No. 764,551. PATENTED JULY 12, 1904.

W. H. BOT, JR.

ROTARY ENGINE.

APPLICATION FILED MAY 13, 1904.

NO MODEL.

Fig. 1

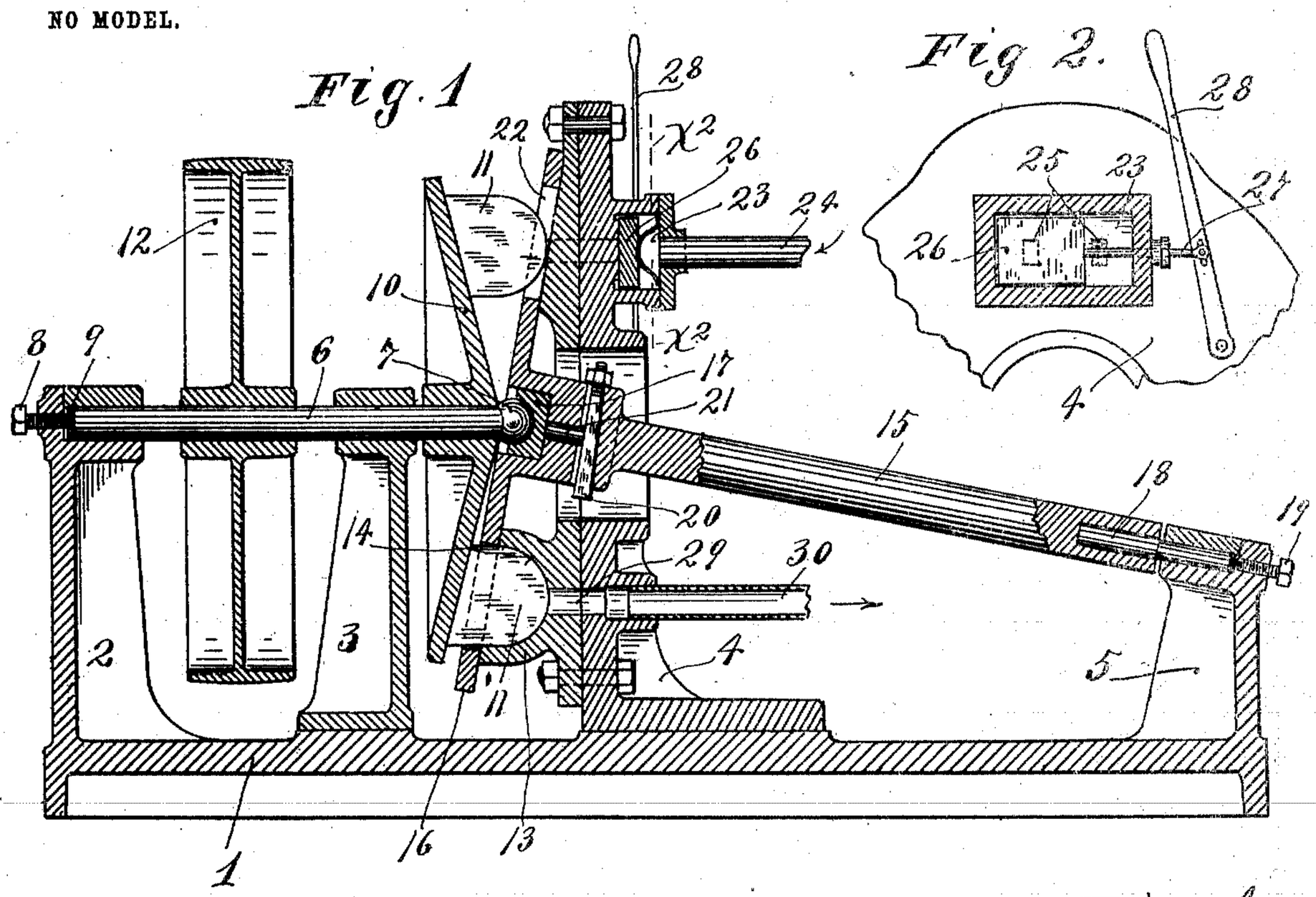


Fig. 2.

Fig. 3.

