

No. 845,270.

PATENTED FEB. 26, 1907.

R. F. SCHMIDT.
ROTARY ENGINE.

APPLICATION FILED JULY 28, 1906.

2 SHEETS—SHEET 1.

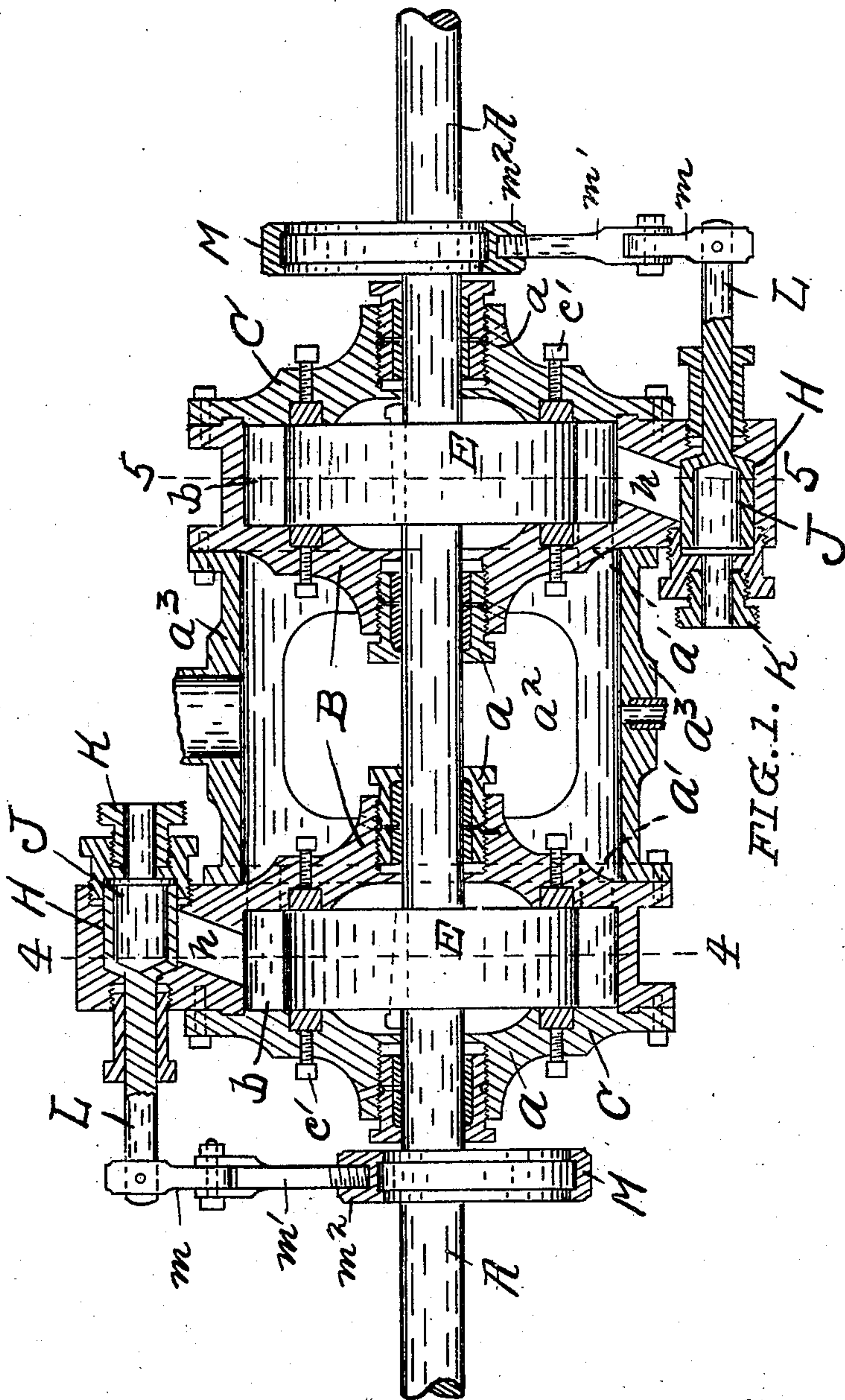


FIG. 1.

Witnesses

Brayton S. Richards
Ada Burnett

Inventor

Rudolph F. Schmidt
By James A. Ramsey
Attorney

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2 SHEETS—SHEET 2.

