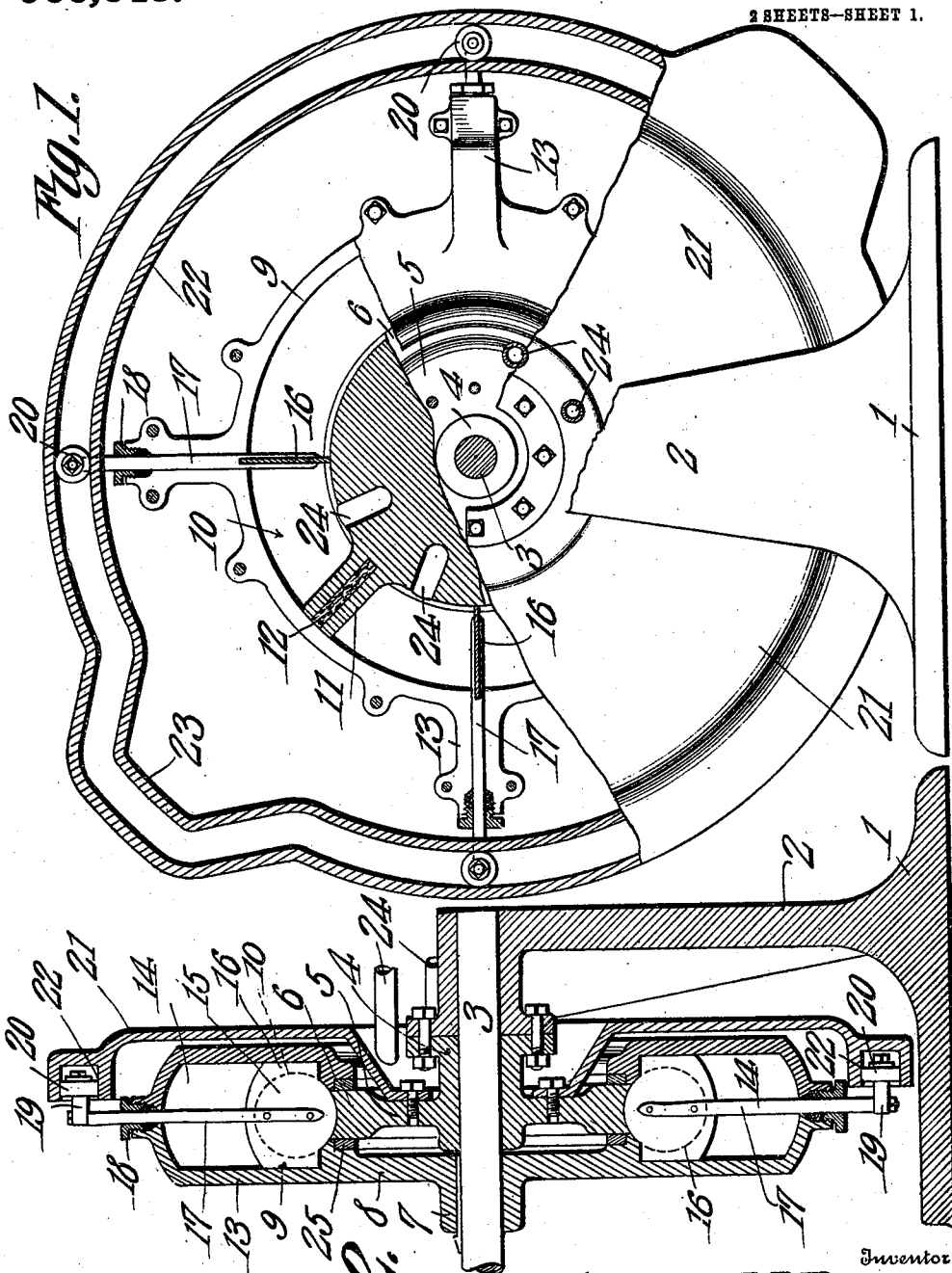


G. W. BROWN.
 ROTARY ENGINE.
 APPLICATION FILED JULY 28, 1909.

966,648.

