

No. 719,634.

PATENTED FEB. 3, 1903.

W. S. AUSTIN.
ROTARY PUMP OR MOTOR.

APPLICATION FILED DEC. 4, 1901.

NO MODEL.

3 SHEETS—SHEET 1.

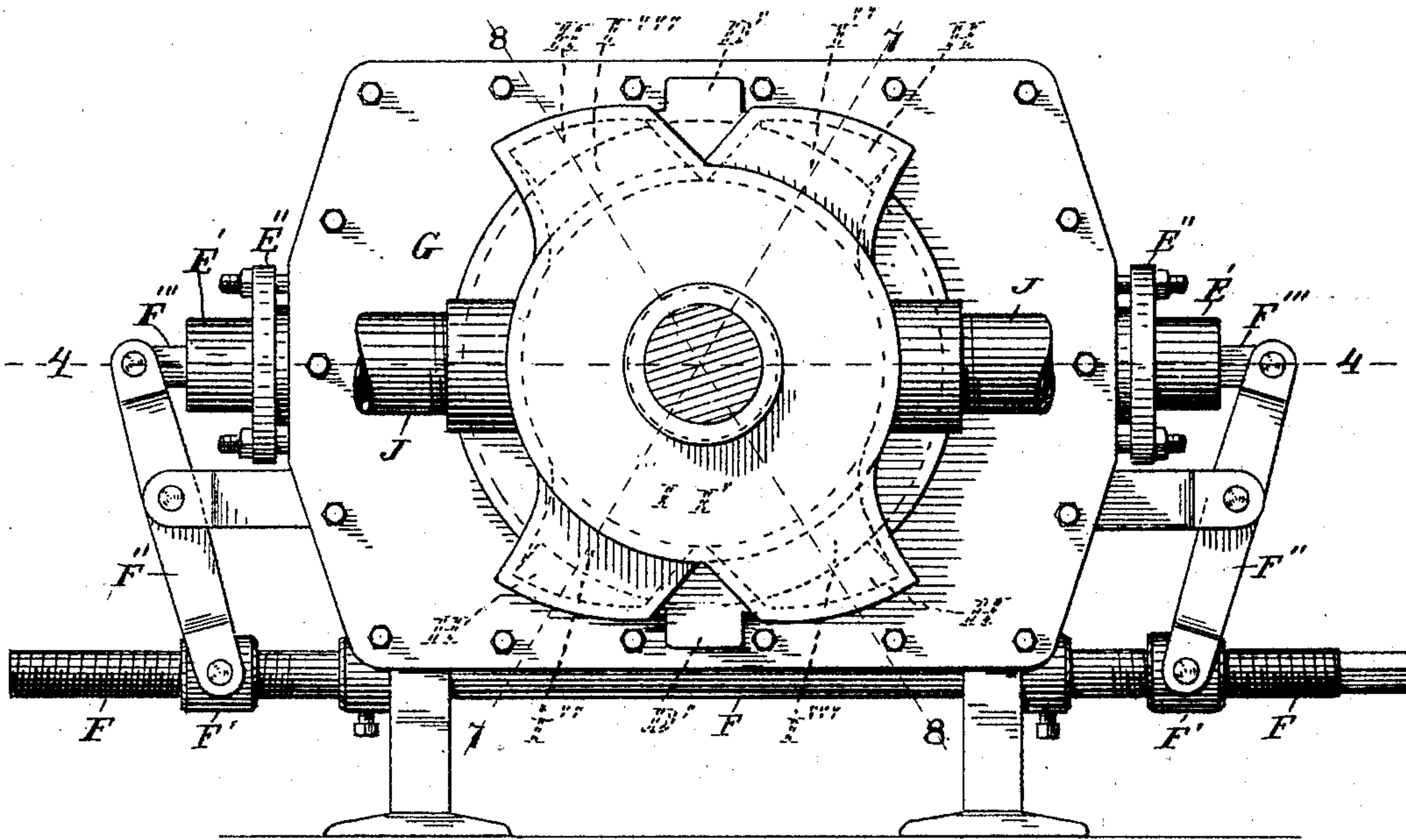


Fig. 1.

