No. 724,201. PATENTED MAR. 31, 1903.

J. W. NOWAK.

STEAM ENGINE.

APPLICATION FILED JAN. 12, 1903.

NO MODEL.

Fig. 3

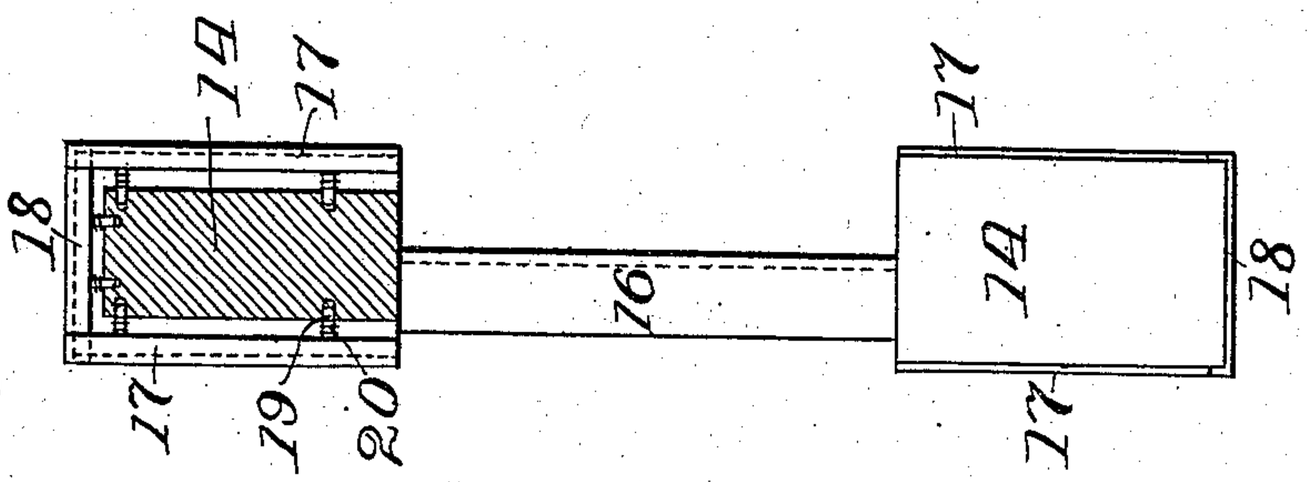



Fig. 2

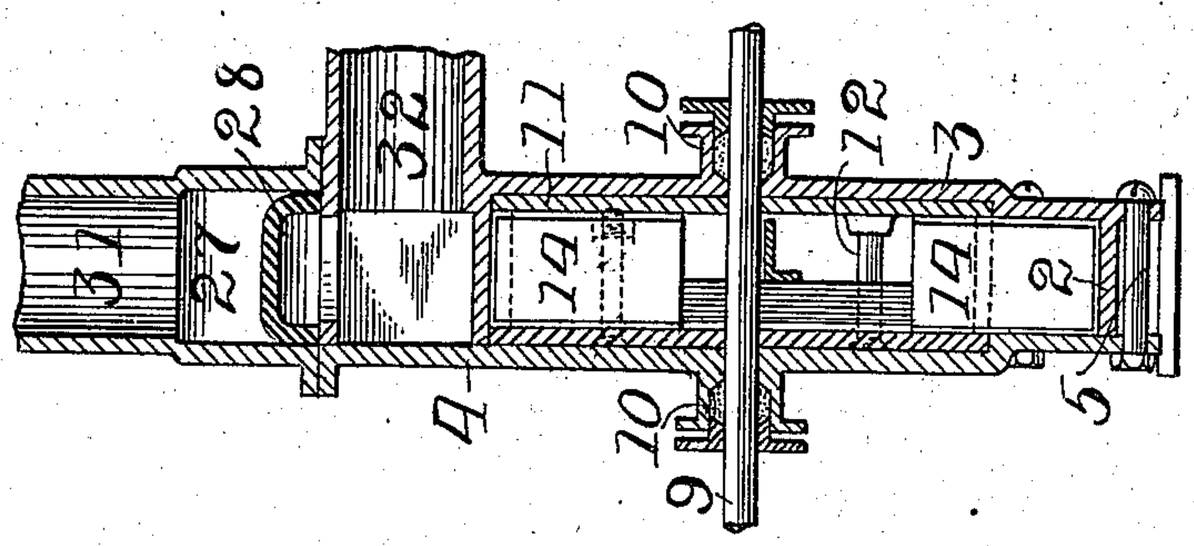
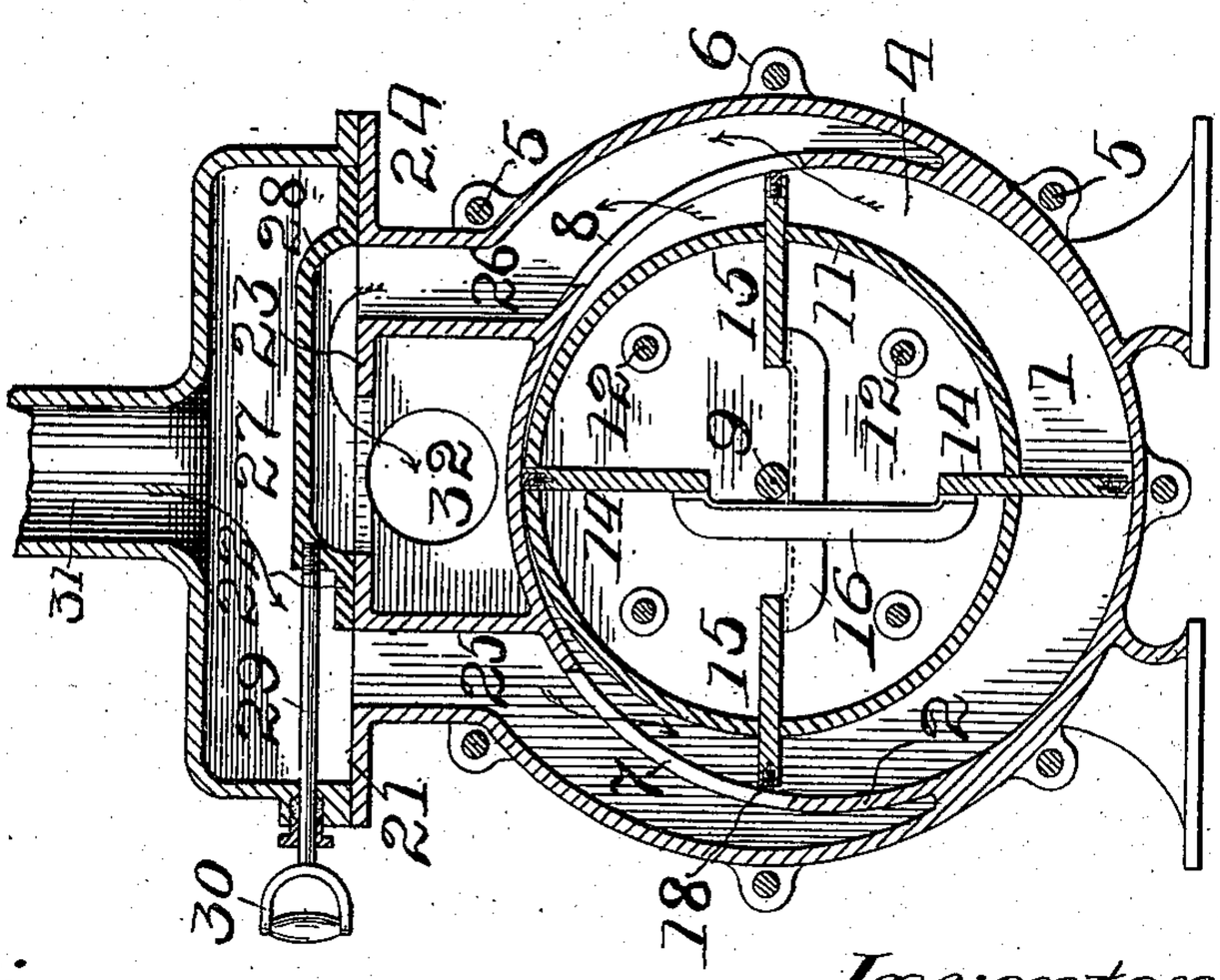



Fig. 1

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# UNITED STATES PATENT OFFICE.

JOHN W. NOWAK, OF ALLEGHENY, PENNSYLVANIA.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 724,201, dated March 31, 1903.

Application filed January 12, 1903. Serial No. 138,651. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN W. NOWAK, a citizen of the United States of America, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Steam-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 steam-engines, and relates more particularly to that class known as "rotary" engines; and the invention has for its primary object to construct a simple and efficient engine of this type embodying a rotator head or piston eccentrically mounted in the circular steam chamber or cylinder and provided with transversely-movable blades or wings adapted to automatically retract and extend as the rotator head or piston revolves, whereby the said blades or wings at one part of the revolution are presented to receive the impact of the live steam and are retracted as they pass the exhaust-port and remain in the retracted position until they again approach the inlet-port.

A further object of the invention is to construct a simple engine of this character with novel means for reversing the engine, which means may also be employed as a throttle for controlling the speed of the engine.

With the above and other objects in view the invention consists in the novel construction, combination, and arrangement of parts to be hereinafter more fully described, and specifically pointed out in the claim.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, and wherein like numerals of reference indicate like parts throughout the several views, in which—

Figure 1 is a central vertical sectional view of my improved engine. Fig. 2 is a transverse vertical sectional view thereof. Fig. 3 is a detached detail plan view of a pair of the blades or wings, with one of said blades or wings in vertical section to illustrate the packing carried thereby.

