J. N. SPENCER.

ROTARY ENGINE.

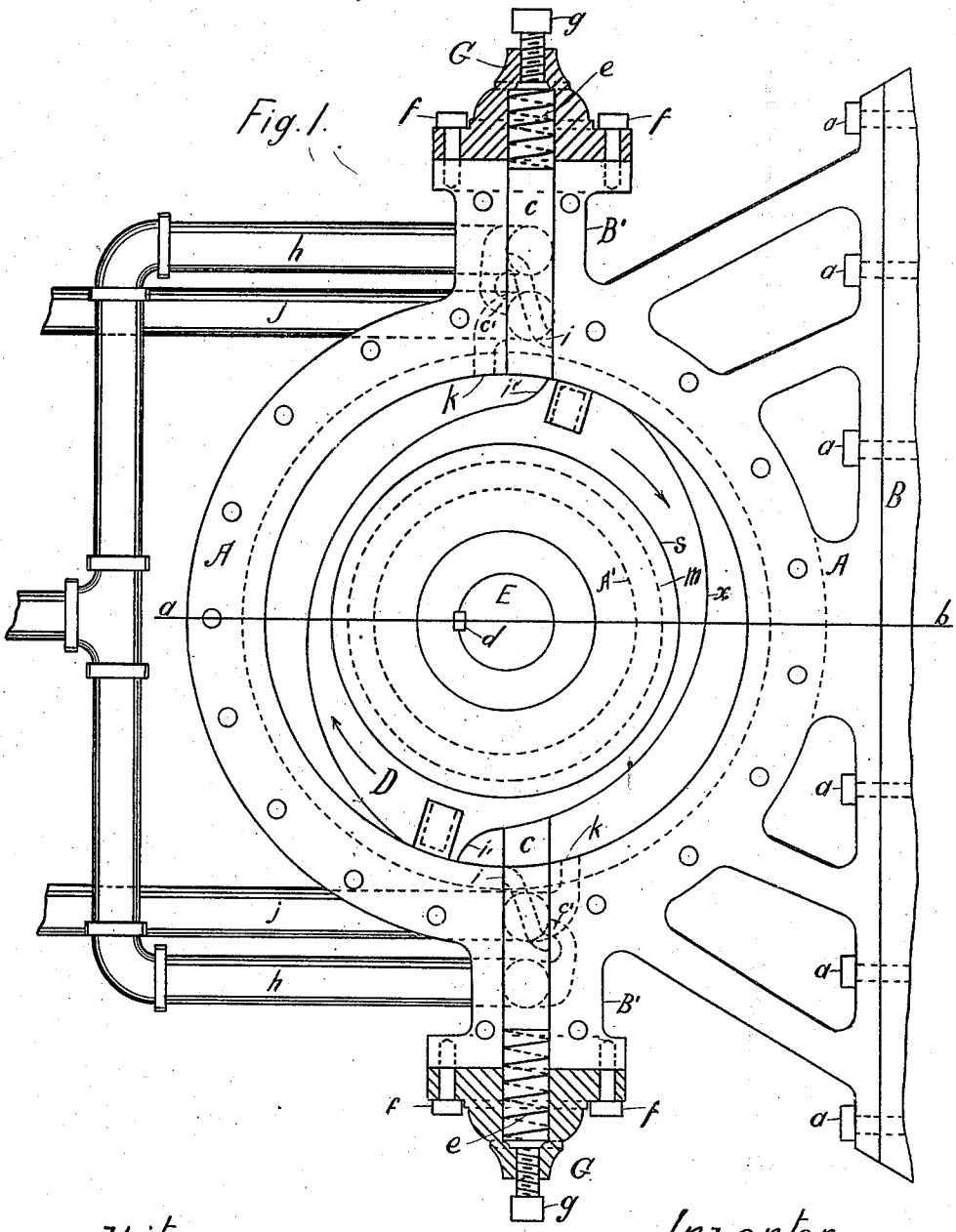
APPLICATION FILED JUNE 20, 1918.

1,300,666.

Patented Apr. 15, 1919.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 6.

