J. S. HANEY.

REVERSIBLE ROTARY ENGINE.

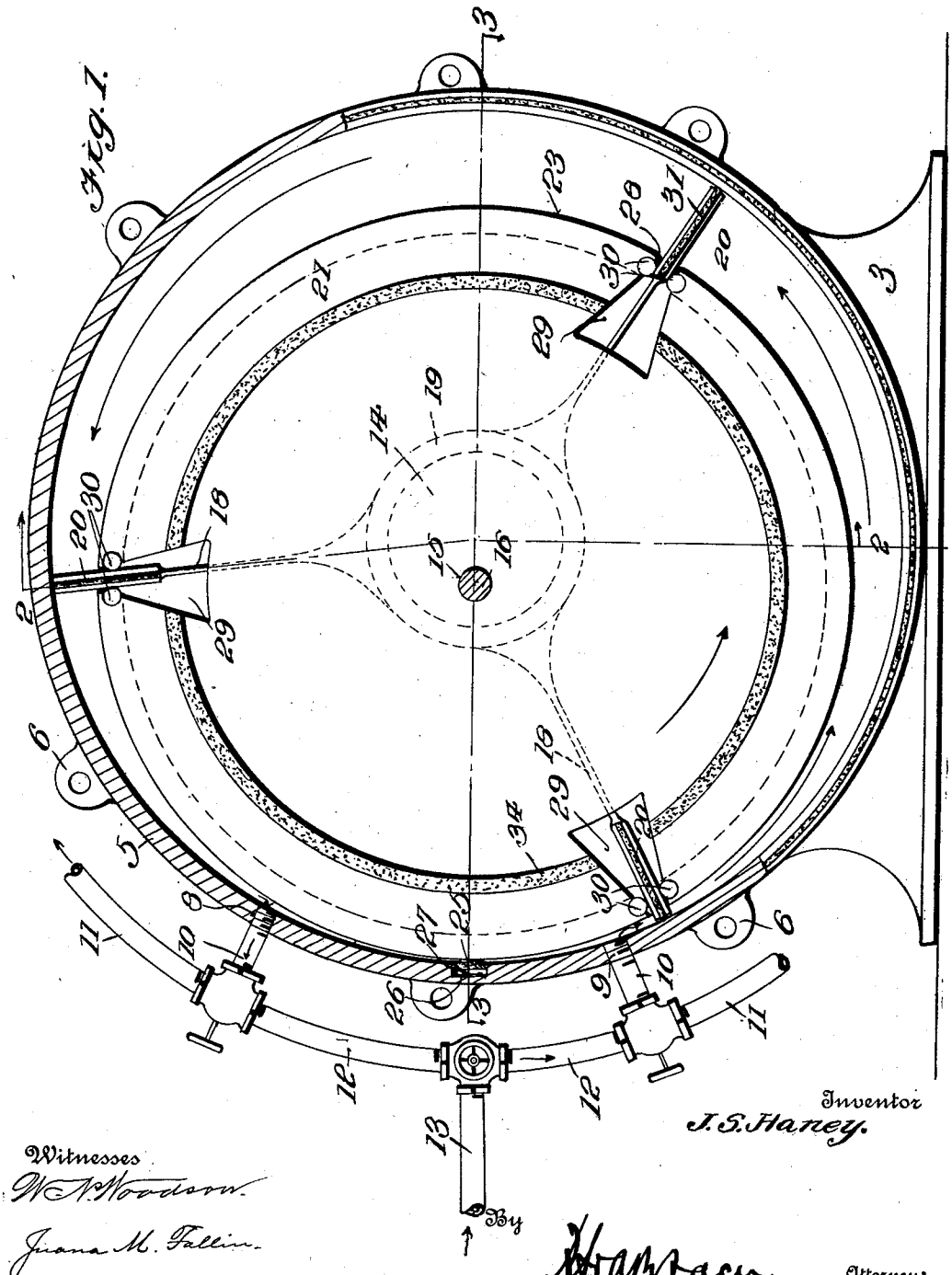
APPLICATION FILED MAR. 16, 1911.

1,009,300.

