

971,043.

W. M. HOFFMAN.
 ROTARY ENGINE.
 APPLICATION FILED NOV. 18, 1909.

Patented Sept. 27, 1910.

2 SHEETS—SHEET 1.

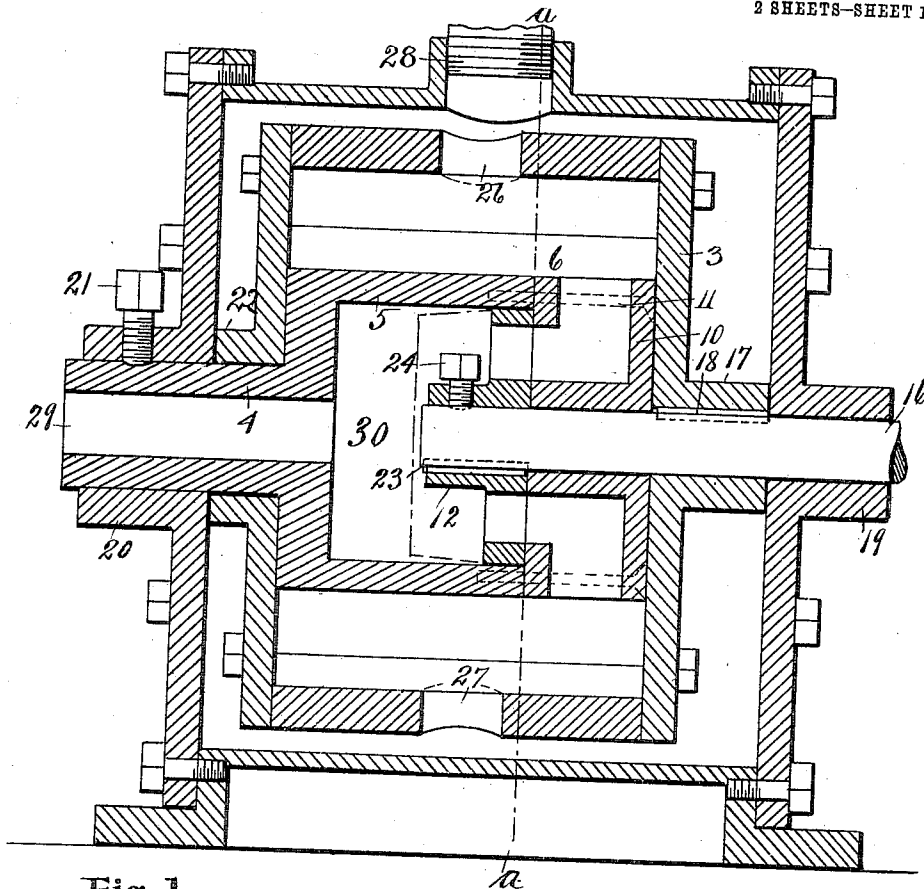


Fig. 1.

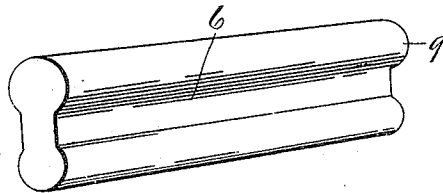


Fig. 4.

Witnesses:

