

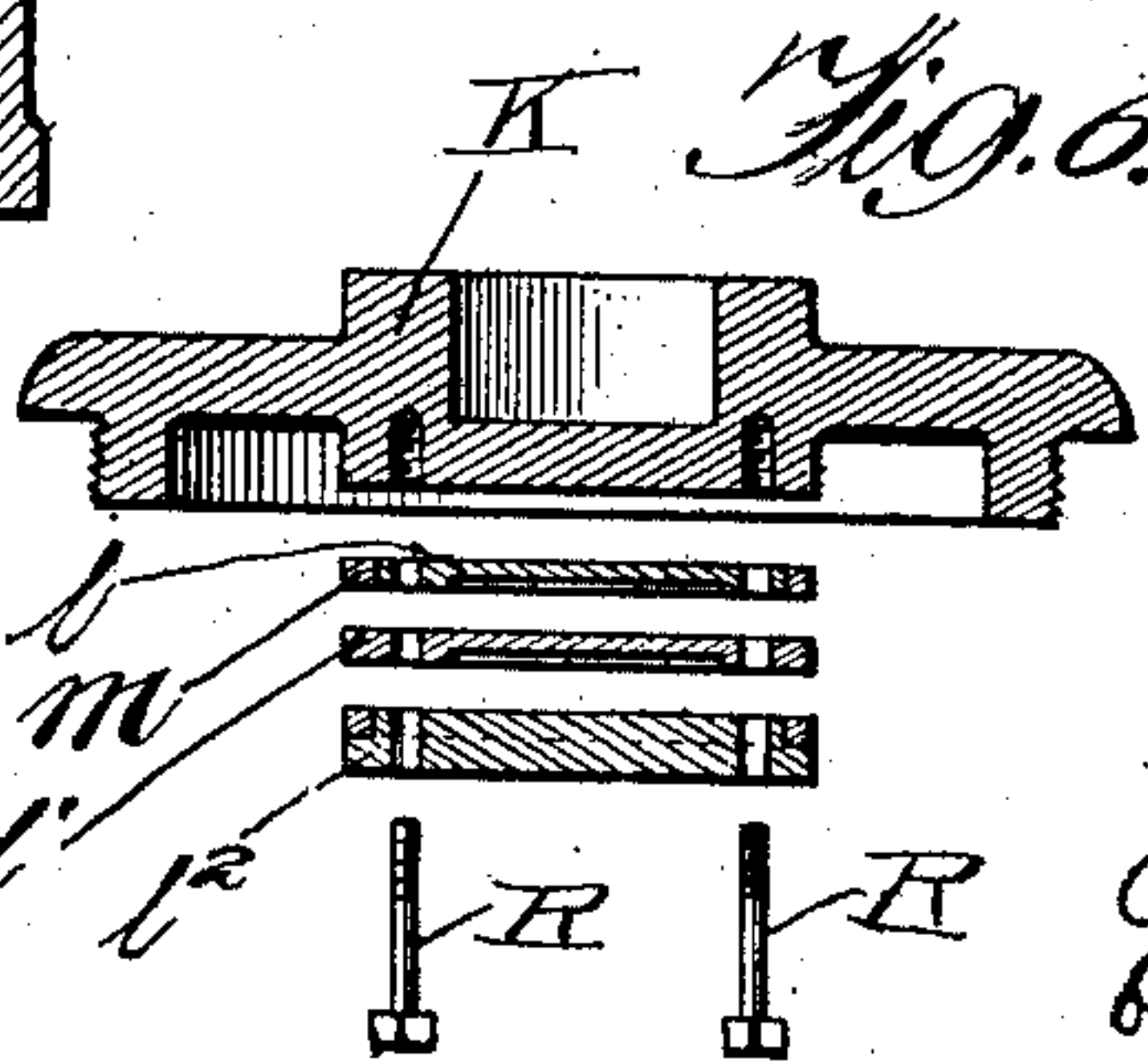