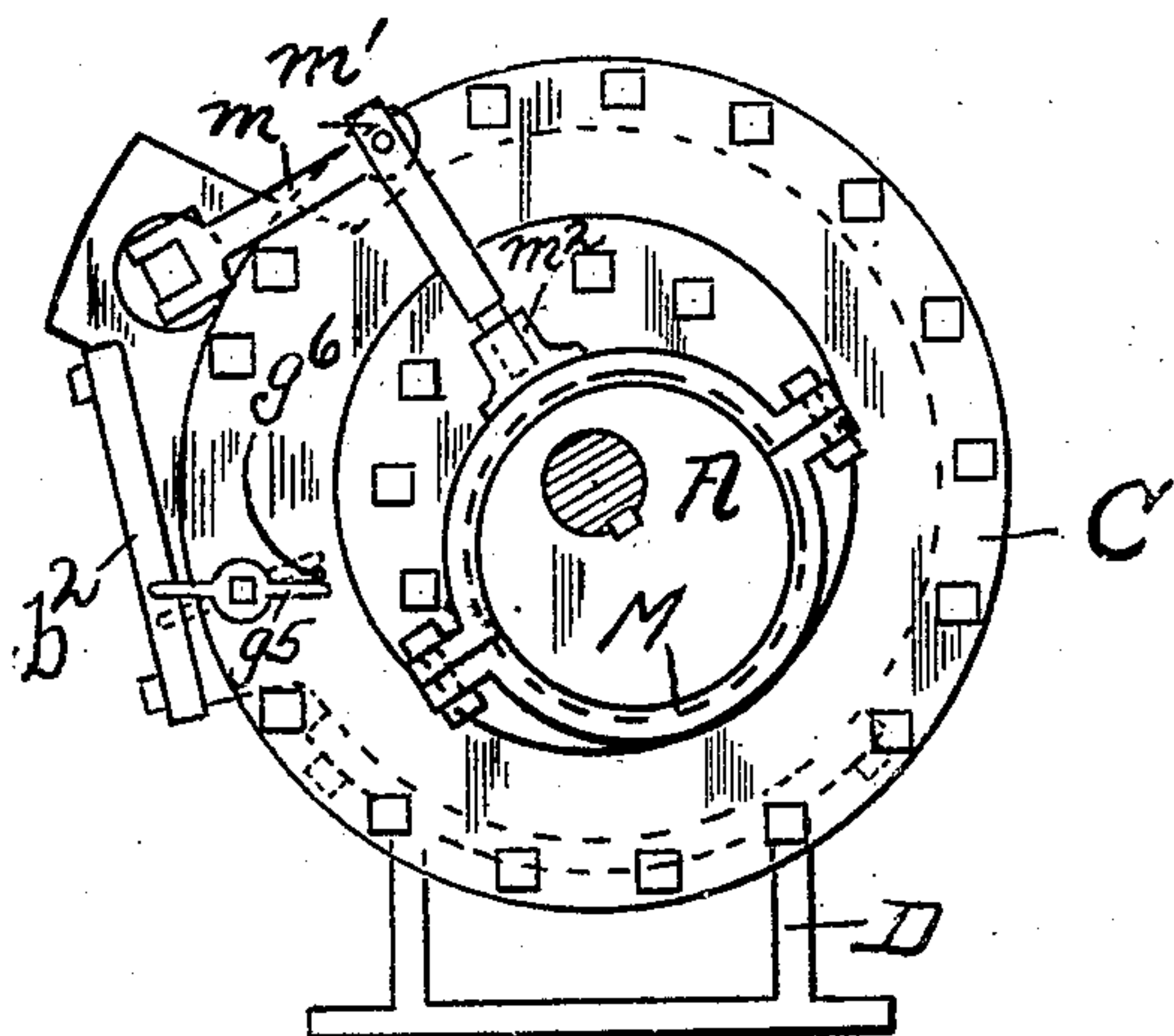


FIG. 2.

