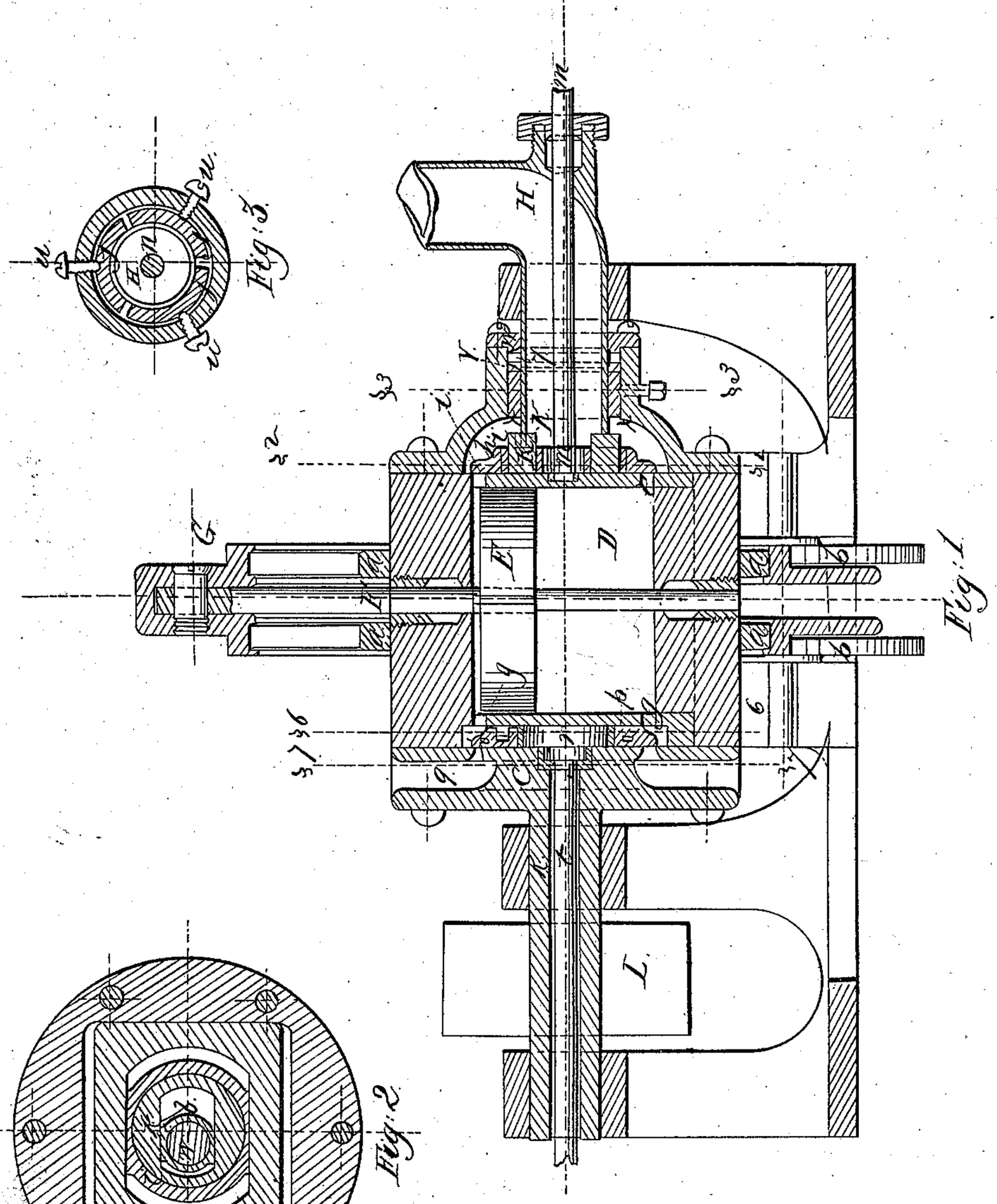
3 Sheets-Sheet 1.

# J. D. Whelpley,

## Rotary Steam Engine.

No. 83,427. Patented Oct. 27, 1868.








