

G. E. BALL.
ROTARY ENGINE.
APPLICATION FILED MAR. 18, 1909.

946,492.

Patented Jan. 11, 1910.

2 SHEETS—SHEET 1.

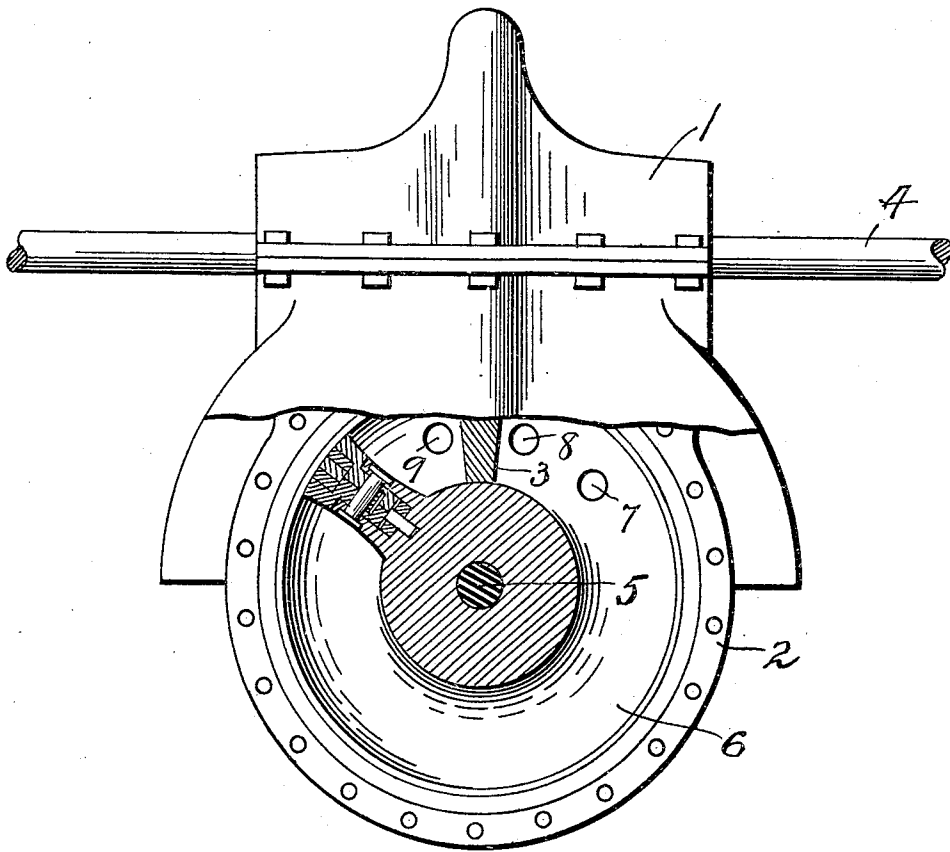


FIG. 1.

WITNESSES:

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INVENTOR:

George E. Ball
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2 SHEETS—SHEET 2.

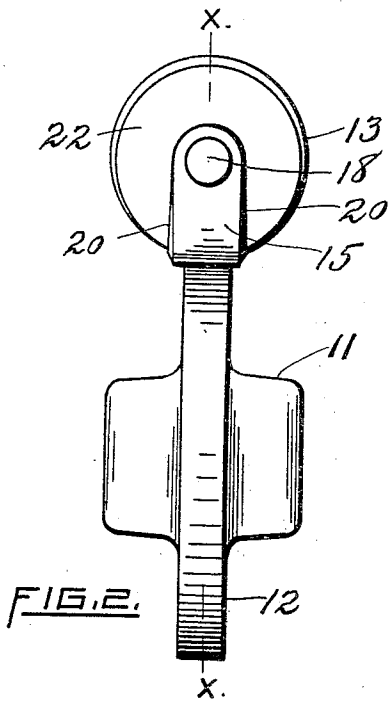


FIG. 2.

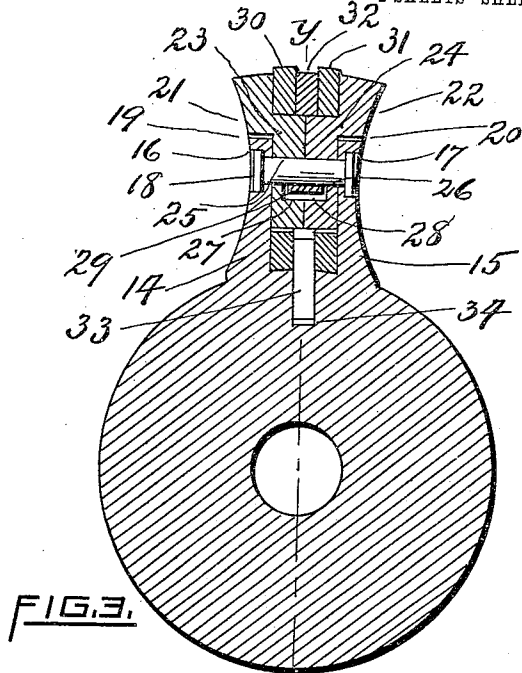


FIG. 3.