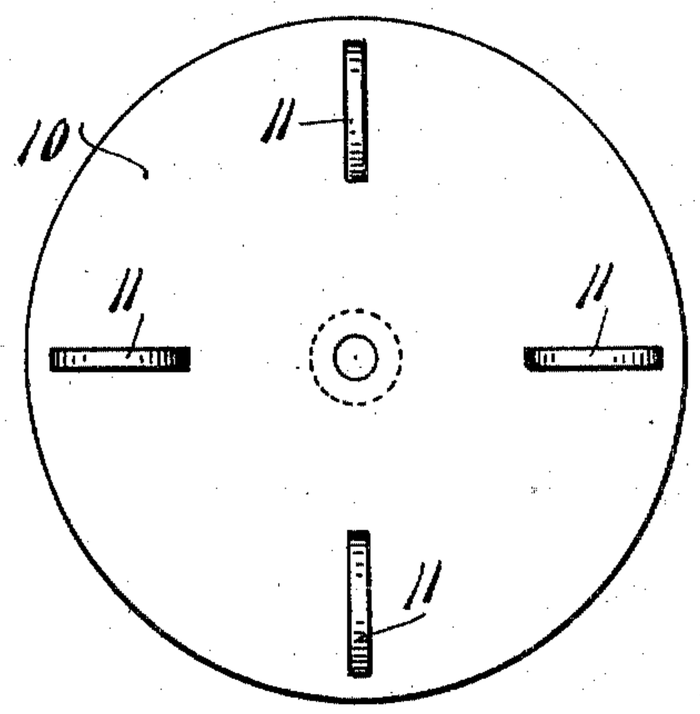


Fig. 4.

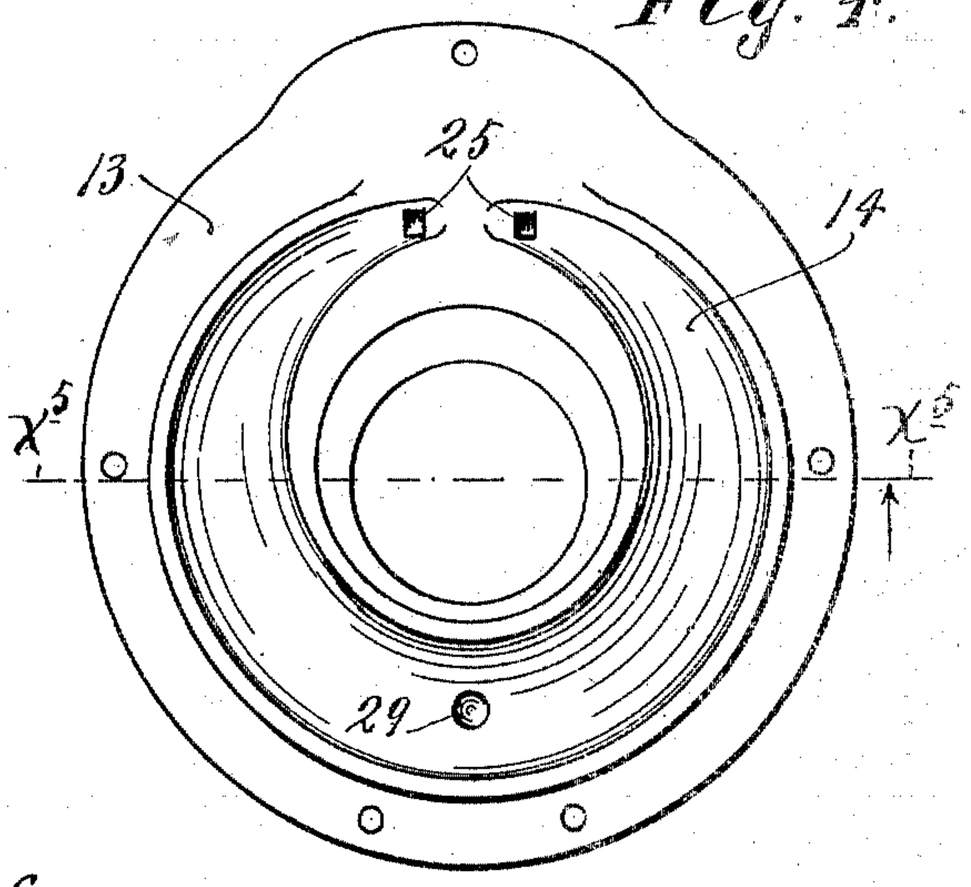


Fig. 6.

