No. 725,412. PATENTED APR. 14, 1903.

W. H. CORNELL.

ROTARY ENGINE.

APPLICATION FILED FEB. 20, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

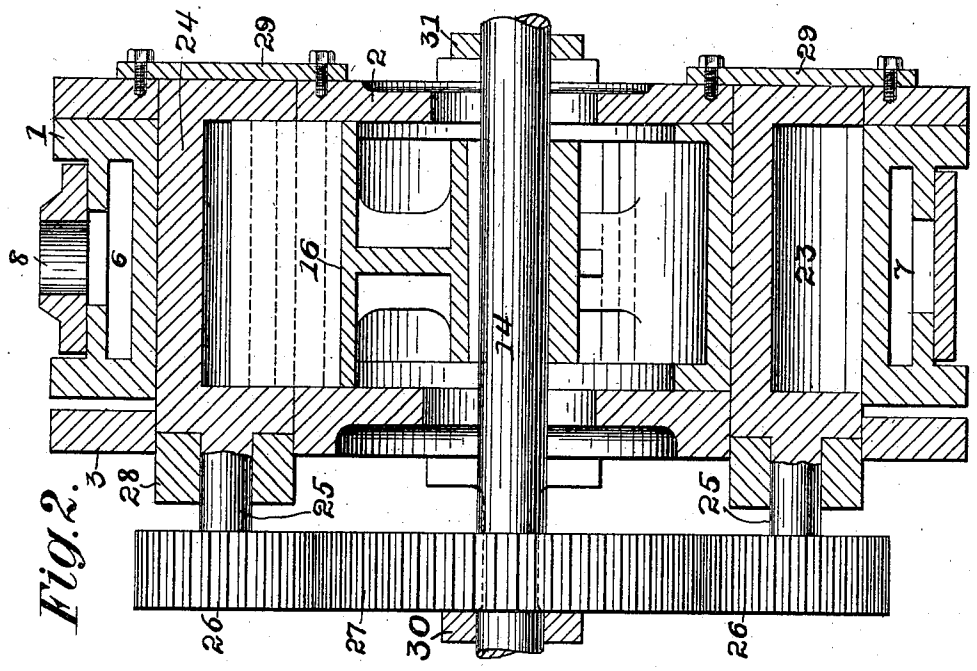


Fig. 2.