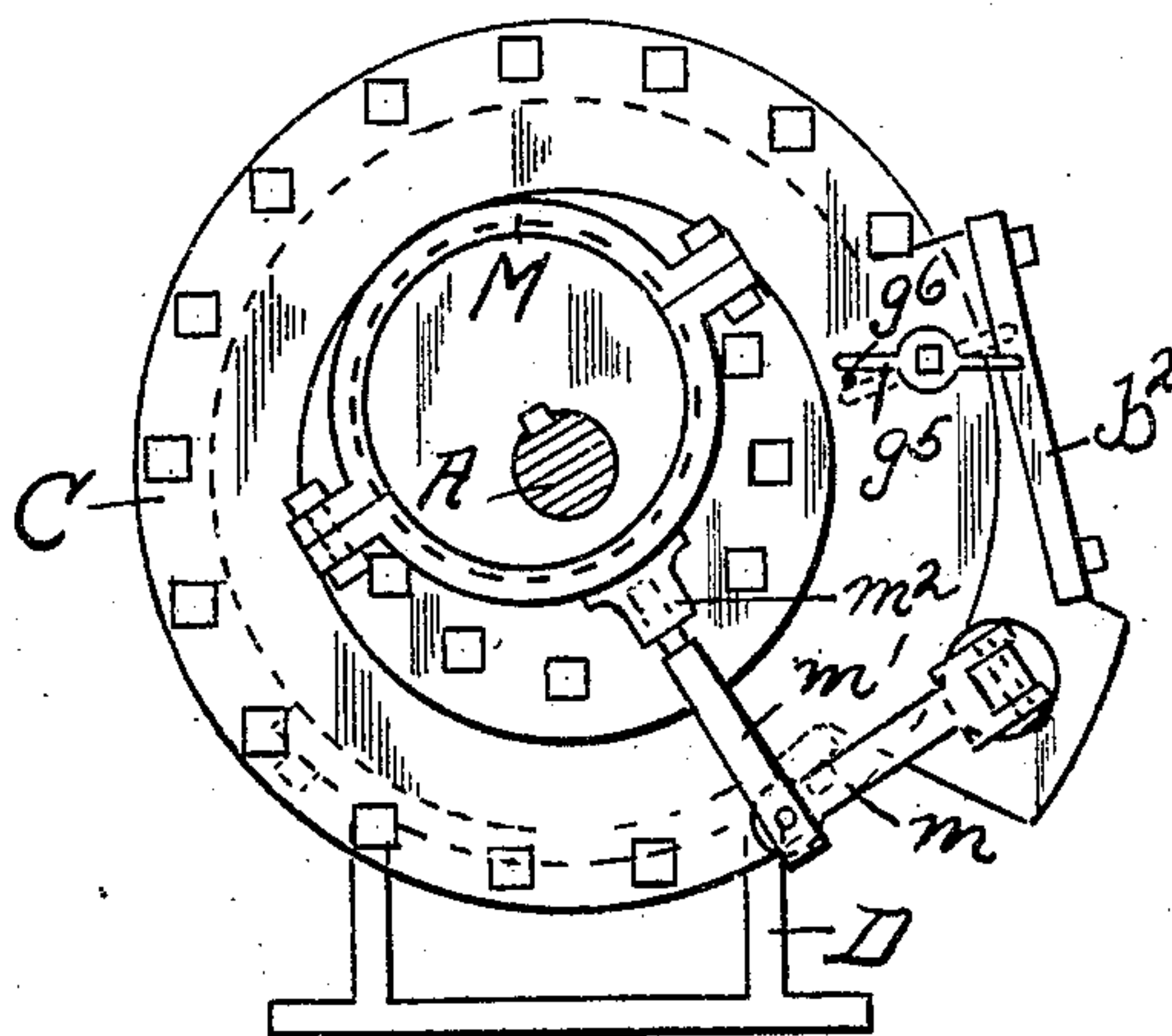


FIG. 3.

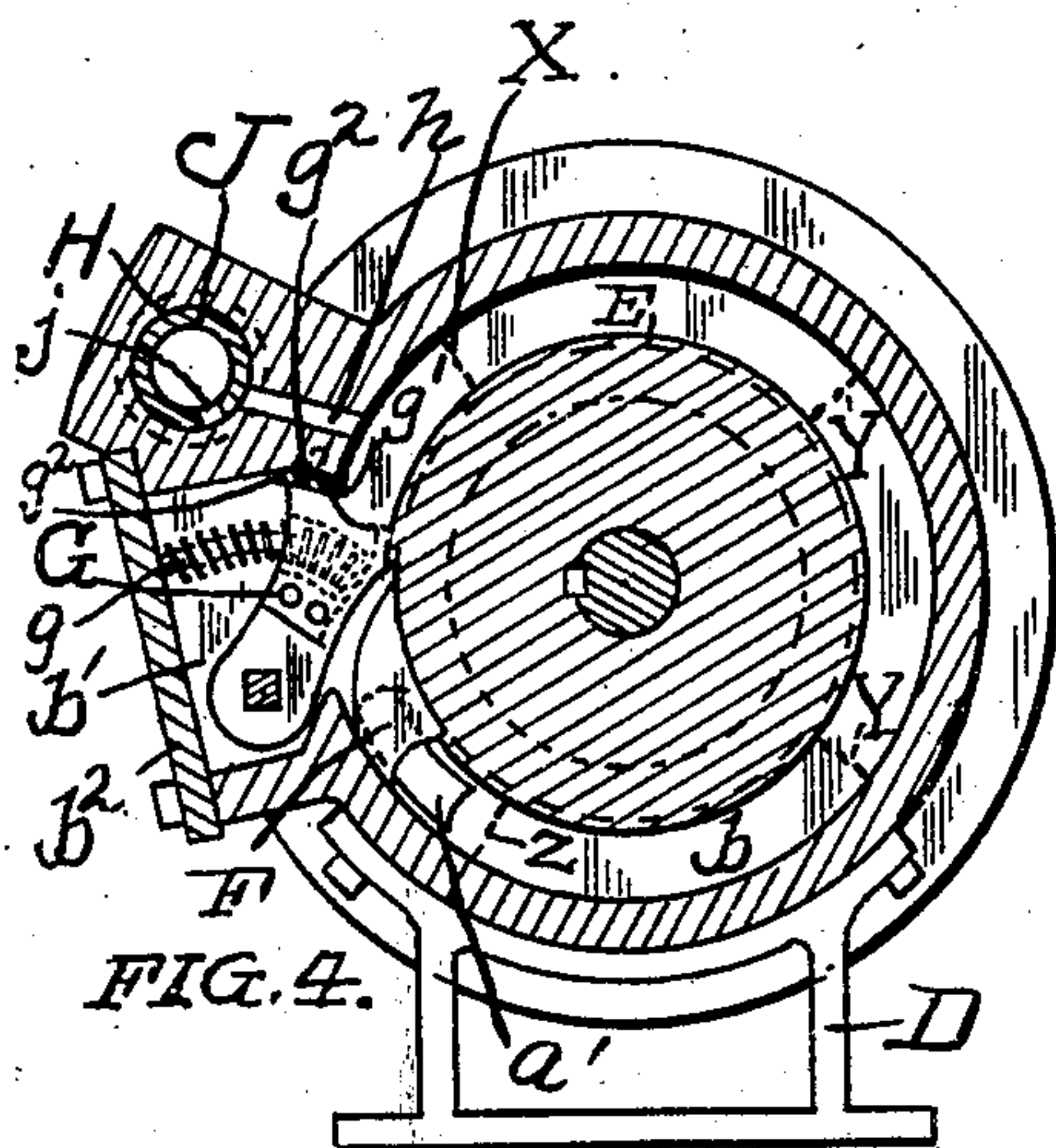


FIG. 4.

