No. 824,647. PATENTED JUNE 26, 1906.

R. W. HAMANN.

ROTARY ENGINE.

APPLICATION FILED AUG. 21, 1905. RENEWED MAY 14, 1906.

2 SHEETS—SHEET 1.

Fig. 2.

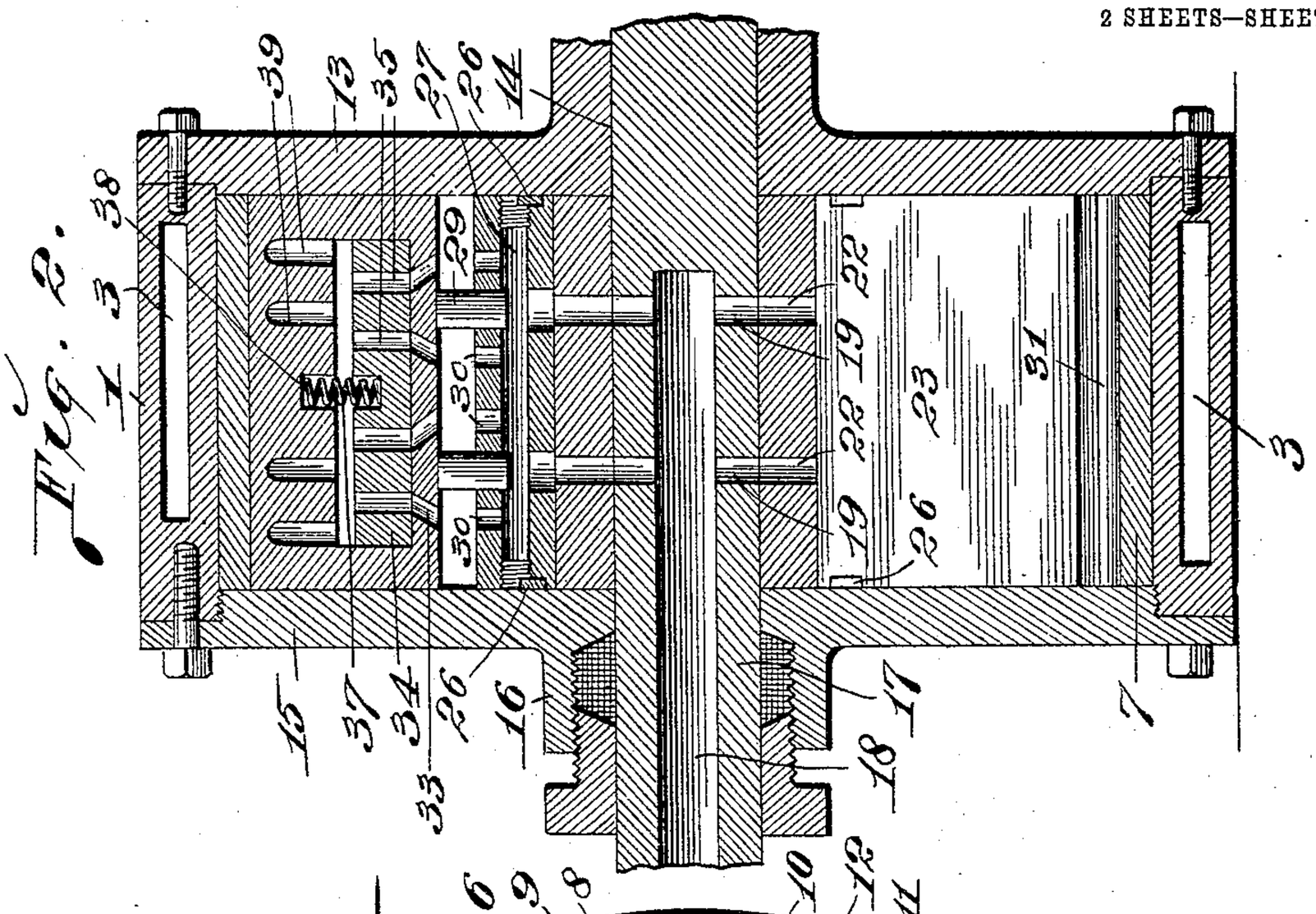


Fig. 1.

Attest:
M. P. Smith,
E. L. Wallace.

Inventor;
R. W. Hamann.
By Higdon & Longan
Attys.

No. 824,647. PATENTED JUNE 26, 1906.

R. W. HAMANN.

ROTARY ENGINE.

APPLICATION FILED AUG. 21, 1905. RENEWED MAY 14, 1906.

