No. 824,648. PATENTED JUNE 26, 1906.

R. W. HAMANN.

ROTARY ENGINE.

APPLICATION FILED MAR. 19, 1906.

2 SHEETS—SHEET 1.

FIG. 2.

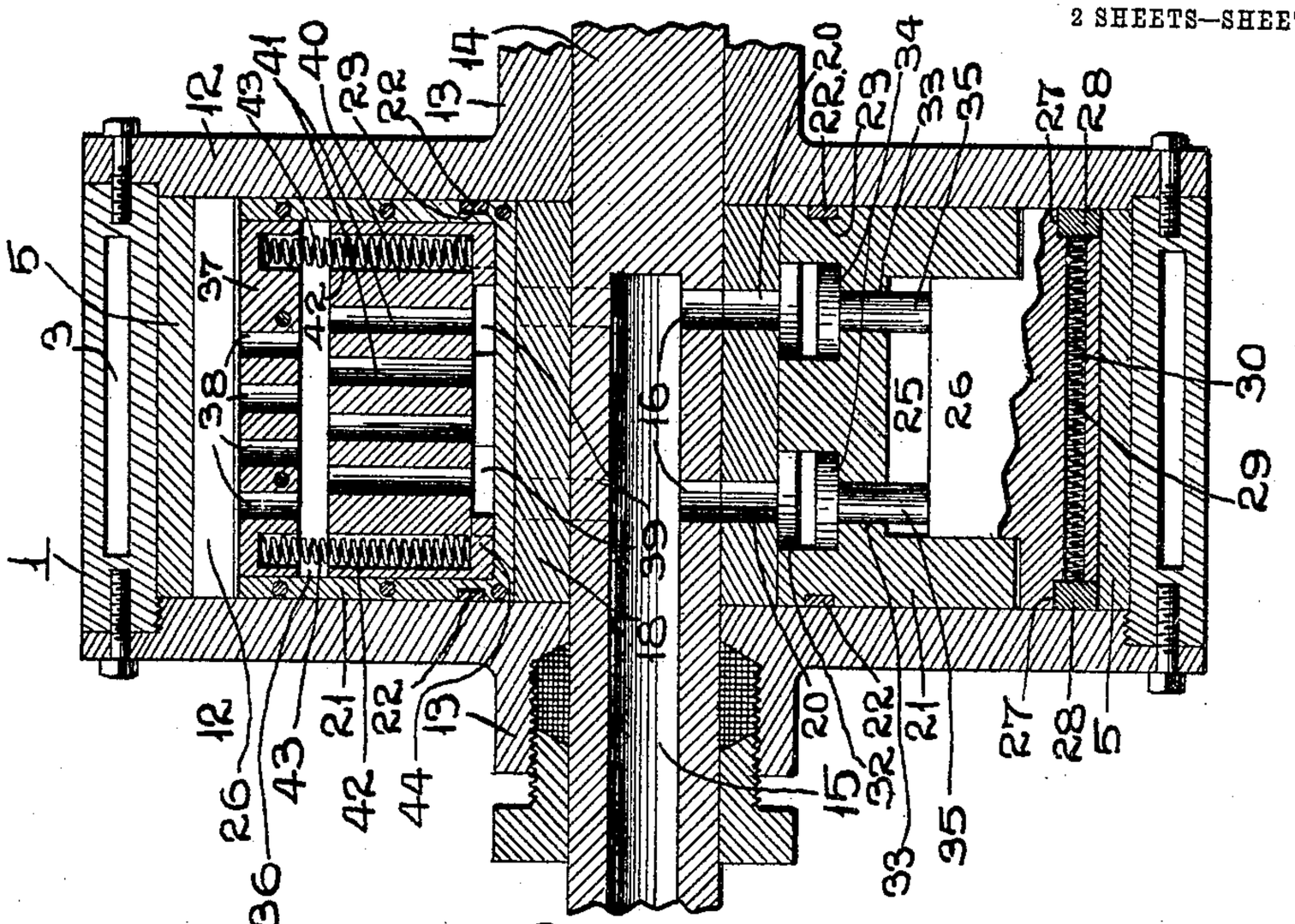
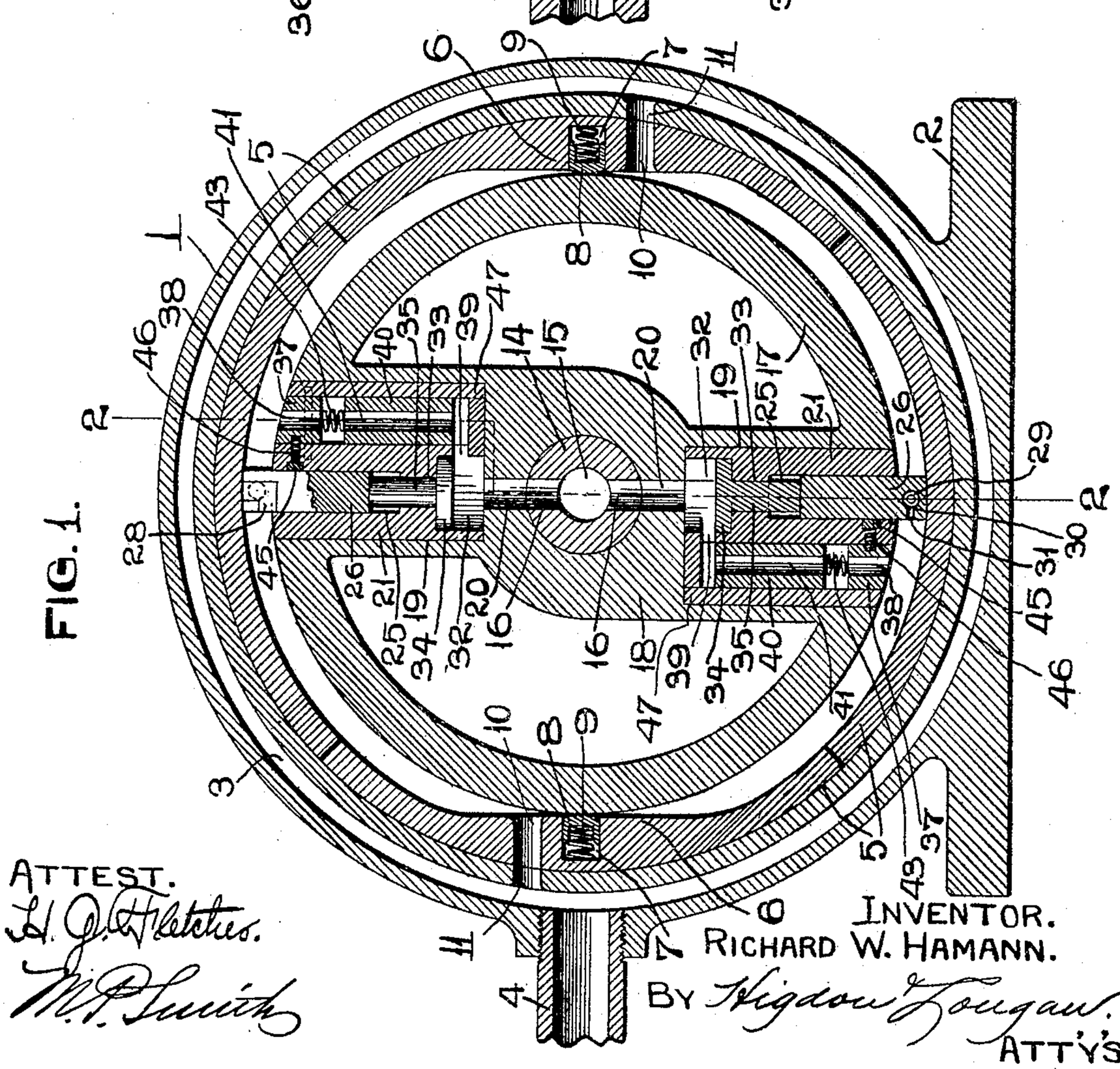


FIG. 1.



