

No. 663,939.

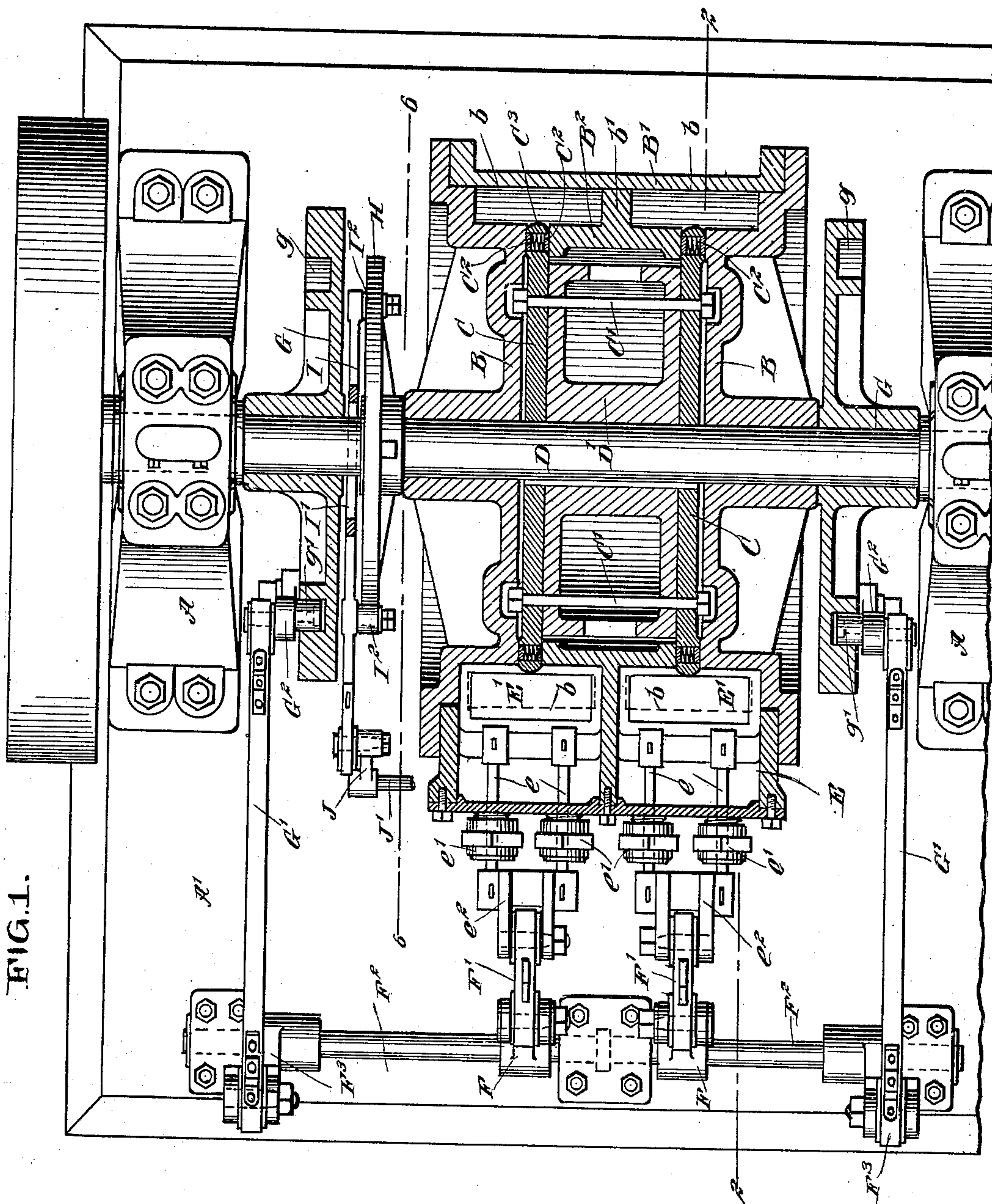
Patented Dec. 18, 1900.