Witnesses:

Jacob S. Stover

Thos. W. Stuart

Inventor:

James D. Whelpley

3 Sheets-Sheet 2.

# J. D. Whelpley,

## Rotary Steam Engine.

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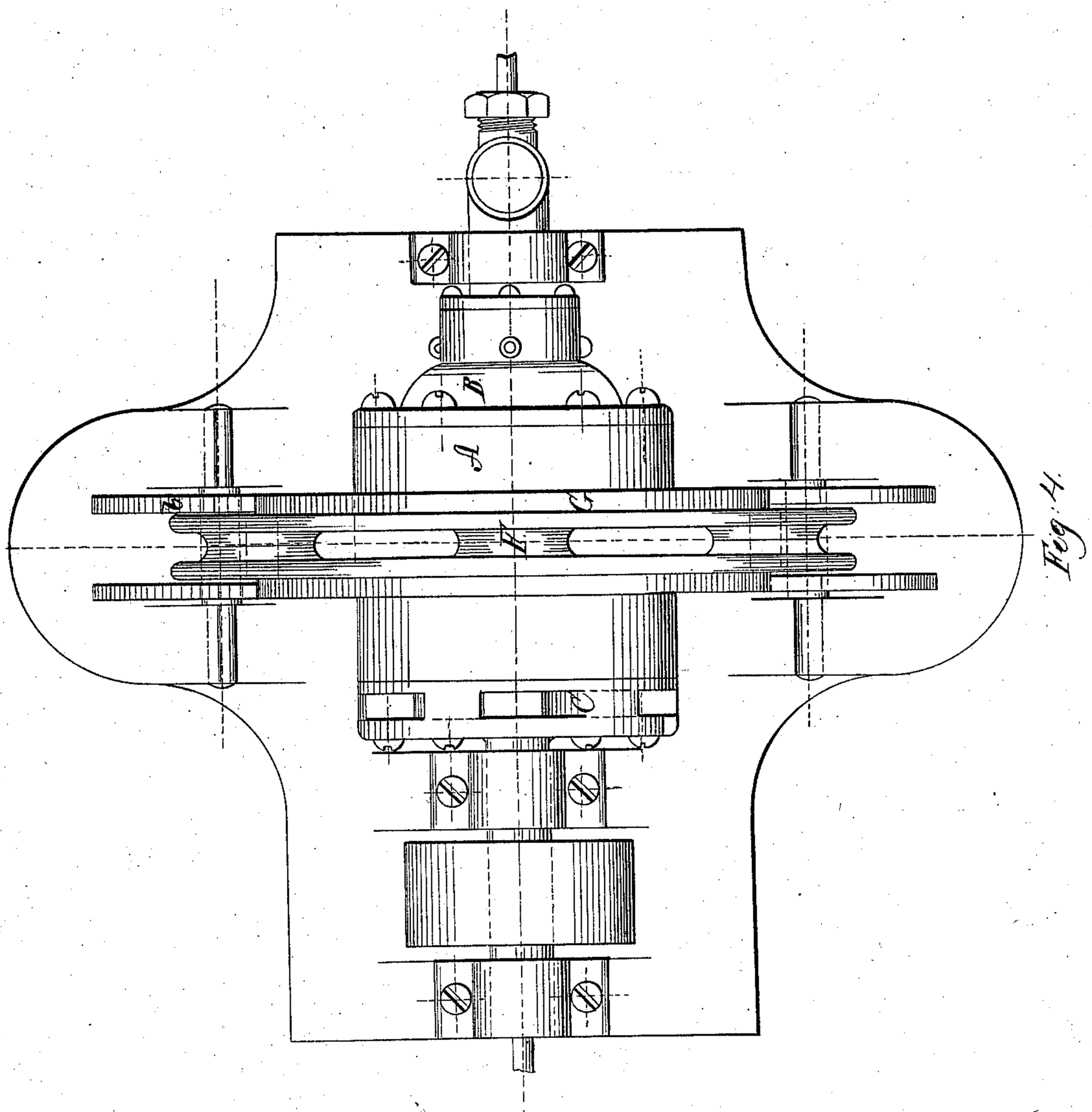


Fig. 1.

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3 Sheets-Sheet 3.