ATTEST.

H. J. Hitchcock.

W. P. Smith

INVENTOR.

RICHARD W. HAMANN.

BY Higdon & Longan.

ATTY'S.

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2 SHEETS—SHEET 2.

FIG. 4.

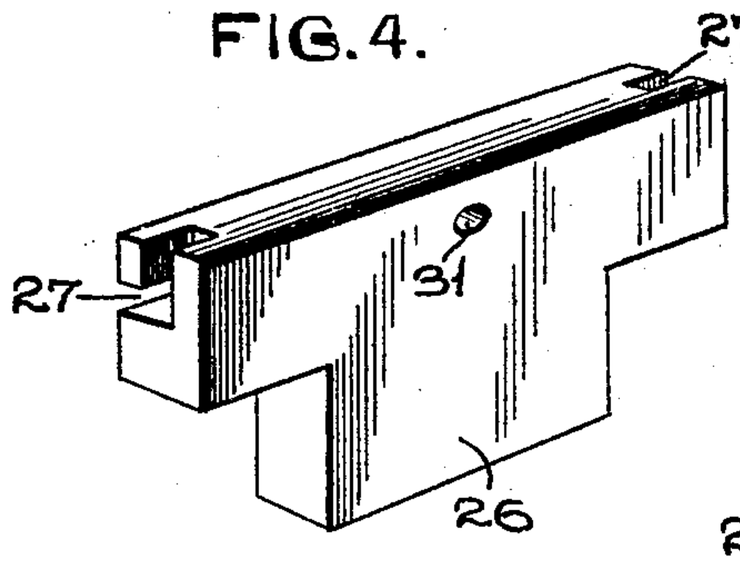


FIG. 3.

