G. E. HANLEY.

ROTARY GAS ENGINE.

APPLICATION FILED MAR. 3, 1911.

1,048,308.

Patented Dec. 24, 1912.

2 SHEETS—SHEET 1.

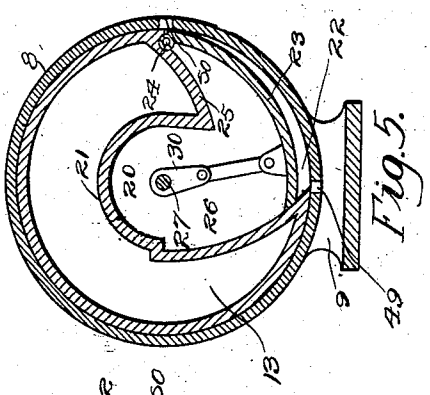

Fig. 5.

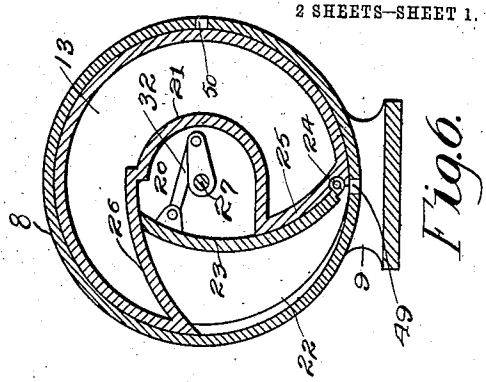

Fig. 6.

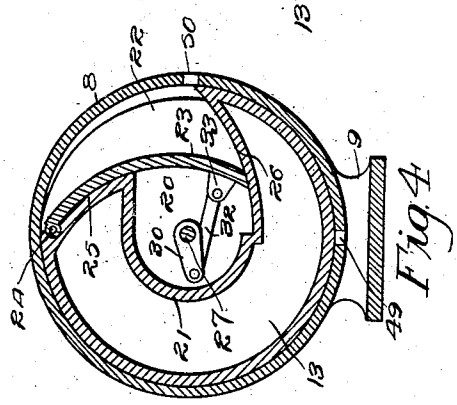

Fig. 4

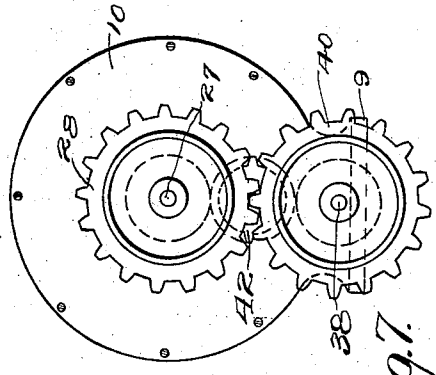

Fig. 7.

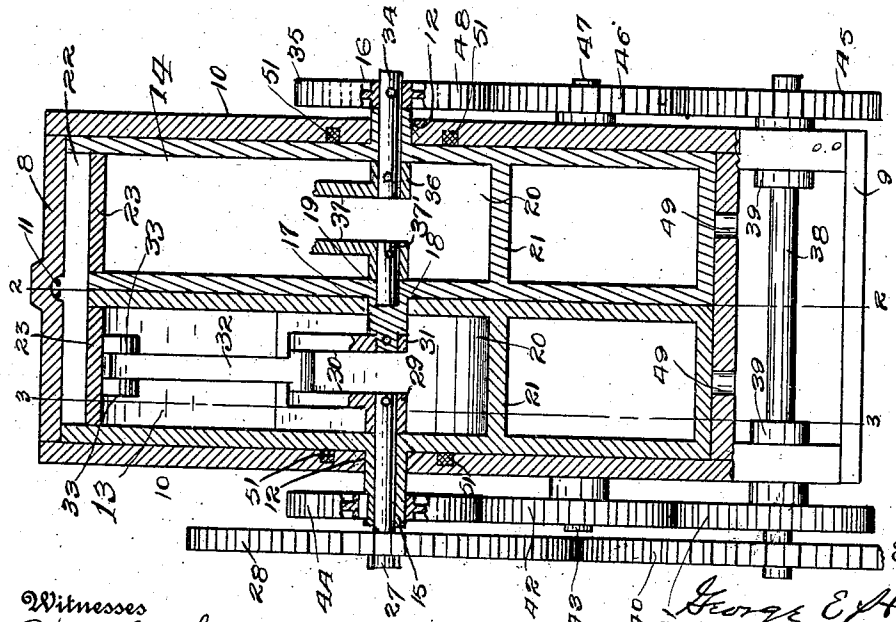

Fig. 1.

