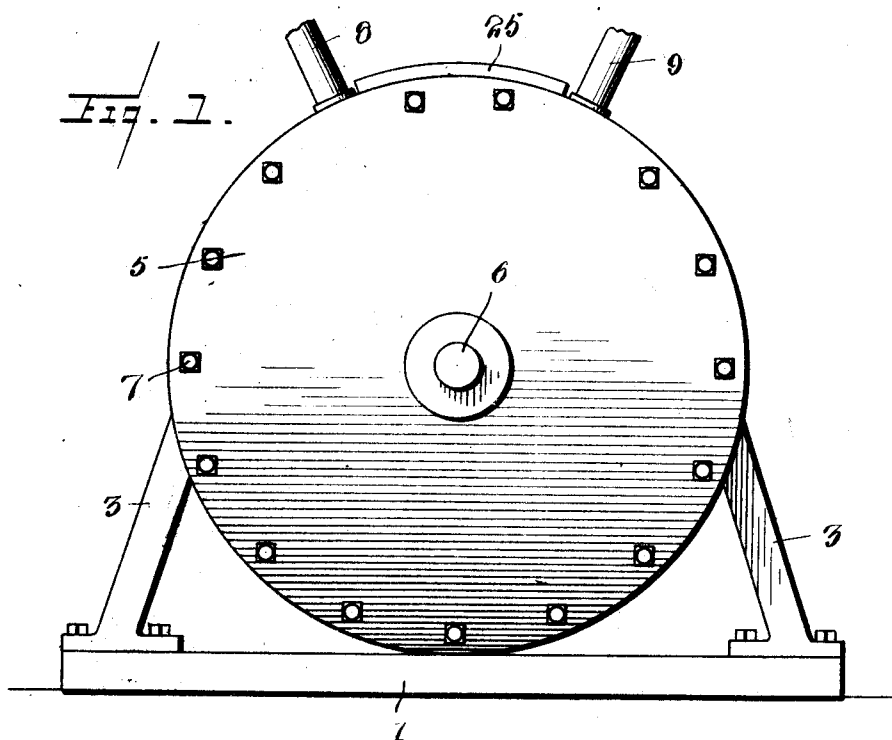
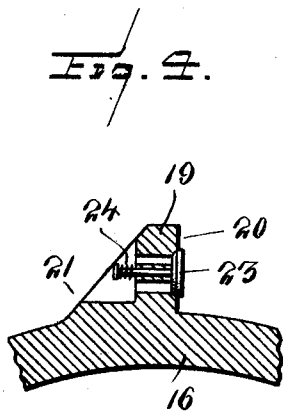
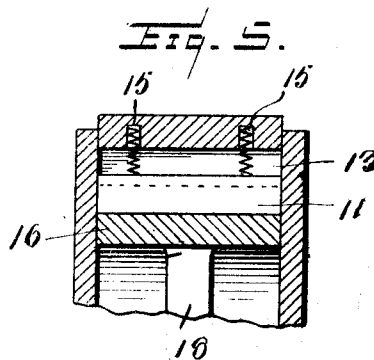


J. JOHNSON.
 ROTARY ENGINE.
 APPLICATION FILED DEC. 17, 1912.

1,066,413.

Patented July 1, 1913.

2 SHEETS—SHEET 1.



Witnesses
 E. R. Ruppert.
 R. M. Smith.

