

No. 631,169.

Patented Aug. 15, 1899.

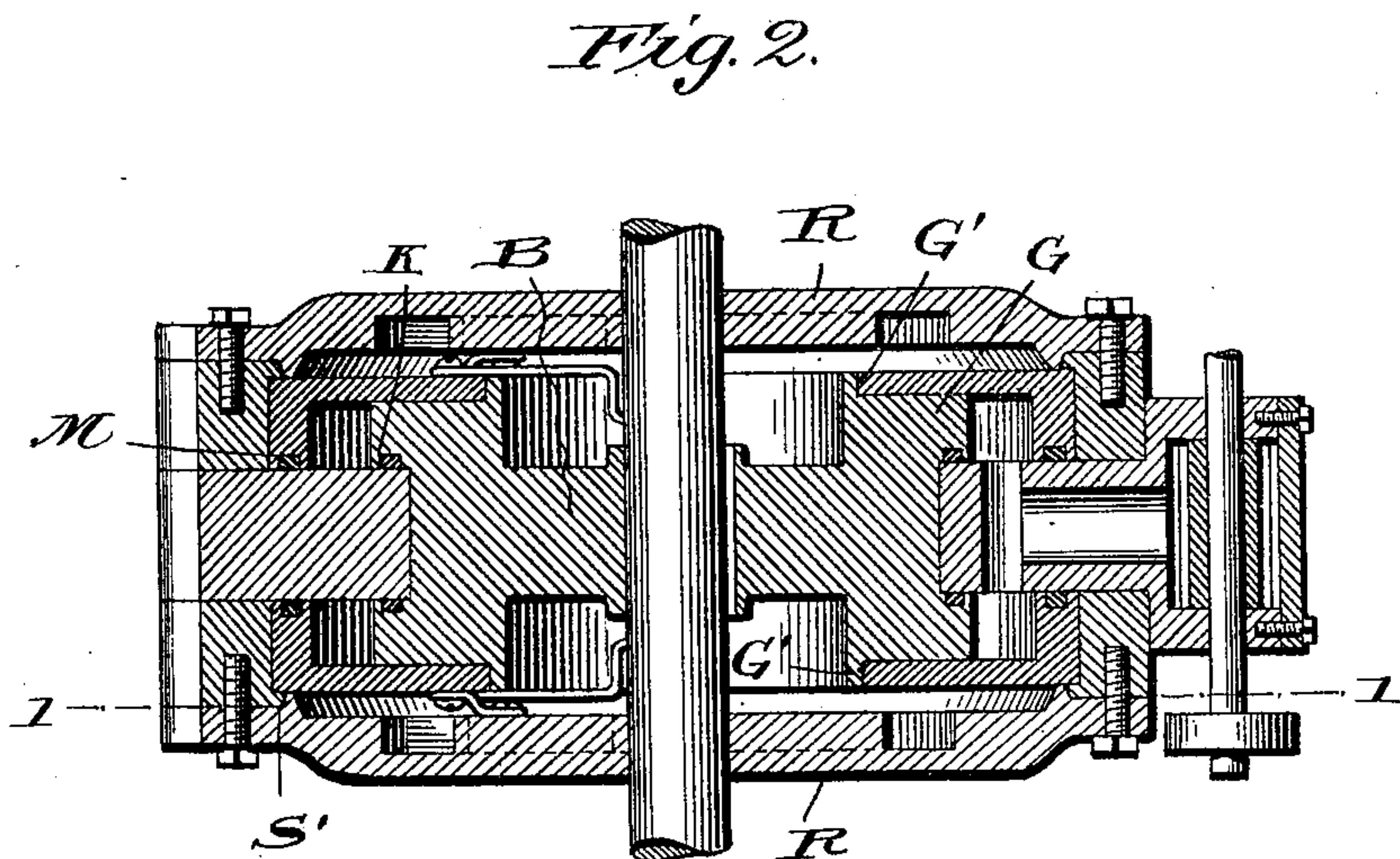
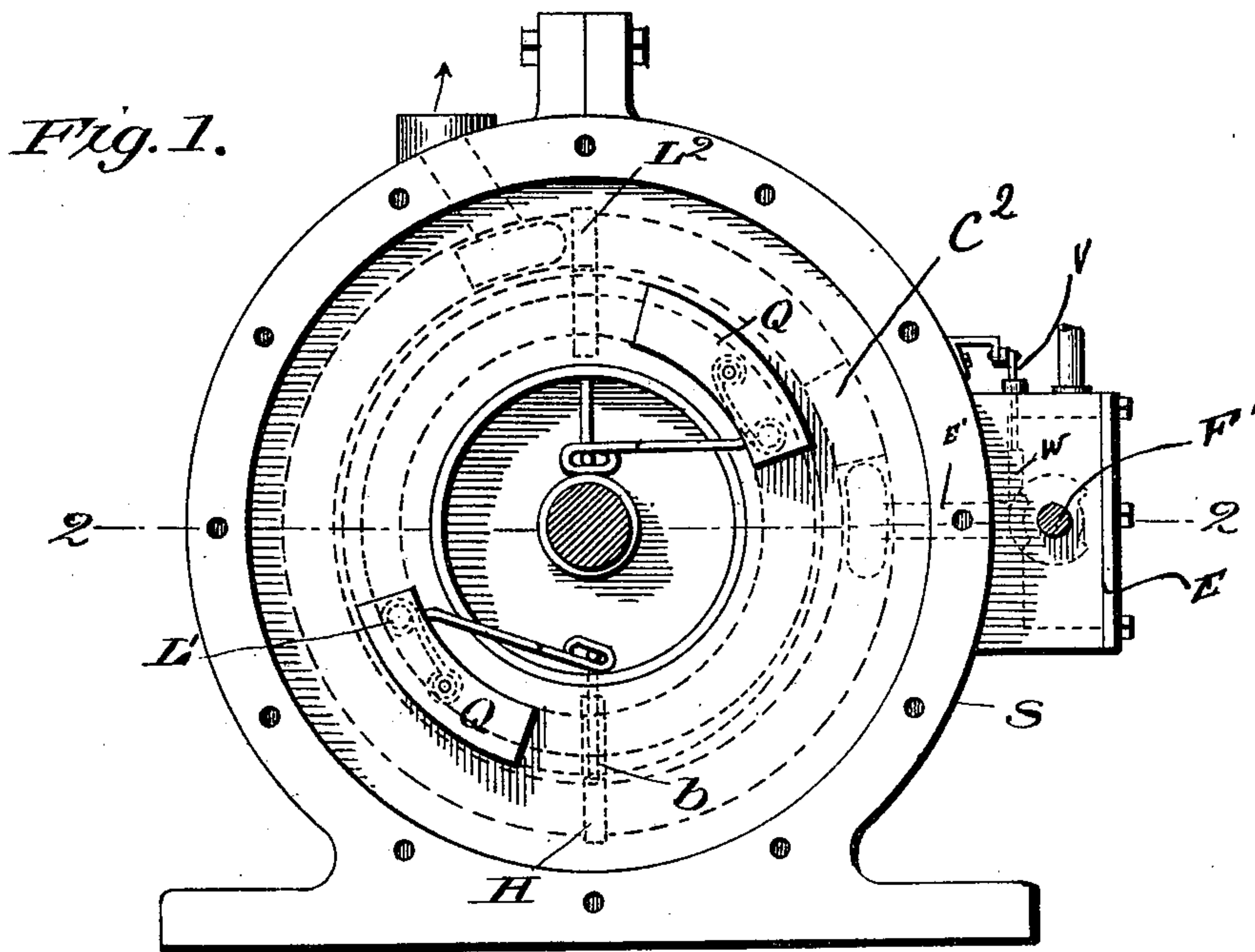
E. C. LAY & G. E. TOLIVER.