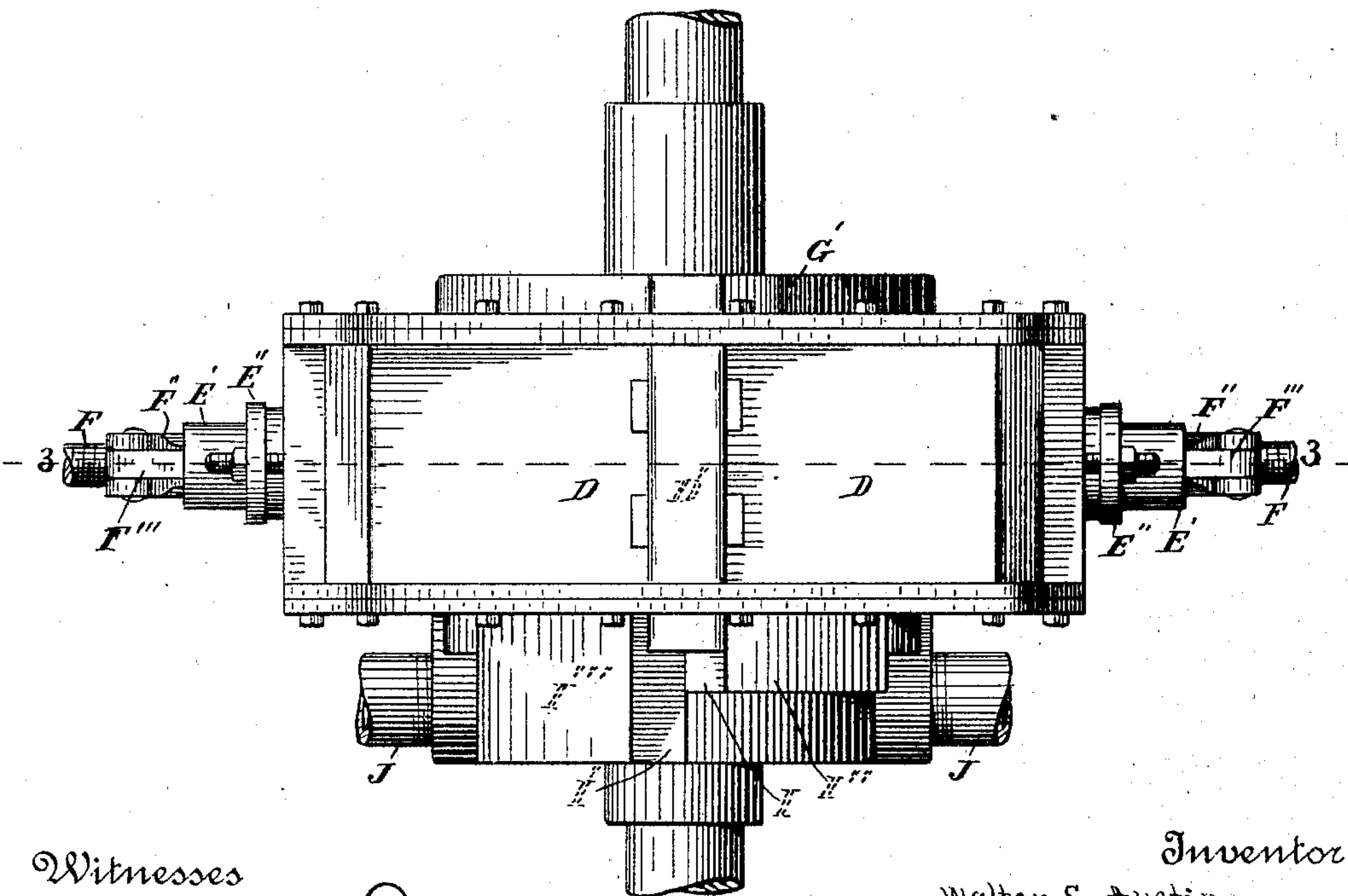


Fig. 2.

Witnesses

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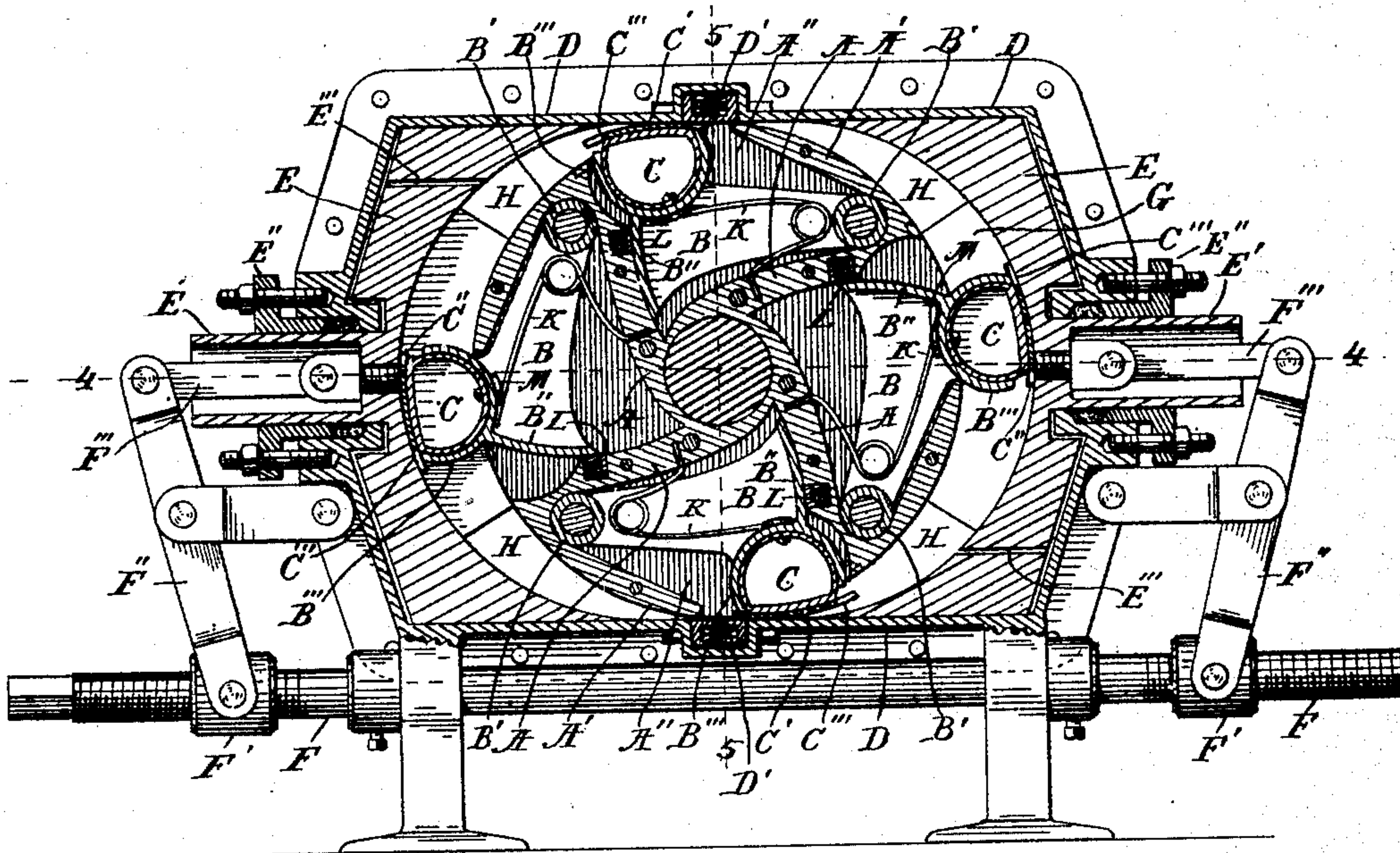


Fig. 3.

