuffing box 33 and loosely connected to the said valve member by any suitable means, although it is preferred that the inner end of the rod 32 be formed with a laterally elongated eye loosely receiving a stud 34 upon the valve 26.

The openings 28 and depressions 29 in the valve member are so arranged that when the valve has been moved to one of its limits the openings 28 communicate with the inner openings 21 and the depressions 29 communicate with the outer openings 22, while this condition is exactly reversed at the opposite limit of the movement of the valve member. It may be here mentioned that the depressions 29 are always in communication with the annular exhaust chamber 23 through the medium of their respective slots 25 and serve to receive the exhaust from either the openings 20 or the openings 22 according to the position of the valve.

From the foregoing description it will be readily apparent that when the valve member 26 is in such a position that the outer openings 22 of the section 17 of the valve casing receive live steam through the openings 28 and the inner openings 21 communicate with the exhaust, the said live steam will be delivered into the outer recesses 11 of the drum 5 and will pass through the ducts 13 and channels 15 so as to expand against one side of the pistons 7, the dead steam upon the opposite side of the said pistons being exhausted through the inner recesses 12 and depressions 18 in the valve member. Upon moving the valve to its opposite position the inner recesses 12 in the drum receive live steam through the openings 28 while the outer recesses 11 communicate with the exhaust through the depressions 29, and the motion of the drum is reversed in direction.

Having thus described the invention, what is claimed as new is:

1. A rotary engine comprising a sliding piston serving as a means for delivering the live steam and exhausting the dead steam.
2. A rotary engine comprising a sliding piston provided with passages for delivering the live steam and exhausting the dead steam.
3. A rotary engine comprising a shell, a drum mounted within the shell and provided with inlet and exhaust recesses, a movable piston carried by the drum and provided with passages communicating respectively with the said recesses.
4. A rotary engine comprising a shell, a drum mounted within the shell, a plurality of sliding piston carried by the drum, the said drum being provided intermediate of each pair of adjacent pistons with an exhaust recess and an inlet recess and the pistons being provided upon oppo-

site sides with passages one of which communicates with the exhaust recess upon one side thereof while the opposite passage communicates with the inlet recess upon the opposite side, and means for regulating the delivery of steam to the engine.

5. A rotary engine comprising a shell having a plurality of chambers formed in the periphery thereof, a drum rotatably mounted within the shell, spring pressed partitions carried by the shell intermediate of the chambers, sliding pistons mounted upon the drum, the said drum being provided with a set of inlet recesses and a set of exhaust recesses and the pistons being provided upon one side with a passage designed to communicate with the inlet recess, and means for regulating the delivery of steam to the engine.

6. A rotary engine comprising a shell, a drum mounted within the shell and provided with recesses spaced radially from each other, a reversible valve for delivering live steam to one of the recesses and carrying away exhaust from the opposite recess, movable pistons carried by the drum, and means for utilizing live steam from either of the recesses in connection with the pistons and delivering the dead steam to the opposite recess.

7. A rotary engine comprising a shell, a drum mounted within the shell, pistons carried by the drum, a valve casing applied to the shell, the drum being provided with recesses spaced radially from each other and the valve casing being provided with corresponding openings, a valve mounted within the casing for throwing either set of openings into communication with the exhaust and the opposite set of openings into communication with the steam inlet, and means for utilizing the live steam within either of the recesses in connection with the pistons.

8. A rotary engine comprising a shell, a rotary drum mounted within the shell, pistons carried by the drum, a valve casing applied to the shell, the said drum being formed with two sets of recesses and the valve casing with two sets of corresponding openings, a rotary valve member mounted within the valve casing and provided with means for throwing either set of openings into communication with the exhaust and the opposite set into communication with the steam inlet, and means for utilizing the steam within either set of recesses in the drum in connection with the pistons.

9. A rotary engine comprising a shell, a drum rotatably mounted within the shell, pistons carried by the drum, a valve casing applied to the shell, the said drum being provided with two sets of recesses and the valve casing with two sets of corresponding openings, means for utilizing the steam from either set of recesses in connection with the pistons, and a rotary valve member mounted within the valve casing and provided with openings communicating with the steam inlet and depressions communicating with the exhaust, the said valve member being designed to be moved to throw the openings therein into registry with either set of the before mentioned openings in the valve casing and the remaining set into registry with the depressions.

10. A rotary engine comprising a revoluble drum provided with an inlet recess and an exhaust recess, a sliding piston mounted upon the drum and provided upon opposite sides with passages communicating respectively with the inlet recess and the exhaust recess, and means for regulating the delivery of steam to the inlet recess and the exhaust of the steam from the exhaust recess.

11. A rotary engine comprising a shell, a drum mounted within the shell, a valve casing applied to the shell and formed in two sections, one of the sections being formed with two sets of openings and also with an exhaust chamber provided with a slot for each set of openings, means for utilizing live steam from either set of openings to drive the drum, and a rotary valve member mounted within the valve casing and provided with openings and depressions operating to throw either set of openings in the valve casing into communication with the steam inlet and the opposite set into communication with the before mentioned exhaust chamber.

12. A rotary engine comprising a shell, a drum mounted within the shell, a valve casing applied to the shell and formed in two sections, one of said sections being provided with two sets of openings and also with an exhaust chamber provided with a slot for each set of openings, and a rotary valve member mounted within the valve casing and provided with alternate openings and depressions, the said depressions being designed to establish communication between either set of openings and the

exhaust chamber and the openings in the valve member 10 communicating with the opposite set of openings in the valve casing.

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

HOMER H. CALKINS. [L. s.]

Witnesses:

GUY H. HUMPHREYS,  
JAMES O. WALKER.