Witnesses

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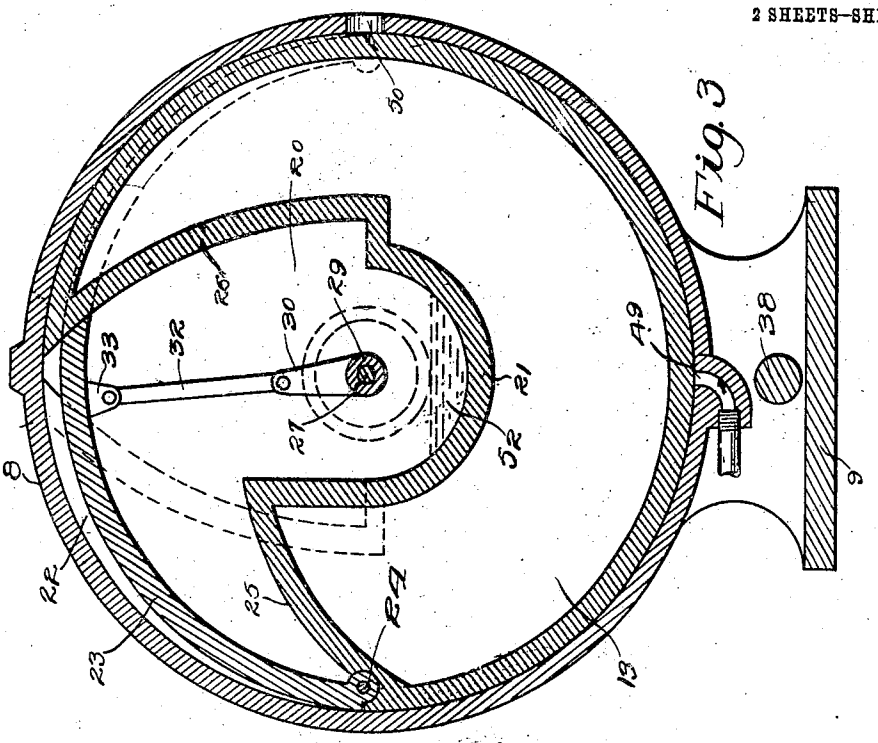