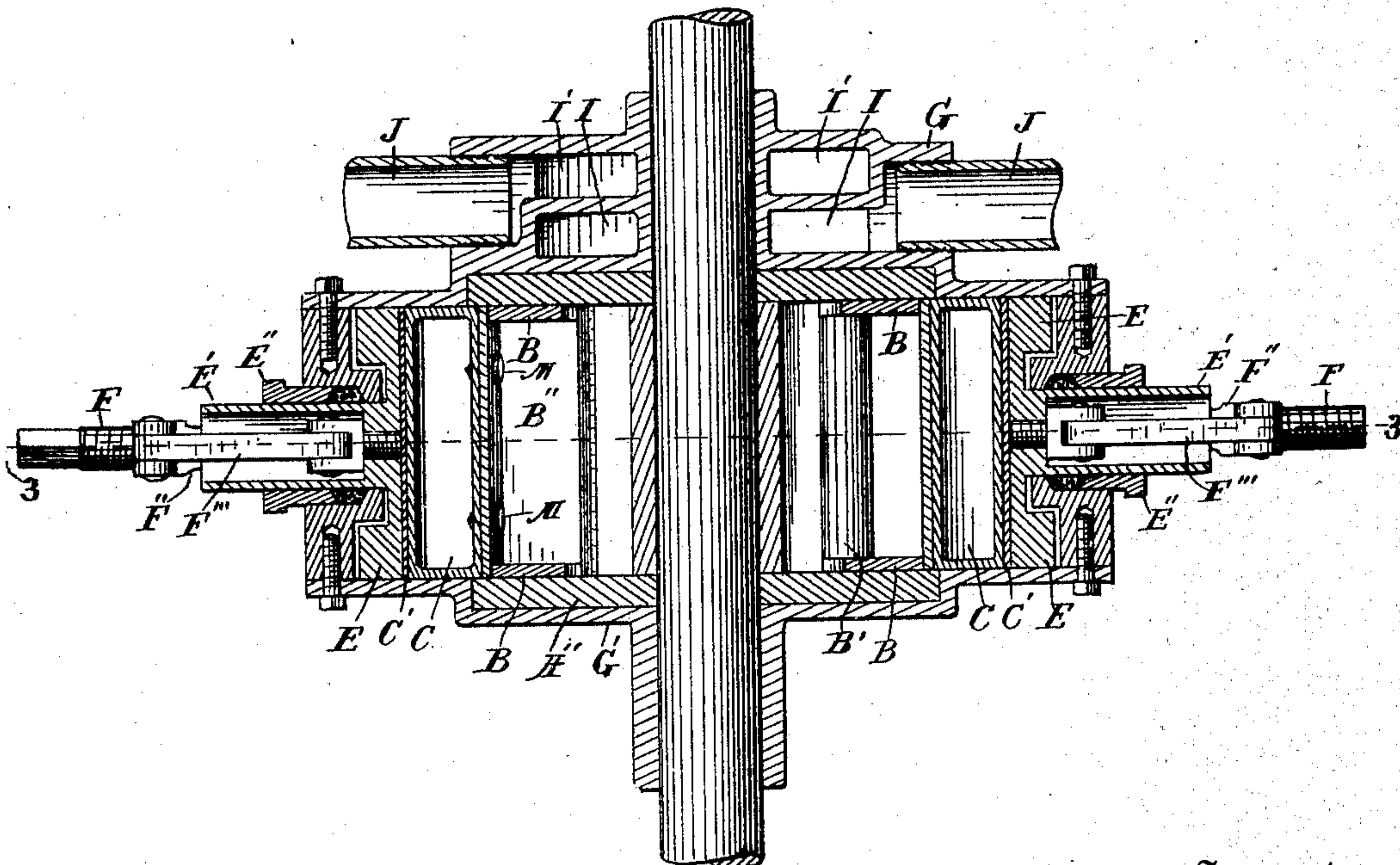


Fig. 4.

Witnesses

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3 SHEETS—SHEET 3.