A. L. SCUDDER.
ROTARY ENGINE.

(Application filed Dec. 26, 1899.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

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INVENTOR

Abraham L. Scudder

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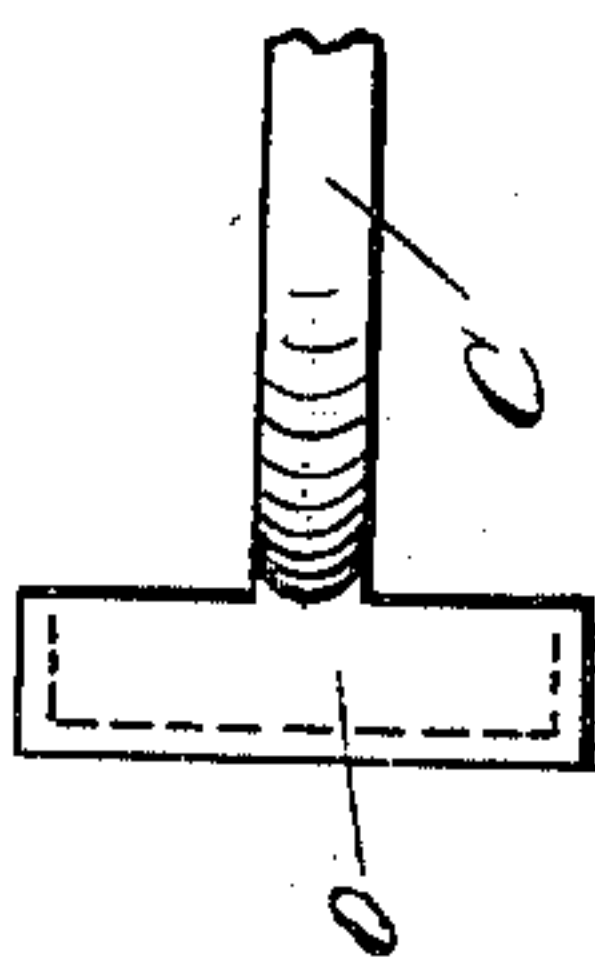
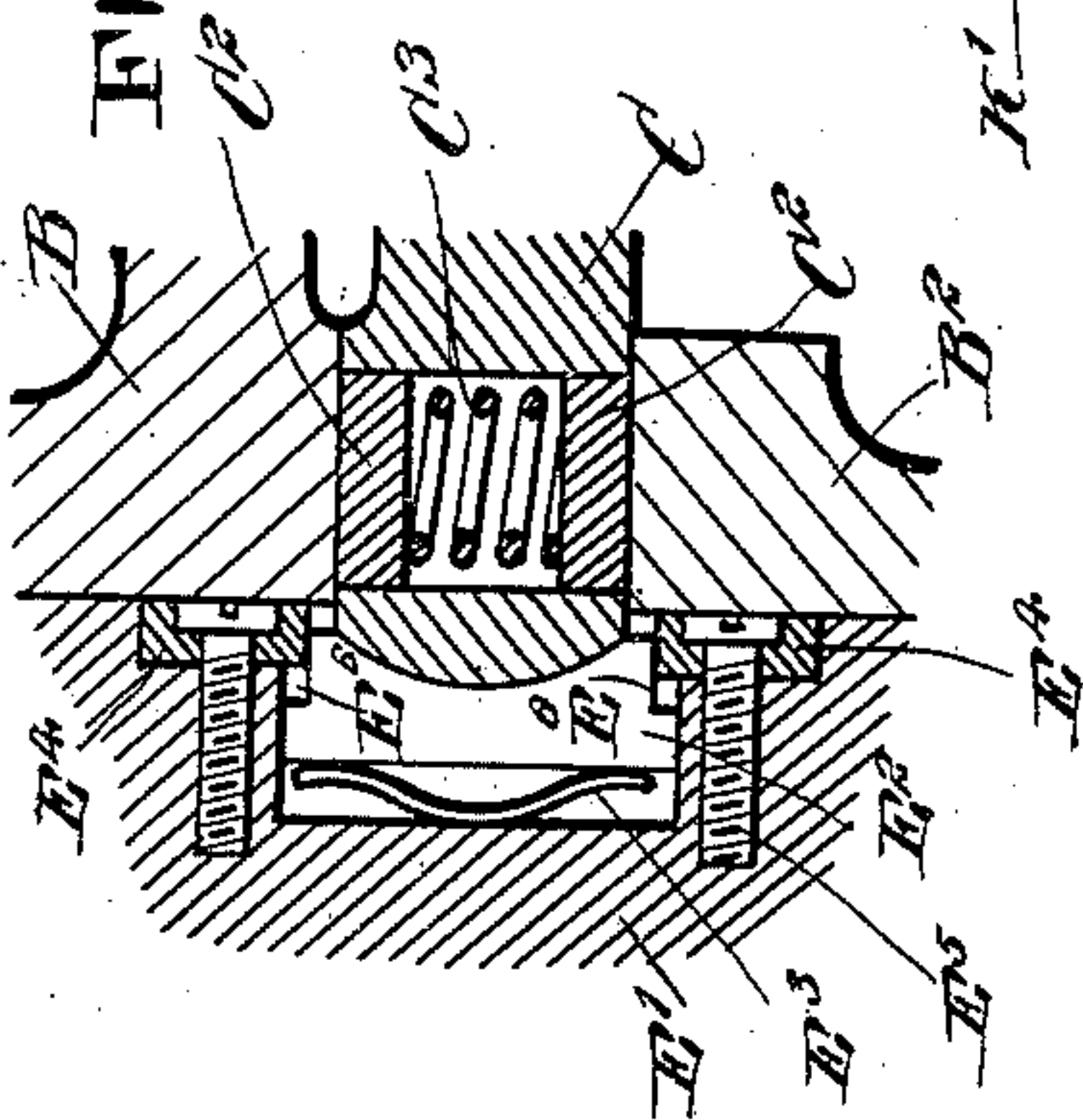