Fig. 3

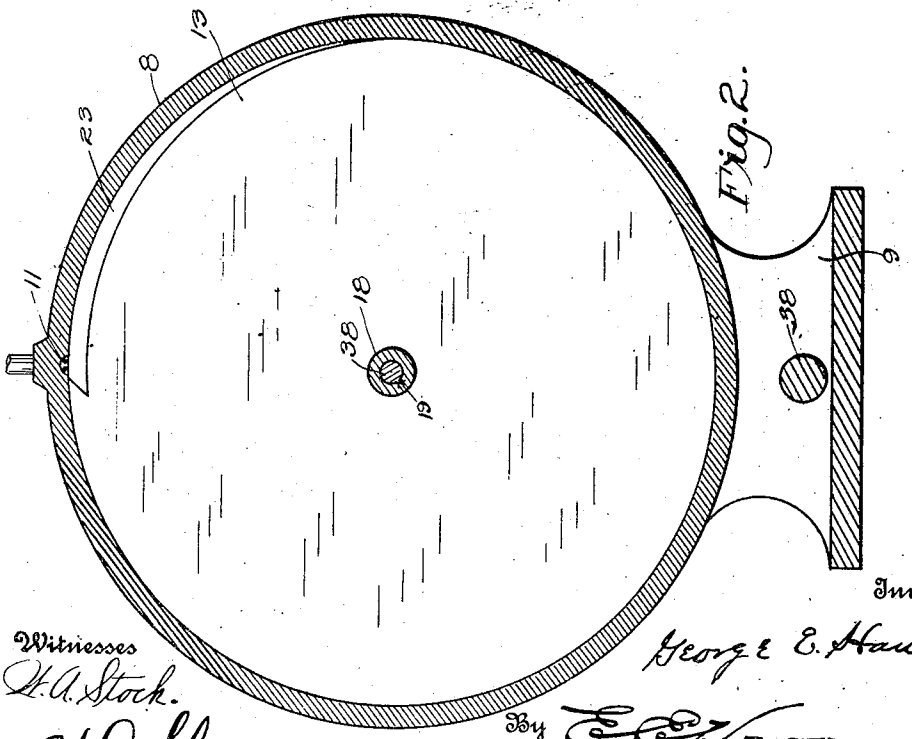

Fig. 2.

Witnesses

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UNITED STATES PATENT OFFICE.

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ROTARY GAS-ENGINE.

1,048,308. Specification of Letters Patent. Patented Dec. 24, 1912.

Application filed March 3, 1911. Serial No. 611,994.

To all whom it may concern:

Be it known that I, GEORGE E. HANLEY, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Rotary Gas-Engines, of which the following is a specification.

This invention relates to the subject of internal combustion rotary engines, and the principal object of the same is to provide a compact engine in which a pair of cylinders are oppositely rotated by a single explosion and through the medium of suitable gearing, communicate rotary power to a drive shaft.

A simple and practical embodiment of the invention is shown in the accompanying drawings, wherein—

Figure 1 is a transverse vertical sectional view of the improved engine, one piston and piston rod being broken away. Fig. 2 is a vertical sectional view taken on the line 2—2, Fig. 1. Fig. 3 is a similar view taken on the line 3—3, Fig. 1. Figs. 4, 5 and 6 are detail vertical sectional views in reduced size illustrating, respectively, the exhaust, intake, and compression positions of the engine. Fig. 7 is a side view of the engine in reduced size.

Referring to the accompanying drawings by numerals, it will be seen that the improved engine comprises a narrow cylindrical casing 8 that is supported upon a base or foundation 9. The casing 8 has flat sides 10 and at a central position in its top is provided with a sparker 11. The flat sides 10 are each provided with a central transverse bearing opening 12.

Cylinders 13 and 14 are rotatable in the casing 8, cylinder 13 having a hollow hub 15 projecting laterally through and rotatable in one of the side bearing openings 12 of the casing 8, and cylinder 14 having a hollow hub 16 which projects through and is rotatable in the opposite bearing opening of said casing 8. The inner side of cylinder 13 is provided with a central bearing opening 17 in which is located hub 18 of cylinder 13. Hub 18 is provided with a longitudinal bearing recess 19.

Cylinders 13 and 14 are duplicates in construction each being provided with a chamber 20 having a semi-circular bottom portion which extends partly about axle center of said cylinder, the chamber 20 being closed by a piston 23, that conforms to the contour of the periphery of the cylinder and has its rear end hinged, as indicated at 24, to one side of the outer end of chamber 20. Each cylinder is provided with a curved portion 25, which limits the inward movement of the piston 23. The free end of the piston 23 slidably engages the front wall 26 of chamber 20, said wall 26 being curved on the arc of a circle, the center of which is the hinge 24.

A shaft 27 extends through hub 15 and its outer end has a large gear 28 fast thereon. The inner end of said shaft projects into cylinder 13 and has the sleeve 29 of one arm of a crank 30 fast thereon. The other arm of crank 30 has its sleeve 31 fast on the end of hub 18 of cylinder 14. The crank 30 is pivotally connected by a piston rod 32 with a pair of ears 33 mounted on the free end portion of piston 23 of cylinder 13.