Patented Aug. 9, 1910.

2 SHEETS—SHEET 1.



Witnesses

E. H. Hunt
H. P. Chapman

Fig. 2.

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 George W. Brown.

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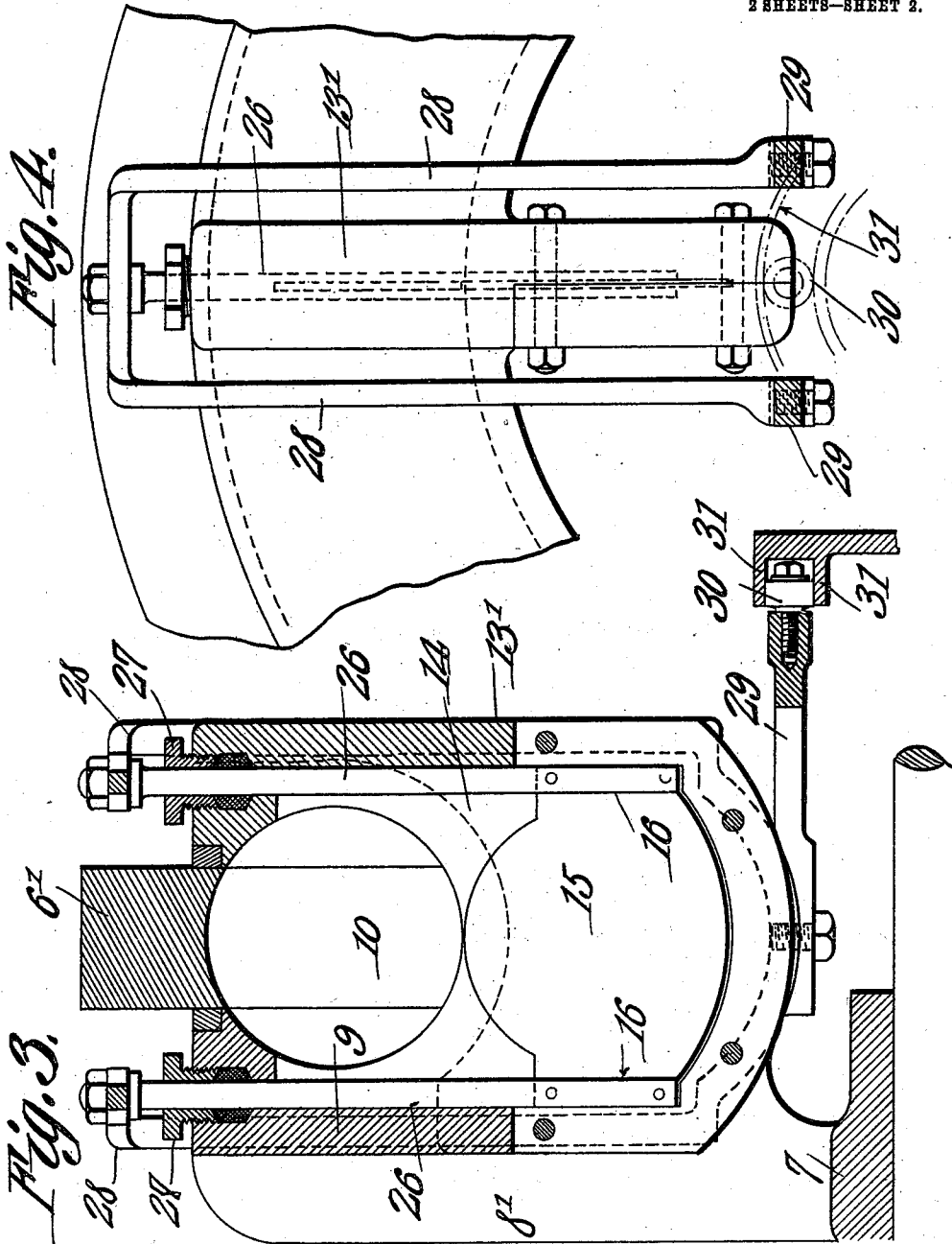


Fig. 3.

Fig. 4.