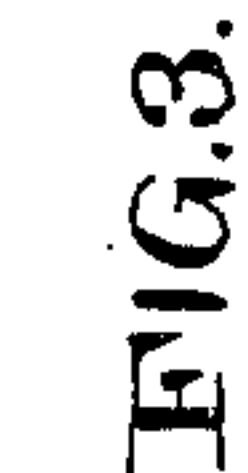
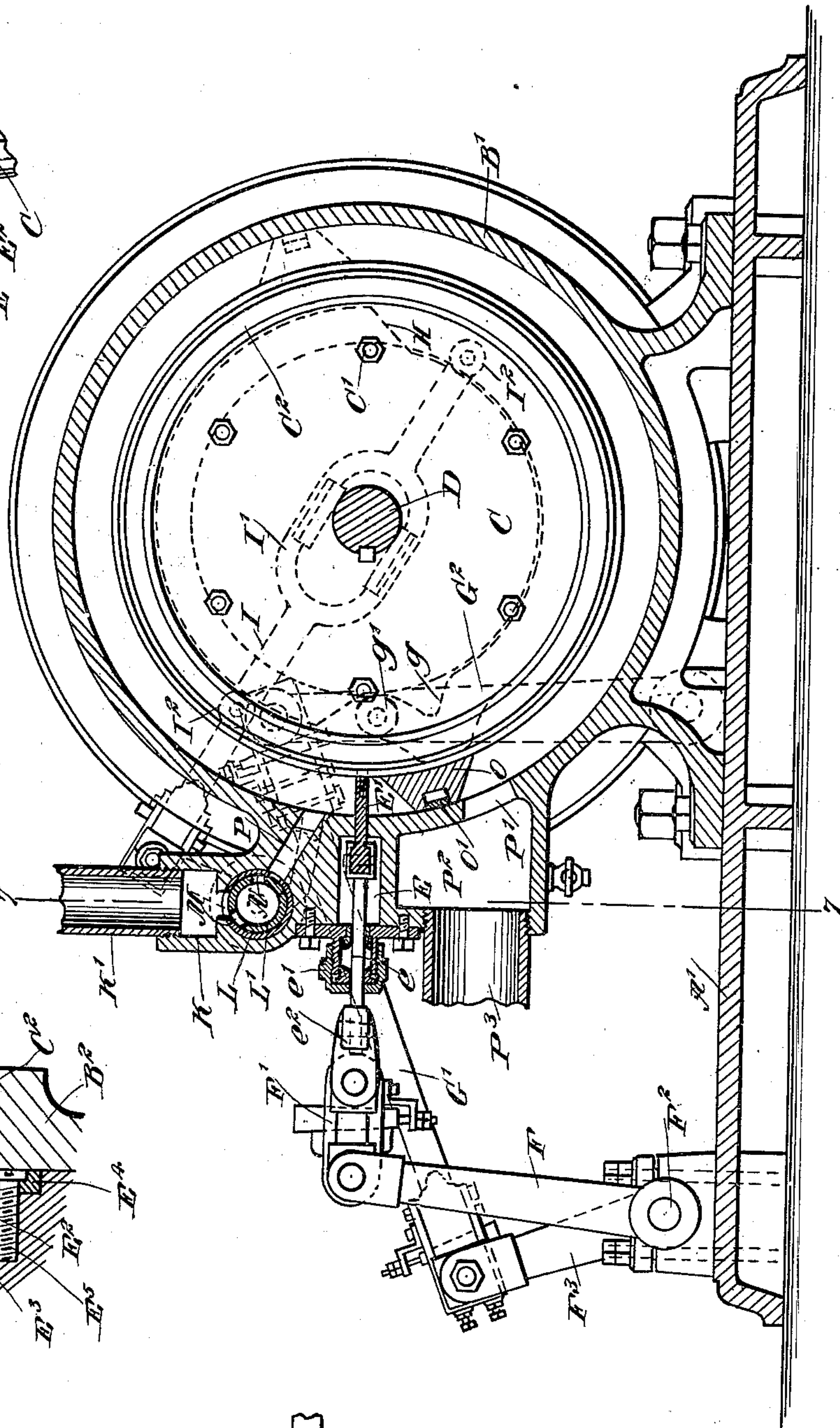
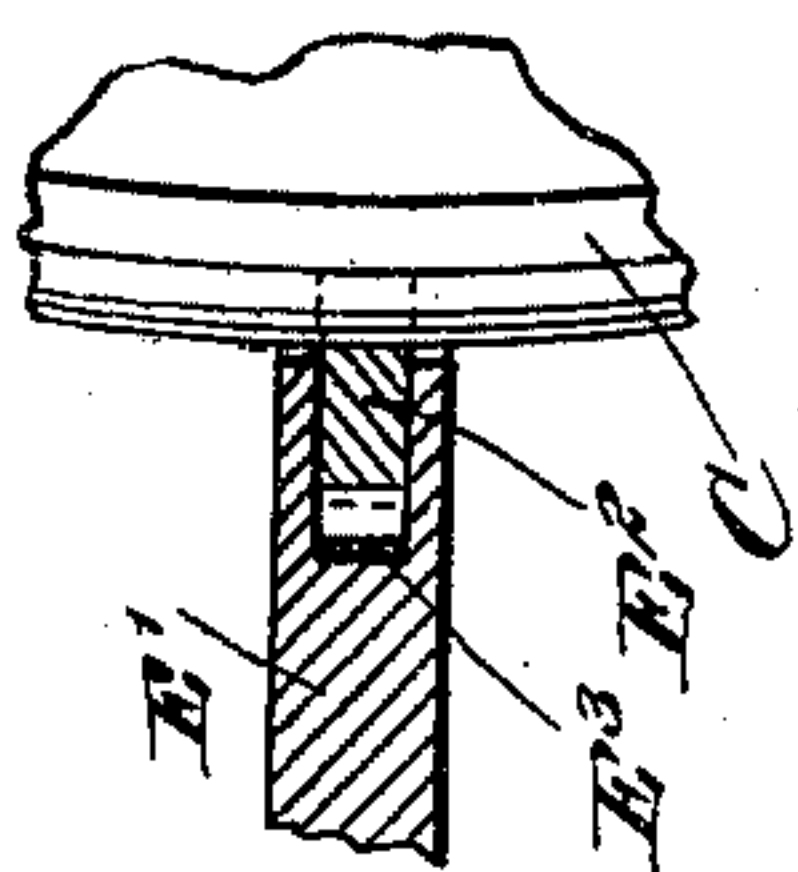
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3 Sheets—Sheet 2.