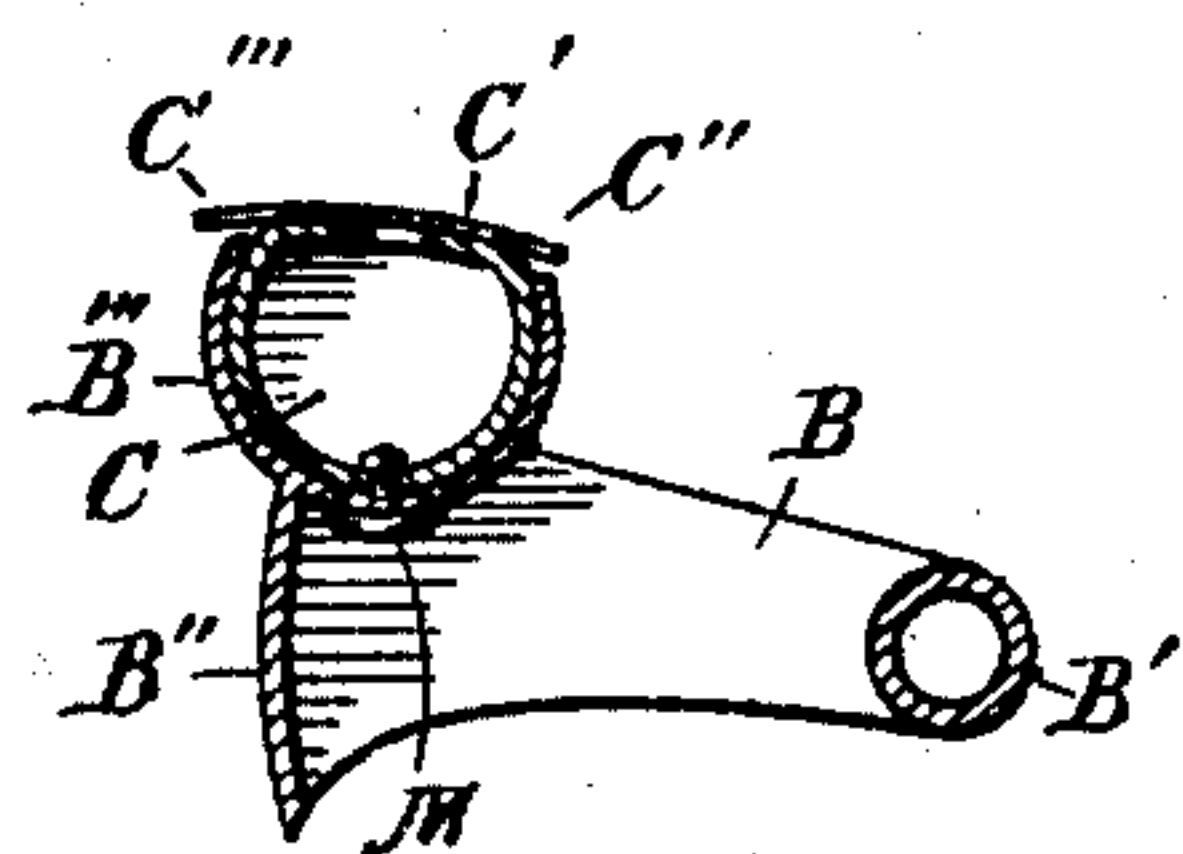
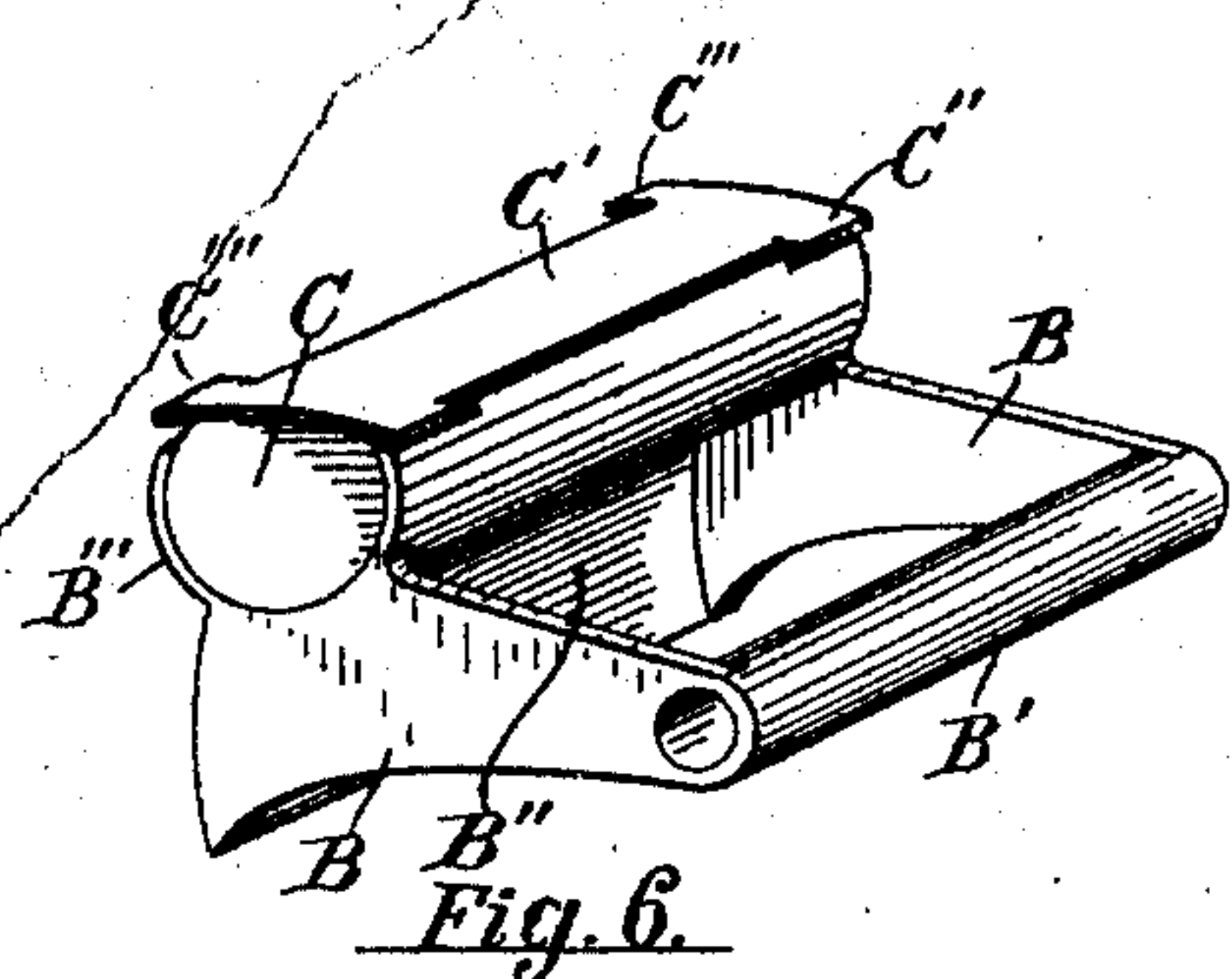