2 SHEETS—SHEET 2.

Fig. 3.

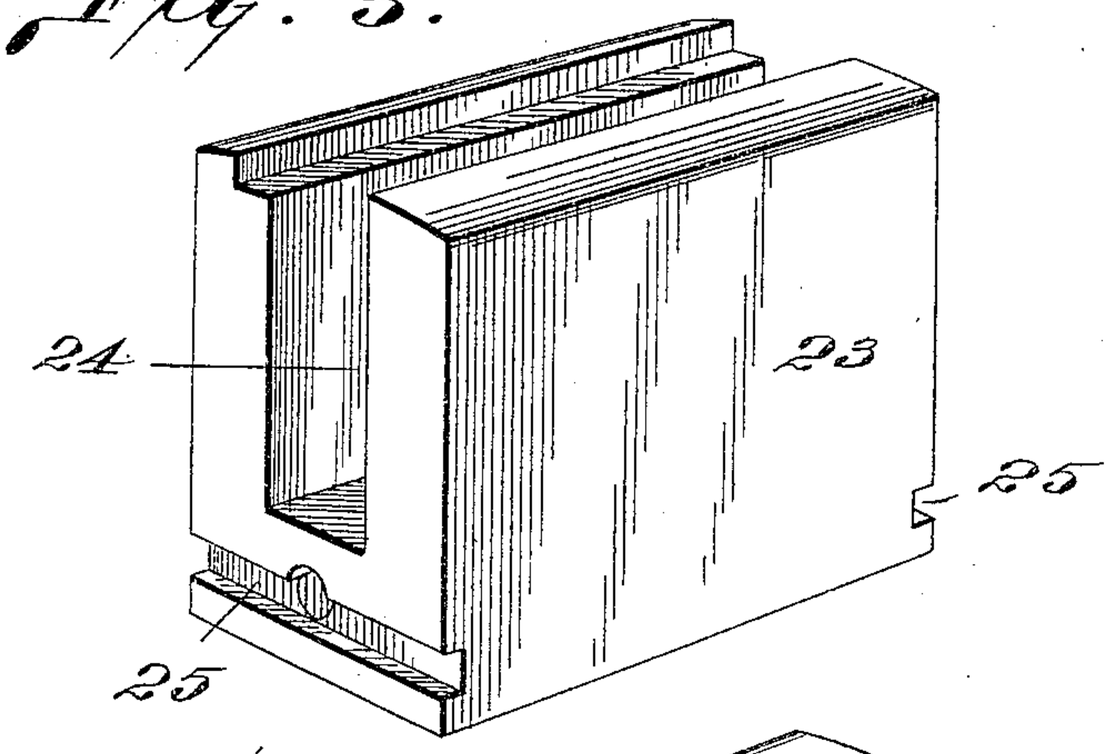


Fig. 4.

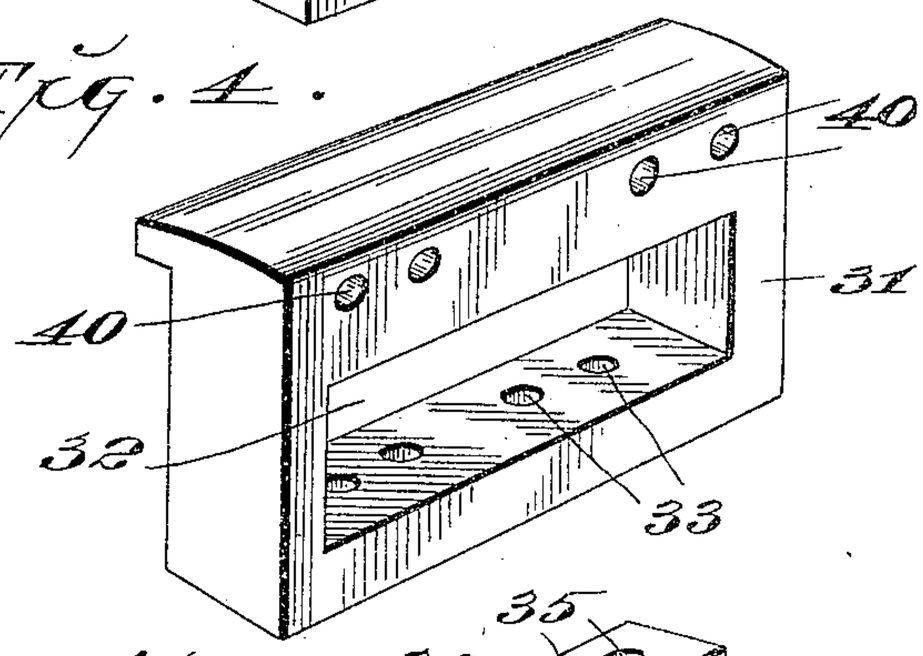


Fig. 5.