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FIG. 6.

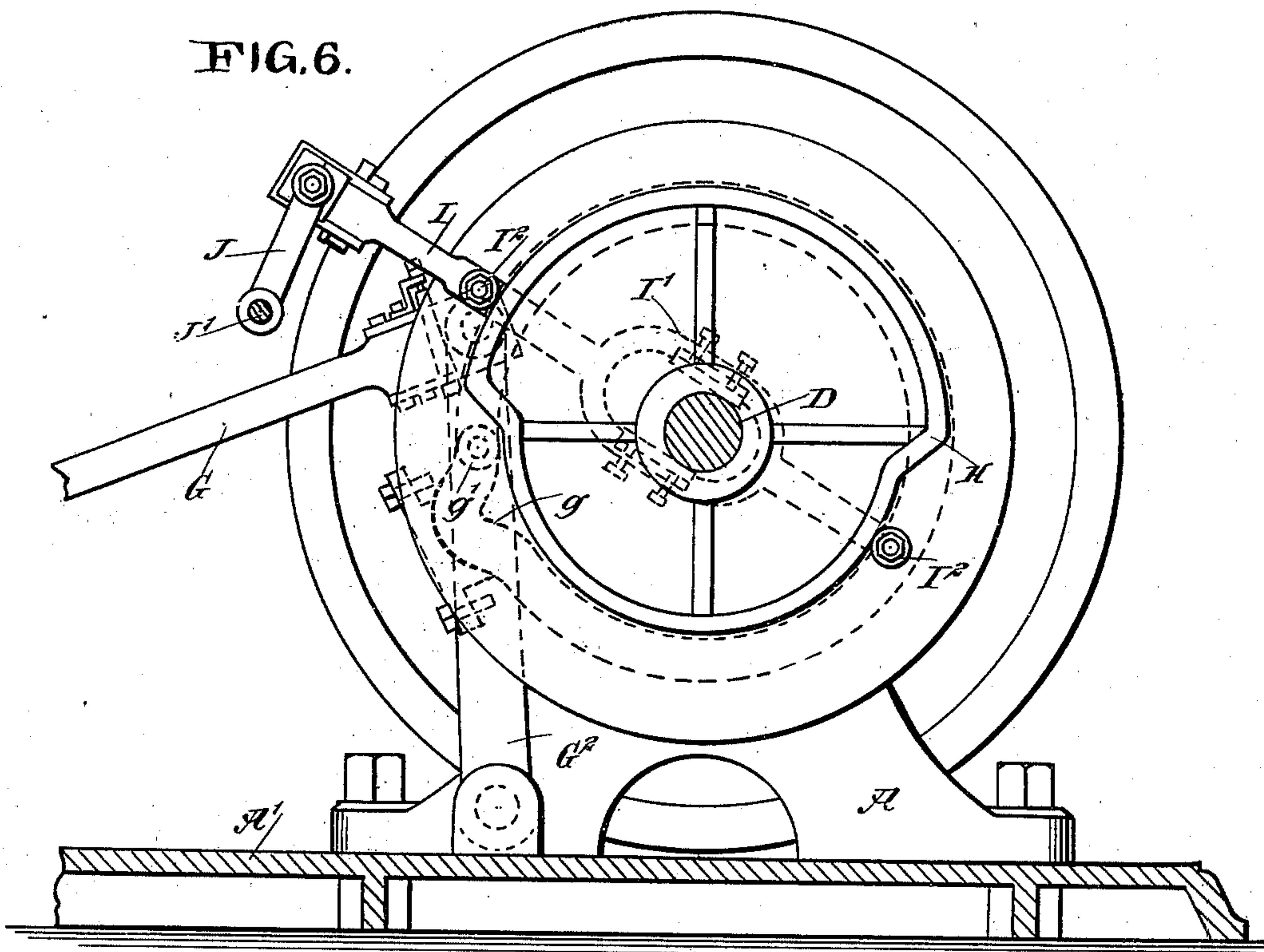
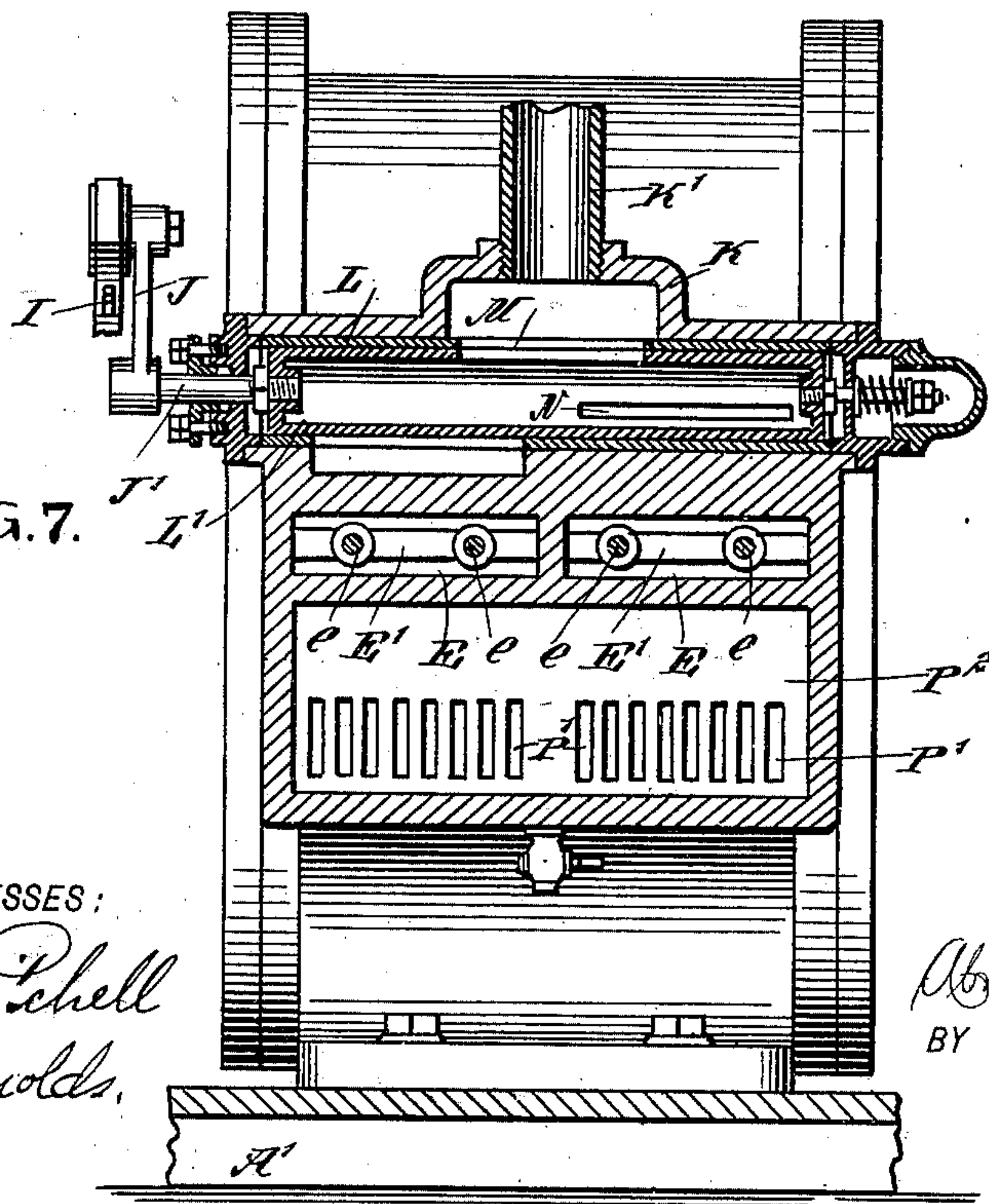