Witnesses

E. J. Brown
J. J. Chapman

George W. Brown.
 INVENTOR.

C. A. Snow & Co.
 Attorneys

UNITED STATES PATENT OFFICE.

GEORGE WALTER BROWN, OF LEDGEDALE, PENNSYLVANIA.

ROTARY ENGINE.

966,648.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed July 28, 1909. Serial No. 510,025.

To all whom it may concern:

Be it known that I, GEORGE W. BROWN, a citizen of the United States, residing at Ledgedale, in the county of Wayne and State of Pennsylvania, have invented a new and useful Rotary Engine, of which the following is a specification.

This invention has reference to improvements in rotary engines and is designed as an improvement upon the rotary engine shown in Letters Patent No. 895,841, granted August 11, 1908 to me.

The present invention relates more particularly to the relation of the rotor carrying the steam course and the stator carrying abutments constantly traversing the steam course which latter is made to embrace the stator in such manner that the major portion of the steam course is in the rotor.

The present invention includes a rotary engine wherein the stator is interior to the rotor thus greatly reducing the extent of frictional surfaces due to the packing introduced at the point where the stator enters the steam course of the rotor.

The invention also includes means for the actuation of the vanes or pistons carried by the rotor so that the said vanes or pistons are moved into and out of the steam course as they recede from or approach the abutment.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings,

Figure 1 is a side elevation partly in section of a rotary engine constructed in accordance with the present invention. Fig. 2 is a vertical axial section of the structure shown in Fig. 1, with parts in elevation. Fig. 3 is a detail section transverse to the steam course and on a larger scale than shown in the other views of a means for supporting and actuating a movable vane or piston. Fig. 4 is an elevation of the structure shown in Fig. 3 viewed at right angles to the showing of Fig. 3.

Referring to the drawings, there is shown a base 1 upon which are erected pedestals 2, one only being shown in the drawings and the other being omitted, and in the upper end of these pedestals is journaled a shaft 3 constituting the power shaft of the engine. Fixed to one of the pedestals 2 is the hub 4 of the stator, the hub being formed with a

web 5 radial to said hub and terminating in an annular flange 6 with parallel sides and its periphery conforming to the curvature of the steam course, which as will hereinafter appear is circular in cross section. Keyed to the shaft 3 at one side of the hub 4 is another hub 7 carrying a radial web 8, or this web may be in the form of a spider and at the periphery the spider or web 8 carries an annular hollow flange 9 which may be made of two parts bolted together for convenience of construction. The flange 9 has a circumferential passage 10 inclosed between the two halves of the flange and circular in cross section and constituting the steam course of the rotor.

At an appropriate point there project radially from the rim 6 abutments 11 filling the steam course at this point, the abutments being circular in outline to conform to the shape of the steam course. Suitable packing 12 is introduced into each abutment to render the connection between the abutment and the steam course steam-tight.

The rotor carries at equi-distant points radially projecting valve casings 13, these casings being approximately as wide in the direction of the axis of rotation as is the inclosing walls of the steam course, while the thickness of these valve casings 13 in the direction of rotation is much less than the width axially. The interior of the valve casing is hollow forming a chamber 14 comparatively thin in the direction of rotation and wide axially. The chambers 14 are somewhat wider than the steam course and within each of these chambers there slides a vane or piston 15 conforming generally in shape to the cross sectional shape of the steam course and also provided with side wings 16 traveling in the marginal portions of the chamber 14, these wings 16 serving to resist the thrust of the steam upon the vanes or pistons. Each vane is carried by a rod 17 in the structure shown in Figs. 1 and 2 and this rod extends through a stuffing box at the outer end of the chamber 14 and at the extremity carries a laterally projecting stud 19 on which is mounted a roller 20.

Fast on the web 5 of the stator is a circular flange or spider 21 having at its periphery two parallel tracks 22 between which each roller travels. These tracks at appropriate points are diverted radially from concentric relation to the axis of rotation of the rotor as indicated at 23, the divergence be-

ing substantially radial and so shaped as to cause the withdrawal of the vane or piston 15 on the approach toward an abutment, and the reinsertion of the vane or piston 5 into the steam course as soon as an abutment has been passed. On each side of an abutment 11 are ports 24 one constituting an exhaust port and the other an inlet port and each port will be an inlet or exhaust port in 10 accordance with the direction of rotation of the rotor, the engine being thereby easily reversible.