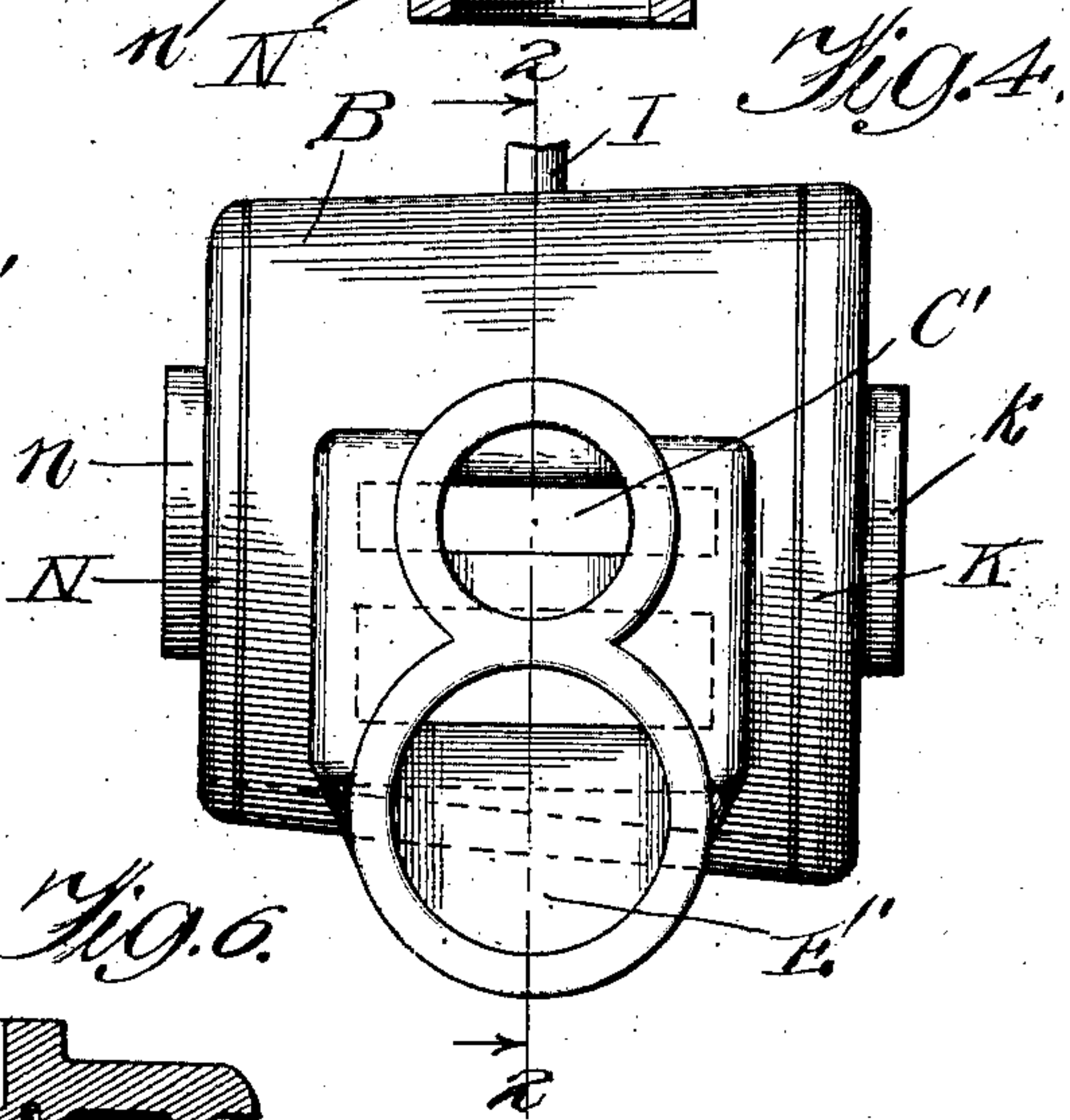
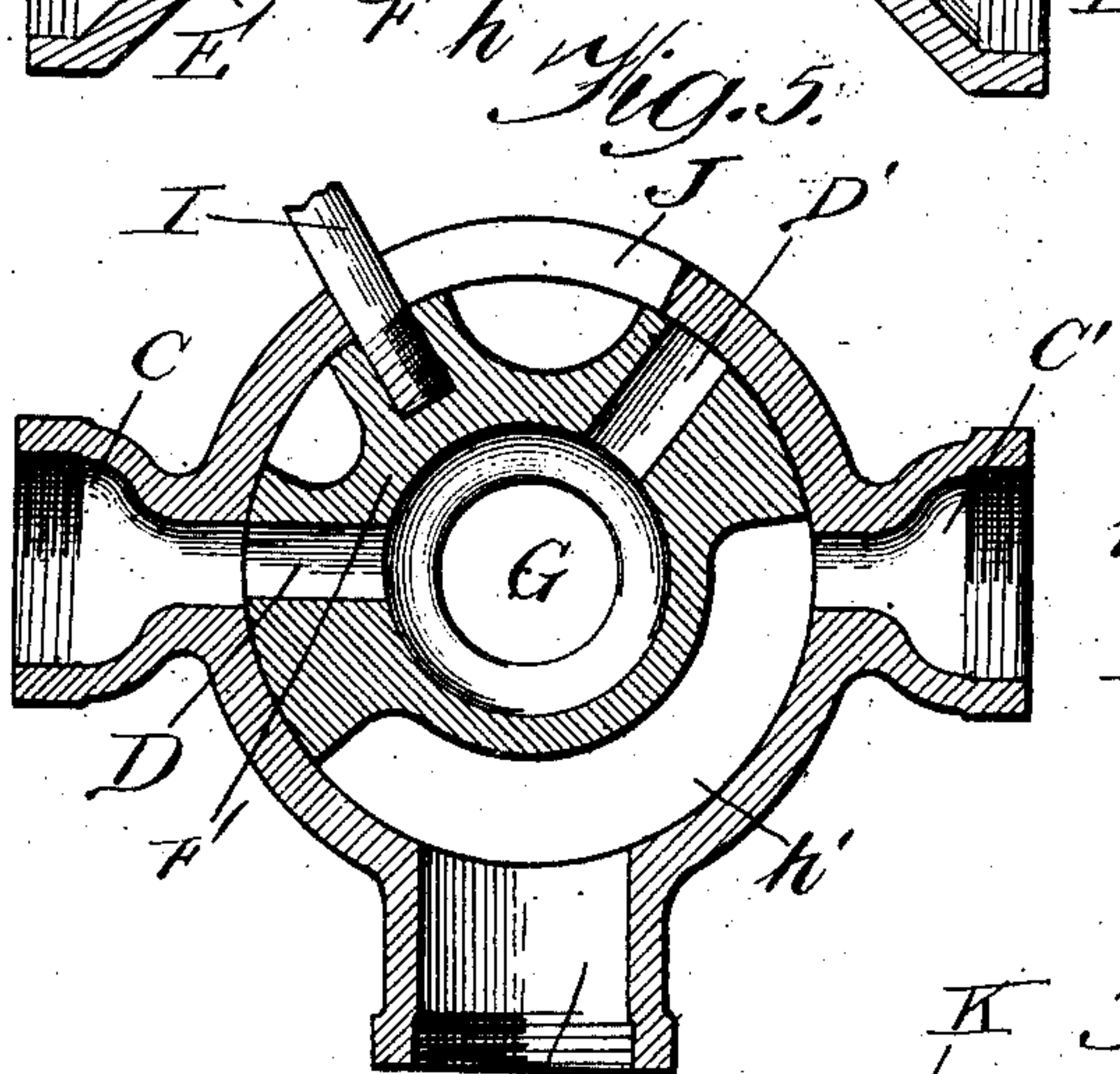