FIG. 7.



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UNITED STATES PATENT OFFICE.

ABRAM LOCKWOOD SCUDDER, OF DEPOSIT, NEW YORK, ASSIGNOR, BY
DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO ALVIN DEV-
EREAUX, JR., AND MABEL DOLLY SCUDDER, OF SAME PLACE.

ROTARY ENGINE.

SPECIFICATION forming part of Letters Patent No. 663,939, dated December 18, 1900.

Application filed December 26, 1899. Serial No. 741,586. (No model.)

To all whom it may concern:

Be it known that I, ABRAM LOCKWOOD SCUDDER, a citizen of the United States, residing at Deposit, in the county of Broome and State of New York, have invented a new and Improved Rotary Engine, of which the following is a full, clear, and exact description.

My invention relates to improvements in rotary engines, and comprises the novel features hereinafter described, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional plan of my invention, the section being taken centrally through the cylinder and the abutments. Fig. 2 is a sectional elevation taken upon the line 2 2 of Fig. 1. Fig. 3 is a section through the abutment and adjacent portions of the cylinder, showing the manner of inserting the packing-strip. Fig. 4 is a section through the same parts, taken at right angles to Fig. 3. Fig. 5 is a detail plan showing the piston-head and the manner of attaching it to the piston-disk. Fig. 6 is a sectional elevation taken upon the line 6 6 of Fig. 1 looking toward the fly-wheel, and Fig. 7 is a sectional elevation taken upon the line 7 7 of Fig. 2.