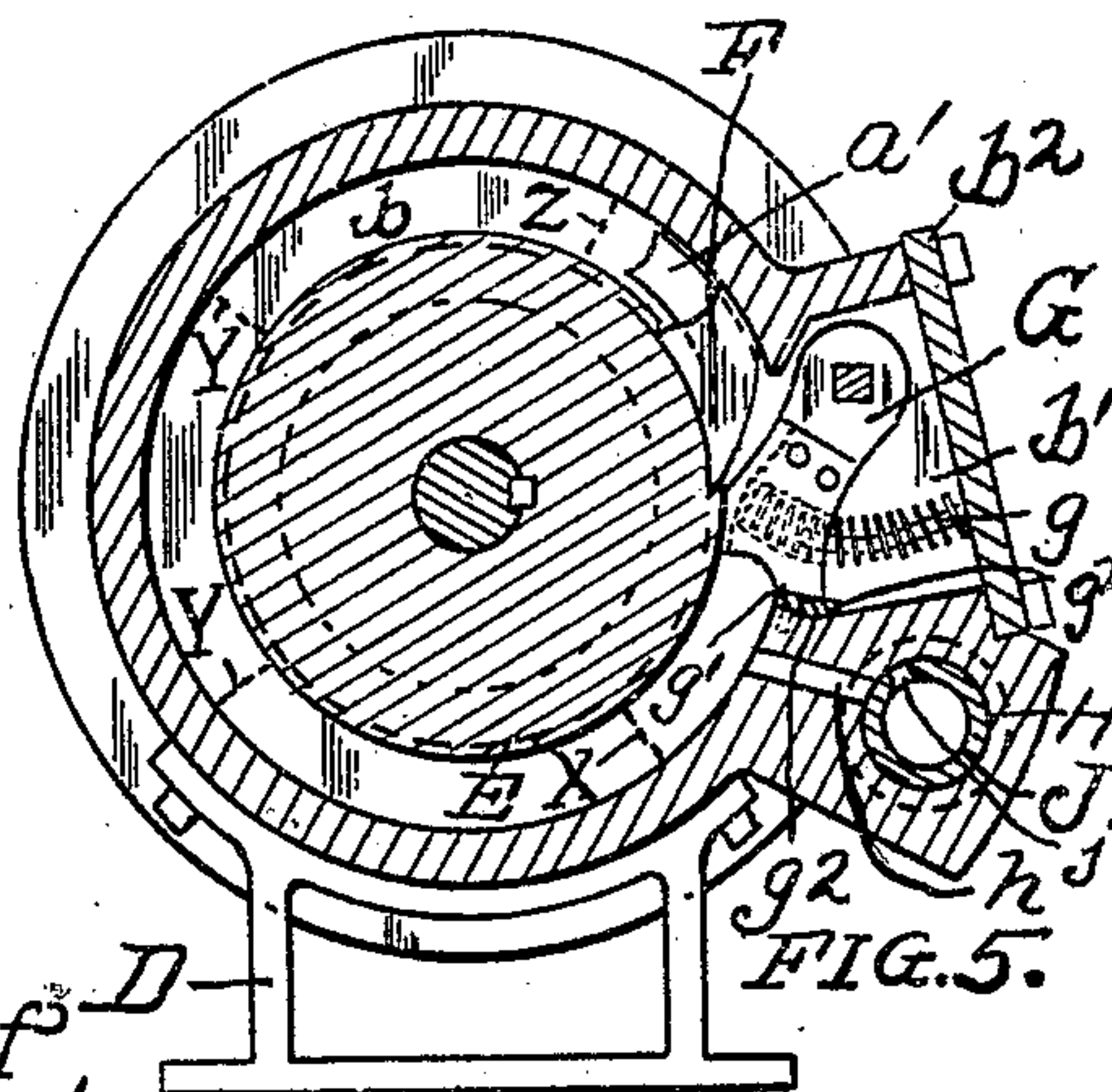


FIG. 5.