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C. C. Jennings

Inventor

Wm. M. Hoffman

By

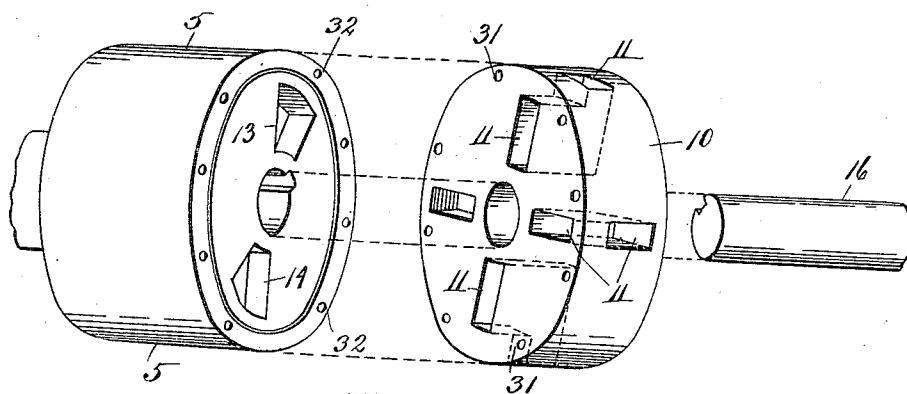
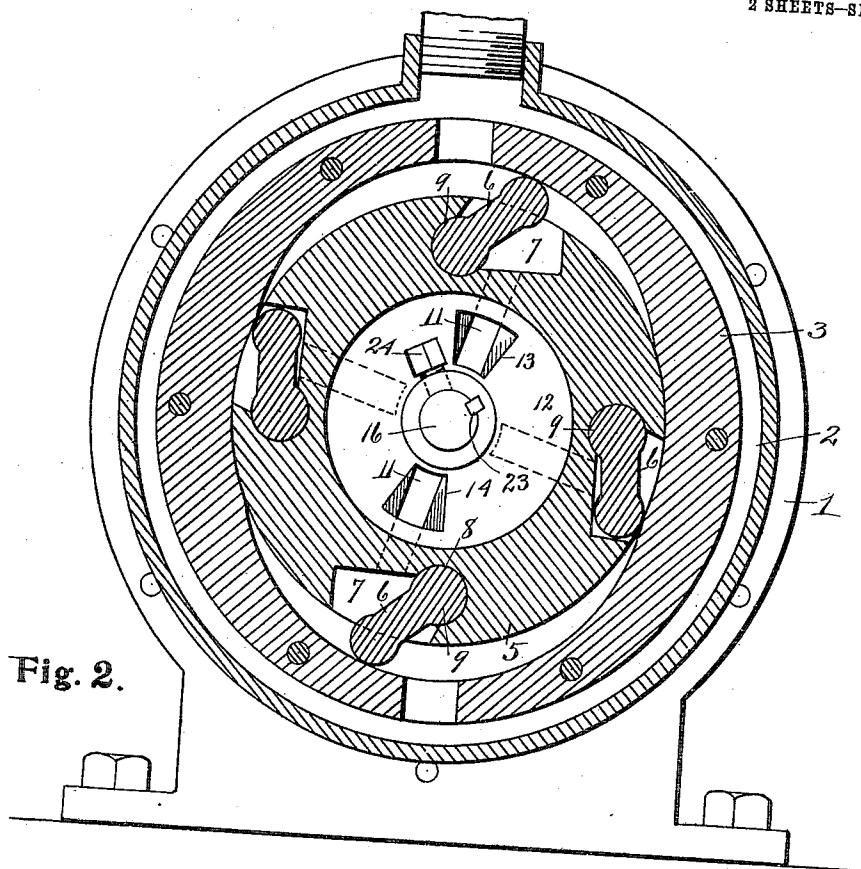
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WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM M. HOFFMAN, OF BUFFALO, NEW YORK, ASSIGNOR TO FRANK B. ALLEN, OF TORONTO, CANADA.

ROTARY ENGINE.

971,043.

Specification of Letters Patent. Patented Sept. 27, 1910.

Application filed November 18, 1909. Serial No. 528,671.

To all whom it may concern:

Be it known that I, WILLIAM M. HOFFMAN, a citizen of the United States, residing at Buffalo, county of Erie, State of New York, have invented a certain new and useful Improvement in Rotary Engines, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to rotary engines.

It has for its object an improved balanced rotary engine adapted to use steam or similar expansive fluid as motive power.

In the drawings:—Figure 1, is a vertical section longitudinal of the shaft. Fig. 2, is a cross section at the line *a—*a** of Fig. 1. Fig. 3, is a perspective showing the end of the steam conduit and the face of the valve which admits steam to the cylinder. Fig. 4, is a perspective of an abutment member.

The abutment members represented in Fig. 4 are swinging members similar in some of their functions to bucket members used in some characters of rotary engines in which the swinging member revolves as well as swings. In the present case these abutment members are stationary in position and the member which acts as a piston or movable member is a barrel circular on its outer periphery and oval or ovate on its inner surface.