It will be observed that where the head 6 of the stator enters the flange 9 of the rotor, 15 which flange overhangs the rotor at this point, the hub 7 being displaced with relation to the hub 4, there are introduced packing rings 25. By making the rotor exterior to the stator it will be observed that 20 the diameter of the packing rings 25 is very materially reduced over the structure shown in the aforesaid patent where the stator is exterior to the rotor, and consequently the friction generated at this point is correspondingly reduced without in any manner 25 affecting the efficiency of the engine otherwise. The engine is therefore improved in efficiency in proportion to the reduction of friction. Furthermore, the heavier portions 30 of the engine are brought closer to the axis of rotation.

In the structure shown in Figs. 3 and 4 the steam course 10 is the same as before and the stator represented at 6' is exterior to 35 the steam course instead of interior thereto as shown in Figs. 1 and 2. The flange 9 inclosing the steam course is mounted upon spokes 8' radiating from a hub 7 displaced axially from the circumferential plane of the stator 6'. In this case the vane casings 13' 40 inclose a chamber 14 as in the structure shown in Figs. 1 and 2 except that the vane casings 13' project radially toward the axis of rotation instead of away therefrom.

In the construction shown in Figs. 3 and 45 the vanes 15 instead of being carried by a single rod as in the structures shown in Figs. 1 and 2 are each carried by two parallel rods 26 each being connected to 50 respective wings 16 of the vanes 15 and passing radially outward through the vane casing 13' on each side of the steam course 10 out of line therewith and through stuffing boxes 27. At the outer end each rod 26 is 55 made fast to the center of the joining member of a yoke 28 returning along the vane casing 13' exterior thereto toward the axis of rotation. At the inner ends the legs of the yoke 28 are connected to the legs of a 60 yoke-shaped arm 29 extending parallel with the axis of rotation and the connecting mem-

ber of this arm carries a roller 30 engaging between parallel tracks 31 fast on the frame of the engine and in general contour agreeing with the tracks 22 although very much 65 less in diameter. The tracks 31 are so shaped as to cause the vanes 15 in the structure shown in Figs. 3 and 4 to move out of the steam course when approaching 70 an abutment 11 and to move into the steam course when beyond such an abutment.

By providing each vane 15 with two rods 26 spaced apart wider than the steam course the vane is moved into and out of the steam 75 course with little effort and without strain on the parts, and consequently the actuation of the vane may be positive from the tracks 31 without the interposition of levers or other intricate parts. The same is true of 80 the structure shown, Figs. 1 and 2, where the single rod 17 is directly engaged by the tracks without the necessity of interposed parts while the wings 16 serve to guide the vane 15 without strain on the parts.

What is claimed is:— 85

1. A rotary engine having as a rotor an annular tube forming a circular steam course of circular cross section and provided with radial extensions inclosing interior 90 chambers wider in the direction of the axis of rotation than in the direction of rotation, radially removable vanes or pistons carried by the rotor and movable into and out of the chambers in the radial extensions of the 95 rotor, a ring shaped stator extending radially beyond the rotor and entering the latter through the steam course and there conforming to the circular cross section of the steam course, said stator also carrying 100 abutments within the steam course, and means for actuating the vanes in timed relation to their passage by the abutments.

2. In a rotary engine, a radially movable vane or piston adapted to be moved into 105 and out of the steam course, a radially disposed chest housing said vane or piston, rods carrying said vane or piston and disposed on opposite sides of the steam course and of the stator of the engine, a track for causing the actuation of the vane or piston, an 110 arm traveling in said track and straddling the chest containing the vane and connections between the arm and the rods carrying the vane, said connections straddling the chest containing the vane. 115

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE WALTER BROWN.

Witnesses:

L. S. PARTRIDGE,
ROBT. A. SMITH.