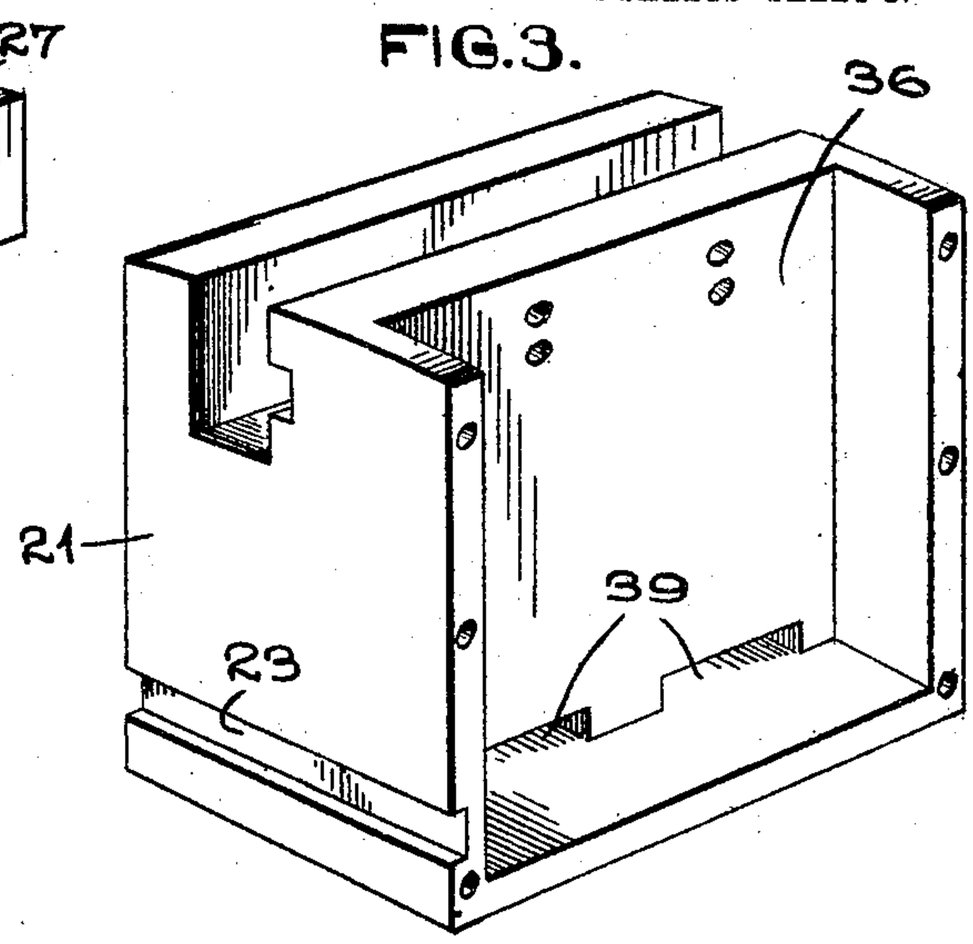


FIG. 5.

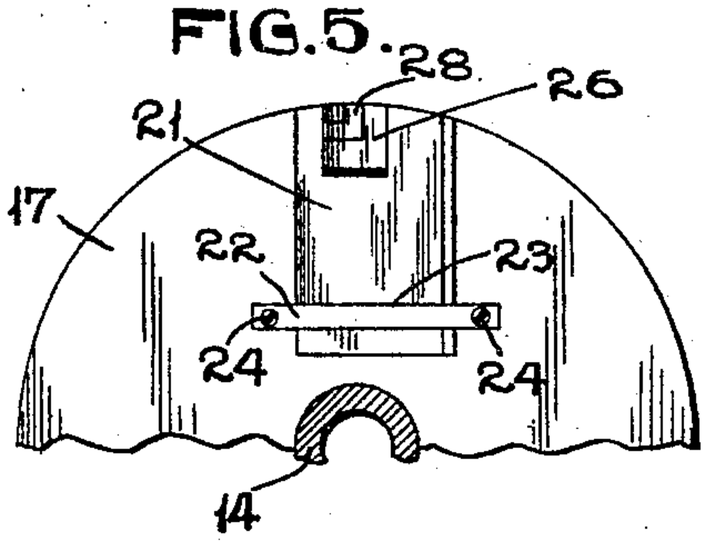


FIG. 6.

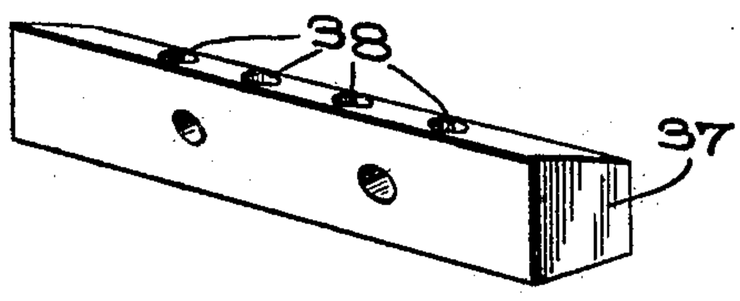
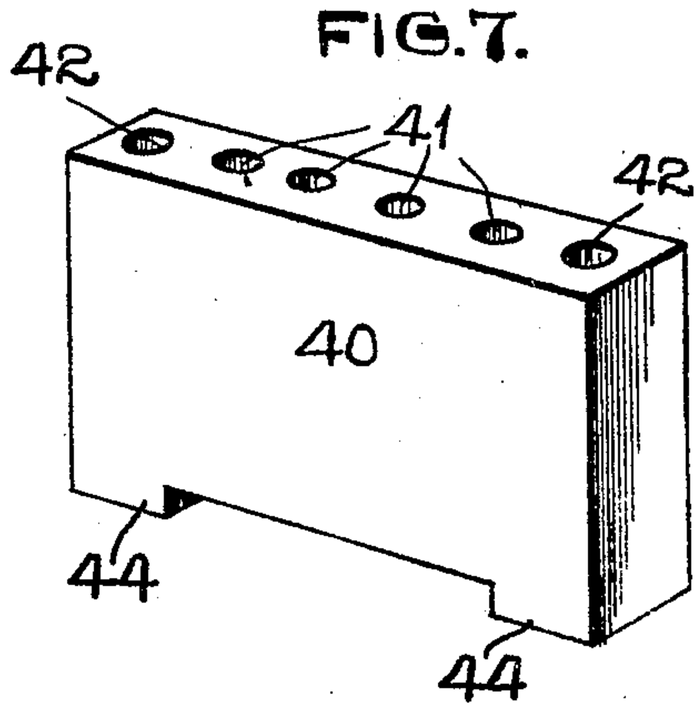