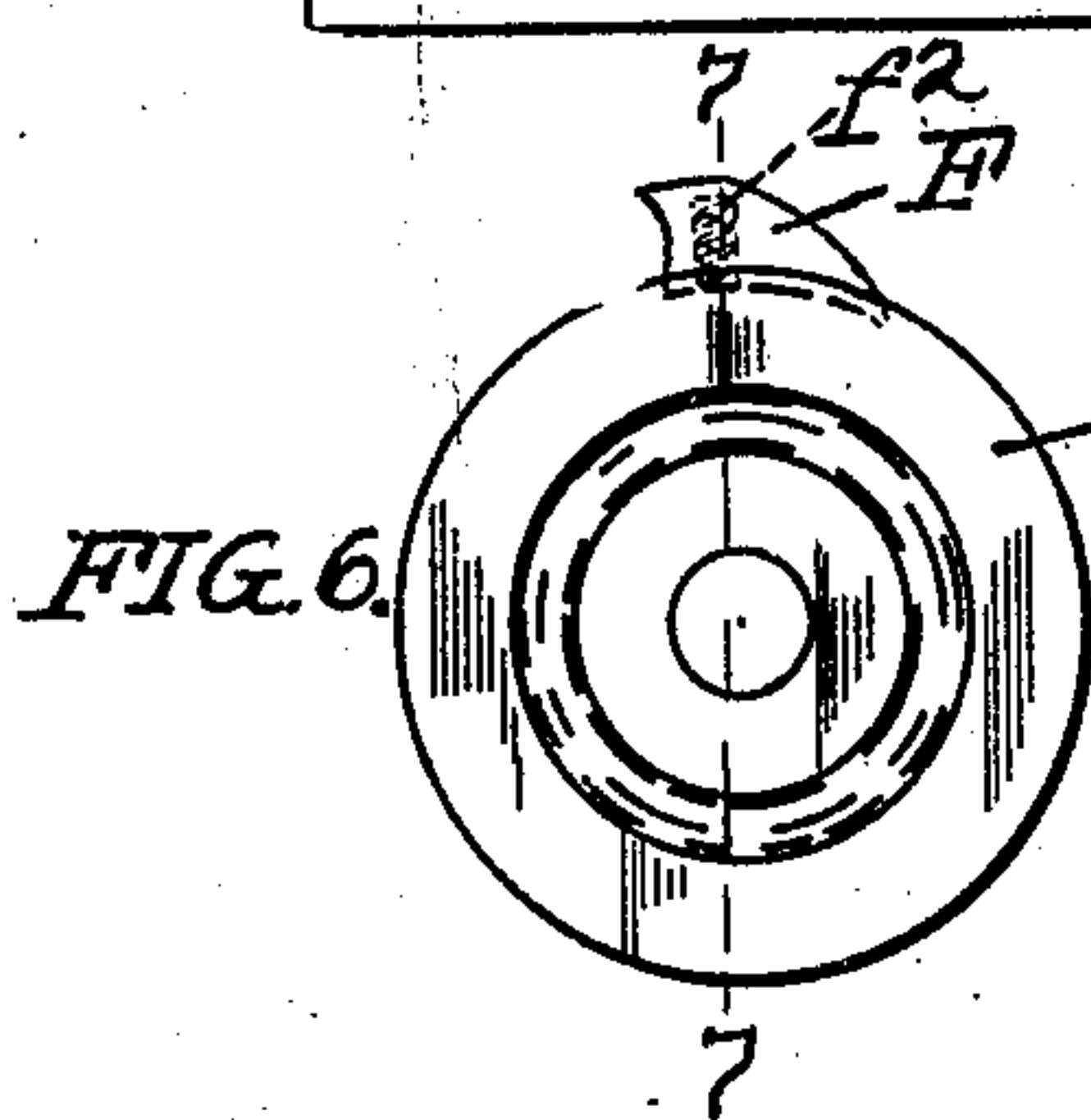


FIG. 6.