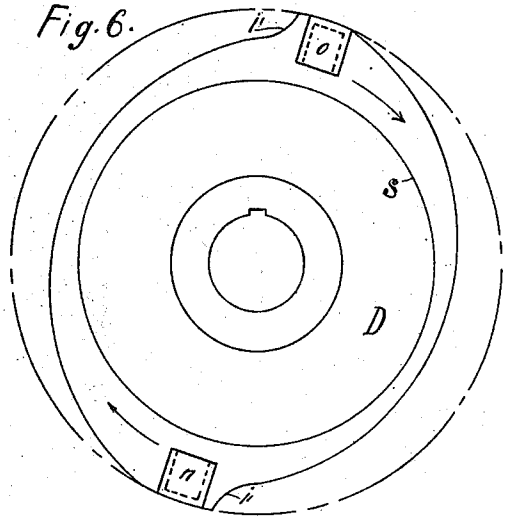


Fig. 2.

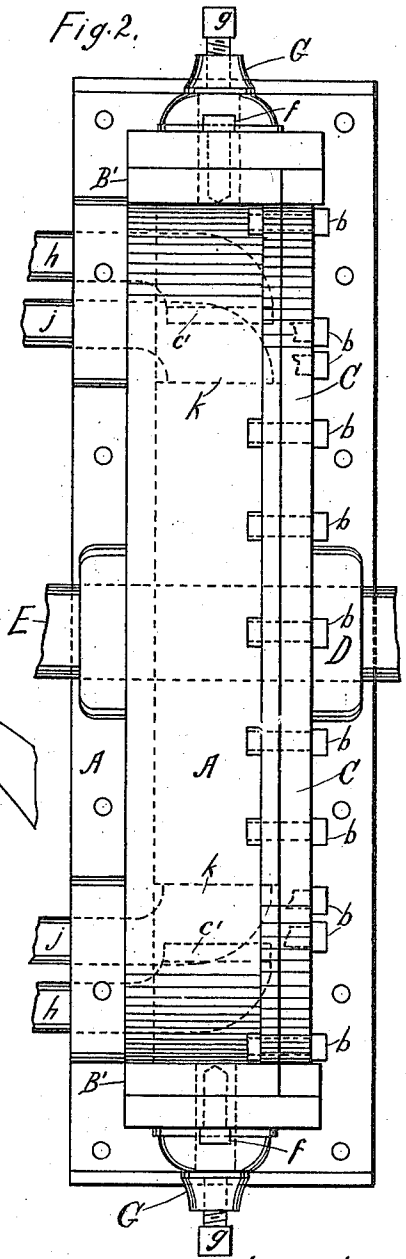


Fig. 7.

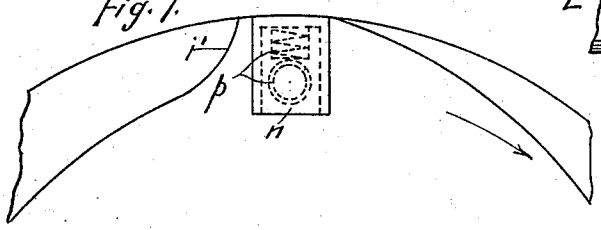
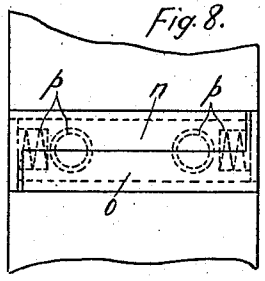


Fig. 8.



Witnesses

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3 SHEETS—SHEET 3.