ROTARY STEAM ENGINE.

(Application filed Dec. 7, 1898.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses

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Fig. 3.

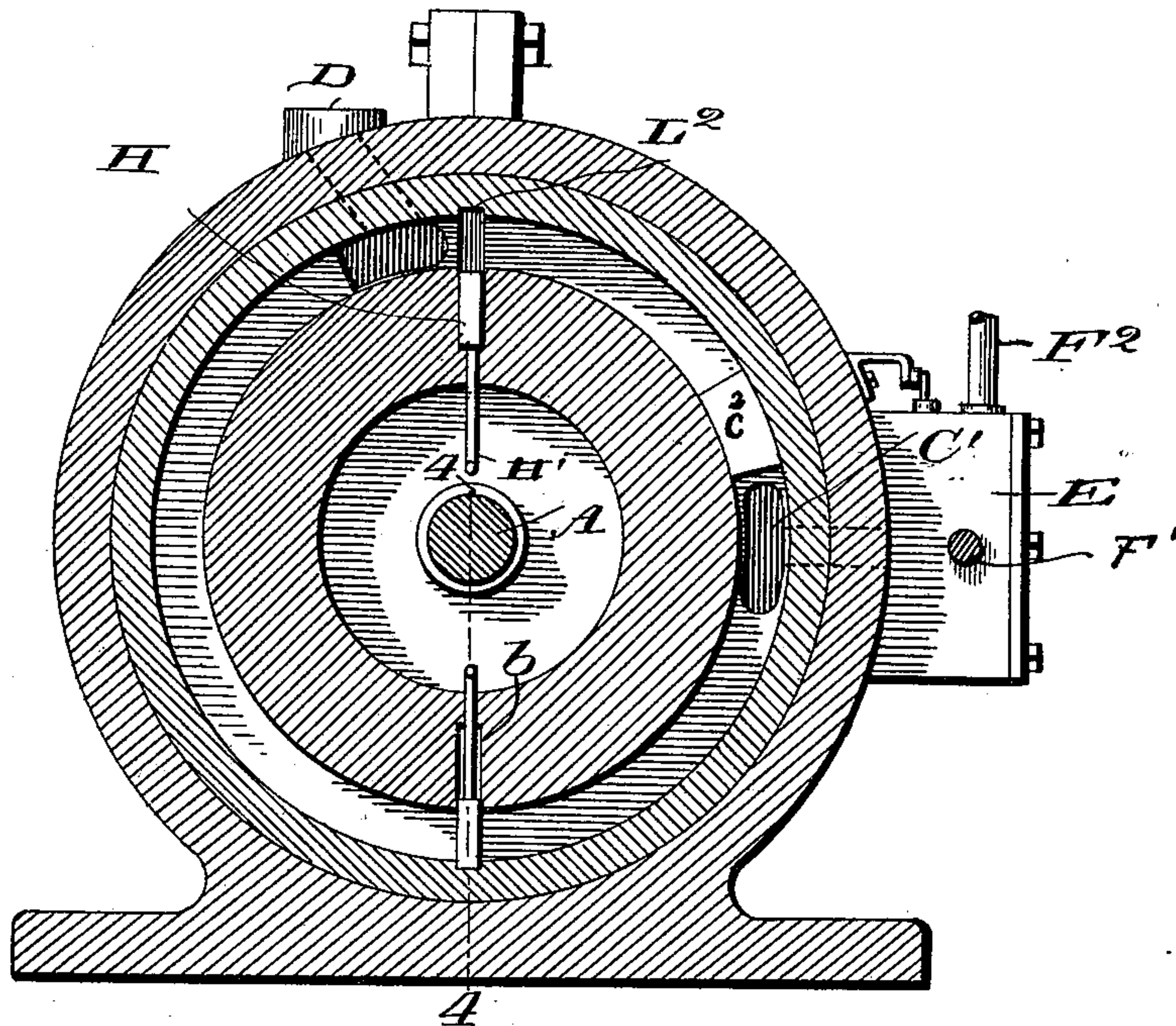
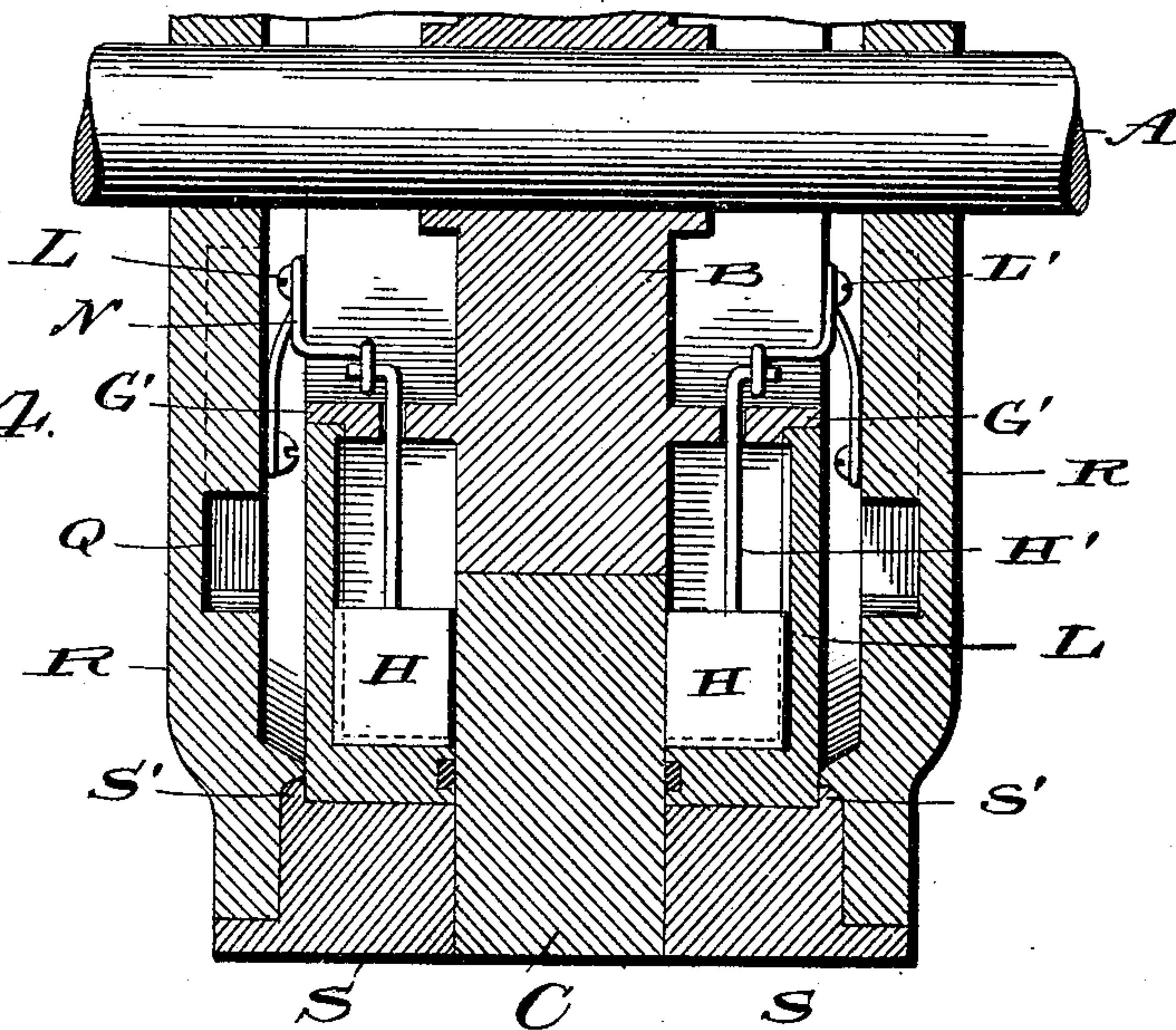