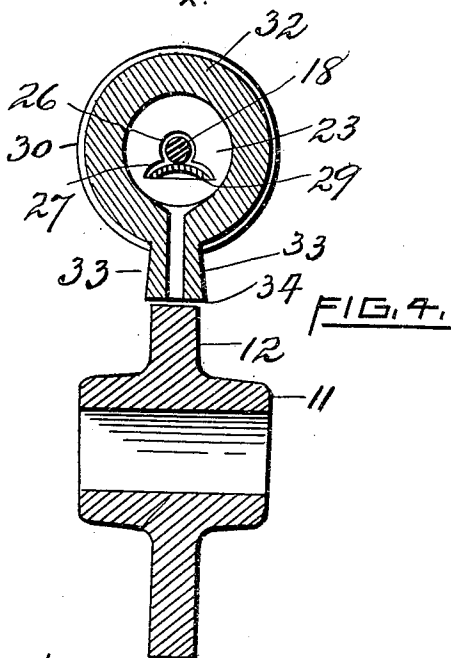


FIG. 4.

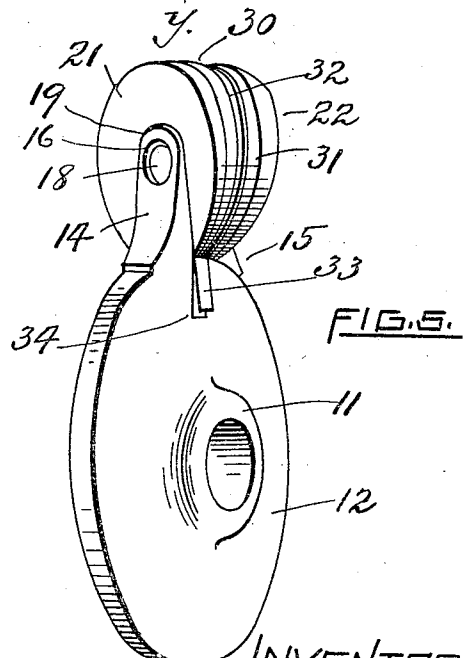


FIG. 5.

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INVENTOR:

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UNITED STATES PATENT OFFICE.

GEORGE E. BALL, OF CRANSTON, RHODE ISLAND.

ROTARY ENGINE.

946,492.

Specification of Letters Patent.

Patented Jan. 11, 1910.

Original application filed November 17, 1908, Serial No. 463,112. Divided and this application filed March 18, 1909. Serial No. 484,225.

To all whom it may concern:

Be it known that I, GEORGE E. BALL, a citizen of the United States, residing at Cranston, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention relates to rotary engines or pumps, and more particularly to the piston member and its contiguous parts.

The present application is a division of my pending United States patent application Ser. No. 463,112, filed November 17, 1908.

The objects of my invention in addition to those commonly sought in this character of structure are simplicity, durability, adaptability, assembling and disassembling of parts, and economy of cost in operation.

Further objects are to avoid leakage and prevent excessive friction upon the piston chamber due to centrifugal force or other cause; and to facilitate the accommodation of the piston parts to the contour of the piston chamber.

To the above ends essentially my invention consists in the novel construction, combination, and arrangement of parts herein after described, and illustrated in the accompanying drawings, wherein,

Figure 1 is a view partially in side elevation and partially in central section of a rotary engine embodying my invention, Fig. 2, a front elevation of the piston and disk, Figs. 3 and 4, sections on line *x x* of Fig. 2 and line *y y* of Fig. 3 respectively, and Fig. 5, a perspective view of the piston and disk.

Like numerals of reference indicate like parts throughout the views.

In the present instance my invention is described in connection with a rotary engine comprising an upper and lower casing, 1 and 2. The former inclosing the abutment, 3, carried on its shaft, 4, driven by the usual gear connections, not shown, from the power shaft, 5, which is mounted in the lower casing. The latter casing is provided with the usual annular piston chamber, 6, and with ports, 7, 8 and 9.