The invention, while primarily adapted for use as a steam-engine, yet is applicable alike for operation by air or water, and in the latter connection may be advantageously used in certain connections as a pump. The concentric chamber or cylinder is formed by means of the annular ring 2, which in practice will preferably be cast integral with the side plate 3, the opposite side plate 4 resting against the free edge of the annular ring 2, and the two side plates being firmly secured together by means of tie-bolts 5, which in practice are preferably inserted through lugs 6, provided therefor. The annular wall or ring 2 is provided at opposite sides with ports 7 and 8, the former of which acts as an inlet-port to the chamber or cylinder 1 when the engine is running in one direction, the port 8 acting as an outlet to the exhaust, and when the engine is running in the opposite direction port 8 becomes an inlet and the port 7 the outlet to the exhaust. The driving-shaft 9 extends through a shell forming the body of the engine and is provided with suitable stuffing-boxes 10 of any approved or desired form. Concentrically mounted on the drive-shaft, which latter is eccentric of the chamber of the cylinder 1, is a hollow rotator head or piston 11, the side plates of which are secured together by tie-bolts 12 or in any other desired or approved form.

The side plates of the rotator head or piston are set in the side plates of the shell, which is accomplished by bulging the side plates of the shell, as best seen in Fig. 2, whereby the inner faces of the side plates of the piston are flush with that portion of the inner faces of the side plates 3 4 engaged by the blades or wings which operate through the rotator head or piston. This is done whereby I may effectually pack the plates or wings to prevent steam passing the same, which packing will be hereinafter fully described. In the present illustration of my invention I have shown four movable blades or wings operative transversely of the rotator head or piston connected in pairs, one plate or wing of each pair being retracted, or partially so, while the plate connected thereto is extended, or partially so. It will of course be evident that only two or a greater number of plates or wings than four may be employed without in any manner altering the principle of the invention. The blades or wings are designated 14 14 and 15 15, the wings 14 being connected together by con-

necting-bar 16, offset so as to pass the drive-shaft, and the wings 15 being connected by a like cross-bar. It is to be noted, therefore, that the blades or wings 14 move in unison, as do the pair of blades or wings 15. These wings or blades are made tight, so that the steam, air, or other motive power being employed may not pass around the edges of the same, by means of spring packing-strips 17 on the side edges thereof and end packing-strips 18. These packing-strips 17 and 18 are recessed into the blades or wings and carry small pins 19, on which are springs 20 for normally holding the packing-strips extended. The shell of the engine is constructed with valve-seats 21, 22, 23, and 24 at its upper end and with steam-passages 25 26, leading from the steam-chest 27, which latter is mounted on the seats 21 24 and suitably secured in position.

In the steam-chest 27 is a slide-valve 28, which operates on the various valve-seats and may be moved in any desirable manner and when operated by hand may be actuated by a valve-rod 29, provided with a suitable handle 30. The steam-chest is provided with a suitable steam-inlet 31, and the valve 28 is hollowed out, whereby to establish communication between passage 26 and the exhaust 32 or between passage 25 and said exhaust. When the valve is set in the position as shown in Fig. 1, steam or other motive agent enters through inlet 31 into the steam-chest 27 and passes through port or passage-way 25 and through port 7 into the chamber or cylinder 1, acting upon the blades, so as to revolve the rotator head or piston, and as the blades or wings pass port 8 the steam is exhausted through said port, passage-way, or port 26 and to the exhaust. If, however, the valve is shifted so as to rest upon ports 21 23, the engine will be reversed, as port 8 will then be the inlet and port 7 the outlet to the exhaust. In this same connection it is to be noted that when the valve is shifted so as to but partially open the passage-ways 25 26 the said valve operates as a throttle to control the speed of the engine. The wings or blades being connected in pairs operate in conjunction, the blade of one pair moving outward while the blade of the same pair is moving inward, due to the eccentric mounting of the rotator head or piston in the chamber or cylinder.

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

The combination with the engine-casing, and an annular wall arranged therein, and being spaced from the said casing, said wall forming a cylinder and being provided with inlet and outlet ports, of an exhaust-chamber having vertical walls formed integral with the said annular wall, and being spaced from the engine-casing whereby passages in communication with the inlet and outlet ports of said cylinder are formed, a steam-chest, a slide-valve arranged in said steam-chest, a piston eccentrically mounted in the said cylinder, and transversely-movable blades carried by the piston, bars connecting said blades in pairs whereby each pair operate in unison, and a spring-pressed packing on the side edges of said blades, the springs therefor being seated in recesses formed in each of said blades.

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

JOHN W. NOWAK.

Witnesses:
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