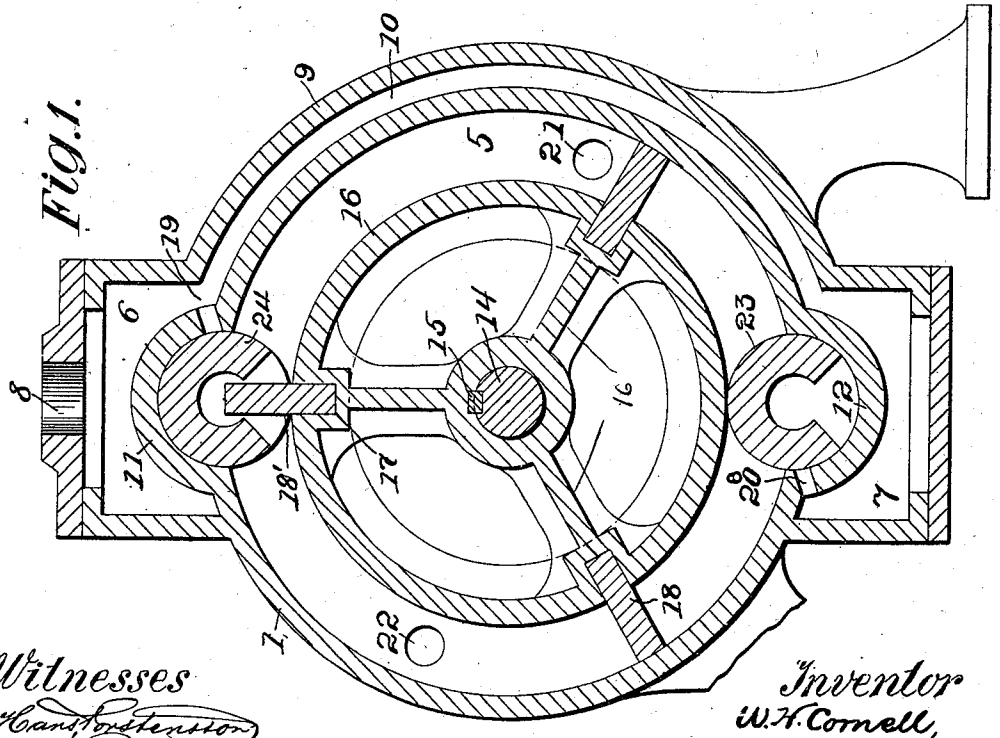


Fig. 1.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

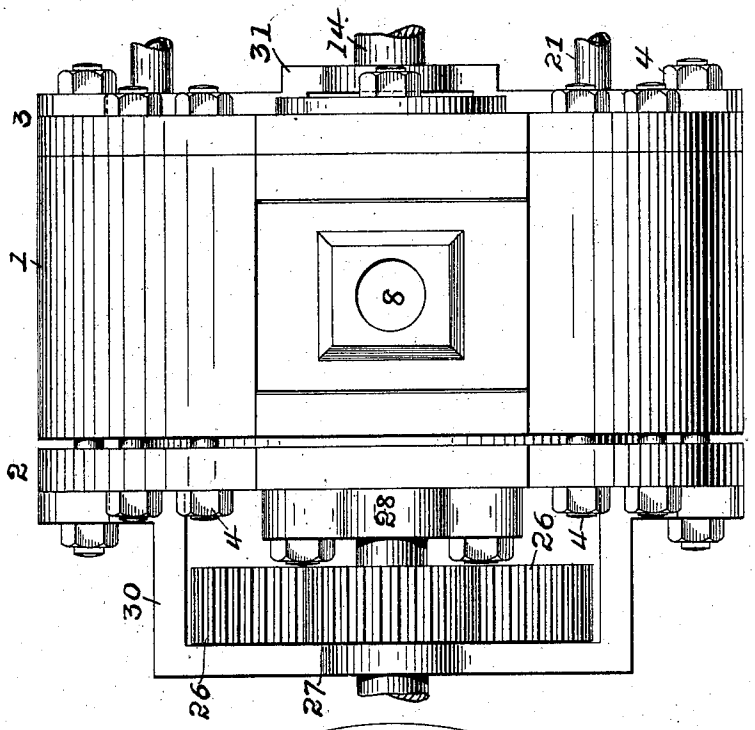
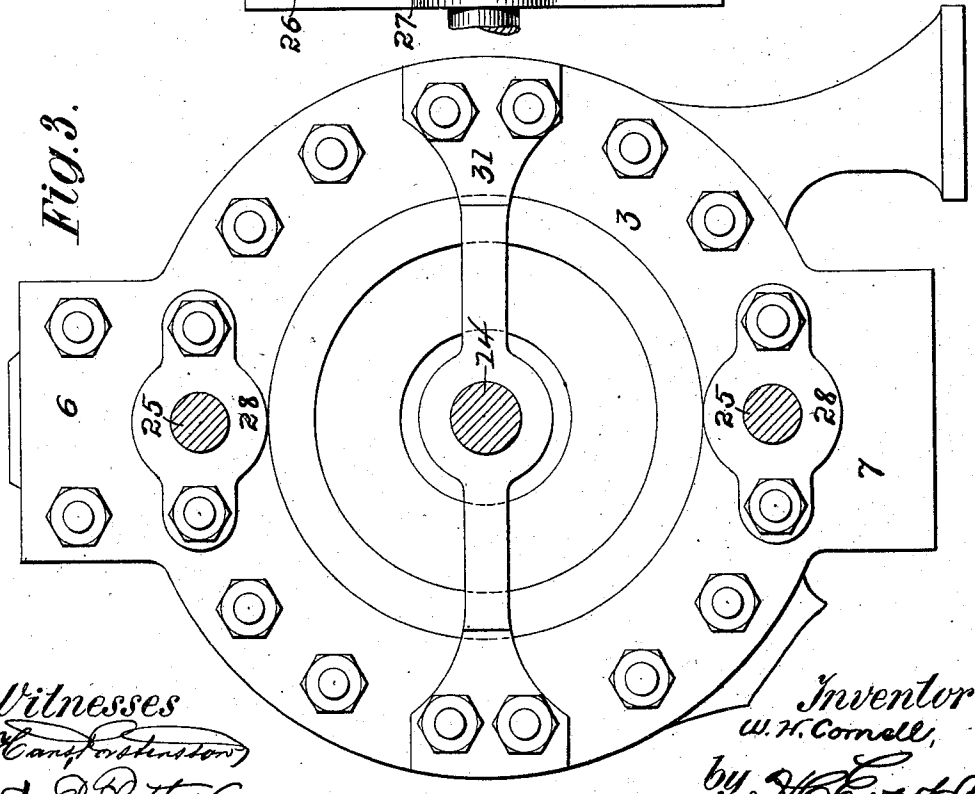


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM H. CORNELL, OF PITTSBURG, PENNSYLVANIA.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 725,412, dated April 14, 1903.

Application filed February 20, 1903. Serial No. 144,179. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. CORNELL, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in rotary engines; and the object of the invention is to simplify and improve the construction, to operate the valves positively from the driving-shaft, and to admit the steam into the cylinder, whereby to receive the greatest driving power possible.

For the attainment of the several objects my invention consists, briefly, in certain details of construction, arrangement, and combination of parts, all of which will be more fully described hereinafter and the specific points of novelty in which will be designated in the appended claims.

While I have herein shown and will give in detail a description of the several auxiliary features of my invention, I desire to herein note that although I have shown in the accompanying drawings and described in the following specific description certain component and coöperative parts which I deem sufficiently improved and operative to carry out the fundamental principles herein incorporated, however, I do not confine myself to the exact details of construction so illustrated and described, since obvious departures may be made without departing from the inherent and generic features constituting the gist hereof.