Fig. 4.



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Fig. 5.

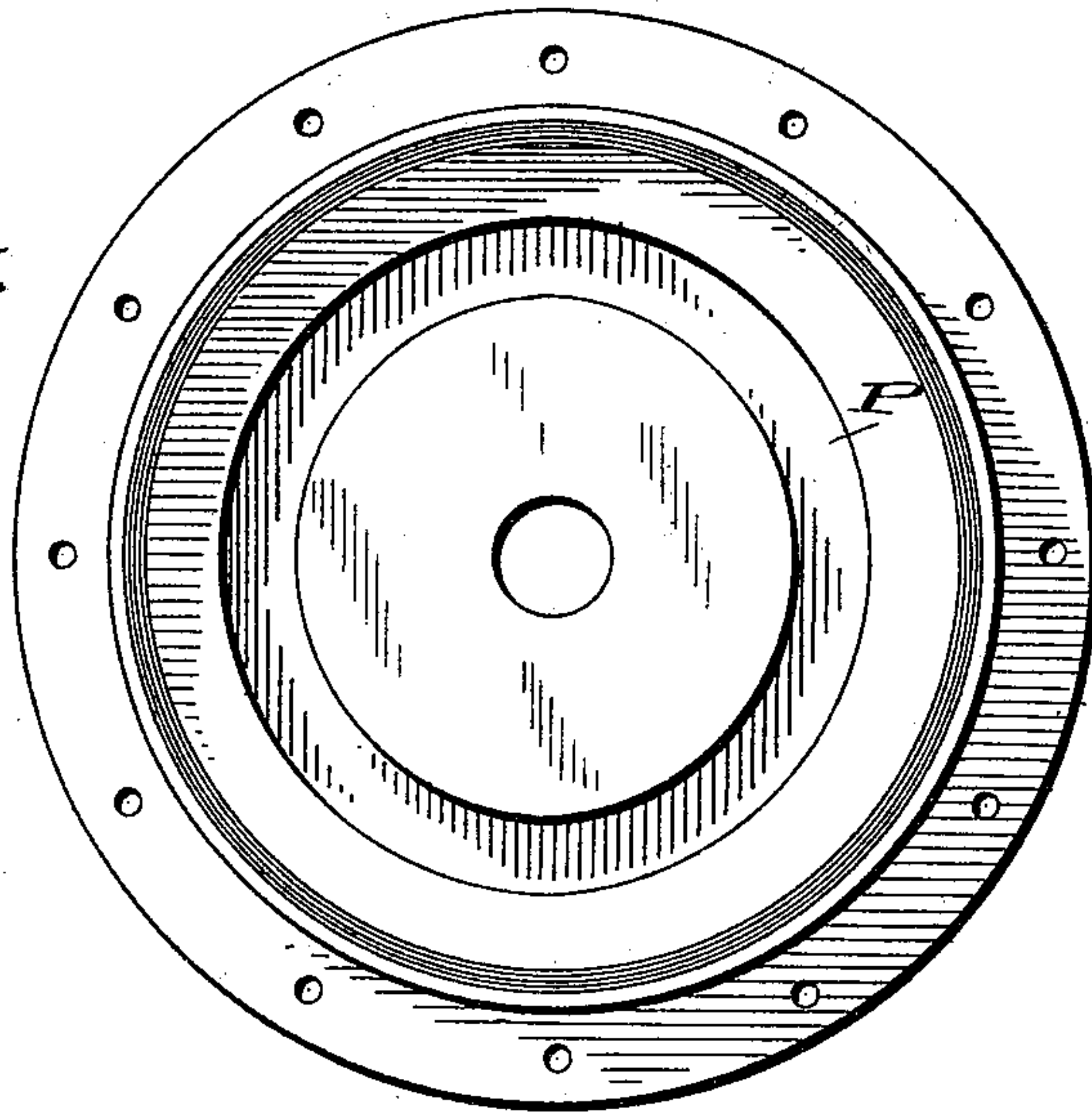


Fig. 6.