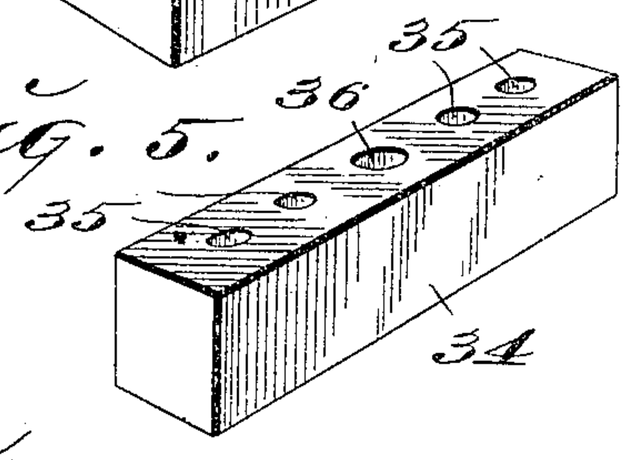
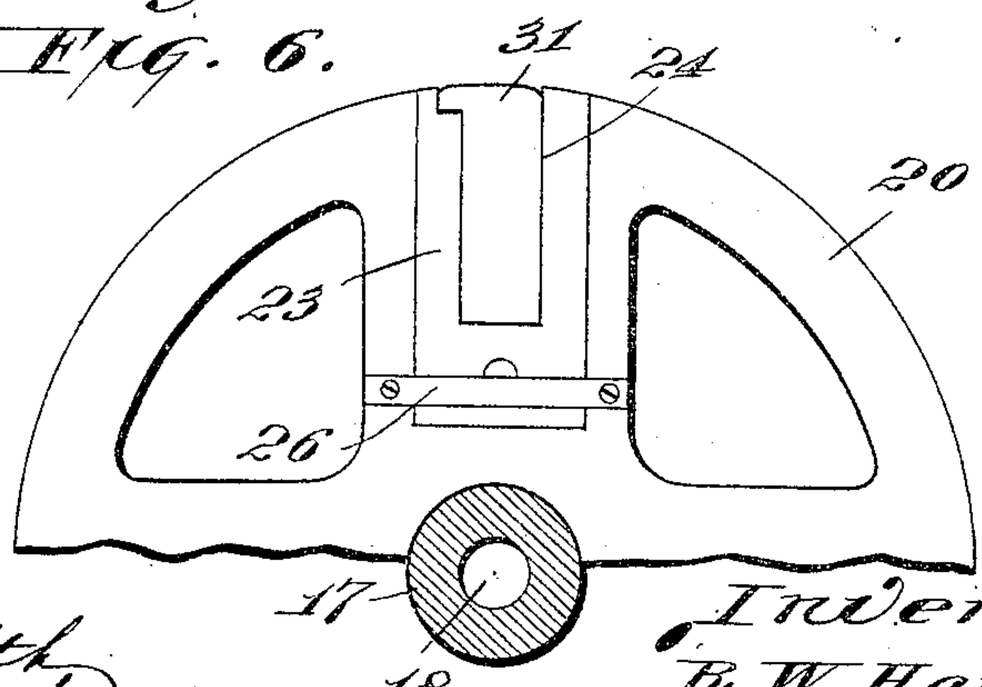


Fig. 6.



Attest
M. L. Smith,
E. L. Wallace.

Inventor.
R. W. Hamann.
By Higdon & Kougan.
Attys.

UNITED STATES PATENT OFFICE.

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

ROTARY ENGINE.

No. 824,647. Specification of Letters Patent. Patented June 26, 1906.

Application filed August 21, 1905. Renewed May 14, 1906. Serial No. 316,635.

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 that will develop a maximum amount of power with a minimum consumption of steam and which will run very evenly with little wear, and the valves of the engine being provided with automatic governors for regulating the passage of steam through said valves.

My invention consists in a steam-jacketed casing, a series of segmental wear-plates inserted in the casing, a rotary piston within the casing, and valves carried in the piston.