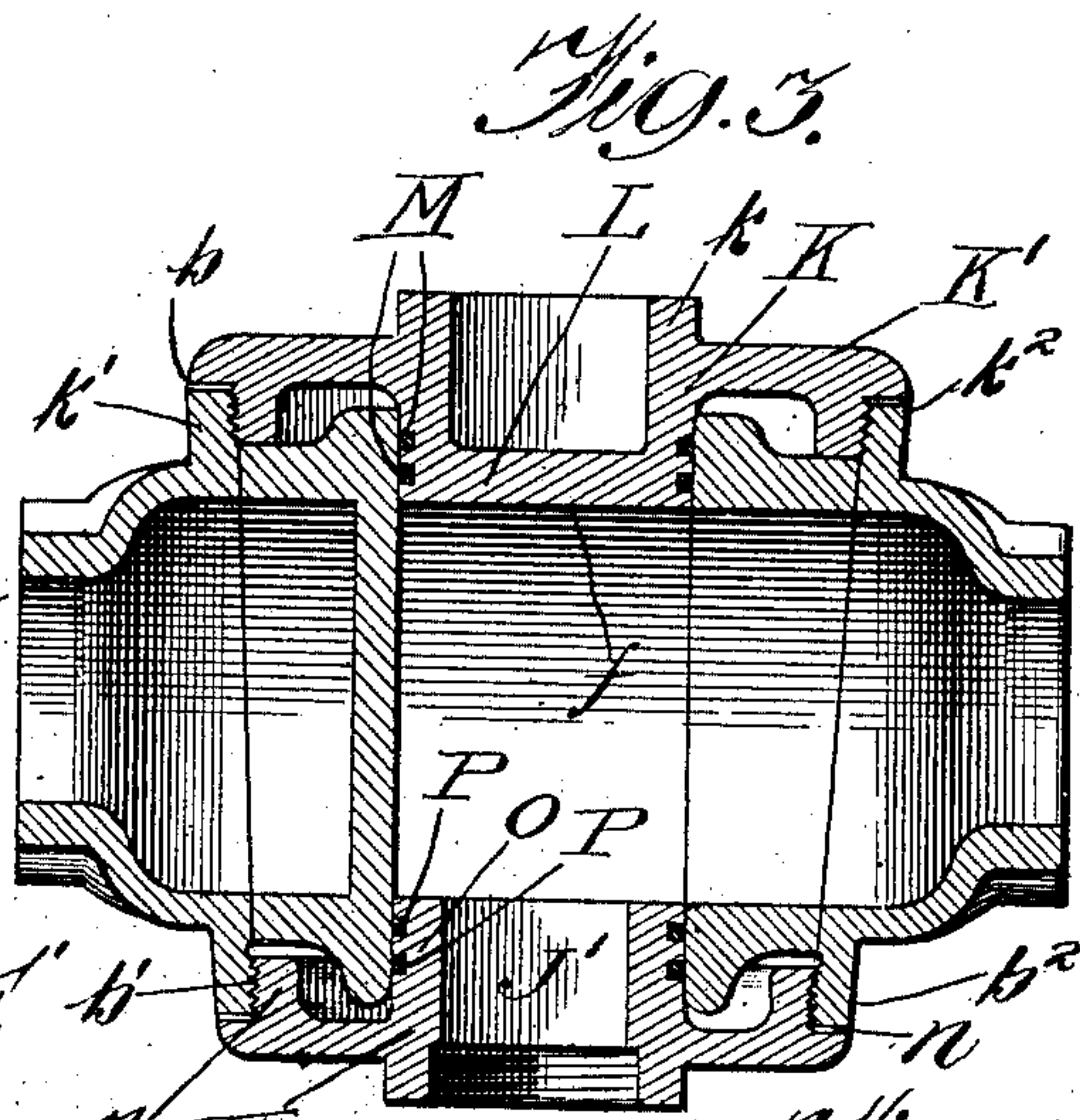