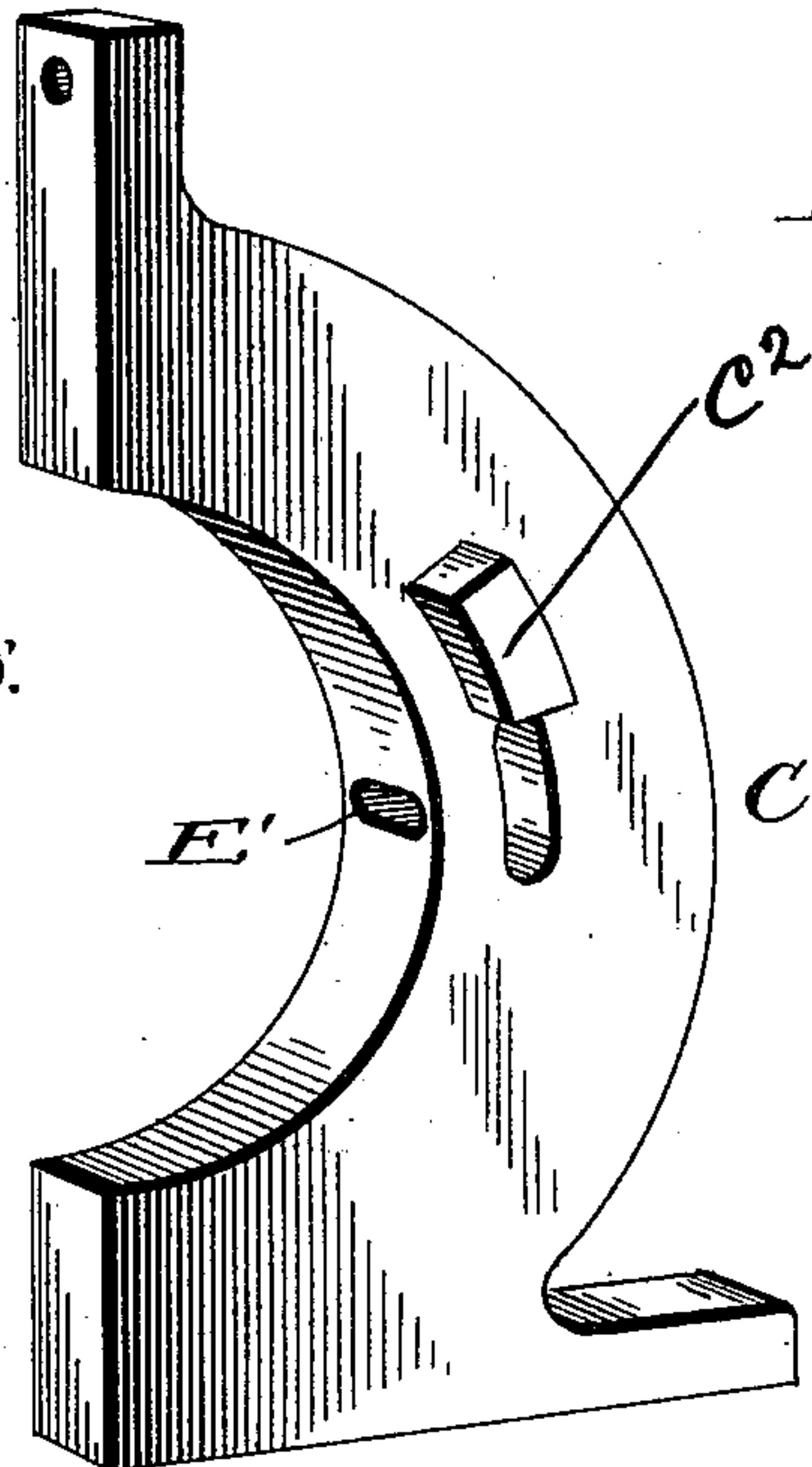


Fig. 7.