My invention further consists in certain new and novel features of construction and arrangement of parts, which will be hereinafter more fully set forth, pointed out in my 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 blocks made use of in the rotary piston in which one of the valves operates. Fig. 4 is a perspective view of one of the valves. Fig. 5 is a perspective view of one of the governor-valves that is carried by the valve seen in Fig. 4. Fig. 6 is an elevation of part of the rotary piston and showing the manner in which the insertible blocks are held in the rotary piston.

Referring by numerals to the accompanying drawings, 1 indicates the circular casing of my improved engine, which is provided with a suitable base 2 and with an annular chamber 3, from which leads an exhaust-pipe 4. Detachably positioned on the inner face of this casing and oppositely arranged is a pair of segmental wear-plates 5, which are provided on their inner faces with the flat surfaces 6, which arrangement necessarily makes the plates thicker at their centers than at their ends, and thus a pair of oppositely-arranged abutments is formed on the interior of the engine-casing. Between the ends of the plates 5 and against the inner face of the casing are segmental wear-plates 7, the same being equal in thickness to the ends of the plates 5.

Formed in each plate 5 in the center of the abutments therein is a transversely-arranged groove 8, in which is positioned a bearing-plate 9, and positioned behind each plate is an expansive coil-spring 10, the tendency of which is to force the plate outwardly. Formed through each plate 5 adjacent the bearing-plates therein and on opposite sides thereof are the exhaust-ports 11, which coincide with similarly-sized apertures 12, formed through the inner wall of the casing 1, and which discharge-ports lead into the annular chamber 3, that is formed in the casing 1. These ports allow the exhaust-steam to discharge from the interior of the engine into the annular chamber 3, thereby making the engine steam-jacketed and so heating the casing as to cause it to expand equally at all points, which will result in a perfect operation of the rotary piston and parts carried thereby within the casing.

The casing 1 is provided with a detachable side plate 13, in the center of which is formed a bearing 14. The opposite side of the casing is closed by a removable plate 15, in the center of which is formed a bearing 16, and rotatably arranged in the bearings 14 and 16 is a horizontally-arranged engine-shaft 17. Formed in the shaft 17 is a longitudinal bore 18, and leading outwardly therefrom at a point inside the engine-casing are the oppositely-arranged apertures 19. Rigidly fixed upon the shaft 17 within the casing is a circular piston 20, which is of such a diameter as that its periphery rides directly against the highest points of the abutments in the plates 5 and against the bearing-plates 9 positioned therein. This rotary piston is constructed with a pair of oppositely-arranged rectangular recesses 21 and leading from the passages 19 into these recesses are the apertures 22. Detachably seated in each recess 21 is a rectangular block 23 of hardened metal, and formed in the outer portion of said block is the transversely-arranged rectangular recess 24. Formed in the inner end of each

block 23 is a transverse groove 25, and occupying each of said grooves is a plate 26, the ends of which are secured by screws to the side faces of the rotary piston 20. Formed transversely through the lower portion of each block 23 is a bore 27, and bisecting this bore and leading from the passages 22 to the recesses 24 are circular bores or passages 28, which are larger in diameter than are the bores 27, and arranged to slide through these bores 28 are the circular valve-plugs 29. Leading from each bore 27 to the adjacent recess 24 in each block 23 is a series of apertures 30. Arranged to slide inwardly and outwardly through the recesses 24 in the blocks 23 are the valves 31, which are rectangular plates of hardened metal and provided with the centrally-arranged rectangular openings 32. Leading from each opening 32 downwardly to the bottom of each valve is a series of apertures 33, the same being so arranged as that the valve-plugs 29 bear against the under side of the valves 31 between these apertures 33. Arranged to slide up and down in the opening 32 of each valve is a governor-valve 34, which comprises a rectangular hardened-metal block, through which passes a series of apertures 35, the lower ends of which coincide with the upper ends of the apertures 33. Formed in the top of the center of each governor-valve is a recess 36, in which is positioned the lower end of a coil-spring 37, the upper end of which rests in a corresponding recess 38, formed in the under side of the upper portion of each valve 31. Leading upwardly from the opening 32 in each valve 31 is a series of bores or passages 39, that communicate at their upper ends with the horizontally-arranged discharge-openings 40, that lead outwardly to the rear face of each valve 31. The bores 39 are offset relative the apertures 35 in order that when the governor-valve moves outwardly, so that its outer surface bears against the corresponding surface of the valve 31, said bores 39 will not register with said apertures 35.