Patented Nov. 21, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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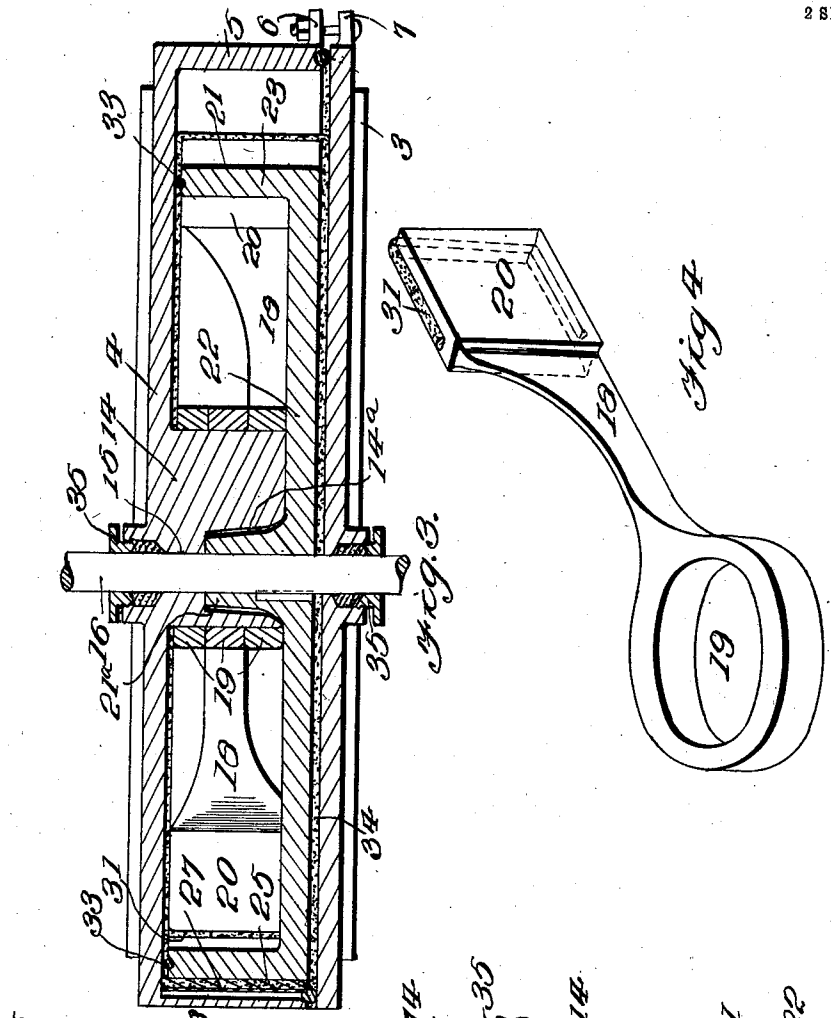

Fig. 3.

Fig. 4.

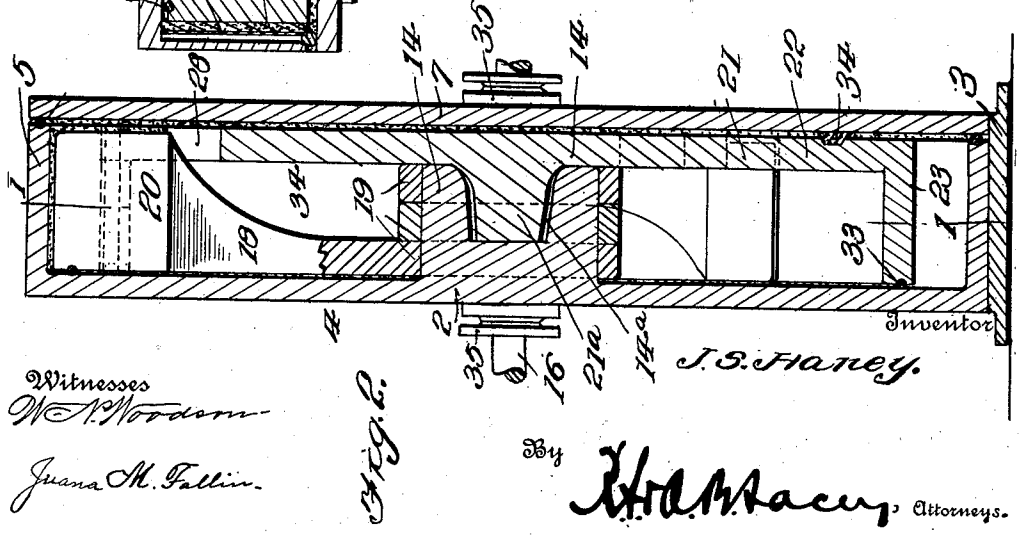

Fig. 2.

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REVERSIBLE ROTARY ENGINE.

1,009,300. Specification of Letters Patent. Patented Nov. 21, 1911.

Application filed March 16, 1911. Serial No. 614,971.

To all whom it may concern:

Be it known that I, JOSEPH S. HANEY, citizen of the United States, residing at Warnerton, in the parish of Washington and State of Louisiana, have invented certain new and useful Improvements in Reversible Rotary Engines, of which the following is a specification.