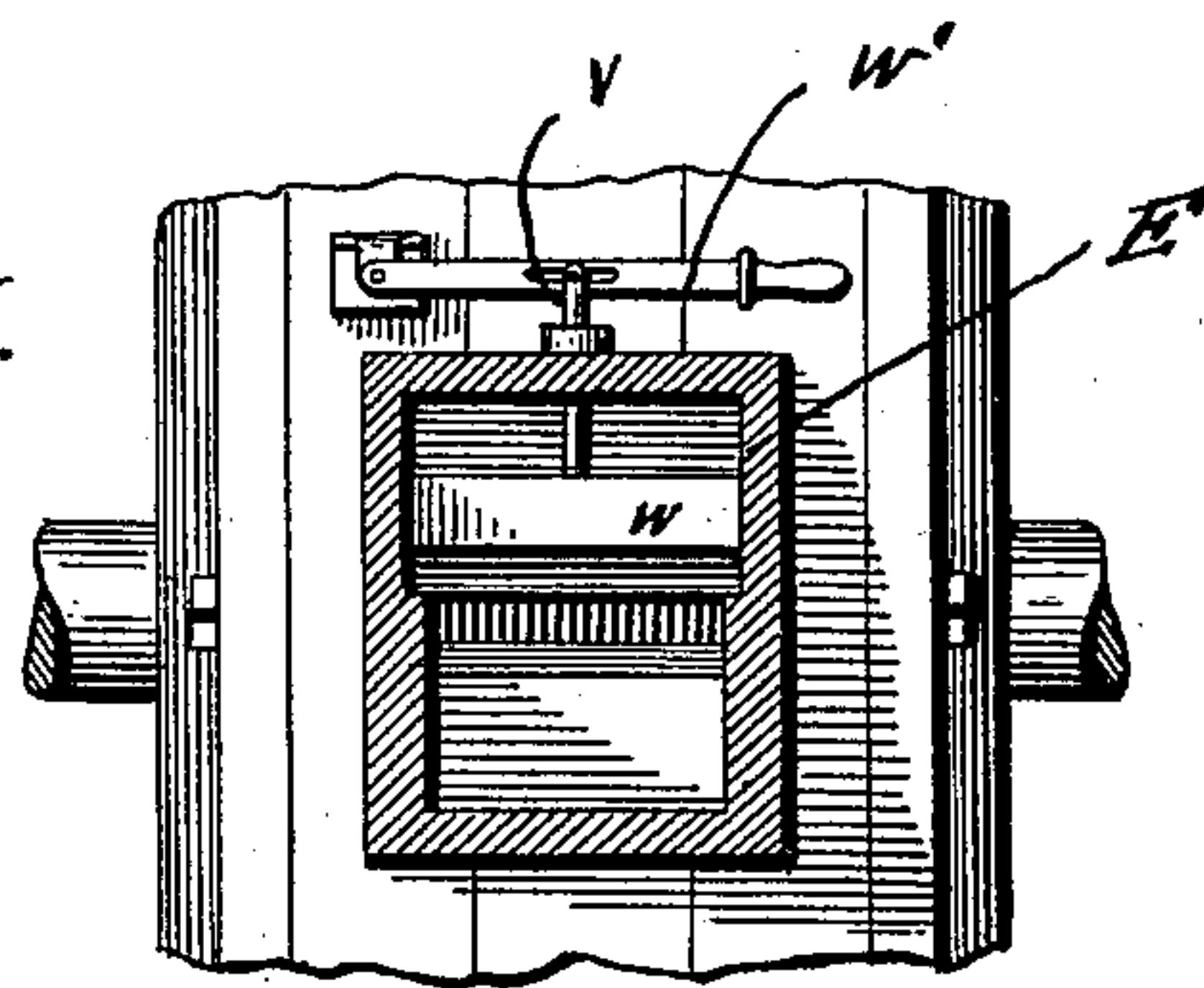
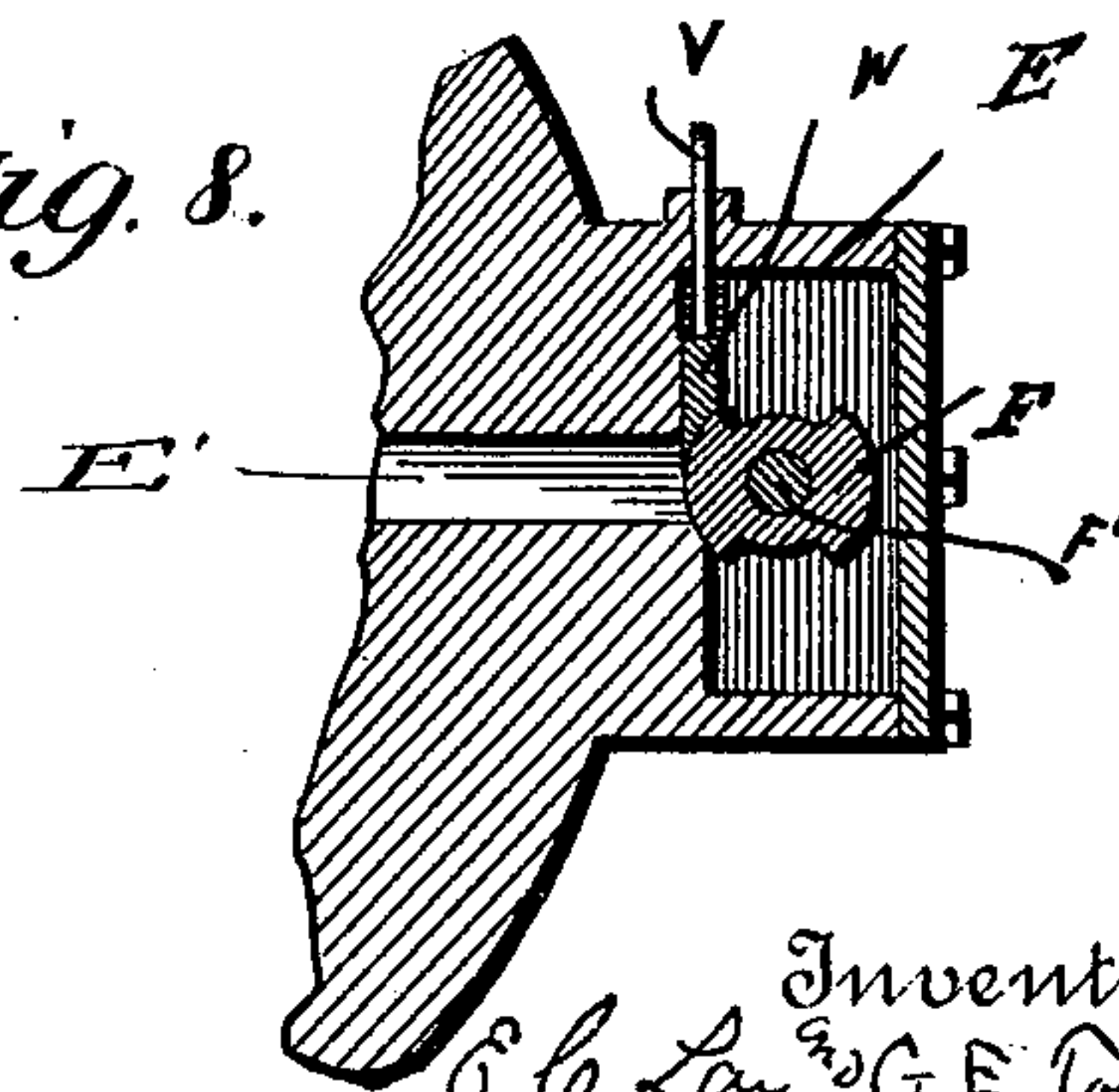