1 indicates the external case or shell within which is an annular chamber 2 surrounding a rotary piston 3. The chamber 2 provides a clearance space that surrounds the piston entirely except those small portions which serve as bearings. Through one end of the external case 1 is inserted a tubular conduit 4 leading to a cylindrical head 5, in the external walls of which cylindrical head are cavities to hold swinging abutments 6; the cavities 7 extend along the head and at one side are furnished with curved bearing grooves 8, in which curved bearing grooves cylindrical bearing portions 9 of the abutment 6 engage. The free ends of the abutment 6 are also curved into cylindrical form and bear against the inner surface of the cylinder 3. The general outer surface of the head 5 is cylindrical and between it and the rotating piston 3 are two chambers that are crescent shaped in cross section. The entire

inner surface is bored with four curved surfaces concentric to four differently located centers and there are four abutments in the head 5 located at the ends of diameters that cross at right angles. The head is continued by a chambered extension 10 through which there are four passages 11 for the admission of steam into the crescent shaped chambers between the head and the piston; these passages 11 are controlled by a disk valve 12, through which there are two openings 13 and 14 to control passages of steam through the passages 11 in the extension 10.

The valve 12 is keyed to a driving shaft 16 which passes through the extension 10 of the head in which it freely rotates and passes through a neck 17 on the piston 3 where the shaft 16 and the neck and piston are keyed together by key 18; the shaft 16 passes through the hub 19 in the outer case 1 which forms a bearing for it and in which it freely rotates. A hub 20 on the opposite side of the casing 1 engages over the tubular conduit 4 to which the head 5 is attached and the conduit and hub are secured together by any suitable means, as by screw 21. The piston 3 is provided with a hub 22 that engages on the conduit 4 which serves as a journal to support it and on which it rotates. The valve 12 is shown as secured to the shaft 16 not only by key 23 but by set screw 24.

Steam that is admitted into the interior of the piston after it has acted against the abutment on the one side and the walls of the piston on the other, escapes from the piston through the openings 26 and 27 into the chamber which surrounds the piston and eventually escapes through the exhaust 28. The outlets 26 and 27 are located at the ends of the long diameter of the oval chamber in the piston 3. Steam is admitted into the engine through the passage 29 in the tube 4 and through the steam chest 30 in the enlarged part 5. The chambered extension 10 is secured to the walls of the head 5 by screws that pass through the holes 31 and engage in the hole 32.

The engine thus constructed is a balanced rotary engine in which there is always a uniform pressure on opposite sides of the shaft, tending to rotate the piston and holding it in balance in whatever position the piston may be found. The operation of the engine is quite obvious from an inspection of the several figures.

The ports through the valve 12 are preferably larger in cross section than the cross section of the passages through the chamber extension 11.

5 What I claim is:—

1. A rotary engine, having in combination
a central cylindrical abutment holder, provided with a steam chest contained in itself,
and with cavities in its outer surface for
abutment members, abutment members engaging in said cavities, a rotary piston having
an internal chamber oval in cross section,
and with discharge openings through the walls of said piston at the extremities of
the long diameter of said oval chamber,
means for securing the piston to a shaft, a
valve actuated by the shaft of the piston arranged to control the steam ports admitting
steam into said piston, substantially as described.
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2. A rotary engine, having a cylindrical fixed abutment holder, a piston adapted to rotate about said abutment holder having an oval cavity equally divided by a diameter of

said abutment holder, discharge passages through the piston walls located at the ends of the long diameter of said oval cavity, means for controlling the admission of steam, and for admitting steam through the walls of said abutment holder into said oval cavity, substantially as described. 25 30

3. In a rotary engine, a rotary piston having a chamber therein oval in cross section, an abutment holder located in said chamber, a steam chest located in said abutment holder, valve controlled passages communicating between said steam chest and the oval chamber in said piston, a shell external to said piston and spaced therefrom, passages leading through the walls of said piston from the chamber therein to the spaces in said shell, substantially as described. 35 40

In testimony whereof, I sign this specification in the presence of two witnesses.

WILLIAM M. HOFFMAN.

Witnesses:

J. H. COYER,

MARY A. WILLETT.