FIG. 7.



ATTEST.

H. J. Fletcher

W. P. Smith

INVENTOR.

RICHARD W. HAMANN.

BY Higdon & Coulson.

ATTY'S.

UNITED STATES PATENT OFFICE.

RICHARD W. HAMANN, OF ST. LOUIS, MISSOURI, ASSIGNOR TO EUGENE J. FEINER, OF ST. LOUIS, MISSOURI.

ROTARY ENGINE.

No. 824,648. Specification of Letters Patent. Patented June 26, 1906.

Application filed March 19, 1906. Serial No. 306,869.

To all whom it may concern:

Be it known that I, RICHARD W. HAMANN, a citizen of the United States, and a resident of St. Louis, Missouri, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to a rotary engine; and the object of my invention is to construct a simple inexpensive rotary engine which will develop a maximum amount of power with a minimum consumption of steam and which will run very evenly with little wear and which engine is provided with automatic governors for regulating the passage of steam through the engine-valves.

My invention consists in a steam-jacketed casing, a rotary piston operating in said casing, valve-housings detachably arranged in the piston, valves arranged for operation in the valve-housings, and automatically-operating governor-valve plates arranged for operation in said valve-housings.

My invention further consists in certain novel features of construction and arrangement of parts, which will be hereinafter more fully set forth, pointed out in the claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section taken longitudinally through the center of a rotary engine of my improved construction. Fig. 2 is a vertical section taken on the line 2 2 of Fig. 1. Fig. 3 is a perspective view of one of the insertible valve-housings made use of in my improved engine. Fig. 4 is a perspective view of a sliding plate that is carried by each valve-housing and which bears directly against the inner periphery of the engine-casing. Fig. 5 is a side elevation of a portion of the rotary piston and showing the means employed for retaining the valve-housings in said piston. Fig. 6 is a perspective view of a perforated plate carried by the valve-housing and through which the steam discharges to the interior of the engine-casing. Fig. 7 is a perspective view of one of the governor-plates made use of in my improved engine.

Referring by numerals to the accompanying drawings, 1 designates the circular casing of the engine, which is provided with a suitable base 2 and with an annular chamber 3, from which leads an exhaust-pipe 4. Removably positioned on the inner face of the casing is a series of segmental hardened metal wear-plates 5, and a pair of these plates, which are oppositely arranged, are provided with abutments 6. Formed in each abutment 6 is a transversely-arranged groove 7, in which is positioned a bearing-plate 8 and behind which is an expansive coil-spring 9. Formed through each abutment 6 adjacent the bearing-plate 8 therein are the exhaust-ports 10, which coincide with similarly-sized ports 11, formed through the inner wall of the casing 1, and which ports lead to the annular chamber 3.