In describing the invention in detail reference will be had to the accompanying drawings, forming a part of this application, and wherein like numerals of reference will be employed for designating like parts throughout the different views, in which—

Figure 1 is a central vertical sectional view. Fig. 2 is a transverse vertical sectional view. Fig. 3 is a side elevation with the drive-shaft and shafts of the valves in section. Fig. 4 is a top plan view.

In construction my improved engine embodies the annular shell or casing 1 and side plates 2 3, secured together by tie-bolts 4, extending therethrough at suitable intervals. The shell 1, within which is the steam-cylinder 5, is constructed at its upper end with a steam-chest 6, having a suitable steam-inlet 8, and at its lower end with a suitable steam-chest 7. The shell or casing 1 is constructed on one side with an enlargement 9, and a by port or pass 10 extends the length of this enlargement, leading from the chest 6 to the chest 7 and establishing communication between the two chests. At the upper end of the steam-cylinder 5, lying within the steam-chest 6, is a semicircular valve seat or casing 11, and at the lower side of the steam-cylinder, lying within the steam-chest 7, is a like valve seat or casing 12. The drive-shaft 14 has secured thereon, by means of a key 15 or other suitable means, a rotary piston 16, provided with spokes 16′, and also provided in its periphery, equidistant apart, with pockets 17, which receive and hold the blades or vanes 18 18′ 18″. The valve seats or casings 11 12 are provided with ports 19 20, respectively, and exhaust-ports 21 22 are provided at suitable points. Mounted in the semicircular valve seats or casings 11 12 are rotary valves 23 24, having hollow centers and slotted in one side with the side walls of the slot at angles which permit the blades or vanes to pass freely. The valves 23 and 24 are seated at their ends in the side plates 2 and 3, one end of the valves carrying stub-shafts 25, on which are pinions or gears 26, which mesh with the driving-gear 27 on the drive-shaft 14. Packing-glands 28 are arranged on the stub-shafts 25 of the valves, while plates 29 are affixed to the side plate 2 over the other ends of the valves to make the same steam-tight. The drive-shaft 14 passes through a yoke 30, affixed to the side plate 3, and at the other side passes through a brace 31, affixed to the side plate 2.

In the accompanying drawings the engine is shown in Fig. 1 as "on center," the ports 19 and 20 being closed just at this time, due to the position of the valves. The blade or vane is under the action of the expanding steam that is in that portion of the steam-cylinder 5 that is between blade or vane 18 and valve 23, the valve at this time being in seat-

ing engagement with the piston 16. As the piston 16 continues to revolve or rotate the slot in valve 24 is brought into communication with port 19, and just prior to this communication being established the valve 24 has been revolved, so that it is in seating engagement with the piston. The steam, therefore, that now enters through port 19 into the hollow valve 24 enters back of blade or vane 18′, so that this blade or vane is under the action of the live steam, while blade or vane 18 has been moved past the exhaust 22, whereby to exhaust the steam which was acting upon said blade. Valve 23 has also been rotated so as to receive blade or vane 18″, and as this blade passes out of the slot in this valve communication is established with port 20, and steam is admitted back of blade 18″, while the steam which was acting upon blade 18′ is exhausted through port 21. It is to be noted that the slots in the valves 23 24 are so made that the blades or vanes will enter and leave the same freely and that just prior to communication being established between the slot in said valves and the ports 19 20 the valves come in seating engagement with the piston, so that no steam can possibly pass back of the blade or vanes. If it is desired to make the engine a reversible one, attachments to accomplish this may readily be applied.

While I have herein shown and described the invention in detail as it is practiced by me, yet it will be evident that in the practice various changes may be made in the details of construction without departing from the general spirit of the invention.

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

1. In a rotary engine, a steam-cylinder having exhaust-ports at opposite sides and inlet-ports communicating with the said cylinder at opposite sides, a drive-shaft, a hollow concentric piston in said cylinder provided with spokes, vanes or blades carried by the said piston and secured in pockets formed in the periphery of the said piston in alinement with the said spokes, hollow rotary valves having slotted sides to receive the said vanes or blades, pinions mounted on stub-shafts carried by the said valves, and a gear on the drive-shaft meshing with the said pinions for rotating the said valves, substantially as described.

2. In a rotary engine, a steam-cylinder having exhaust-ports at opposite sides, a drive-shaft, a hollow concentric piston in said cylinder provided with spokes, vanes or blades carried by the said piston and secured in pockets formed in the periphery of the said piston in alinement with the said spokes, hollow rotary valves having slotted sides to receive the said vanes or blades, an inlet-port communicating with each of said valves, a steam-chest surrounding each of said valves, a by-port connecting the said steam-chests, and means for operating the said valves and piston, substantially as described.

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

WILLIAM H. CORNELL.

Witnesses:
A. M. WILSON,
E. E. POTTER.