# J. D. Whelpley,

## Rotary Steam Engine.

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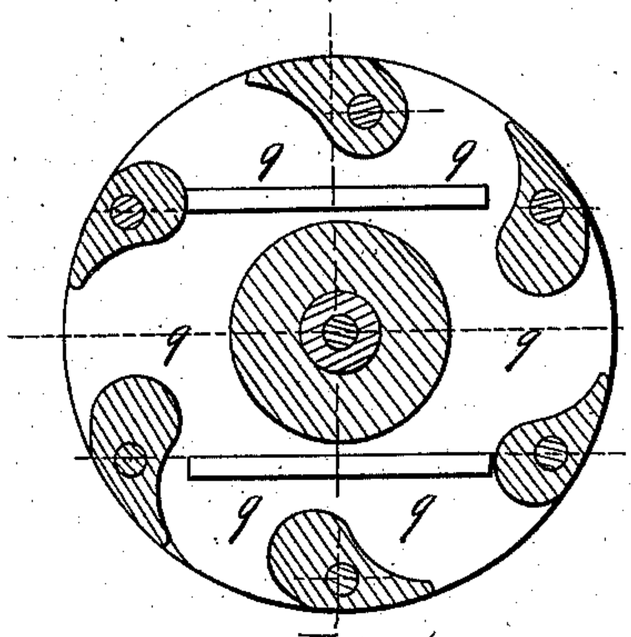



Fig. 7.

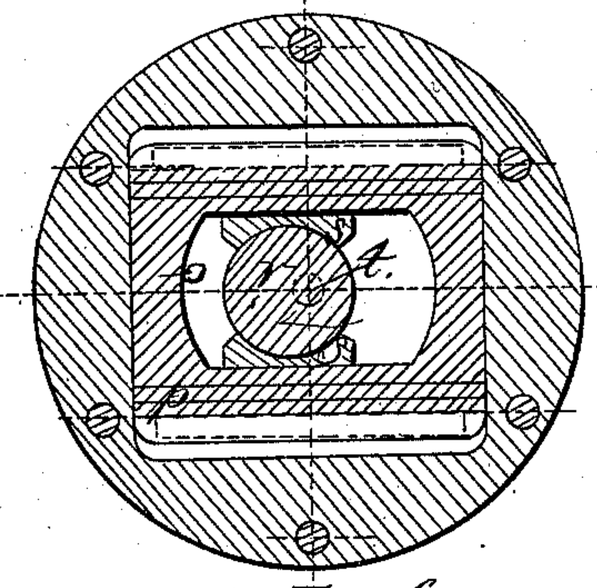
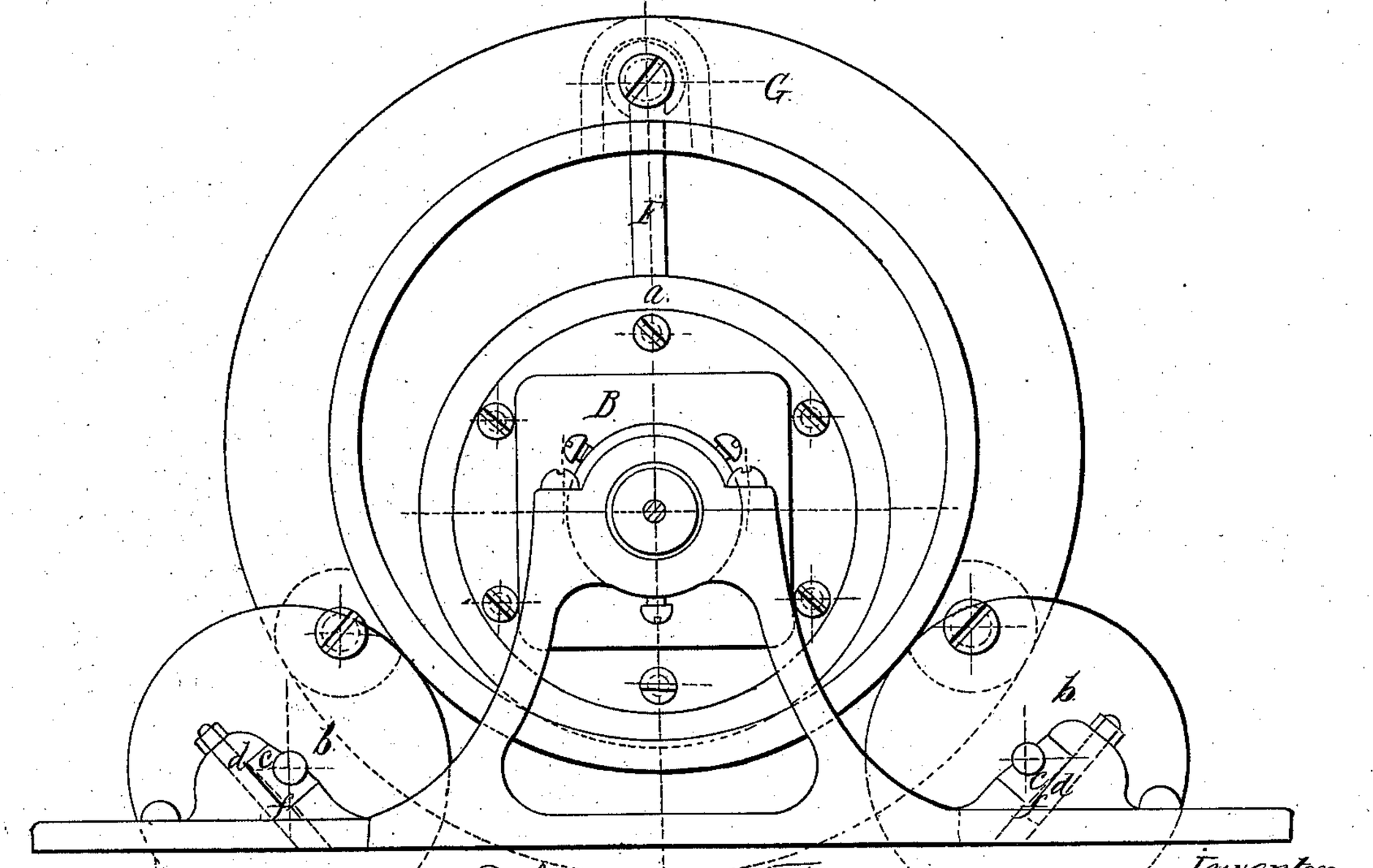