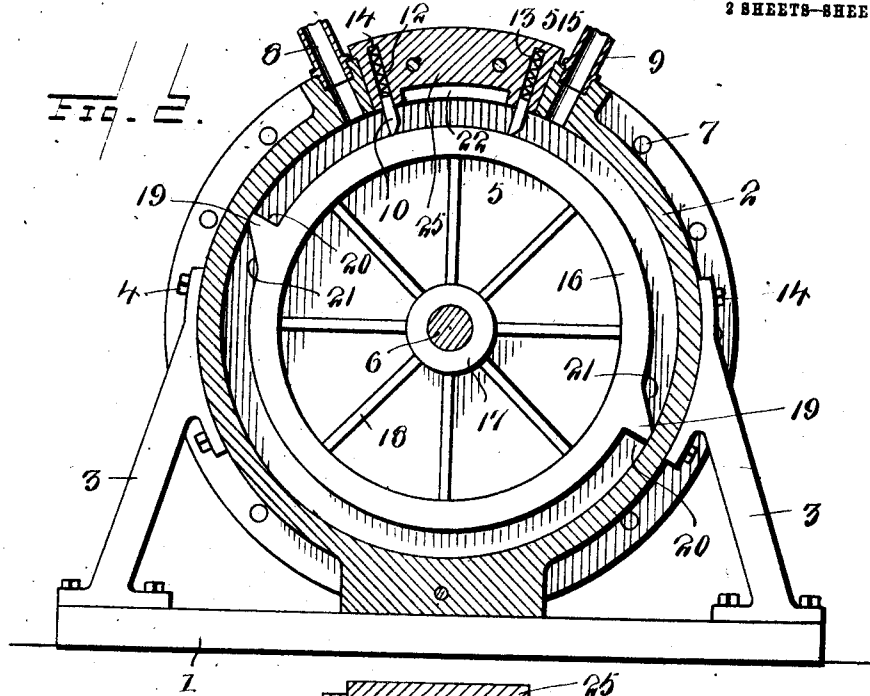
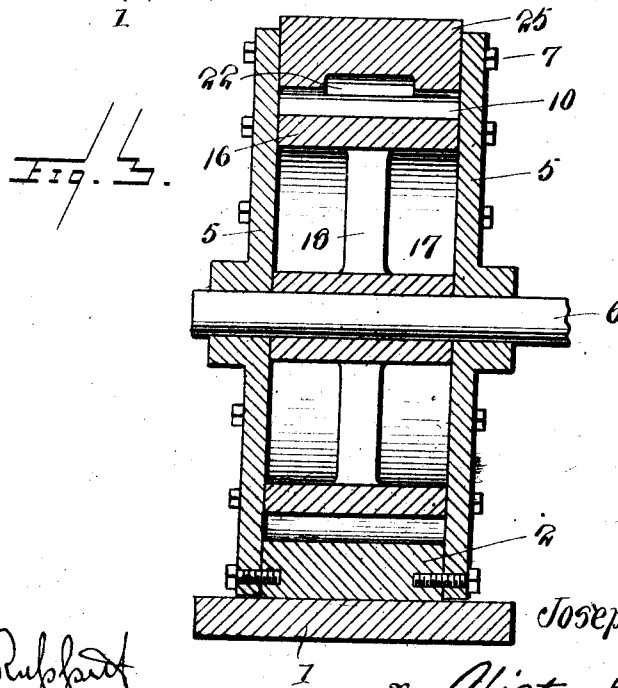
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UNITED STATES PATENT OFFICE.

JOSEPH JOHNSON, OF QUARTZSITE, ARIZONA.

ROTARY ENGINE.

1,066,413.

Specification of Letters Patent.

Patented July 1, 1913

Application filed December 17, 1912. Serial No. 737,255.

To all whom it may concern:

Be it known that I, JOSEPH JOHNSON, a citizen of the United States, residing at Quartzsite, in the county of Yuma and State of Arizona, have invented new and useful Improvements in Rotary Engines, of which the following is a specification.

This invention relates to rotary engines, the object of the invention being to provide a compact and efficient rotary engine which is operated by the expansion of steam admitted to an annular steam space between the rotor and the stationary casing, surrounding the same, the steam expanding between lugs or projections on the periphery of the rotor and displaceable cut-offs mounted in the casing and normally held yieldingly against the periphery of the rotor, the cut-offs and the inlet and exhaust ports being so arranged with relation to each other and the lugs on the rotor that back pressure on the rotor is overcome.

A further object of the invention is to provide check or relief valves in connection with the lugs on the rotor to further assist in relieving back pressure and to enable said lugs to force their way through any live steam with which they may come in contact, during the time they are passing by the cut-offs or moving in the vicinity thereof.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of parts, as will be hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the claims hereunto appended.

In the drawings: Figure 1 is a side elevation of a rotary engine, embodying the present invention. Fig. 2 is a vertical longitudinal section through the same taken at right angles to the rotor shaft. Fig. 3 is a vertical diametrical section through the engine. Fig. 4 is a detail cross section on an enlarged scale on the line 4-4 of Fig. 2. Fig. 5 is a detail cross section on the line 5-5 of Fig. 2.

The engine contemplated in this invention comprises a suitable base or bed 1, upon which the stationary cylindrical casing 2 is mounted, said casing being shown as supported by upwardly converging braces or legs 3 which are bolted, at 4, to the outer annular or cylindrical wall of the casing 2. The casing 2 is closed at its opposite sides by disk shaped heads 5, which may carry

suitable bearings for the centrally located shaft 6, on which the rotor, hereinafter described, is mounted. These side plates or heads are fastened by means of bolts 7 to the peripheral wall of the casing in such manner as to make the casing as a whole steam tight. Steam is admitted to the interior of the cylindrical casing through an inlet port 8 and passes outwardly through an exhaust port 9, the ports 8 and 9 extending through the outer peripheral wall of the casing and being shown preferably as extending radially with respect to the shaft 6, although this is not essential.