The form of engine in the drawings is simply given as an illustration of the manner of carrying out my invention and is the form in which I at present prefer to embody my invention.

Upon a suitable foundation-plate A' are placed standards A, upon which the engine-shaft D is journaled. Upon this shaft is secured a core D', which forms the body of the rotating piston-disk. To the ends of this core are secured two plates or disks C, which have the piston-heads O attached thereto in the manner shown in detail in Fig. 5. These parts are secured together by means of bolts C', which pass through both plates and the core. The piston-disk and the piston-heads are inclosed within a casing the ends of which are composed of the two plates B, which are

provided with a base adapted to be secured to the base-plate A'.

Outside of the two plates B is placed a cylindrical casing B', which forms the outer walls of the steam or working chambers b. Two such chambers are provided for accommodating the piston-heads of the two disks C and are separated by means of a flange b', which projects outwardly from a central casting B², which forms a portion of the inner wall of the steam-chambers.

Upon one side of the casing are provided chambers E, connected with the steam-chambers b by means of slots adapted to receive the abutments E', a chamber E being provided for each of the steam-chambers b. The abutment E', which works through the slot into the steam-chamber, consists of a flat plate which slides within grooves formed in the walls of the engine and is adapted to entirely close the steam-chamber. It will be noticed that with the construction of casing shown the greater portion of the inner wall of the steam-chamber is formed by portions of the casing and that there is therefore no wear between the inner edge of the abutment and said portions of the inner wall of the steam-chamber. The only wear upon the inner edge of the abutment is where it contacts with the comparatively narrow edge of the disks C. This wear is provided for and a tight joint secured by means of the packing-bar E², such as shown in Figs. 3 and 4.

The edge of the abutment is provided with a longitudinally-extending slot, within which is mounted the thin plate E², which is held outwardly or toward the edge of the abutment by means of a spring E³. The ends of the plate are provided with notches E⁶, which when the plate is projected outwardly to the limit will engage the under surfaces of the blocks E⁴, which are secured in place so as to project slightly over the ends of the recess in the abutment by means of screws E⁵. The packing plate or bar is thus prevented from escaping from its recess and is yet easily removable when desired. It will be noted that the outer edges of the disks C are rounded, as clearly shown in Fig. 3, and the edges of

the abutment and of the packing-plate E^2 are rounded to fit the disk.

In order to move the abutments E' alternately inward and outward, the following device is provided: Upon the shaft D outside of the casing are mounted the cam-disks G , each of which is herein shown as having a cam-groove g formed in one face thereof. In each cam-groove is placed a cam-roller g' , which is secured to a lever G^2 , pivoted at its lower end upon the casing and at its upper end connected with a bar or link G' . At the other end each link is connected with an arm F^3 , which is secured to one end of a rock-shaft F^2 . Upon the rock-shaft are also secured arms F , which at their upper ends are connected, by means of links F' , with bars e^2 , connected with the stems e , which project through stuffing-boxes e' into the chamber E , which contains the abutment, at which point they are secured to the abutment. Each cam-groove g is circular except at one point, where an incline is provided which will give the abutments a quick outward and return movement. This point is so timed as to move the corresponding abutment outwardly at the time its piston-head O passes, it being understood that the inclines of the two cams are disposed approximately diametrically opposite each other to give the abutments the desired alternate inward and outward movement above referred to. The piston-heads O are provided with slots or recesses, within which are placed packing-strips O' . Steam is alternately admitted to the steam-chambers through ports P , which connect with a steam-chest K , and in this steam-chest is mounted the valve. The valve-chamber is preferably lined with a cylindrical shell L , which is provided with sets of suitable ports for the admission and exit of steam, the exit-ports registering with the ports P and the admission-ports connecting with the steam-chest K . The valve is tubular, fits snugly within the shell or casing L , and is provided with admission and exhaust ports M and N , which are adapted to register with the ports in the shell or casing L . The valve L' is connected at one end with a stem or short shaft J' , which extends through suitable stuffing-boxes and has an arm J attached thereto. The arm J is directly connected with one end of a bar I , said bar being provided with a yoke I' , embracing the engine-shaft D , and provided with suitable bearing-surfaces engaging the sides of said shaft.