Fig. 6.

Fig. 5.




Witnesses:

Jacob J. Stover.

Thos. Crank

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# United States Patent Office.

JAMES D. WHELPLEY, OF BOSTON, MASSACHUSETTS.

*Letters Patent No.* 83,427, *dated October* 27, 1868.

## IMPROVEMENT IN ROTARY STEAM-ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, JAMES D. WHELPLEY, of Boston, in the county of Suffolk, and State of Massachusetts, have invented a new and useful Improvement in Revolving Cylinder-Engines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawing, forming a part of this specification.

Figure 1 is a transverse section.

Figure 2 is a plan of the valve and valve-gearing induction-side.

Figure 3 is a section at right angles to section of fig. 1, through the trunnion of the valve-chest.

Figure 4 is a plan of the machine in position.

Figure 5 is an end elevation induction-end.

Figure 6 is the valve and valve-gearing exhaust-side.

Figure 7, the exhaust-passages.

Figs. 2, 3, 6, 7 are drawn from cuts or sections at right angles to the section of fig. 1, and are taken on the lines marked on that figure §2, §3, §6, §7 respectively.

Like figures indicate like parts in all the figures.

A is a cylinder, of iron, having on its ends the induction-valve chest B and exhaust-valve chest C. At right angles to the axis of this cylinder is excavated a cylindrical cavity, D, in which plays piston E, having attached to it piston-rod F. This rod is hooked to ring G, the inner diameter of which is somewhat greater than the diameter of cylinder A, increased by the length of stroke of the engine. The centre of ring G is adjusted, at a point half the length of the stroke distant from the axis of cylinder A, by means of a friction-cradle. This consists of two friction-wheels *b*, fixed in the frame of the engine, and bearing on the outside of ring G, and a ring, *a*, bearing on the inside of ring G, intermediate between the points of contact with wheels *b*, and supporting it against the cylinder A. The ring *a* is loose on cylinder A, and runs in grooves in ring G. This friction-cradle, with ring G, forms an abutment for the piston in the revolution of the engine, and renders the work of the engine freer from friction than in the ordinary cross-head type of engine, or in the oscillator.

By making ring *a* concentric with cylinder A, and as large as possible, the sliding friction is considerably reduced, and but little power lost, for its motion upon cylinder A will be in the direction of general revolution, and at a rate faster than the motion of the cylinder, in the proportion of the difference between the diameter of ring G and ring *a*, divided by the diameter of ring *a*. Thus, ring G being 4 and ring *a* 3, the ratio of travel would be 1 in 3, or ring *a* would move, on cylinder A, one revolution relative in every three of the engine.

Friction-rolls *b* are set up against the flange of abutment-ring G by the device shown in fig. 5.

*c* is a box set in a recess of the frame, so as to receive pressure at an angle of forty-five degrees with the frame. At the bottom of this recess is a wedge, *f*, on which box *c* rests, and this wedge is driven up from time to time, as box *c* wears, by means of bolt *d*, which hooks on the head of wedge *f*, and drives it by tightening the check-nut on the point of said bolt. The ring G may be separated, and each part of it moved towards the ends of cylinder A, and the inner ring, *a*, may bear against any part of cylinder A, or against its trunnions, but I prefer that ring G shall belt the cylinder A as near the centre as possible.