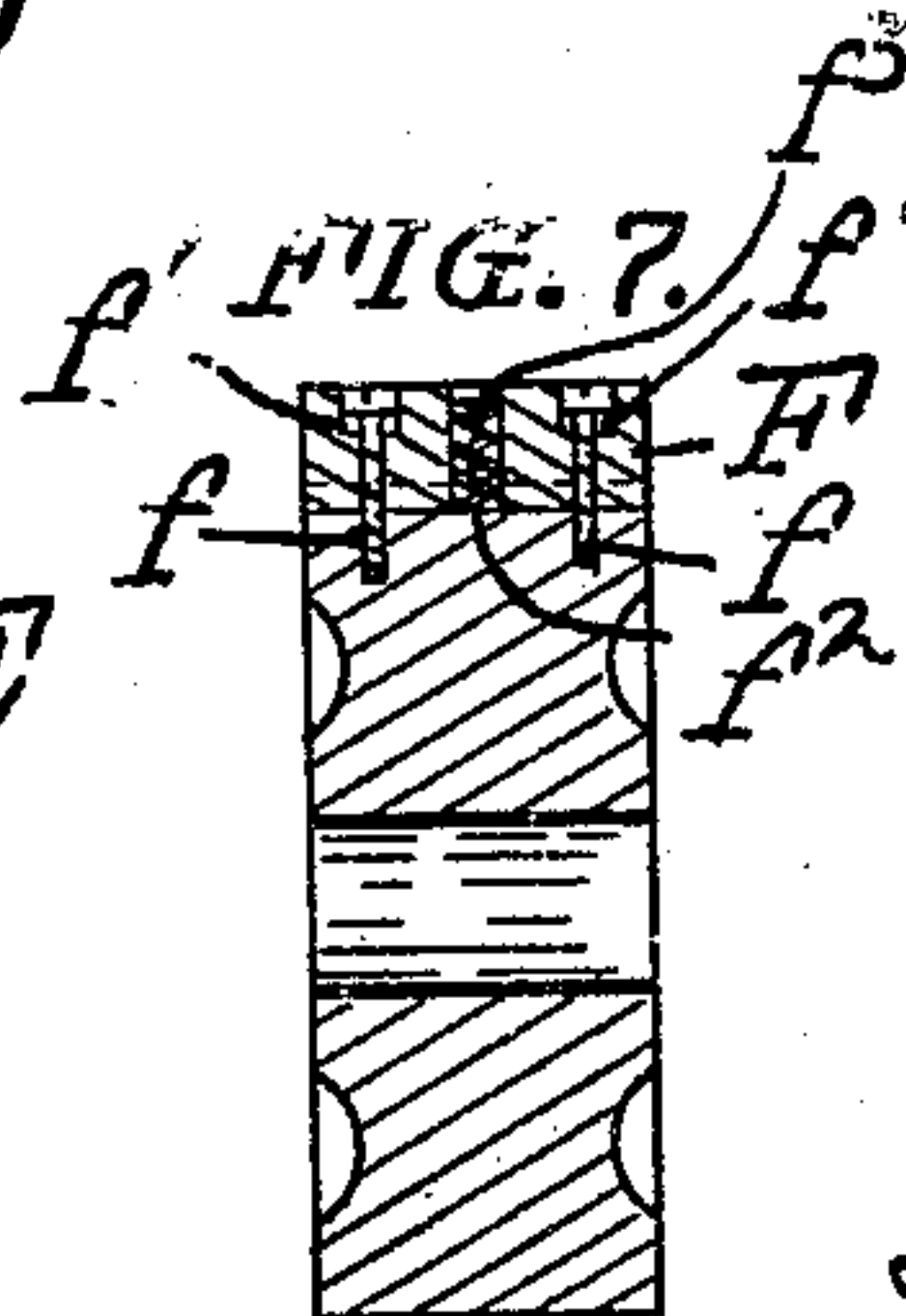


FIG. 7.

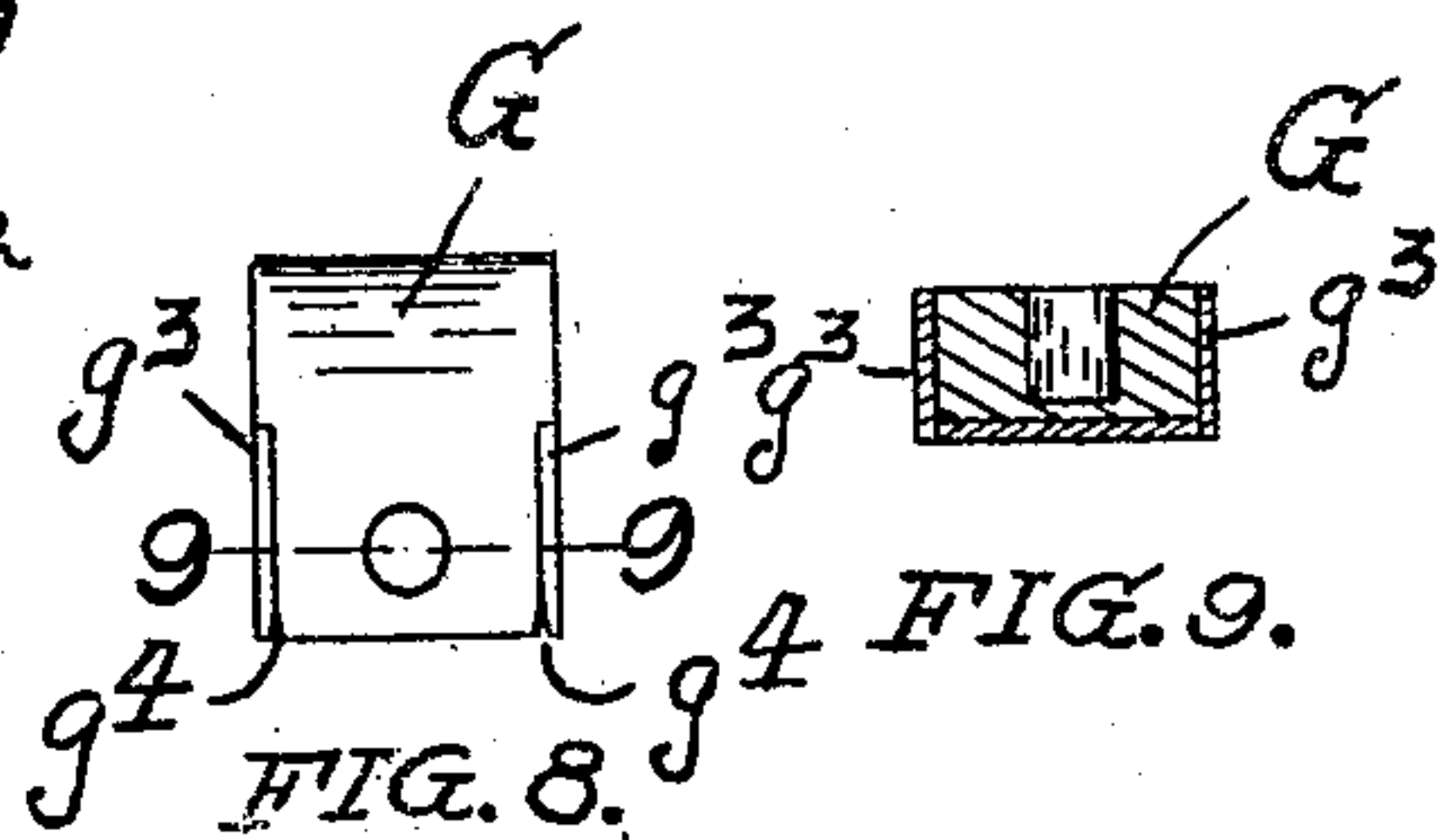


FIG. 8.