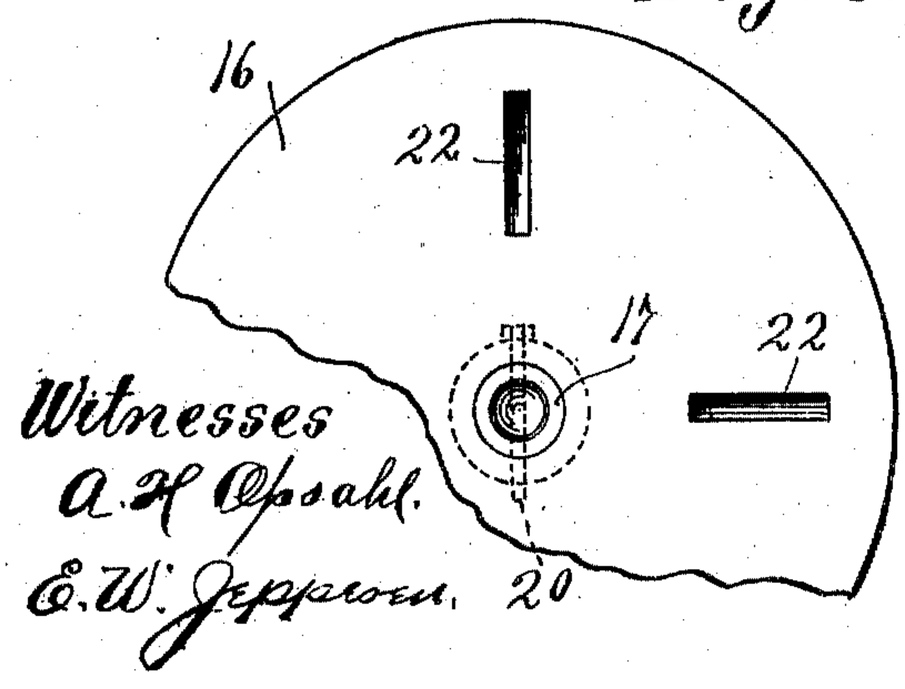
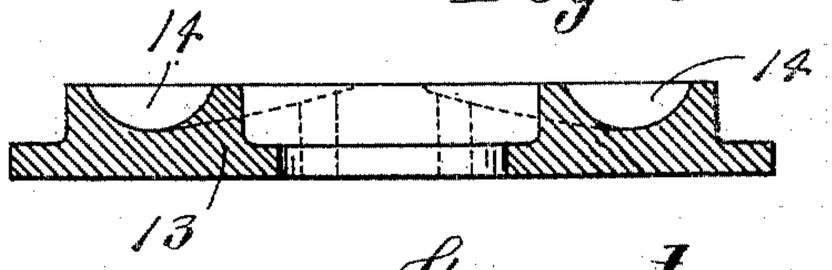


Fig. 5.



Witnesses
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No. 764,551. Patented July 12, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM HERO BOT, JR., OF GHENT, MINNESOTA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 764,551, dated July 12, 1904.

Application filed May 13, 1904. Serial No. 207,727. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HERO BOT, Jr., a citizen of the United States, residing at Ghent, in the county of Lyon and State of Minnesota, 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 rotary engines, and has for its object to simplify the construction thereof and improve the operation thereof, as hereinafter noted.

The invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a view in vertical section, taken centrally and longitudinally through the engine. Fig. 2 is a detail in section on the line $x^2 x^2$ of Fig. 1, some parts being broken away. Fig. 3 is a face view of the conical head which carries a plurality of impelling-blades. Fig. 4 is a face view of a so-called "oblique" abutment. Fig. 5 is a section on the line $x^5 x^5$ of Fig. 4; and Fig. 6 is a face view of a radially-slotted bearing-disk, parts thereof being broken away.

The numeral 1 indicates a bed-plate having vertical bearing-pedestals 2, 3, 4, and 5.

The numeral 6 indicates a shaft, which is journaled in the bearing-pedestals 2 and 3 and at its projecting right-hand end, as shown in Fig. 1, is provided with a spherical head or ball 7. At its other end said shaft is subject to a thrust-screw 8, which, as shown, works through the head of the pedestal 2 and presses the loose washer 9 directly against the end of said shaft. Between the head 7 and the pedestal 3 the shaft 6 is provided with a rigidly-secured conical head 10, which is provided with a plurality of propelling-blades 11, which blades project laterally from the face of said head and lie in planes radiating from the axis thereof. Said shaft 6 is further shown as provided with a pulley 12, over which a belt (not shown) may be run to transmit motion from the engine, as will presently more fully appear.

Rigidly secured to one face of the pedestal 4 is an annular thrust-block 13, the left-hand face of which extends obliquely to the axis of the shaft 6, so that the said wedge-block in vertical cross-section is wedge shape. This thrust-block is formed with an approximately endless blade-channel 14, the bottom of which extends in a plane at a right angle to the axis of the shaft 6. The projecting portions of the propelling-blades 11 fit and work in this channel 14. In other words, the said channel has such form as would be given to the same were it to be cut out by rotation of the head 10 and blades 11. At one point—to wit, as shown, the highest point—said channel 14 nearly or entirely disappears, or, in other words, is reduced to zero, while its maximum depth is at its lowest point.