At the induction-end of cylinder A, valve-ports *e* open into valve-chest B. This chest is continued into a sort of neck or trunnion which rests, through a stuffing-box shown in fig. 3, upon the induction-pipe H, and revolves upon it.

This stuffing-box is of the following construction: Inside of the neck of valve-chest B are three gibs, *j*, pressed upon the pipe H by set screws *u*. At the outer end of these is a bevelled packing-plate, *v*, fitting the neck tightly, and at the end of the neck a stuffing-box, *w*, is screwed, having its male end bevelled in the opposite direction. Between these bevelled surfaces the packing *y* is inserted, which is of course pressed very tightly upon pipe H.

Induction-pipe H is firmly fixed to the frame of the machine, and projects into the outer chest, B. Two ears project from it, continuous with the sides of the pipe, into eccentric, *k*, of the valve-gear. Around this eccentric is the gib *i*, fig. 2, which operates to work valve-plate *h*. In the centre of the eccentric, *k*, a space is cut, as shown, fig. 2, in which eccentric, *m*, and gib *l* are operated. Eccentric, *m*, is a circular plate, fixed eccentrically upon rod *n*, passing through induction-pipe, H and out through a stuffing-box, as shown in fig. 1. Upon turning this rod by a hand-wheel or other suitable device, eccentric, *k*, will follow its motion, so that any desirable amount of lap and lead can be given to the induction-valve. On the exhaust-side ports *g* open into valve-chest C, which is only a narrow passage in which the valve plays. This valve consists of a plate *o*, fig. 6, packed on the cylinder-side by a steel bar set into notches in the valve, and pressed against the cylinder-valve seat by a spring or other suitable device, or it may consist of a steel bar set in a notch in the side of the cylinder, and similarly pressed against the valve, or pressed by steam against the valve. Within valve-plate *o* is eccentric, *r*, held by rod *t*, passing through the trunnion *k*, and operating the valve through gibs *s*. The outer valve-seat is like the valve-seat of an ordinary valve, and the steam exhausts into passages *q*, communicating freely with the open air. The whole of this side of the engine is supported on trunnion *k*, a hollow steel shaft which carries balance-wheel L. In small machines, cylinder A might be lagged out on either the induction or exhaust-side, so as to make the balance-wheel a part of the cylinder.

The essential novelties of this engine are mainly

points of construction requisite for working successfully a revolving cylinder-engine. With them a revolution of six hundred a minute has been reached on an engine of six-inch cylinder and four-inch stroke; and at a speed of between three and four hundred a minute, machinery has been run by the engine, estimated to take ten-horse-power net when obtained from an ordinary engine at a speed of sixty a minute. By getting high speed on the engine, the vast cost of intermediate shafting for high-speed machinery is avoided, and we entirely escape the great expense of moving this shafting, often one-half of the power.

I claim as my invention, and desire to secure by Letters Patent—

1. The friction-cradle, consisting of exterior bearing-rolls *b* and interior ring *a*, in combination with abutment-ring, G, substantially as described.

2. The arrangement of the interior friction-ring *a*, whereby its axis of revolution coincides with the axis of revolution of cylinder A, substantially as described.

3. The arrangement of the steam-cylinder D, revolving on its axis, perpendicular to the axis of its piston-cavity, and carrying the reciprocating piston E, combined with rod F, abutment-ring G, and friction-roll *a*, substantially as described.

4. The arrangement of the steam-cylinder D, the reciprocating piston E, rod F, abutment-ring G, and friction-rolls *b*, substantially as described.

5. The combination of the eccentric, *m*, gib *l*, eccentric, *k*, gib *i*, and valve-plate *h*, with reference to the rod *n*, and ears on the induction-pipe H, substantially as described.

6. The arrangement of the valve-chest C, valve-plate *o*, with the packing *p*, and adjustable eccentric, *r*, substantially as described.

7. The arrangement of the cylinder A, with the trunnion K revolving with it, abutment-ring G, and its friction-cradle *b* and *a*, and the neck B of the steam-chest revolving with cylinder A, with reference to the fixed steam-pipe H, substantially as described.

8. The arrangement of the valve-plate *h*, revolving about a ring, *k*, held from revolution by ears on pipe H, thereby allowing linear motion when combined with the adjustable interior eccentric, *m*, pivoted on the axis of revolution of cylinder A, substantially as described.

JAMES D. WHELPLEY.

Witnesses:

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THOS. WM. CLARKE.