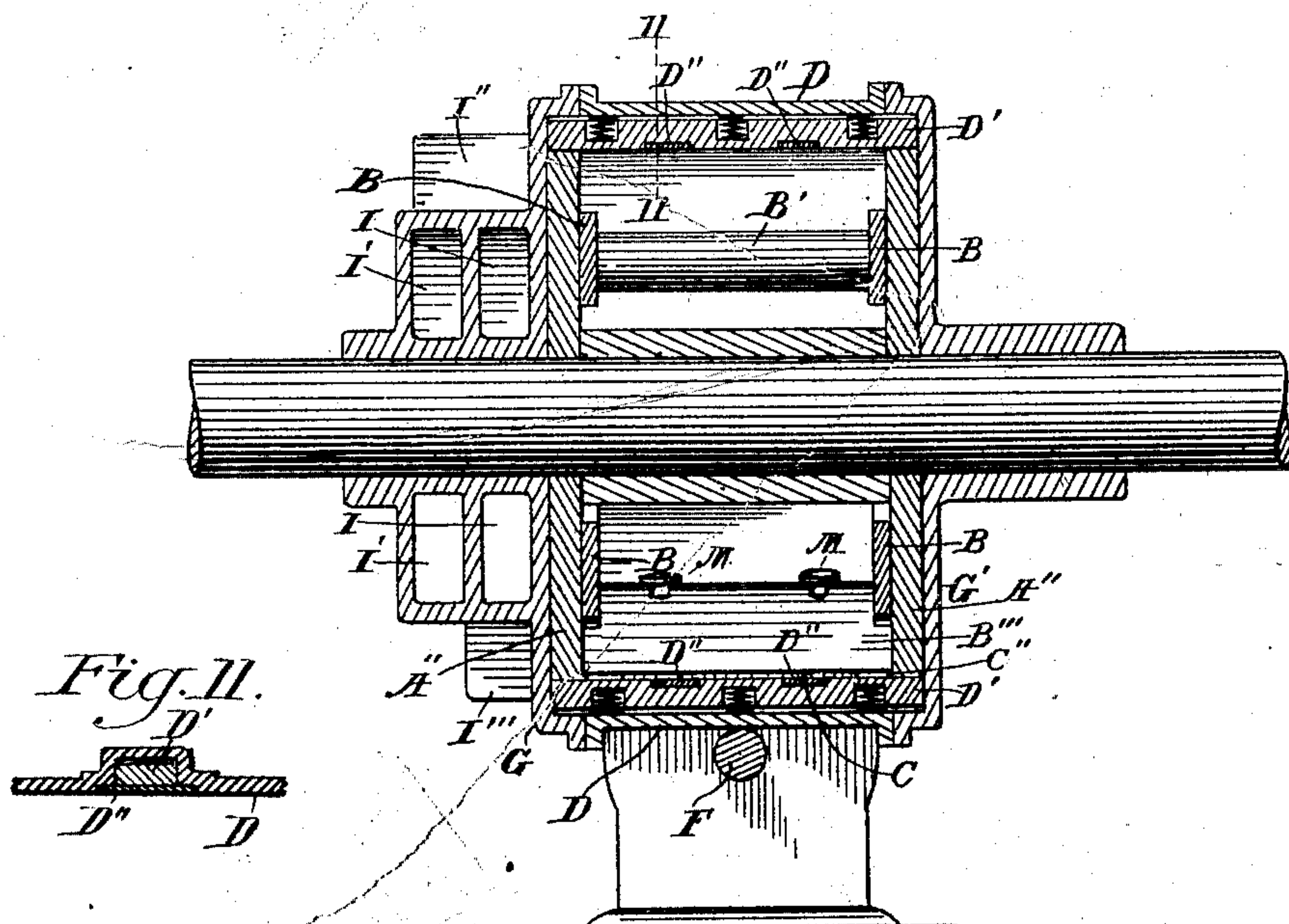