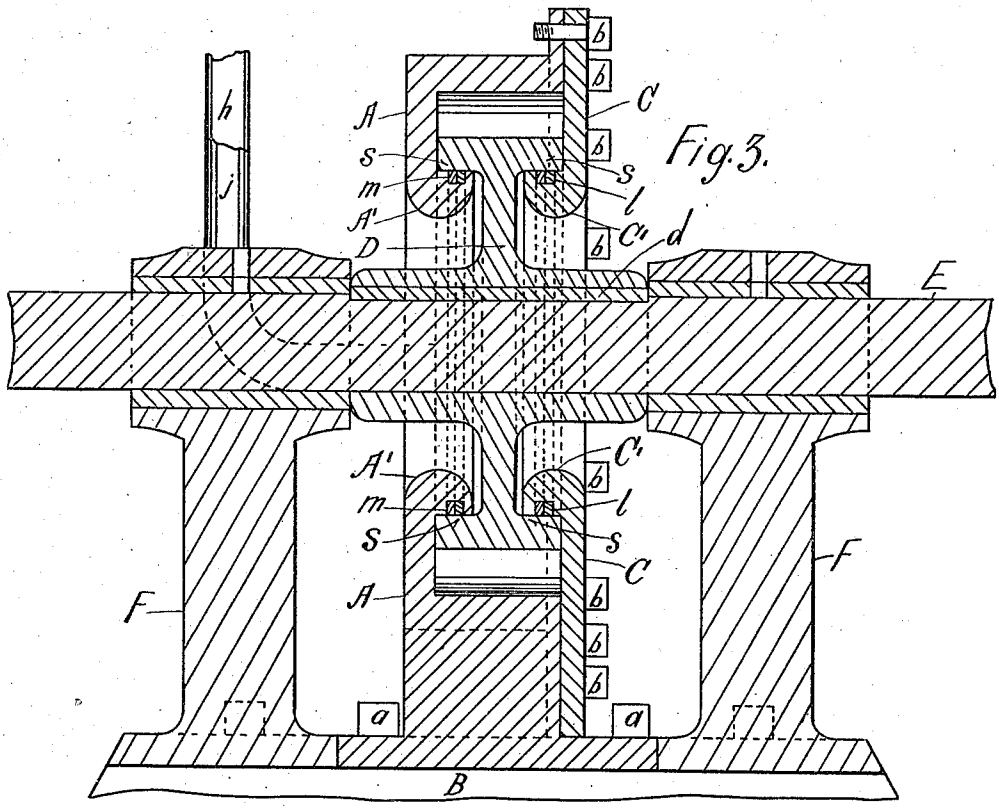


Fig. 3.

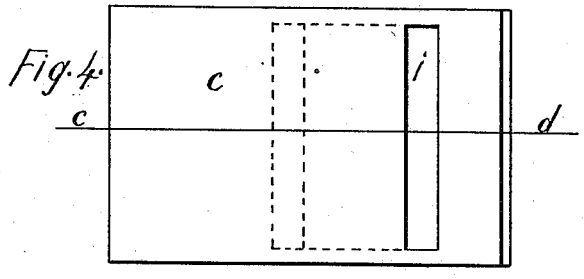


Fig. 4.

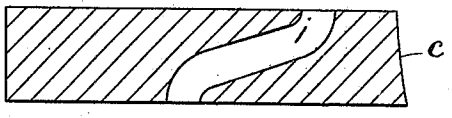


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN N. SPENCER, OF TRURO, NOVA SCOTIA, CANADA.

ROTARY ENGINE.

1,300,666. Specification of Letters Patent. Patented Apr. 15, 1919.

Application filed June 20, 1918. Serial No. 241,064.

To all whom it may concern:

Be it known that I, JOHN N. SPENCER, a subject of the King of England, residing at the town of Truro, in the county of Colchester, in the Province of Nova Scotia, in the Dominion of Canada, have invented new and useful Improvements in Rotary Engines, of which the following is a specification.

My invention relates to engines in which the piston has a rotary motion, instead of a reciprocating motion, and the objects of my invention are first,—to eliminate the valve movement by the use of the ordinary eccentric and substitute therefor the movement of the piston itself. Second,—to reduce any required reciprocal motion to a minimum. Third,—to employ packing rings to prevent loss from the leakage of steam. Fourth,—to maintain a regular cut off and period of expansion and the free discharge of exhaust without the use of valves, and to produce a comparatively inexpensive and efficient engine.

I attain these objects by the mechanism illustrated in the accompanying drawing, in which:—

Figure 1 is a side elevation of my engine with the cylinder head removed, the valve adjustment cap being shown in section. Fig. 2 is a plan of Fig. 1 with the cylinder head in place. Fig. 3 is a section of Fig. 1 on line 3—3 showing the shaft resting in independent bearings. Fig. 4 is an enlarged plan of one of the valves. Fig. 5 is a section of Fig. 4 on the line 5—5. Fig. 6 is an elevation of the piston showing the relation of its form to the cylinder. Figs. 7 and 8 are enlarged views of portions of the piston showing the automatic wear adjustment.

Similar letters refer to similar parts throughout the several views.