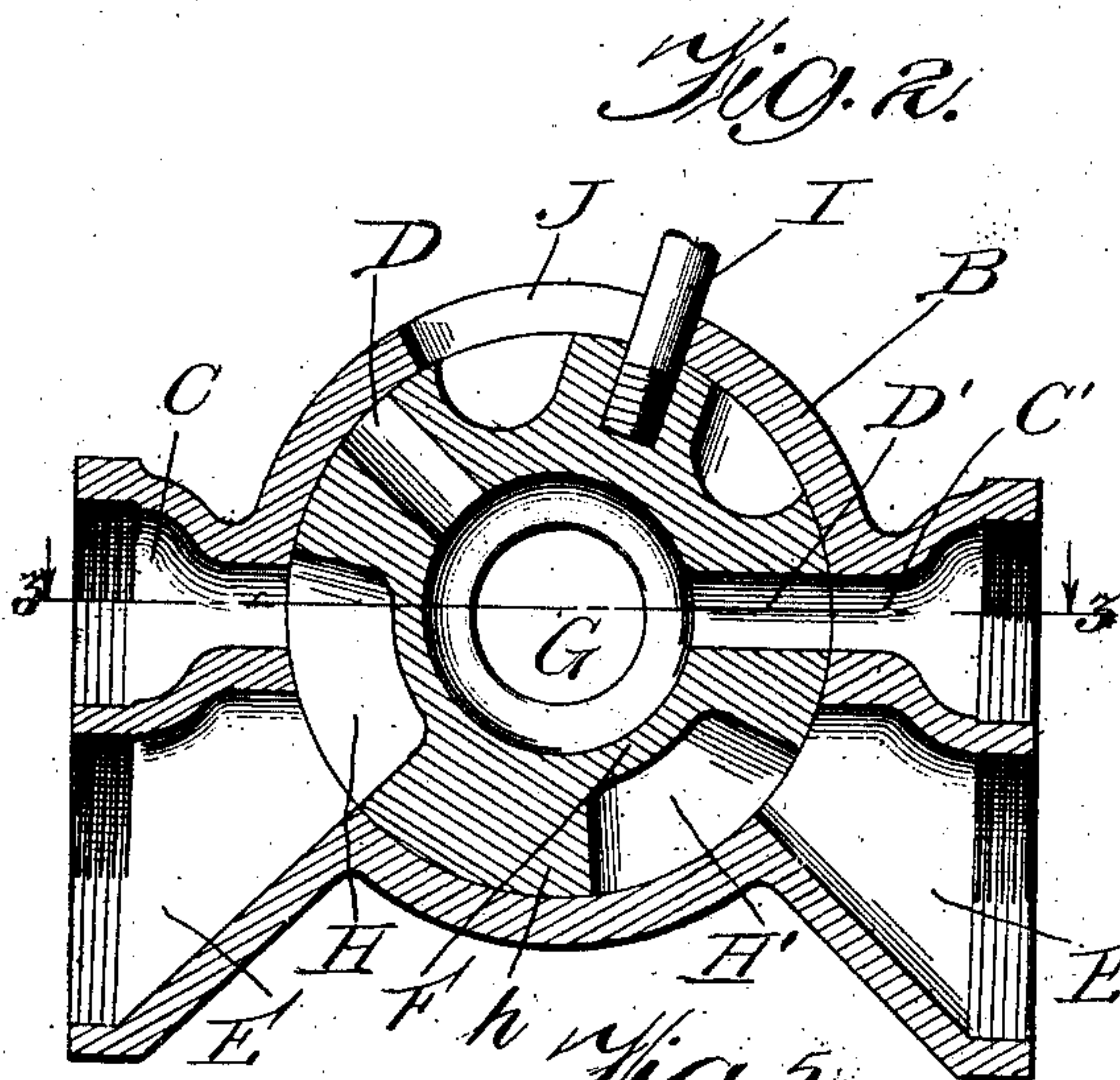