Fig. 9.

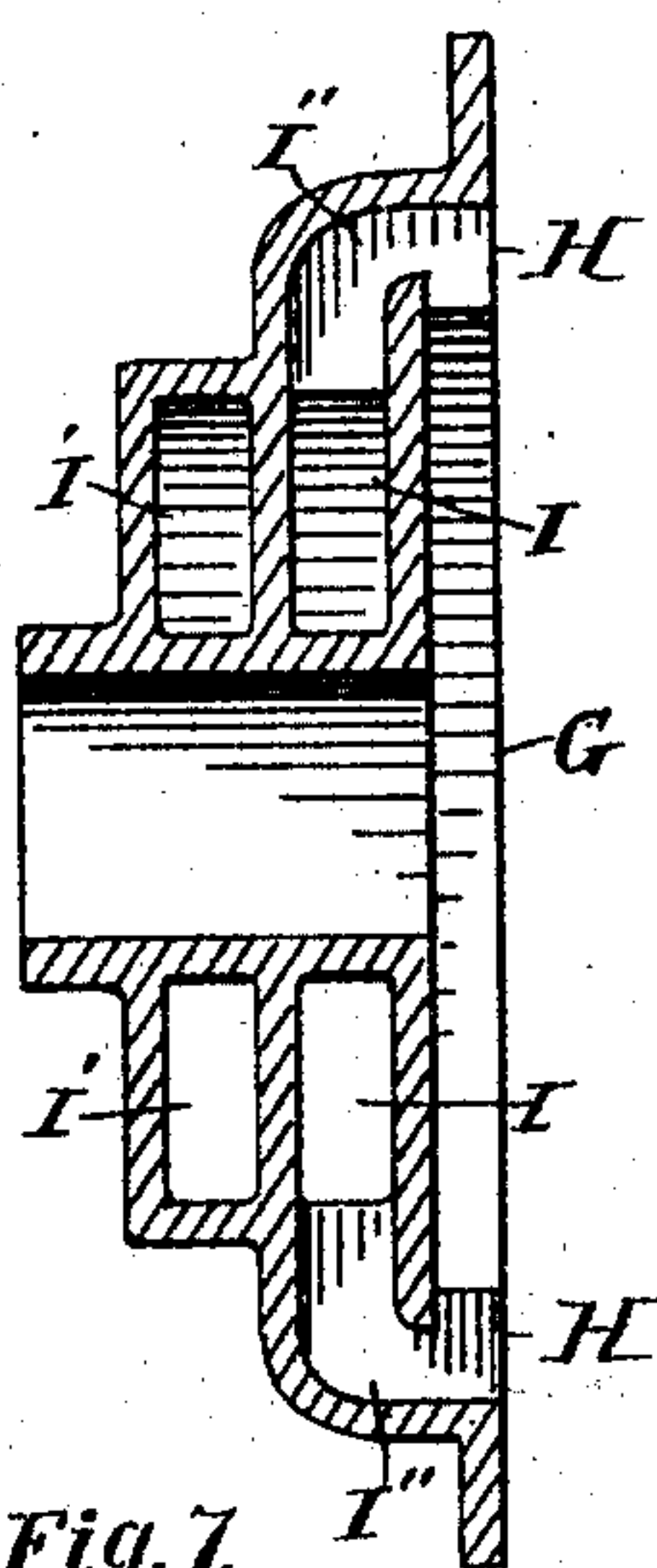


Fig. 7.

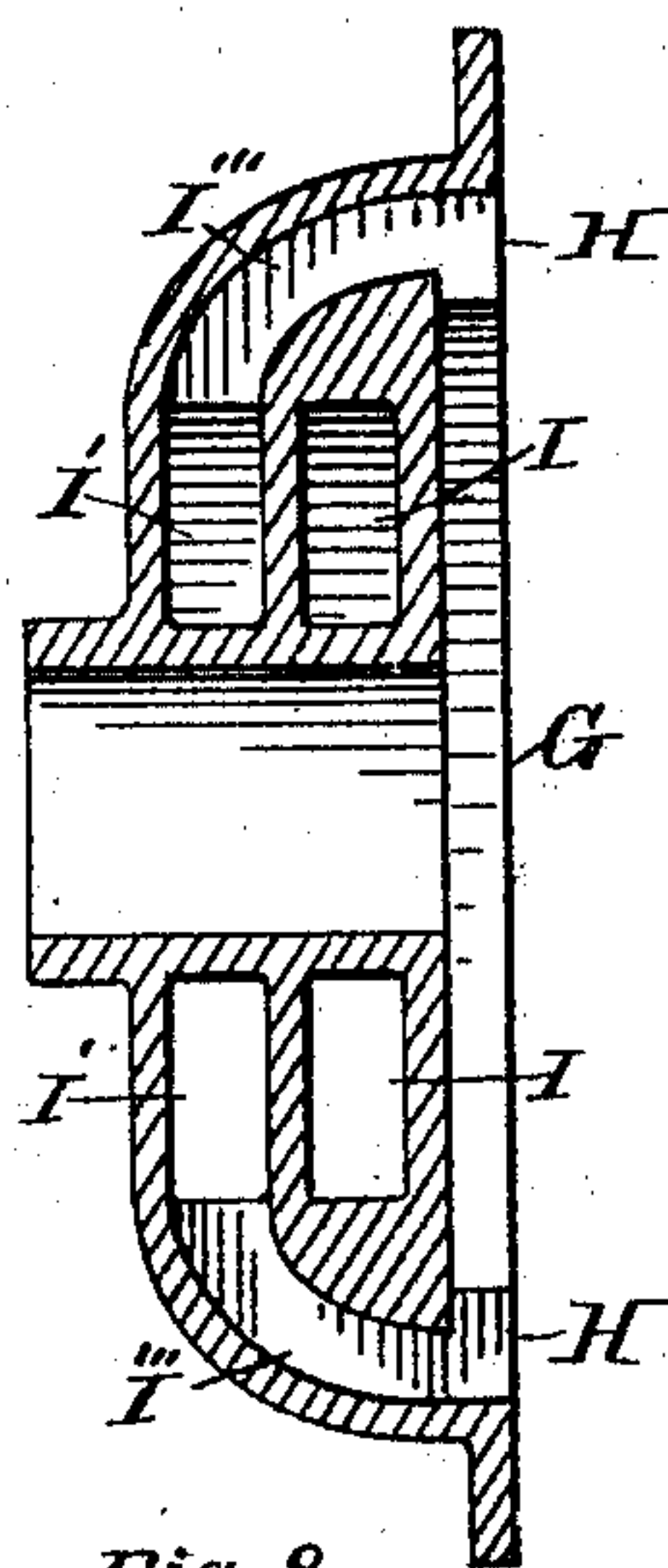


Fig. 8.

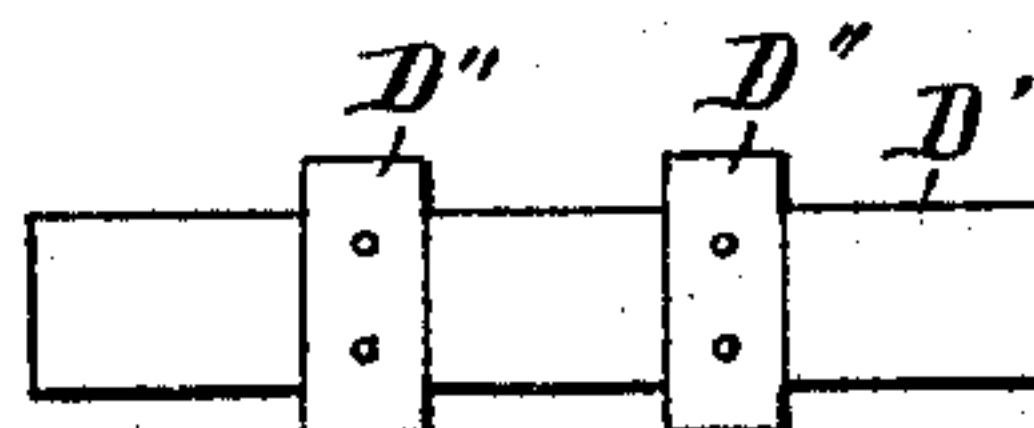


Fig. 10.