In the drawing A is the cylinder which is bolted to the base B by the bolts *a a*. A′ is an inward projection on the cylinder designed to carry the steam tight packing rings *m m*. B′ B′ are steam chests on opposite sides of the cylinder. C is the cylinder head which is held in place by the bolts *b b*. C′ is an inward projection on the cylinder head designed to carry the steam tight packing rings *l l*. D is the piston which is revolved by the action of the steam through the ports *i i* in the valves *c c* striking against the abutments *i′ i′*. *c′ c′* are ports in the steam chests through which steam enters the ports *i′ i′* in the valves and are closed by the action of the valves at the same time the steam is shut off from the cylinder, thus insuring a double cut off. G G are the valve adjustment caps which partially carry the springs *e e* and are secured to the cylinder by the bolts *f f*. *g g* are spring tension adjustment screws. *h h* are steam pipes. *j j* are exhaust pipes. K K are exhaust ports which are open to the atmosphere independent of the valves. *n* and *o* are automatic wear adjustment plates which meet on the circumference of the piston. *p p* are light coiled springs adapted to exert a constant outward pressure on the plates *n* and *o*. *s s* are flanges on the piston in contact with which the packing rings *m* and *l* form a steam tight joint.

The operation of my invention is as follows: The contour of the piston from the abutments *i′ i′* is formed of part of two circles of approximately the same diameter as the interior of the cylinder, and by following the contour marked *x*, it will be noticed in Fig. 1 that the steam port *i* is about ready to open, and as the piston moves in the direction indicated by the arrow, it will be fully opened and closed when the joint *x* reaches the valve, leaving the steam for about one third of the stroke or of a half revolution to work by expansive force, the light springs *e e* maintaining a constant pressure on the valves causing them to conform to the contour of the piston as it revolves. In the drawing the piston and valves are shown as adapted to two steam admissions and exhausts for each revolution, but any number can be employed.

I am well aware that rotary engines are not new and I therefore do not claim such as my invention, but what I do claim and desire to secure by patent is:—

1. In a rotary engine, the combination of a base plate, a cylinder mounted on the base plate and having an inwardly projecting circumferential flange adapted to receive a plurality of packing rings in its outer surface, a cylinder head secured to the cylinder and having an inwardly projecting circumferential flange adapted also for the reception of a plurality of packing rings on its outer surface, a piston revoluble between the cylinder and the cylinder head and having oppositely formed circumferential projections arranged in overlapping relation with the said flanges and adapted to fit against the

said packing rings, said circumferential projections being provided with outer peripheral cam faces and valves operated by the peripheral cam faces for controlling the admission and cut off of fluid pressure.

2. In a rotary engine, the combination of a base plate, a cylinder mounted on the base plate and having an inwardly projecting circumferential flange adapted for the reception of packing rings on its outer surface, a cylinder head secured to the cylinder and having an inwardly projecting circumferential flange also adapted to receive packing rings on its outer surface, a piston revoluble between the cylinder and the cylinder head and having oppositely formed circumferential projections arranged in overlapping relation with the said flanges to fit against the said packing rings, said circumferential projections being provided with outer curved surfaces forming cam faces and valves operated by the cam faces of the piston for controlling the admission and cut off of fluid pressure.

3. In a rotary engine, the combination of a base plate, a cylinder mounted on the base plate and having an inwardly projecting circumferential flange adapted to receive packing rings on its outer face, a cylinder head secured to the said cylinder and having an inwardly projecting circumferential flange also adapted to receive packing rings on its outer surface, and a piston revoluble between the cylinder and the cylinder head and having oppositely formed circumferential projections arranged in overlapping relation with the said circumferential flanges to fit against the said packing rings, said circumferential projections being provided with outer peripheral curved faces forming cams, and valves operated by the cams of the piston for controlling the admission and cut off of steam, means for providing a constant inward pressure against the valves; exhaust outlets independent of the valves, and steam in the exhaust pipes.

4. In a rotary engine, the combination of an annular cylinder, provided with an inwardly extending circumferential flange, an annular cylinder head secured to the cylinder and provided with an inwardly extending circumferential flange, said flanges being provided at their outer peripheral faces with circumferential grooves, a rotary piston operating within the annular cylinder and extending between the said flanges and provided with opposite circumferential projections arranged in overlapping relation with the said flanges, and covering the said grooves and provided with peripheral cam faces, packing rings arranged in the grooves of the said flanges and fitting against the said circumferential projections of the piston, and valves operated by the cam faces of the piston for controlling the admission and cut off of fluid pressure.

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Witnesses:
ADAM E. FARQUHAR,
RUTH W. MOSHER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."