A rotary shaft or member 15, which is set at an oblique angle to the axis of the shaft 6, but which intersects the center of the spherical head 7 thereof, is provided with a projecting bearing-disk 16, which bears against the oblique face of the thrust-block 13 and rotates thereover with a tight joint. To support this shaft 15 for rotary movement in the position indicated, it is, as shown, provided with a countersunk bearing-box 17, which receives approximately one-half of the bearing-head 7. At its other end said shaft 15 is shown as provided with a projecting spindle 18, which is seated in the bearing-pedestal 5 and at its end is subject to a thrust-screw 19, working through the head of said pedestal. As shown, the bearing-box 17 is adapted to be adjusted by a nut-equipped wedge 20, seated in the shaft 15 and acting on a projecting stem 21 of said bearing. The conical head 10 is provided with four impelling-blades 11, set ninety degrees apart. Hence at corresponding points the bearing-disk 16 is formed with radial slots 22, through which the impelling-blades 13 work with close engagement.

The steam or compressed air will be delivered to a small steam-chest 23 through a supply-pipe 24. Said steam-chest, as shown, is applied to the pedestal 4 and communicates with the extremity of the blade-channel 14

through admission-ports 25. A spring-pressed distribution-valve 26 works within the steam-chest 23 and coöperates with the ports 25, the said valve being of such length that when moved into intermediate position it will close both of said ports. Said valve has a stem 27, which works outward through a stuffing-box on one end of the steam-chest 23 and is attached to a reversing-lever 28, pivoted to the pedestal 4. At its lowered and deepest point the channel 14 is provided with an exhaust-port 29, which leads to an exhaust-pipe 30.

As is evident, the rotation of one of the shafts 6 and 15 will cause the other to rotate, since the impelling-blades 11, working through the radial slots 22 of the impelling-disk 16, cause the said bearing-disk 16 and head 10 to operate very much after the manner of a pair of bevel-gears. It is also evident that when live steam or compressed air is admitted into the channel 14 through one of the ports, 25, the engine will be caused to rotate in one direction and that when said steam or air is admitted through the other port, 25, the engine will be rotated in a reverse direction. The admitted steam will act upon the impelling-blade in advance thereof until it reaches the exhaust-port, and at such point will be exhausted. The valve 26, being spring seated, will yield from its seat slightly if at any time the steam or air should be compressed in advance of an impelling-blade.

As already stated, the engine described is a reversible engine. If the engine were to be constructed to run in one direction only, the admission-port would be placed at one extremity of the channel 14 and the exhaust-port would be placed at the other extremity thereof.

The engine described is extremely simple and cheap to build. It is thought to be efficient for the purposes had in view.

It will of course be understood from what has already been said that the engine is capable of modification within the scope of my invention as herein set forth and claimed.

It will of course be understood that the "engine," so called, when positively driven may be used as a pump to force water or to compress air.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a rotary engine, the combination with a pair of rotary members having their axes at an angle to each other, one thereof having a radially-slotted bearing-disk, and the other having a head formed with impelling-blades working through the radial slots of said bearing-disk, a relatively fixed oblique abutment, with the face of which said bearing-disk engages, said abutment having a blade-channel, the bottom of which lies in a plane intersecting the axis of said blade-equipped head at a right angle, the said channel fitting said blades, and having a variable depth, substantially as described.

2. In a rotary engine, the combination with a pair of rotary members having their axes at an angle to each other, one thereof having a radially-slotted bearing-disk, and the other having a head formed with impelling-blades working through the radial slots of said bearing-disk, a fixed oblique abutment with the face of which said bearing-disk engages, said abutment having a blade-channel, the bottom of which lies in a plane intersecting the axis of said blade-equipped head at a right angle, said channel fitting said blades and having a variable depth, suitable admission and exhaust ports leading to and from said blade-channel, one admission-port opening into each extremity thereof, and a valve coöperating with said admission-ports to open and close the same in reverse order, whereby the engine may be run in either direction, substantially as described.

3. In a rotary engine, the combination with the shaft 6, formed with a head 7, of a head 10 secured to said shaft 6 and provided with impelling-blades 11, the shaft 15 set at an angle to said shaft 6 and having a bearing engaging said shaft-head 7, said shaft 15 further having the bearing-disk 16, formed with radial slots 22 through which the said blades 11 work, the rigidly-supported abutment 13, with the face of which said bearing-disk 16 engages, said abutment having the variable-depth blade-channel 14 fitting said blades 11, and suitable admission and exhaust ports opening into and from said channel 14, substantially as described.

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

WILLIAM HERO BOT, JR.

Witnesses:
J. CAVANAGH,
EDWARD MAERTENS.