Witnesses
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UNITED STATES PATENT OFFICE.

WALTER S. AUSTIN, OF GRAND RAPIDS, MICHIGAN.

ROTARY PUMP OR MOTOR.

SPECIFICATION forming part of Letters Patent No. 719,634, dated February 3, 1903.

Application filed December 4, 1901. Serial No. 84,660. (No model.)

To all whom it may concern:

Be it known that I, WALTER S. AUSTIN, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Rotary Pumps or Motors; and I do hereby 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.

My invention relates to improvements in rotary pumps or motors; and its object is to provide the same with means for varying the capacity at pleasure and to provide the device with certain new and useful features hereinafter more fully described, and particularly pointed out in the claims.

My device consists, essentially, in providing an adjustable side or wall in the case, whereby the total space between the hub and case may be varied at pleasure to vary the capacity of the device, and also in certain improved arrangement and construction of parts, as hereinafter more fully described, and particularly pointed out in the claims, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a device embodying my invention; Fig. 2, a plan view of the same; Fig. 3, a vertical section of the same on the line 3 3 of Figs. 2 and 4; Fig. 4, a horizontal section of the same on the line 4 4 of Figs. 1 and 3; Fig. 5, a transverse vertical section on the line 5 5 of Fig. 3; Fig. 6, a perspective detail of a piston; Fig. 7, a sectional detail of the head, having the ports taken on the line 7 7 of Fig. 1; Fig. 8, the same on the line 8 8 of Fig. 1; Fig. 9, a detail of a piston in transverse section; Fig. 10, a detail of the packings in the case, and Fig. 11 a detail of the same in section on the line 11 11 of Fig. 5.

Like letters refer to like parts in all the figures.

The hub is a cylindrical body fixed on the shaft and having chambers for the pistons. This hub is preferably composed of a middle portion consisting of the partitions A, extending outward from the axis and having the surface adjacent each piston concentric with the pivot of the piston, and segments

A' at the outer ends of the partitions, said segments forming portions of the periphery of the hub to engage the case and prevent blowing through from side to side of the hub by engaging the packing D' when the plates C' are not opposite said packing. Between these segments the pistons are projected outward by springs K and engage and traverse the interior of the case. At each side of this middle portion and secured thereto are discous plates A'', which plates constitute the ends of the hub and rotate in suitable recesses in the heads G and G' of the case. These parts are secured together by bolts extending through the plates A'', the partitions A, and segments A'. The pistons are preferably four in number, and each piston consists of side arms B, connected at one end by a tubular portion B', in which is inserted a pin on which the piston is pivoted, and at the other end a segmental portion B'', having an outer surface concentric with the axis of said pin and fitting closely against the concave surface of the partition A. At the outer end of the portion B'' is a concave B'''. This concave is preferably made more than one-half of a tube, whereby it tends to retain the packing C in place therein. This packing is preferably of cast metal and has a limited rotary movement in the concave and is provided with a convex facing-plate C', preferably of sheet metal. This plate C' has lateral projections C'', engaging one side of the concave B''' to limit the rotary movement of the packing C in one direction, and similar projections C''' to engage the hub to limit said movement in the opposite direction. The case has two parallel sides D D, engaging the periphery of the hub at the middle, where they are provided with packings D' D', contacting the hub at opposite sides thereof. These packings have laterally-extended portions D'', engaging suitable recesses in the case, whereby the pistons are carried smoothly over the edges of the packing. Lune-shaped chambers are provided in the case at each side of the hub. The concave surfaces of these chambers preferably have a radius the same as the hub and are formed in walls E E, slidably engaging the interior of the case at the top, bottom, and sides and adjustable therein toward and from the hub, whereby the capacity of the lune-shaped cham-

bers at each side of the hub may be varied at pleasure. These walls have small vents or openings E''' to permit the fluid to pass behind the same to balance the pressures and permit free adjustment of the walls E. The walls E are also provided with tubular stems E' E', extending through the ends of the case and slidable in stuffing-boxes E'' in the same. Said walls are adjusted and held by means of a right-and-left screw F, having nuts F', pivoted in the forked ends of pivoted levers F'' F'', which levers are connected to the walls by rods F''' F''' within the stems E' E'.

In the head G of the case and near the ends of the lune-shaped chambers are ports H, Fig. 3, for ingress and egress of fluid. The diagonally opposite ports are connected to each other by means of annular ports I I' in the head G and surrounding the shaft. The port I has branch ports I'', connecting it to two diametrically opposite ports H, and the port I' has like ports I''', connecting it with the other two ports H. Any suitable ingress and egress pipes J J are connected to the respective ports I I', as occasion requires.

The pistons are pivoted near the angles formed by the union of the partition A and segments A' and are yieldingly held outward by suitable springs K. Packing L is also provided to make a tight joint between the pistons and partitions. Bolts M are also inserted in the packing C and extend through the slotted openings in the concaves B''' and are provided with large heads slidable on the concaves. These bolts serve as auxiliary means of securing the packing in place in the concave in case the packing wears and becomes loose. In operation the packings C oscillate in the concaves to closely engage the plates C' with the walls E. As these plates traverse the interior of the case between the walls E the packings C tend to turn in the concaves and engage the forward edge of the plates C' with the acute angle of the wall E or any slightly-projecting angle of the packing D'. To prevent this, the rotation of the packing C in the concave is limited by engagement of the projecting portions C'' with the edge of the concave B''' when the machine is running one way and the engagement of the portions C''' with the hub when the machine is running the other way. The axis of the packings C being near the plates C' tends to evenly seat the latter against the walls, and the large surface in contact between the concaves and packings and where the pistons engage the walls prevents leakage and rapid wear. The fluid being free to pass between the arms and into the chambers of the hub acts directly upon the part B'' of the pistons and substantially at right angles to the pivots of the pistons. These pistons thus operate equally well when the machine rotates in either direction. The outward tendency of the piston is also substantially the same when running in either direction and may be varied by varying the radius of the part B''.