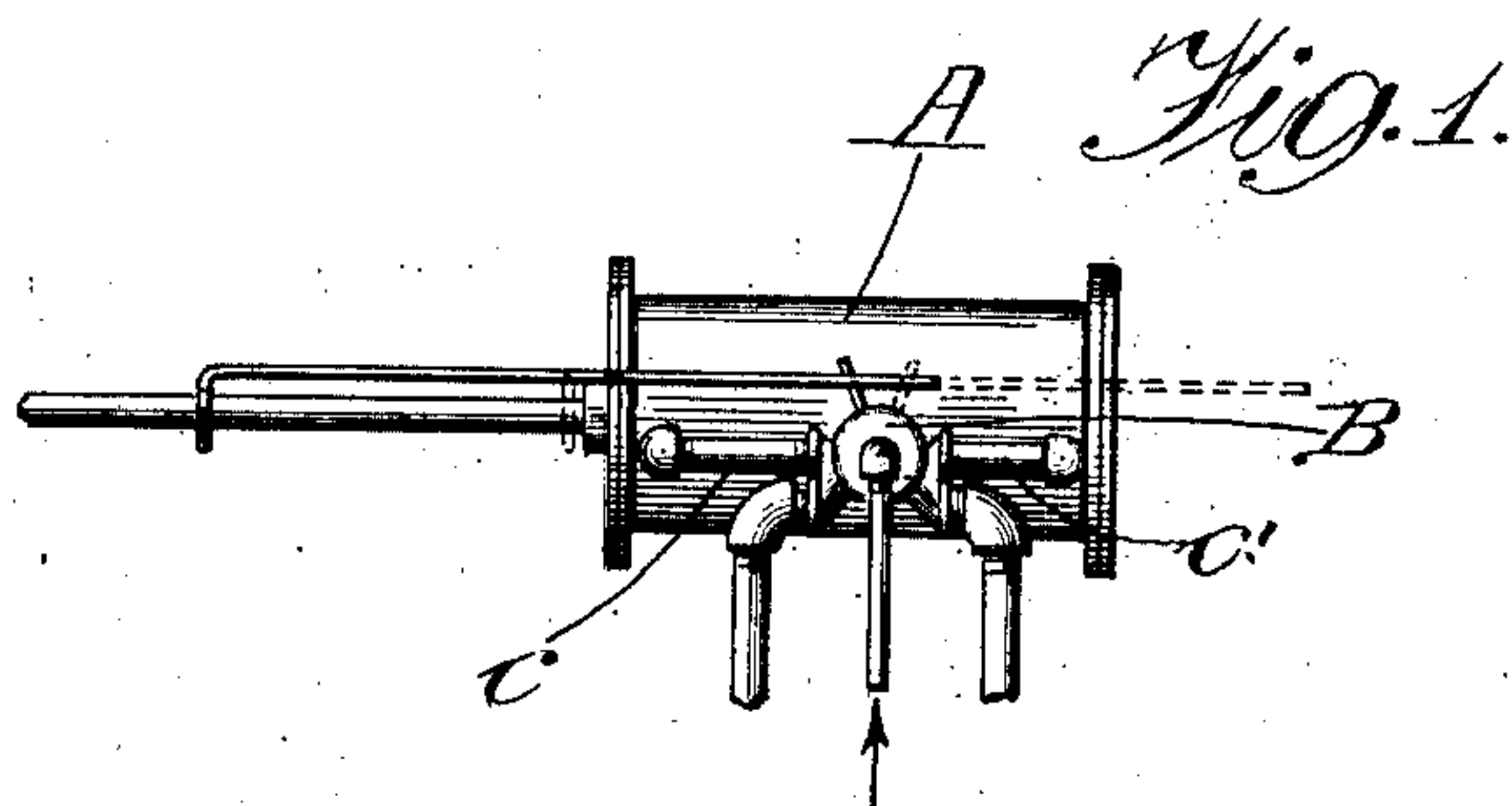
No. 826,667.