Fig. 8.



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UNITED STATES PATENT OFFICE.

ELBIRT CICERO LAY AND GEORGE ELVIN TOLIVER, OF LUTTRELL,
TENNESSEE.

ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 631,169, dated August 15, 1899.

Application filed December 7, 1898. Serial No. 698,557. (No model.)

To all whom it may concern:

Be it known that we, ELBIRT CICERO LAY and GEORGE ELVIN TOLIVER, citizens of the United States, residing at Luttrell, in the county of Union and State of Tennessee, have invented certain new and useful Improvements in Rotary Steam-Engines; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in steam-engines, and especially to a rotary engine in which piston-valves are employed that are operated by means of pivoted levers connected to shoes designed to travel in an eccentric groove in the cylinder-head, whereby as the rotary disk revolves the valves are thrown in and out of slots in the disk.

More specifically our invention resides in a rotary engine having a disk in which sliding pistons are mounted, which pistons are operated by means of levers pivoted to a steam-wheel, which levers have pivotal connection with shoes which are of such a shape as to conform to the curved recess in the cylinder-head and travel therein, said groove being slightly eccentric, suitable packing-strips being provided, making steam-tight joints between the various parts of the steam-pistons, disks, and ports.

To these ends and to such others as the invention may pertain the same consists, further, in the novel construction, combination, and adaptation of parts, as will be hereinafter more fully described and then specifically defined in the appended claims.

Our invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this application, and in which drawings similar letters of reference indicate like parts throughout the several views, in which—

Figure 1 is a side elevation of the disk carrying the shoes which actuate the piston-valves, the cylinder-plate having been removed. Fig. 2 is a cross-section on line 2 2

of Fig. 1. Fig. 3 is a vertical section through the engine on line 1 1 of Fig. 2 after all of the parts of the engine are fastened together. Fig. 4 is a sectional view on line 4 4 of Fig. 3. Fig. 5 is an elevation of the inside of a cylinder-head. Fig. 6 is a perspective view of one of the standards. Fig. 7 is a sectional view through the chamber containing the hand operating-lever. Fig. 8 is a sectional view through the steam-chest.