The casing 1 is provided with detachable side plates 12 in the centers of which are formed alined bearings 13, in which is mounted for rotation the engine-shaft 14. Formed in this shaft 14 is a longitudinal bore 15, and leading outwardly therefrom at a point inside the engine-casing are the pairs of oppositely-arranged apertures 16. Rigidly fixed upon the shaft 14 within the casing is a circular piston 17 of such a diameter as that its periphery rides directly against the highest points of the abutments 6 and against the plates 8 therein. The rotary piston 17 is constructed with an integral diametrically-arranged web 18, in the ends of which are formed the rectangular recesses 19, and leading from the apertures 16 through the inner portions of the web 18 into said recesses 19 are the apertures 20. Seated in each recess 19 is a rectangular valve-housing 21, and each housing is held in position by a transversely-arranged plate 22, seated in a corresponding recess 23, formed in each end of the housing, and being attached by screws 24 to the sides of the rotary piston 17. Formed in the outer portion of each valve-housing 21 is a rectangular slot 25, in which is arranged to slide a plate 26, and the outer end of each plate rides directly against the inner surfaces of the wear-plates 5. Formed in the ends of each plate 26 are the L-shaped recesses 27, which are occupied by correspondingly-shaped metallic blocks 28, which are forced outwardly by an expansive coil-spring 29, which is arranged in a horizontal bore 30, extending between the recesses 27. A small steam-inlet port 31 is formed through the outer portion of each plate 26 and leads to the bore 30.

Formed in the under side of each housing 21 is a pair of circular recesses 32, with which the apertures 20 communicate, and leading from each pair of recesses 32 into the slots 25 are the small circular apertures 33. Arranged to slide through the recesses 32 are circular plates 34, with which are formed integral small circular valve-plugs 35, which pass through the apertures 33 and bear against the under sides of the sliding plates 26. Formed in one side of each valve-housing 21 is a rectangular recess 36, the upper end of which is closed by a plate 37, through which is formed a plurality of vertically-arranged apertures 38. Leading from each recess 32 to the lower ends of the recesses 36 are steam-inlet ports 39. Arranged to slide vertically in each recess 36 is a governor-valve plate 40, through which is formed a series of vertically-arranged apertures 41, which are so located as to be offset from the apertures 38 in the plates 37. Formed in the ends of each governor-plate 40 are recesses 42, in which are seated expansive coil-springs 43, and the upper ends of these coil-springs are seated in corresponding recesses formed in the under sides of the plates 37. Formed integral with the under side of each governor-plate 40 and at the ends thereof are lugs 44, which normally rest against the bottoms of the recesses 36.

Transversely-arranged metallic packing-plates 45 are arranged in corresponding grooves formed in the outer portions of the housings 21 on one side of the slots 25 therein, and said packing-plates bear against the rear sides of the sliding plates 26, being forced forwardly by expansive coil-springs 46, positioned in suitable recesses to the rear of said bearing-plates.

47 designates a plate which is secured to the lower ends and sides of the housings 21 and to the plates 37, thus closing the recesses 36 in which the governor-valves 40 operate.

The operation of my improved rotary engine is as follows: Steam enters the longitudinal bore 15 and passes from thence through the apertures 16 and 20 into the recesses 32. The steam-pressure upon the plates 34 forces the valve-plugs 35 outwardly, and thus moves the sliding plates 26 outwardly and causes their outer ends to bear against the inner surfaces of the wear-plates 5. When thus positioned, the plates 34 occupy positions in the recesses 32 above the ports 39, and when so positioned the steam passes through said open ports into the recesses 36 below the governor-valves 40. From thence the steam passes through the apertures 41, and from thence through the apertures 38 in the plates 37 and discharges from said apertures into the annular space between the periphery of the rotary piston and the inner surfaces of the wear-plates 5. The steam will expand in this chamber, and as it cannot pass the spring-pressed plates 8 the expansive pressure will bear against the projecting portions of the plates 26, and as a result the circular piston 17 will be rotated. When the sliding plates 26 pass the bearing-plates 8, the steam in the chambers in front of said plates having spent its force is free to exhaust through the ports 10 and 11 into the annular chamber 3 and from thence outwardly through the exhaust-pipe 4. The outer ends of the plates 26 bear directly against the inner faces of the wear-plates 5, and when said plates 26 pass the abutments 6 said plates will necessarily move inwardly a short distance and in so doing the valve-plugs 35 and circular plates 34 carried thereby will likewise be moved inwardly, and this action causes said plates 34 to travel to the inner ends of the recesses 32, thus cutting off the flow of steam from said recesses 32 through the ports 39. Thus the pressure of the steam on the sliding plates 26 is cut off at the time said plates are passing the abutments. As the circular piston rotates the centrifugal action causes the governor-plates 40 to move outwardly in the recesses 36 against the resistance offered by the coil-springs 43, and should the engine rotate too rapidly or beyond a certain speed these governor-plates 40 will be moved outwardly until their outer faces bear against the under faces of the plates 37, thus gradually reducing and finally cutting off the supply of steam through said governor-plates and through the apertures 38 of the plate 37, this action being possible for the reason that the apertures 41 and 38 are offset from one another. Thus the speed of the engine is automatically governed and the supply of steam into the annular chamber is properly regulated. The steam-pressure on the plates 34 forces the plates 26 outwardly to bear against the inner surfaces of the wear-plates 5, and said plates and the valve-plugs move together easily without undue friction and without pounding.