PATENTED JULY 24, 1906.

J. P. KENNEDY.

VALVE.

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UNITED STATES PATENT OFFICE.

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VALVE.

No. 826,667.

Specification of Letters Patent.

Patented July 24, 1906.

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To all whom it may concern:

Be it known that I, JOSEPH P. KENNEDY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Valves, of which the following is a specification.

My invention relates to improvements in rotary valves, and has for its object the construction of a valve which will be so balanced as to be easily operated regardless of the pressure within the valve-chamber.

A further object is the production of a valve of simple construction the parts of which may be readily assembled and which will be practically steam-proof.

A further object is the production of a valve of such construction as will be least readily affected by rough usage and the life of which will be greatly prolonged over that of the ordinary valve.

These and such other objects as may hereinafter appear are attained by my invention, several illustrative embodiments of which are shown in the accompanying drawings, in which—

Figure 1 is a front elevation of my invention, showing it attached to a locomotive-cylinder. Fig. 2 is a longitudinal section on the line 2 2 of Fig. 4. Fig. 3 is a horizontal cross-section on the line 3 3 of Fig. 2. Fig. 4 is a side elevation. Fig. 5 is a vertical cross-section on the line 2 2 of Fig. 4, illustrating a modified form of my invention; and Fig. 6 is a detail showing a modified form of end cap and the method of assembling its parts.

Like letters of reference indicate like parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, A represents a cylinder of an engine; B, the valve-casing; C C', outlet-ports; D D', fluid-passages; E E', exhaust-ports; F, the valve-piece; G, an interior chamber in the valve-piece; H H', auxiliary valve-chambers; I, the valve-stem; J, a slot through which the valve-stem extends, and K a valve-cap. This cap K comprises a disk K', having a boss on its outer face and an inner threaded flange k', adapted to screw into the casing B. The face of the outer rim b of the casing B forms a seat for the cap, and washers k² are preferably interposed between the casing and the cap. This cap K projects inwardly, forming a circular journal or hub L, fitting

within the valve-piece F, and the inner face f of which forms one of the walls of the interior valve-chamber G. This journal is provided on its periphery with packing M M in order to prevent the entrance of steam between the periphery of the disk and the abutting face of the valve-piece. On the opposite side of the valve-casing is another disk N, having an inwardly-projecting threaded flange n, adapted to engage the threaded interior of the valve-casing at b'. The end b² of the casing forms a seat for the disk N, and washers n' are interposed between the flange and the seat. The inlet-port J', through which the steam enters the valve, extends through this disk N. The inwardly-projecting hub or journal O of this disk is provided with packing P P to render the connection between the valve-piece and the disk steam-tight.

