To all whom it may concern:

Be it known that JAMES C. MATHIESEN, deceased, formerly a citizen of the United States residing at Oakland, in the county of Alameda and State of California, did invent a new and useful Improvement in Rotary Steam-Engines, of which the following is a specification.

This invention relates to improvements in steam engines and particularly appertains to certain novel and useful improvements in rotary engines.

The object of this invention is to provide a simple, substantial and efficient form of rotary engine in which steam reacts against a comparatively large number of piston vanes, and which in the course of its travel passes from the interior of the rotor to the exterior thereof, reacting both directly and expansively on the vanes and finally exhausting into the exterior portion of the engine.

The invention consists of the parts and combination and construction of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a cross section showing the relation of the valves, vanes and rotor. Fig. 2 is a longitudinal cross section partly broken away on line X X.

In the drawings A indicates a stationary casing in which is mounted a series of revolving piston valves 2 and a rotary piston 3. The rotary piston is revoluely mounted upon a stationary member 4 forming part of the end cover or casing 5 through which live steam is admitted to drive the piston 3 through a pipe 6. The stationary member 4 is provided with an annular port or passage 7 through which the steam passes, and is also provided with a number of radial ports 8 through which the steam discharges. The rotary piston 3 is also provided with a similar number of radial ports 9 which are so positioned with relation to the radial ports 7 in the stationary portion 4 that they will register with the radial ports 7 a part of the revolution of the piston so as to admit live steam to the outside periphery of the piston. The piston is provided with a suitable number of radial vanes or abutments 9 against which the steam pressure is exerted to drive the piston. The piston valves 2 operate in unison with the vanes 9 on the rotary piston and are connected with the driveshaft of the rotary piston through suitable means, as the gears 10 and 11, the speed ratio being such that the outside peripheral speed of the valves and piston will be the same. The valves are provided with segmental pockets or recesses 12 which are so positioned with relation to the abutments or vanes 9 on the piston that these will register and allow the vanes to pass the valves.

In operation live steam is admitted into the annular chamber of the stationary member 4 and discharges through the radial ports 7. The live steam is admitted into the piston chambers 13 formed between the valves and the piston vanes during the period that the radial ports 7 and 8 register. However, as the piston rotates the ports 8 will gradually be brought out of register and the admission of live steam cut off, the cut off position being shown in dotted lines at 16. The remainder of the stroke is acted on by the expansive force of the steam. The position of the next valve will then be such that the piston vane 9 and the segmental pocket in the piston valve will register to permit the vane to pass into the next pressure chamber, where it is again acted on by live steam, and the radial ports 8 will again register with the ports 7. All exhaust steam is discharged through the exhaust ports 17, being forced out through the ports by the forward faces of the vanes 9.

In order to prevent leakage of steam by or around the valves or piston, these are shown as provided with packing rings 19.

The drawings here illustrate an engine having four separate pressure chambers and connected valves. It will be understood that any number may be arranged when it is desired to increase the size or power of the engine.

The engine is simple and substantial in construction and reliable in its actions. The materials and finish of the several parts of the engine are such as the experience and judgment of the manufacturer may dictate.

It is to be understood that various changes in form, proportions and minor details of construction may be resorted to within the
scope of the appended claim, and that the invention is not to be limited to the specific design and construction here shown.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

In a rotary engine of the character described, a casing composed of outer and inner shells with intermediate channels divided into sections, a port from each section communicating with the interior of the casing, valve chambers between each section of the channel, rotatable valves with radial grooves, a piston with a plurality of fixed radial vanes corresponding in number to the rotatable valves registering and passing through the valve grooves during rotation, spring pressed packing carried by each vane, a head fitting the end of the casing, and a central drum formed integral with and projecting inwardly therefrom and forming a bearing for the piston cylinder, said drum having a continuous opening therethrough for a shaft and an annular channel and an exterior communicating passage to admit steam, radial ports in the drum and corresponding ports in the piston cylinder registering intermittently and communicating with the space traversed by the vanes, so as to impel the vanes between the valves and exhaust the spent steam into the spaces between the casing shells.

In testimony whereof, I have hereunto set my hand in the presence of two subscribing witnesses.

FRANCES E. MATHIESEN,
Administratrix of the estate of James C. Mathiesen.

Witnesses:
W. M. H. Barker,
W. P. W. Albee.