Mounted upon the shaft, 5, in the casing, 2, is a piston member comprising a hub, 11, disk 12, and piston 13. In detail, the piston, 13, comprises two vertical end supports, 14 and 15, integral with the disk, 12,

and provided with openings, 16 and 17, respectively, to permit passage therethrough of a bolt, 18. The supports, 14 and 15, enter radial cavities, 19 and 20, in circular bearing blocks, 21 and 22. The bearing blocks are provided at their upper inner portions with shoulders, 23 and 24, to form seats. They are also respectively provided with central orifices, 25 and 26, and recesses, 27 and 28. The orifices are to loosely accommodate the bolt, 18, and the recesses, to form a seat for the flat spring, 29, which bears against the bolt. Upon the seats, 23, and 24, of the bearing blocks are packing rings, 30 and 31, together with an intermediate split ring, 32, provided at its lower portion with lugs, 33, seated in a transverse recess, 34, in the piston disk or web portion, 12.

It will be noted that the piston parts, 21 and 22, are interspaced from the supports, 14 and 15, and from the bolt, 18, permitting of movement in a lateral and vertical direction, and even a torsional movement in relation to the disk. Vertical movement is controlled in a degree by spring, 29. The play of the parts, or yielding properties, facilitates the accommodation of the piston parts to the contour of the piston chamber. Excessive friction upon the piston chamber due to centrifugal force is obviated by the action of spring, 29.

What I claim is,

1. In a rotary engine, the combination with the power shaft and piston disk, of supports upon the periphery of the disk, bearing blocks intermediate the supports provided with seats, packing rings in the seats, and means for connecting the supports and blocks.

2. In a rotary engine, the combination with the power shaft and piston disk, of supports upon the periphery of the disk, bearing blocks mounted intermediate the supports and provided with seats, packing rings in the seats, a split ring intermediate the packing rings, and means for connecting the supports and blocks.

3. In a rotary engine, the combination with the power shaft and piston disk, of supports upon the periphery of the disk, bearing blocks mounted intermediate the supports and provided with seats, packing rings in the seats, and a bolt connecting the supports and blocks.

4. In a rotary engine, the combination with the power shaft and piston disk, of supports upon the periphery of the disk, bearing blocks intermediate the supports provided with seats and with central recesses, packing rings in the seats, a bolt traversing the supports and the blocks, and a spring in the recesses bearing against the bolt.
5. In a rotary engine, the combination with the power shaft and piston disk, of supports upon the periphery of the disk, bearing blocks intermediate the supports provided with seats and with central recesses, packing rings in the seats, a split ring intermediate the packing rings, a bolt traversing the supports and the blocks, and a spring in the recesses bearing against the bolt.
6. In a rotary engine the combination with the power shaft, of a piston disk provided with a transverse marginal recess, supports upon the periphery of the disk, bearing blocks intermediate the supports provided with seats and with central recesses, packing rings in the seats, a split ring intermediate the packing rings, lugs upon the split ring extending into the marginal recess of the piston disk, a bolt traversing the supports and the blocks, and a spring in the recess bearing against the bolt.
7. In a rotary engine, the combination with the power shaft, of a piston disk upon the shaft provided with a marginal recess, supports upon the periphery of the disk, bearing blocks mounted intermediate the supports and provided with seats, packing rings in the seats, a split ring intermediate the packing rings, lugs upon the split ring extending into the recess, and means for connecting the supports and blocks.
8. In a rotary engine, the combination with the power shaft and piston disk, of supports upon the periphery of the disk, bearing blocks loosely mounted intermediate the supports and provided with seats, packing rings mounted in the seats, and a bolt connecting the supports and blocks and interspaced from the blocks.
9. In a rotary engine, the combination with the power shaft and piston disk, of supports upon the periphery of the disk, bearing blocks loosely mounted intermediate the supports provided with seats and with central recesses, packing rings in the seats, a bolt in the supports loosely traversing the blocks, and a spring in the recesses bearing against the bolt.
10. In a rotary engine, the combination with a power shaft, a piston disk and a piston mounted upon the disk and radially movable with relation to the disk, of means within the piston for yieldingly counteracting the centrifugal pull of the piston with relation to the disk.
11. In a rotary engine, the combination with the power shaft, of a piston disk upon the shaft, supports upon the periphery of the disk, bearing blocks mounted intermediate the supports and provided with seats, packing rings in the seats, and means for connecting the supports and blocks.
12. In a rotary engine, the combination with the power shaft, of a piston disk provided with a slot, a piston mounted upon the disk, a split ring embracing the piston, and lugs upon the ring within the slot.
- In testimony whereof I have affixed my signature in presence of two witnesses.
- GEORGE E. BALL.
- Witnesses:
 HORATIO E. BELLOWES,
 CLAUDE C. BALL.