The operation of my improved rotary engine is as follows: Steam enters the longitudinal bore 18 and passes from thence through the apertures 19, 22, and 28 into the horizontally-extending bores 27. From thence it passes through the apertures 30, through the apertures 33, thence through the apertures 35 into the space between the governor-valves and the upper portions of the valves 31. From this point the steam passes through the bores 39 and finally discharges through the openings 40 into the spaces between the periphery of the rotary piston 20 and the interior faces of the wear-plates 5 and 7. The steam will expand into these chambers, and as it cannot pass the bearing-plates 9, located in the abutments of the plates 5, the tendency will be to bear against the projecting portions of the valves 31, and as a result the piston-head will be rotated within the casing. When the valves pass the bearing-plates in the abutments, the steam in the chambers in front of the valves, having spent its force, is free to exhaust from said chambers outwardly through the coinciding apertures 11 and 12 into the annular chamber 3 and from thence outwardly through the exhaust-pipe 4. By forming this chamber entirely around the exterior of the casing and discharging the exhaust-steam thereinto the entire engine is kept at a uniform temperature and will uniformly expand and contract when starting up and shutting down, and therefore the operating parts will move much easier and will not be inclined to bind. The outer ends of the valves 31 bear directly against the inner faces of the wear-plates 5 and 7, and when the ends of said valves are off the abutments or flat faces 6 the discharge-openings 40 in the valves are just outside the periphery of the rotary piston-head. Whenever the valves pass by the abutments, they will necessarily move inwardly a short distance, and in so doing the discharge-openings 40 are moved downwardly, so that they are covered by corresponding portions of the insertible blocks 32, and as said valves move inwardly the valve-plugs 29 are correspondingly moved inwardly, and when their lower ends pass into the portions of the apertures 28 inside the bores 27 the flow of steam will necessarily cut off from the apertures 19 and 22 into the bores 27. In this manner the pressure of the steam to the valves is cut off at the time said valves are passing the bearing-plates located in the abutments. As the piston-head rotates the centrifugal action causes the governor-valves to move outwardly in the openings 32 against the resistance of the coil-springs 38, and should the engine rotate too rapidly or beyond a certain speed the governor-valves will be moved to the outer portions of the openings 32, and as a result the steam will be cut off from passage to the apertures 39 for the reason that the outer ends of the apertures 35 of the governor-valves will be closed when said governor-valves bear against the corresponding surfaces of the valves 31.

The inner face of the casing is provided with the wear-plates, which are made removable in order that they can be renewed when worn instead of having to dispose of the entire casing, and the wearing parts of the rotary piston are made of hardened metal and are located in insertible blocks in order that said wearing parts of the blocks can readily be removed and replaced by new ones when the old ones become worn, thus doing away with the necessity of supplying an entirely new piston.

A rotary engine of my improved construction is simple, strong, and durable, is very economical in the consumption of steam, and

as it comprises a minimum number of parts it can be readily repaired and cleaned.

I claim—

1. In a rotary engine, a cylindrical casing, wear-plates arranged on the interior thereof, there being abutments formed integral with certain of said wear-plates, a rotary piston-head arranged within the cylindrical casing, sliding valves carried by said piston-head, and spring-actuated governor-valves carried by the first-mentioned valves; substantially as specified.

2. In a rotary engine, a casing in which is formed an annular chamber to receive the exhaust-steam, wear-plates arranged on the interior of the casing, there being abutments formed integral with certain of said plates, a rotary piston-head operating within the casing, sliding valves carried by the rotary piston-head, there being suitable apertures formed through the rotary piston-head and through the valves for admitting live steam to the interior of the casing, and spring-actuated governor-valves arranged to slide in the first-mentioned valves; substantially as specified.

3. In a rotary engine, a casing, a rotary piston arranged for operation therein, sliding valves carried by said piston-head, and governor-valves carried by the sliding valves; substantially as specified.

4. In a rotary engine, a cylindrical casing, a rotary piston arranged to operate in said casing, sliding valves carried by the rotary piston, governor-valves arranged in said sliding valves and adapted to be moved outwardly by centrifugal action, and springs arranged to resist the centrifugal action of the governor-valves; substantially as specified.

5. In a rotary engine, a casing, a hollow shaft extending transversely through the casing, a rotary piston fixed upon the hollow shaft, sliding valves arranged in the rotary piston, the outer ends of which bear against the inner face of the casing, there being ports leading from the hollow shaft to the inner ends of the sliding valves, and governor-valves arranged to move in the sliding valves and to cut off the passage of fluid-pressure therethrough; substantially as specified.

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

RICHARD W. HAMANN.

Witnesses:
E. E. LONGAN,
E. L. WALLACE.