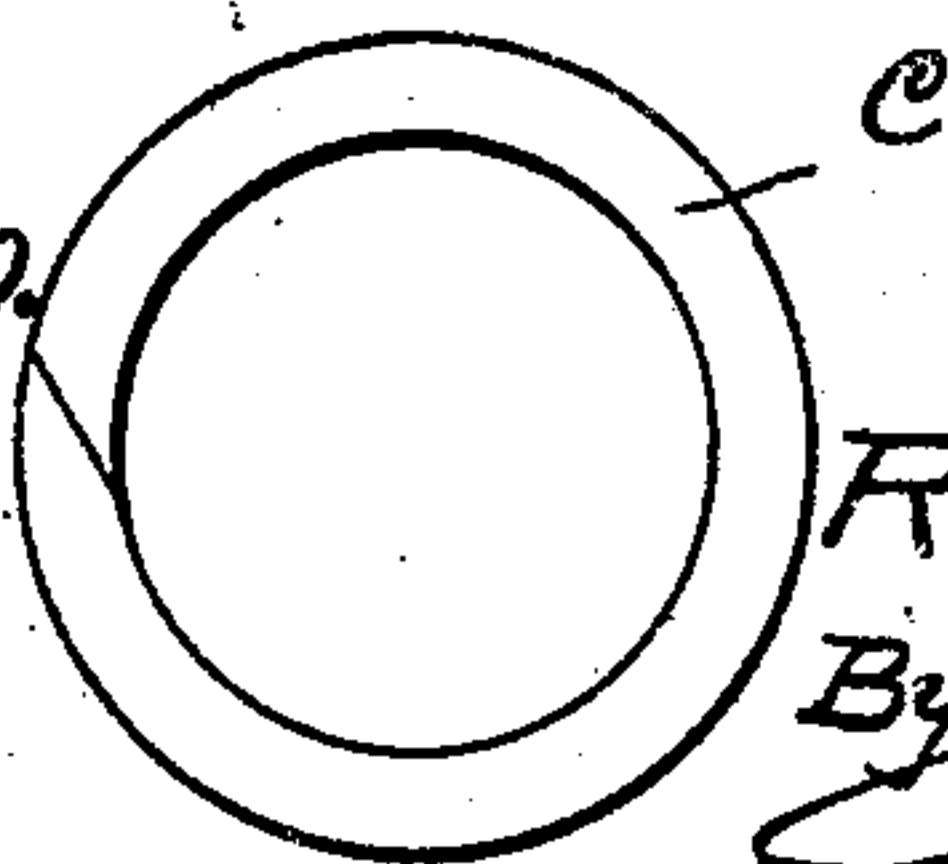
FIG. 9.

Witnesses

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FIG. 10.



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UNITED STATES PATENT OFFICE.

RUDOLPH F. SCHMIDT, OF CINCINNATI, OHIO.

ROTARY ENGINE.

No. 845,270.

Specification of Letters Patent.

Patented Feb. 26, 1907.

Application filed July 28, 1906. Serial No. 328,158.

To all whom it may concern:

Be it known that I, RUDOLPH F. SCHMIDT, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Rotary Engines, of which the following is a specification.

The object of my invention is to provide a rotary engine of improved construction and operation; and my invention consists in the combination and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a longitudinal section of a pair of engines embodying my invention; Fig. 2, an end view of one of the engines; Fig. 3, an end view of the other engine; Fig. 4, a section on line 4 4 of Fig. 1; Fig. 5, a section on line 5 5 of Fig. 1; Fig. 6, a side elevation of a rotary piston; Fig. 7, a section on line 7 7 of Fig. 6; Fig. 8, a plan view of a back-pressure block; Fig. 9, a section on line 9 9 of Fig. 8, and Fig. 10 a side view of a packing-ring.

The engine-shaft A is mounted in suitable bearings *a* in castings B and C, which are supported by standards D, bolted to castings B. Castings B inclose rotary pistons E, keyed to shaft A so as to form annular chambers *b* around pistons E, and castings C are bolted to castings B to inclose pistons E. Piston-heads F are mounted in suitable notches in the peripheries of pistons E and are fitted to operate in chambers *b*. The piston-heads F are secured in position by means of screws *f*, taking through wells or sockets *f'* therein, so as to permit of a slight radial movement of the piston-heads. Springs *f*² are mounted in sockets *f*³ in the piston-heads and tend to force the piston-heads outwardly against the outer walls of chambers *b*. Exhaust-openings *a'* are provided in the walls of castings B and lead to exhaust-chamber *a*², which is formed by a cylindrical casting *a*³, bolted to castings B.

In chambers *b'* at one side of castings B are pivoted back-pressure blocks G, which are yieldingly held against the peripheries of pistons E by means of springs *g*. Chambers *b'* are closed by plates *b*², bolted to castings B, and which may be readily removed in order to render the blocks G easily accessible for renewal or repair. Blocks G closely fit the walls of chambers *b* and *b'*, so as to prevent as far as possible leakage of steam into chambers *b'*, and the portions of the blocks

contacting with pistons E are faced with Babbitt metal. The free ends *g'* of blocks G are shaped to the circles of which the block-pivots are the centers, and plates *g*², similarly shaped, are set in the walls of chambers *b'*, so as to form a close fit when the blocks swing on their pivots. Spring-plates *g*³ are secured to the sides of blocks G, and recesses *g*⁴ are formed between the ends of the plates and the sides of blocks G, so as to permit access of steam to the inner sides of the plates to spread them against the walls of chambers *b* and *b'* to further prevent leakage.