Reference now being had to the details of the drawings by letter, A designates the main shaft, which has mounted thereon the disk B, which has shoulder B', forming a rotary bearing-surface for the disks, which bearing portion is mounted in the standards C, which contain the steam-inlet ducts C' and the exhaust-duct D. Mounted on one side of this standard is the steam-chest E, which has ports or ducts E' leading to and through a duct C to the valves carried by the disks B B. At a suitable location between the inlet and the exhaust passage-ways and in the steam-duct is located an abutment C². In this chest is mounted the rotary cut-off valve F, which is recessed on diametrically opposite sides, said cut-off valve being keyed or otherwise fastened to the shaft F', having a pulley thereon, which may be driven in any suitable way, as by connection with the operating-shaft A. This chest has a steam-inlet duct F² and is suitably packed. Each face of said disk B has its outer face recessed, as at G, with a forwardly-extending flange G', and seated in diametrically opposite slots b in the circumference of the disk is a sliding piston H, the outer edge of each piston extending out a slight distance beyond the outer face of the disk, as shown in the drawings. To each piston is connected a rod H', the free end of which is L-shaped and outwardly bent. Seated in the outer faces of the disk B are packing-strips K. Mounted over each outer edge of the said disk is a flanged disk L, with enlarged central aperture. This disk—one on each side of the standard—has an annular recess in its flange, in which is to be placed a suitable packing M. On the outer face of each of said disks L are pivotal screws L', on which are pivoted levers N, each having an L-shaped end to which a shoe Q is pivoted,

while the other end of the lever is inwardly bent and engages with the bent end of the rod II', whereby as the lever is tilted on its pivot the sliding pistons will be operated.

5 These shoes are slightly curved, so as to slide in the eccentric groove P in the inside wall of the cylinder-head R, there being two sets of shoes similarly mounted in each cylinder-head. On the inner face of the disks L are
10 diametrically-disposed slots or recesses L², in which the outer edges of the slide-valves work, each slot or recess extending into the inner wall of the flange, as shown. When the disks are adjusted in place and fastened
15 to the standard, it will be observed that there will be formed a steam passage-way between the outer circumference of the disk B on each side of the standard, in which passage-way steam enters to drive the piston-blades, which
20 also travel in said passage-ways, and the exhaust-ports lead away in the manner illustrated.

Disposed about the two disks—the one carrying the sliding pistons, the other carrying
25 the shoes for operating said pistons—is a ring S, which is provided with a flange or annular bead S', which is adapted to fit snugly about the annular bead or flange on the inner face of the cylinder-head, suitable packing
30 being used between all of the joints.

In Figs. 7 and 8 we have shown sectional views through the steam-chest, in which W is a hand-operated valve actuated by the lever W', which latter is connected to the rod V,
35 as shown, whereby the flow of steam to the engine may be regulated by hand when desired.

Having thus described our invention, what we claim to be new, and desire to secure by
40 Letters Patent, is—

1. A rotary engine, comprising the two complementary standards having circular recesses in adjacent edges, and securely held together,

the flanged disk B having a bearing in said recesses, the disks L fitted to and rotating
45 with said disk B, the sliding pistons seated in slots in the flanges of the disk B, cylinder-heads and shoes traveling in eccentric grooves therein, and connections between said sliding pistons and shoes, as set forth. 50

2. A rotary engine, comprising the two complementary standards C C having circular recesses in adjacent edges, and securely held together, the flanged disk B having a bearing
55 in said recesses, the disks L fitted to and rotating with said disk B, the sliding pistons seated in slots in the adjacent faces of disks L and the flanges of said disk B, the cylinder-heads, the shoes pivoted to the disks L and traveling in eccentric grooves in the cylinder-
60 heads and connections between said shoes and the sliding pistons, as set forth.

3. In a rotary engine, the combination with the complementary standards and disk journaled therein, the disks L having diametric-
65 ally opposite slots in their inner faces and flanges, the sliding pistons seated in said recesses in the disks L and flanges of the disk B, the angle-levers pivoted to the outer faces of the disks L and carrying the pivoted and
70 curved shoes, the inner ends of said levers having eyes, which engage with the bearing ends or rods connected to said sliding pistons, the cylinder-heads having eccentric grooves in their inner faces, in which said shoes travel,
75 and the rings disposed about the circumferences of the disks L, and to which the cylinder-heads are secured, all substantially as shown and described.

In testimony whereof we affix our signatures in presence of two witnesses. 80

ELBIRT CICERO LAY.

GEORGE ELVIN TOLIVER.

Witnesses:

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M. T. LAY.