The pressure being equal and at opposite sides of the shaft, all side strains on the same are avoided.

By adjusting the walls E E toward the hub the capacity of the chambers at each side thereof can be varied at pleasure. This adapts the device to various uses, some of which are as follows: As a propelling-pump having a uniform rotary motion and to drive another rotary device the ratio of motion of the two can be varied at pleasure, thus providing a high pressure and slow movement of the driven device or lower pressure and more rapid motion of the same, as occasion may require. As a motor driven by an inelastic fluid under high pressure no more fluid need be used than is required to do the work. The capacity can be cut down to the amount required at the time and increase with the increase of load, as occasion requires. It can thus be used to great advantage in transmitting power from a gasolene-engine running at constant speed to the driving-axle of an automobile or as a hydraulic motor for elevators, using no more water than necessary to do the work. Various other uses are obvious to one skilled in the art to which the device belongs.

I do not limit myself to the exact construction shown, as various modifications of the same may be adopted without departing from the spirit of my invention.

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

1. The combination of a rotary hub, pistons movably attached to the hub, a case inclosing the hub and pistons, and an adjustable wall in the case, at one side of the hub, and having a concave surface of the same radius as the hub, substantially as described.

2. The combination of a case, a rotary hub, pistons movably attached to the hub, an adjustable wall in the case at one side of the hub and having a concave side adjacent to the hub and of the same radius as the hub, and means for adjusting the wall, substantially as described.

3. The combination of a case, a rotary hub having chambers, reciprocating pistons in the hub and projecting outward therefrom, separate movable walls at opposite sides of the hub and having concave sides adjacent to the hub and of the same radius as the hub, and means for adjusting the walls toward and from the hub, substantially as described.

4. The combination of a hub, outwardly-movable pistons in the hub, a case engaging the periphery of the hub at opposite sides thereof, and having chambers at opposite sides of the hub, and a separate adjustable wall in each chamber whereby the total space between the hub and walls is varied by adjusting the walls, substantially as described.

5. The combination of a hub, outwardly-movable pistons in the hub, a case engaging the periphery of the hub and having a cham-

ber at one side of the hub, an adjustable wall in the chamber, and means for adjusting the wall, whereby the total space between the wall and hub may be varied by adjusting the wall, substantially as set forth.

6. The combination of a case having parallel sides engaging the periphery of the hub at opposite sides only, a hub rotative in the case, an adjustable wall in the case having a concave side of the same radius as the hub, an outwardly-movable piston in the hub, a concave on the piston, a packing rotative in the concave, and projections on the said packing to engage the concave and hub and limit the rotation of the packing in the concave, substantially as described.

7. The combination of a hub, a case engaging the periphery of the hub at opposite sides thereof, adjustable concave walls in the case at each side of the hub and having the same radius as the hub, means for adjusting the said walls, outwardly-movable pistons in the hub and packing on the pistons contacting the concave surfaces of the walls, substantially as specified.

8. The combination of a rotary hub, a case having parallel sides contacting the periphery of the hub at opposite sides, concave walls at each side of the hub and slidably engaging the case at the top, bottom, and sides, and having concave sides adjacent to the hub and of the same radius as the hub, outwardly-movable pistons in the hub contacting and traversing the concave sides of the walls, and means for adjusting the walls, substantially as described.

9. The combination of a case, a rotary hub in the case, outwardly-movable pistons in the hub, a movable wall in the case and having a concave side adjacent to the hub, a stem on the said wall and extending through the case, a screw, a nut on the screw, and a pivoted lever connected to the nut at one end, and to the wall at the other end, substantially as described.

10. The combination of a rotary hub, outwardly-movable pistons in the hub, a case having parallel sides contacting the periphery of the hub at opposite sides thereof, movable walls at each side of the hub and slidably engaging the interior of the case, said walls having concave sides adjacent to

the hub, stems on the walls and extending through stuffing-boxes in the case, a right-and-left screw journaled on the case, nuts on the screw, pivoted levers pivotally connected to the nuts at one end, and rods connecting the other ends of the levers to the movable walls, substantially as described.

11. The combination of a rotary hub, a case inclosing the hub and having lune-shaped chambers at each side of the hub, outwardly-movable pistons in the hub and traversing the interior of the case, adjustable walls in the case to vary the size of said chambers, means for adjusting the said walls consisting of, a right-and-left screw, nuts on the screw, pivoted levers pivotally connected to the nuts at one end, and connecting-rods attached to the other end of the levers and to the movable walls, substantially as described.

12. The combination of a rotary hub, an outwardly-movable piston in the hub, a concave on the piston having a transverse slot, an oscillating packing in said concave, and a bolt in the packing and extending through the slot, and movable therein, substantially as described.

13. The combination of a rotary hub, outwardly-movable pistons in the hub, a case engaging the periphery of the hub at opposite sides thereof, an adjustable wall in the case, having a concave side of the same radius as the hub, a passage to permit fluid to pass behind the wall, and means for adjusting the wall, substantially as described.

14. The combination of a hub, outwardly-movable pistons in the hub, a case engaging the periphery of the hub at opposite sides thereof, a movable wall in the case and having a concave side of the same radius as the hub, an opening in the wall to permit the passage of a fluid behind the wall, a stem on the wall and extending outside the case, packing surrounding the stem, and means for adjusting the wall attached to the stem, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WALTER S. AUSTIN.

Witnesses:

PALMER A. JONES,
LUTHER V. MOULTON.