My invention relates to rotary engines of that type wherein a rotor is provided eccentrically set with relation to the casing and having radial blades which contact with the inner face of the casing, the casing being provided with ports whereby steam may be admitted or the exhaust discharged from the spaces between the blades.

The primary object of the invention is to provide a simple, durable, efficient and economically operated construction of this character wherein the parts are few in number, easily placed in position, readily displaced therefrom when desired, and of such simple character that they may be easily repaired or replaced.

A further object is to provide an engine of this character which is readily reversible so that by merely rotating the valve, the rotor may be rotated either in one direction or the other, the exhaust port in one case becoming the inlet port in the other case and vice versa.

My invention is illustrated in the accompanying drawings wherein:

Figure 1 is a vertical section of my improved rotary engine on the line 1—1 of Fig. 2. Fig. 2 is a vertical section on the line 2—2 of Fig. 1. Fig. 3 is a horizontal section on the line 3—3 of Fig. 1. Fig. 4 is a perspective detail view of one of the blades and its supporting ring.

Corresponding and like parts are referred to in the following description and indicated in all the views of the accompanying drawings by the same reference characters.

Referring to these figures, it will be seen that in its general construction my engine comprises a rotor casing made in two parts, one of the parts mounted upon a base and provided with a hub upon which a plurality of blades are mounted, the ends of the blades contacting with the interior face of the casing. Also mounted within the casing is a rotor with which the blade rotates and through the rim of which the blades project, the rotor being set eccentrically to the casing and the casing being provided with an inlet port and an exhaust outlet port.

Specifically, the section 2 of the casing is mounted upon a base 3 of any suitable character. The section 2 comprises an end plate 4 forming one end of the casing and a rim 5 having projecting lugs 6 whereby a covering plate 7 forming the other end of the casing may be attached. It is obvious that this covering plate might be attached in any suitable manner to the section 2.

The rim 5 of the section 2 of the casing is formed with the ports 8 and 9, these ports being connected by pipes 10 to exhaust pipes 11 and to steam conducting pipes 12, which in turn are connected to a main steam pipe 13 which extends to any suitable source of steam. These pipes are of course to be covered with some nonconducting material so that the steam will not become condensed in the pipes.

The inner face of the end plate 4 of the section 2 is formed with a hub 14 which is concentric to the rim 5 and is provided with a shaft passage 15 eccentric to the center of the hub and eccentric to the rim 5. Through this passage 15 passes the shaft 16 of the rotor. The hub 14 is less in depth than the interior width of the rotor casing. I have shown this hub as projecting about two-thirds the interior width of the rotor casing but do not wish to limit myself to any specific depth for the hub.

Mounted upon the hub 14 are a plurality of freely rotatable arms 18. Preferably these arms are each provided at its inner end with a strap or ring 19, like an eccentric ring, which surrounds the hub 14. These rings are superposed one upon the other to the full depth of the hub 14. Each arm 18 at its extremity is widened at its outer end to form a blade 20, the outer edges of these blades contacting with the inner face of the casing and being provided with packing strips as will be later described so as to secure a steam-tight joint between the end of the blade and the inner face of the casing and yet permit the blades to move easily around the casing. It is to be understood, of course, that these rings are loose upon the hub 14.

Disposed within the casing between the end of the hub 14 and the cover plate 7 is the rotor 21. This consists of a disk or web

22 having thereon a peripheral flange or rim 23. This flange or rim 23 is nearly as wide as the interior depth of the rotor casing, but the diameter of the rotor is less than the interior diameter of the rotor casing. The center of the rotor is provided with a shaft 16 which extends through the passage 15 in the hub 14. It will thus be seen that the rotor is set eccentrically to the interior of the rotor casing and that it will approximately contact at only one point with the rotor casing. At this point the rotor casing is provided with a packing strip 25 which extends entirely across the face of the rotor. This packing strip is preferably beveled on each face and is pressed outward by a spring 26, the packing strip being set in a packing recess 27. It will be noted from Fig. 1 that this packing strip 25 is located midway between the ports 8 and 9 and that it prevents the passage of steam from the inlet port to the exhaust port.