The forward sides of piston-heads F are sloped or beveled down to the peripheries of pistons E, so that as pistons E rotate blocks G ride thereon and are swung outwardly into chambers *b'* as the pistons pass and then are forced inwardly by springs *g* to contact with the pistons behind the piston-heads. By this arrangement it will be seen that the outward swing of the blocks G are readily caused by the passage of piston-heads F without cramping or binding.

Annular grooves are provided in castings B and C opposite to the sides of pistons E and split packing-rings *c* placed therein. These rings are so shaped as to be sprung into place, making a tight contact with the outer walls of their containing grooves, and set-screws *c'* are provided for pressing them against the sides of pistons E. By these means a tight joint is made to prevent the escape of steam from chamber *b*.

Valve-chambers H, having ports *h*, are formed in castings B and hollow rotary valves J mounted therein. The valves J are in the form of an open cup having ports *j*, adapted to register with ports *h* as the valves rotate. Steam-couplings K communicate with valve-chambers H and serve to supply steam to valves J. The valves J are carried by shafts L, having arms *m*, pivoted to coupling-rods *m'*, carried by eccentrics M on shaft A. Rods *m'* are threaded into sockets *m*² on eccentrics M, so as to render their lengths adjustable to properly communicate motion from eccentrics M to valves J.

It will be seen that as shaft A rotates valves J are caused to partially rotate by the action of eccentrics M on arms *m* and the ports *j* caused to register with ports *h* to admit steam to chambers *b*. The throw of eccentric M and the lengths of arms *m* and rods *m'* are such that when the rear ends of piston-

heads F are in the positions indicated by lines X ports *j* are just beginning to register with ports *h*, and steam is admitted between piston-heads F and back-pressure blocks G, thus causing the pistons E to rotate under the influence of the pressure and expansion of the steam. When the rear ends of the piston-heads are in the position indicated by lines Y, the ports *j* are fully open, and at lines Z, just before the piston-heads pass exhaust-openings *a'*, ports *j* are closed and the supply of steam shut off. Then as the piston-heads pass exhaust-openings *a'* chambers *b* are exhausted. The piston-heads then pass blocks G, swinging them outwardly, and steam again admitted when the piston-heads reach lines X, thus continuing the rotations of pistons E, and consequently shaft A.

It will be noted that the two pistons E and their accompanying parts constitute two separate engines, which are exact duplicates of each other, set oppositely on shaft A, so that when one piston-head is passing its corresponding block and the supply of steam cut off the other is being supplied with steam. By this arrangement I am enabled to dispense with the use of a fly-wheel to continue and steady the motion of shaft A. By employing but one piston-head I am enabled to apply the steam thereto through a large portion of its revolution.

In order to reverse the motion of shaft A, I extend the shafts upon which blocks G are mounted through the walls and provide them with arms *g*⁵, by means of which blocks G may be swung out of the way of piston-heads F and locked in this position by inserting a pin *g*⁶ in a suitable hole in casing B. By this arrangement a duplicate set of engines may be mounted on shaft A to rotate it in the reverse direction and the shaft rotated in either direction by locking the blocks G of one set of engines in idle position and operating the other set of engines.

While I have illustrated and described the preferred construction for carrying my invention into effect, it is capable of variation without departing from the spirit of the invention. I therefore do not wish to be limited to the exact construction shown in the drawings; but

What I claim as new, and desire to secure by Letters Patent, is—

1. In a rotary engine, the combination of shaft A; castings B and C mounted on shaft A and provided with piston-chambers *b*, back-pressure-block chambers *b'* and valve-chambers H; exhaust-openings *a'*; pistons E mounted in chambers *b*; piston-heads F on pistons E; back-pressure blocks G in chambers *b'*; valves J in chambers H; shafts L carrying valves J; arms *m* on shafts L; eccentrics M on shaft A; and coupling-rods *m'* connecting eccentrics M and arms *m*, substantially as set forth.

2. In a rotary engine, the combination of shaft A, castings B and C mounted on shaft A and provided with piston-chambers *b*, back-pressure-block chambers *b'*, and valve-chambers H; exhaust-openings *a'*; pistons E mounted in chambers *b*; piston-heads F on pistons E; annular chambers in castings B and C opposite the sides of pistons E; packing-rings *c* in the chambers; set-screws *c'* for adjusting the packing-rings; back-pressure blocks G in chambers *b'*; valves J in chambers H; shafts L carrying valves J; arms *m* on shafts L; eccentrics M on shaft H; and adjustable coupling-rods *m'* connecting eccentrics M and arms *m*, substantially as set forth.

3. In a rotary engine, the combination of shaft A; castings B and C mounted on shaft A and provided with piston-chambers *b*, back-pressure-block chambers *b'* and valve-chambers H; exhaust-openings *a'*; pistons E mounted in chambers *b*; piston-heads F secured to pistons E by means of screws *f*¹ and springs *f*²; annular chambers in castings B and C opposite the sides of pistons E; packing-rings *c* in the chambers; set-screws *c'* for adjusting the packing-rings, back-pressure blocks G in chamber *b'* and provided with side plates *g*; valves J in chambers H; shafts L carrying valves J; arms *m* on shafts L eccentrics M on shaft A; and adjustable coupling-rods *m'* connecting eccentrics M and arm *m*, substantially as set forth.

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Witnesses:

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