A rotary engine of my improved construction can be very easily assembled or taken apart to be cleaned or repaired, comprises a minimum number of parts, operates very smoothly and with little noise, and is very economical in the consumption of steam.

I claim—

1. In a rotary engine, a casing, a rotary piston arranged for operation therein, valve-housings detachably arranged in the piston, and a plurality of sliding valves arranged in each of said valve-housings; substantially as specified.

2. In a rotary engine, a casing, a rotary piston arranged for operation therein, valve-housings detachably arranged in the piston, sliding valves arranged in said valve-housings, and governor-valves independent of the sliding valves arranged in the valve-housings; substantially as specified.

3. In a rotary engine, a casing, a rotary

piston arranged for operation therein, there being steam-inlet ports through the piston, governor-valves arranged to slide in the piston for controlling the passage of steam through the inlet-ports, and sliding valve-plugs operating independently of the governor-valves to cut off the supply of steam to said governor-valves; substantially as specified.

4. In a rotary engine, a casing, a rotary piston arranged for operation therein, there being steam-inlet ports through the rotary piston, governor-valves arranged to slide in the piston to control the passage of steam through the inlet-ports, valve-plugs arranged to slide in the piston and to close the ports leading to the governor-valves, and means whereby the valve-plugs are moved inwardly against the steam-pressure; substantially as specified.

5. In a rotary engine, a casing, a rotary piston arranged for operation therein, there being steam-inlet ports through the piston, valve-plugs arranged to slide in the piston and cut off the passage through the inlet-ports, means whereby said valve-plugs are moved inwardly against the steam-pressure; and spring-pressed governor-valves arranged to slide in the rotary piston, and constructed to control the passage of steam after the same has passed the valve-plugs; substantially as specified.

6. In a rotary engine, a casing, a rotary piston arranged for operation therein, an integral web diametrically arranged in the piston, there being recesses formed in the ends of the web, valve-housings removably seated in said recesses, and steam-inlet-controlling valves arranged to slide in said valve-housings; substantially as specified.

7. In a rotary engine, a casing, a rotary piston arranged for operation therein, an integral web diametrically arranged in the piston, there being recesses formed in the ends of the web, valve-housings removably seated in said recesses, governor-valves sliding in the valve-housings, and valve-plugs arranged to slide in the valve-housings and to cut off the supply of steam to the governor-valves; substantially as specified.

8. In a rotary engine, a casing, a rotary piston arranged for operation therein, there being steam-inlet ports through the rotary piston, governor-valves arranged to slide in the rotary piston to control the passage of steam through the inlet-ports, springs for normally maintaining the governor-valves in open positions, valve-plugs arranged to slide in the piston and close the inlet-ports to the governor-valves, and sliding plates carried by the piston for moving the valve-plugs inwardly against the steam-pressure; substantially as specified.

In testimony whereof I have signed my name to this specification in presence of two subscribing witnesses.

RICHARD W. HAMANN.

Witnesses:
M. P. SMITH,
H. G. FLETCHER.