The rim 23 of the rotor is slotted as at 28 at a plurality of points to provide for the passage of the blades 20. I have shown three blades to my rotary engine but do not wish to be limited to this number as I might use any desired number of blades. The blades 20 pass through the slots 28 of the rim and inasmuch as the blade 20 is as wide as the depth of the rotor casing and is therefore as wide as the width of the rim 23, it is necessary that the web 22 of the rotor be cut away as at 29 to permit the blades to be retracted within the circumference of the rotor or projected therefrom. The side walls of each slot 28 should be provided with suitable packing contacting with the faces of the blades 20 and I have shown for this purpose these side walls as being provided with rollers 30 which have rolling contact with the faces of the blades, permitting them to slide out and in easily and yet prevent any leakage of steam past the joints so formed. The edges of the blades 20 as illustrated in Fig. 4 are also provided with packing 31 which extends along the side edges of the blades and across the end thereof, this packing contacting with the end walls of the rotor casing and with the inner face of the rim 5 thereof. The edge of the rim 23 is also provided with a packing strip 33 which contacts with the adjacent face of the end of the rotor casing, and the side wall 7 of the rotor casing is also provided with a packing strip 34 contacting with the web of the rotor 22. The shaft 16 is preferably continued through the other side of the casing, as previously described, and the end wall 4 of the casing and the covering plate 7 which forms the other end wall are both provided with stuffing boxes 35 through which the shaft 16 passes.

The operation of my invention is as follows. Assuming that steam is entering the port 9 and the exhaust is passing out through the port 8, it will be obvious that the rotor will be rotated in the direction of the arrow in Fig. 1, that is, in a counter-clockwise direction. The steam will enter behind one of the blades and act to rotate the rotor in the direction of the arrow until this blade passes the exhaust port 8. Just in advance of the exhaust port 8 is the point of contact between the rotor and the inner face of the rim 23 and as a consequence the space inclosed between the rotor, the rim 23 and the blade will be contracted, thus causing the exhaust steam to be forced out through the exhaust passage 8. It will be noted that if the steam be cut off at a predetermined point in the rotation of the blades, the steam entering the inlet passage 9 will expand as it does its work, thus securing economy and efficiency for the machine. While the blades themselves do not move radially, yet the rotor being set eccentrically to the casing secures a like effect. In other words, the blades move with relation to the rotor but not with relation to the outer casing. I thus eliminate the necessity of complicated gearing for shifting the blades in and out, and also eliminate the necessity of providing means for passing the blades over an abutment with all its attendant complications.

While I do not wish to be limited to this construction, I preferably form the rotor 21 with an inwardly projecting hub 21^a which extends into a recess 14^a in the hub 14 carried by the casing. This acts to steady the rotor and hold it parallel with the face of the casing.

It will be seen that the parts are simple, that the movement of the blades with relation to the rotor is entirely automatic and that by reversing the positions of the valves in the supply pipes 12, either one of the ports may become an exhaust port and either one the inlet port, and that the engine may be started even when upon a dead center by reversing the engine for a portion of a revolution and then so adjusting the valves as to rotate the rotor in the desired direction. It will also be obvious that as the rotor is relatively heavy, it will act as a fly wheel and that this construction eliminates the jar usually to be found in reciprocating engines.

What I claim is:

1. A rotary engine including a rotor casing, one wall of the casing being provided with a centrally disposed hub having a shaft passage extending therethrough eccentric to the axial center of the hub, the interior face of the hub being recessed concentrically to the shaft passage, a rotor disposed within the casing and having a central shaft passing through the passage in the hub, said rotor having a hub surrounding the shaft and extending into the recess in the hub of the casing wall, the rotor being disposed eccen-

tric to the casing but contacting with the inner face thereof at one point, and a plurality of independent radial blades, each rotatably mounted upon the hub and contacting with the inner peripheral face of the casing, said blades projecting through the rim of the rotor and being rotated therewith.

2. A rotary engine including a rotor casing, one end wall of which is provided with a centrally disposed projecting hub, said hub having a shaft passage eccentric to the axial center thereof and having an annular recess on its interior face concentric to the shaft passage and surrounding the same, the hub being less in depth than the inside width of the casing, a rotor mounted within the casing comprising a circular web having a peripheral flange or rim, the rotor having a centrally disposed shaft passing through the passage in the hub and through the opposite wall of the casing, the inner face of the rotor being formed at its center with a hub projecting into the recess in the inner face of the casing hub, the rim and adjacent side wall of the rotor being cut away at a plurality of points, said rotor being eccentrically mounted and contacting with the inner face of the casing at one point, a plurality of superposed parallel rings surrounding the hub of the casing, each ring having a radially projecting arm, a blade on the extremity of each arm, each blade being disposed within one of the cutaway portions of the rotor, the blades being rotatable with the rotor, the casing being provided at points on opposite sides of the point of contact between the rotor and the inner face of the casing with inlet ports, steam pipes and exhaust pipes connected to each of said ports, and valves for directing the steam into either of said ports or directing the exhaust out of either of said ports.

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

JOSEPH S. HANEY. [L. S.]

Witnesses:

J. L. BROCK,

MAURICE BATEMAN.