The inlet and exhaust ports 8 and 9 are arranged in spaced relation to each other or at a suitable distance apart, as shown in Fig. 2, while between said inlet and exhaust ports, there are arranged two spring-pressed cut-offs 10 and 11. These cut-offs 10 and 11 work in recesses 12 and 13 in the casing 2, and are yieldingly urged inwardly by means of expansion springs 14 and 15 arranged in the recesses behind the cut-offs 10 and 11, as illustrated, said springs causing the inner edges of the cut-offs to ride against the outer periphery of the rotor 16 which is provided with a hub 17 fast on the shaft 6, the hub and rim or body portion of the rotor being secured together in rigid relation by means of spokes 18, or the equivalent thereof. The rotor 16 is provided on its outer periphery with lugs 19, two of such lugs being shown and arranged at diametrically opposite points. Each of said lugs comprises an abrupt face 20 extending radially with respect to the shaft 6, and an inclined or beveled face 21, which is designed to act against the inner edges of the cut-offs 10 and 11, which may be also correspondingly beveled, as shown, in order to lift or move said cut-offs outwardly, and enable the lugs 19 to pass by the same. As soon as each lug passes by either cut-off, said cut-off is immediately returned into contact with the periphery of the rotor by means of the expansion spring lying behind the same. Between the two cut-offs 10 and 11, the casing is provided with a by-pass 22, shown as consisting of a groove forming an enlargement of the steam space between the two cut-offs. This allows ample space for steam that is caught between the two cut-offs and permits the lugs 19 to pass along such portion of the space between the casing and rotor, without serious back pressure, which would other-

wise result were the live steam admitted freely to said space. In order to still further guard against the absorption of power by the lugs 19 having to force their way through live steam, before reaching the inlet port 8, each of said lugs is provided with a check valve or back pressure relief valve 23, the same being held normally closed by means of a valve closing spring 24. After the lug reaches the second cut-off 11, and while the live steam passing in through the inlet port 8 is expanding against the beveled side of said lug, the check or relief valve in the lug opens to allow the steam to pass by said valve to the opposite side of the lug, but as soon as the lug has passed by the inlet port, said check valve closes, thus enabling the full force of the expanding steam to act against the lug and expand between said lug and the cut-off 11.

In order to give access to the cut-offs 10 and 11 and the backing springs therefor, a section 25 of the cylindrical casing may be made detachable, as shown in Fig. 2, said detachable section closing the outer ends of the recesses 12 and 13, and being held in place by one or more of the bolts 7 which fasten the side walls or heads of the casing to the cylindrical wall thereof.

It will be understood that the number of lugs 19 may be varied, according to the will of the manufacturer, and as may be found expedient in accordance with the use to which the engine is to be put. It will also be apparent that the distance between the inlet and exhaust ports, and also the distance between the primary and secondary cut-offs may also be varied, in accordance with what is found to be the best in practice.

It will be understood that the primary cut-off 10 serves as a back stop for the exhaust steam at one side of the casing, while the cut-off 11 serves as a stop for the live steam as it expands between said stop and the lug 19 at the opposite side of the inlet port 8.

What is claimed is:

1. In a rotary engine, a cylindrical casing provided with inlet and exhaust ports in the peripheral wall thereof and spaced apart, a cylindrical rotor concentric with the casing, lugs projecting from the periphery of the rotor and working in contact with the casing, check valves in said lugs, and sliding cut-offs mounted in the casing and normally bearing against the periphery of the rotor, said cut-offs being spaced apart

and located between the inlet and exhaust ports.

2. In a rotary engine, a cylindrical casing provided with inlet and exhaust ports in the peripheral wall thereof and spaced apart, a cylindrical rotor concentric with the casing, lugs projecting from the periphery of the rotor and working in contact with the casing, back pressure relief valves, and sliding cut-offs mounted in the casing and normally bearing against the periphery of the rotor, said cut-offs being spaced apart and located between the inlet and exhaust ports.

3. In a rotary engine, a cylindrical casing provided with inlet and exhaust ports in the peripheral wall thereof and spaced apart, a cylindrical rotor concentric with the casing, lugs projecting from the periphery of the rotor and working in contact with the casing and formed with beveled faces for displacing the cut-offs, and sliding cut-offs mounted in the casing and normally bearing against the periphery of the rotor, said cut-offs being spaced apart and located between the inlet and exhaust ports.

4. In a rotary engine, a cylindrical casing provided with inlet and exhaust ports in the peripheral wall thereof and spaced apart, a cylindrical rotor concentric with the casing, lugs projecting from the periphery of the rotor and working in contact with the casing, and spring pressed sliding cut-offs mounted in the casing and normally bearing against the periphery of the rotor, said cut-offs being spaced apart and located between the inlet and exhaust ports.

5. In a rotary engine, a cylindrical casing provided with inlet and exhaust ports in the peripheral wall thereof and spaced apart, a cylindrical rotor concentric with the casing, lugs projecting from the periphery of the rotor and working in contact with the casing, and sliding cut-offs mounted in the casing and normally bearing against the periphery of the rotor, said cut-offs being spaced apart and located between the inlet and exhaust ports, the casing being provided with a by-pass extending longitudinally thereof between the cut-offs.

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

JOSEPH JOHNSON.

Witnesses:

WM. B. HILL,
H. STINEMAN.