A shaft 34 projects through hub 16, of cylinder 14 and its outer end has a small gear 35 fast thereon. The inner end of shaft 34 projects into cylinder 14 and has the sleeve 36 of one arm of crank 37 fast thereon. The other arm of crank 37 is provided with a shaft 37′ that is journaled in recess 19 of hub 18. Crank 37 is pivotally connected by a piston rod with piston 23 of cylinder 14 which is the same in all respects as the piston rod connection described in connection with cylinder 13.

A power shaft 38 is journaled in bearings 39 carried by the foundation 9 and one end of said shaft has a large gear 40 fast thereon, that is in mesh with gear 28 of shaft 27. Adjacent gear 40, a small gear 41 is fast on said shaft 38, said gear 41 meshing with an idler gear 42, carried by a stub shaft 43 projecting laterally from one side of casing 8. Gear 42, in turn is in mesh with a gear 44 fast on the outer end portion of hub 15. The opposite end of shaft 38 has a small gear, 45 fast thereon which meshes with an idler gear 46 carried by a stub shaft 47 projecting from casing 8, said gear 46, in turn, being in mesh with a gear 35 fast on shaft 34.

Casing 8 has base ports 49 for the admission of fuel, and side ports 50 for the escape of the exhaust. Packing rings 51 are carried by the inner surfaces of the sides 10 of casing 8 and surround hubs 15 and 16 in spaced relation to prevent the gas passing through the bearing openings 12.

As is suggested in Fig. 3 of the accompanying drawings, the bottoms of the cavities 20 serve as pockets for lubricating material 52 for the cranks and their shafts.

It will be clear from the foregoing that the crank 30 causes cylinder 13 and gear 28 to rotate in one direction and that the train of gears 41, 42, and 44 cause the cylinder 14 to rotate in an opposite direction, and that the train of gears 45, 46 and 48 rotate crank 37 in the same direction as crank 30. It will therefore be seen that while the cylinders 13 and 14 rotate in opposite directions, they rotate in unison so that they are in position to receive the force of the explosion caused by the sparker 11 so that such explosion will force the cylinders in opposite directions. The operation of the engine is shown in the detail Figs. 5 6 and 7, and it will be seen that in Fig. 5 the cylinder has been started on its rotation by the explosion crank 30 having caused piston 23 to seal the cavity 20 so that an expansion chamber is provided, the wall 26 acting as an abutment against which the force of the explosion acts. In said Fig. 5 the exhaust port 50 is being uncovered, and the piston 23 is being pushed outward to expel the products of combustion from the cavity to and through port 50. In Fig. 6 the scavenging operation of the piston has been finished, the port 50 sealed, inlet port 49 is being opened, and said piston is swinging in to permit fuel to enter the cavity. In Fig. 7 the port 49 is being covered, and the piston 23 swinging outward to compress the fuel. The next step in the operation is the explosion of the compressed fuel, as has been explained.

It will be clear from the foregoing detailed description that this invention provides a compact engine or motor that is composed of few parts, and the manner of mounting the cylinders in the casing 8 permits the force of one explosion to rotate the cylinders in opposite direction, said rotary movements of the cylinders, through the trains of gearing, driving the shaft 38 from which power may be taken in any suitable manner.

What I claim is:—

1. A rotary internal combustion engine comprising a casing provided with pairs of inlet and exhaust ports, the inlet ports being peripherally spaced from the exhaust ports, a pair of oppositely rotating cylinders mounted in said casing and provided with peripheral cavities, oscillating pistons in said cavities, and means operable by the oscillation of said pistons to rotate said cylinders.

2. A rotary internal combustion engine comprising a casing, said casing being provided with spaced fuel ports and spaced exhaust ports, the fuel ports being peripherally spaced with reference to the exhaust ports, sparking means in said casing, oppositely rotatable cylinders, each provided with a peripheral cavity and each mounted in said casing, a piston for each of said cylinders carried in said cavity and having one end pivoted to the cylinder, crank shafts extending through said cylinders, each of said shafts having an end projecting from said casing, a gearing connecting one of said cylinders with the crank shaft of the opposite cylinder.

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

GEORGE E. HANLEY.

Witnesses:
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F. P. SCHROEDER.