Alongside of the bar I is a cam-disk H , which is secured to turn with the shaft. This cam-disk is provided with two sections, each of them approximately the form of a circle, but of different radius. The two sections are connected by cam inclines and are engaged by cam-rollers I^2 , mounted upon the bar I . These cam-rollers engaging the edges of the cam-disk will cause the bar I to be reciprocated first in one direction and then in the other. This will result in opening the valve

for the admission of steam for approximately one half of the rotation of the piston-disk and will then close it for the other half of the rotation, permitting the steam which has been admitted to the cylinder to be expanded. Now as the steam is alternately admitted to the steam-chambers it is evident that while in one chamber the steam presses its piston-head under boiler-pressure the piston-head in the other chamber is at the same time pressed by the expansive force of the steam previously admitted to this other chamber. The amount of expansion of the steam in each chamber may be varied by altering the shape of the cam, so as to hold the valve open a greater or less time. The steam is discharged through ports P' , which are shown in Fig. 7, and is conveyed from the chamber P^2 , connected with said ports, through an exhaust-pipe P^3 .

The edges of the piston-disks C are provided with packing-rings C^2 , which are inserted within recesses formed in the faces of said disks, as shown in Fig. 3. These rings are held outward by means of spiral springs C^3 , which are inserted in apertures provided therefor at suitable intervals in the disks, the rings C^2 bearing against the faces of the outer end casings B and the central ring B^2 .

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A rotary engine, comprising a casing having therein an annular steam chamber or cylinder, and provided with inlet and exhaust ports, and a slot for the piston-disk, a piston-disk mounted to turn in said slot and having a head filling the steam-chamber, an abutment mounted to slide in guides in the casing, a cam-disk mounted to turn with the piston-disk, a pivoted lever having its free end engaging the said cam-disk, and a rock-shaft having arms connected one with the upper end of said lever and the other with the abutment, substantially as described.

2. A rotary engine, having a rocking valve in combination with a disk mounted to turn with the engine-shaft and having peripheral cam-surfaces said cam-surfaces each being approximately the form of a circle but of different radius, an arm upon the valve, and a rod secured by one end to said arm and having a yoke surrounding the shaft and permitting the rod to reciprocate thereon, and cam-rollers on said rod one on each side of the yoke and engaging the edges of the cam-disk, substantially as described.

3. In a rotary engine, the combination with a cylindrical casing having two annular peripheral steam-chambers, each provided with an annular slot in its inner wall, of a rotary piston, comprising a body, and a disk secured to each side of the body and of greater diameter than the same, the said disks projecting through the slots into the steam-chambers and provided with piston-heads in the said steam-chambers, substantially as described.

4. In a rotary engine, the combination with a cylindrical casing having two annular peripheral steam-chambers, each provided with an annular slot in its inner wall, of a rotary piston comprising a body, two disks secured to opposite sides of the body and of greater diameter than said body, said disks having rounded edges and projecting through the slots into the chambers and provided with piston-heads in said chambers, abutments mounted to slide in the casing and to engage the periphery of the said piston-disks, and means for operating the said abutments, substantially as described.

5. In a rotary engine, the combination with a cylindrical casing having a peripheral annular steam-chamber, provided with an annular slot in its inner wall, of a piston-disk having a curved or rounded periphery projecting through the said slot into the steam-chambers and provided with a piston-head, within the steam-chamber, and an abutment mounted to slide in the casing and provided with a spring-pressed packing curved to correspond to the curved periphery of the piston-disk, substantially as described.

6. In a rotary engine, the combination with

a cylindrical casing having a peripheral annular steam-chamber provided with an annular slot in its inner wall, of a piston-disk having its periphery projecting through the said slot into the steam-chamber and provided with a piston-head in the said chamber, said disk having recesses in its opposing faces near the periphery and apertures connecting the recesses packing-rings in said recesses and springs in the apertures and engaging the packing-rings, substantially as described.

7. In a rotary engine, a casing having two annular steam-chambers and formed of side plates, a central casting having an annular peripheral flange, and a cylindrical shell outside of the side plates, and a rotary piston formed of a body and two disks, one secured to each side of the body and projecting between the side plates and central casting into the steam-chambers, and each provided with a piston working in and filling said chambers, substantially as described.

ABRAM LOCKWOOD SCUDDER.

Witnesses:

E. D. CUMMING,
S. G. BARNUM.