Referring to Fig. 6, this view illustrates a method of constructing the journal L in several sections, so that the packing-rings may be more readily sprung in place. In this modification the inwardly-projecting journal L consists of, first, a disk l, about which a spring-washer M is placed. A second disk l', having a diameter equal to that of the disk l and washer combined, is next put in place. A third disk l², the upper portion of the periphery of which is cut away sufficient to permit the insertion of a second spring-washer m, is then put in place. In the face of the disk L are bolt-holes Q, and the disks l, l', and l² have corresponding holes registering therewith adapted to receive bolts R R. By this construction it is very easy to slip the spring-washers in place without distorting them, as might happen if the flange were solid, and when the separate disks are bolted together the result is practically a solid disk.

In the construction shown it will be noted that the valve-piece is of tapered form, and the inner face of the casing is correspondingly tapered, so that the valve-piece is snugly seated therein, while the end cap K is provided with an inwardly-projecting annular flange which abuts against one end of the valve-piece, so as to force it against this tapered seat.

To avoid unnecessary tightness, washers may be interposed between the end cap K and the casing, and as it may become necessary to take up wear upon the valve-piece and the valve-seat these washers may be re-

moved, thus permitting a further tightening of the end cap K and a corresponding tightening of the valve-piece.

Referring now to Fig. 2, when steam is allowed to enter the valve-chamber G it at once passes through the valve-port D' and steam-port C', through the pipe c', into the front end of the cylinder, forcing the piston-head backward. This operation forces the steam in the back end of the cylinder through the pipe c, the steam-port C, and the auxiliary valve-chamber H, whence it exhausts through the exhaust-port E. When the valve is carried to reversed position, the operation is reversed.

In the embodiment shown in Fig. 5 the wall h between the auxiliary valve-chambers H H' is cut away, leaving one auxiliary chamber h' and one exhaust-port Q.

It will thus be seen that by supplying the motor fluid first to the interior of the valve-piece and distributing it from the interior of the valve I succeed in producing an almost perfectly balanced valve, so that slight power applied to the valve-stem will readily operate the valve to control very high pressures, while at the same time the valve is strong, simple, and durable and may be readily adapted for use in various situations.

While I have shown my invention in certain desirable embodiments thereof, I do not limit my invention as hereinafter claimed to any particular embodiment here shown.

I claim—

1. A valve, comprising the combination with a casing, of end caps therefor provided with inwardly-projecting valve-bearings, and a valve-piece adapted to rotate on said bearings.
2. A valve, comprising the combination with a casing provided with an inlet and an outlet port, of a valve-piece rotatably arranged within said casing, bearings upon which said valve-piece rotates, means for conducting a motor fluid through one of the bearings and said valve-piece to said outlet-port, and means for excluding such motor fluid from between said valve-piece and said casing.
3. A valve, comprising the combination with a casing provided with a bearing therein an inlet-port opening through said bearing, and an outlet-port, of a valve-piece rotatably mounted in the casing and provided with an interior chamber in communication with said inlet-port and provided with a passage adapted to lead from said chamber to said outlet-port, means for moving said valve-piece so as to bring said passage into or out of register with said outlet-port so as to permit or prevent the flow of a motor fluid through said valve-piece, and means for excluding said motor fluid from entering between said valve-piece and said casing.
4. In combination, a casing provided with

an outlet-port and an exhaust-port, end caps secured to opposite faces of said casing and provided with inwardly-projecting hubs, one of said end caps being provided with an inlet-port, a valve-piece rotatably mounted upon said hubs and provided with an interior chamber communicating with said inlet-port and with a passage leading from said chamber and adapted to communicate with said outlet-port, and provided also with an auxiliary chamber adapted to connect said outlet-port with said exhaust-port, and means for moving said valve-piece so as to either establish communication between said interior chamber and said outlet-port, through said passage-way, or to close such communication and establish communication between said outlet-port and said exhaust-port.

5. In combination, a casing provided with an outlet-port, end caps adapted to be secured to opposite faces of said casing, said end caps being provided with inwardly-projecting hubs and one of said end caps being provided with an inlet-port, a valve-piece rotatably mounted upon said hubs and provided with an interior chamber in communication with said inlet-port and with a passage adapted to lead from said chamber to said outlet-port, and means for rocking said valve-piece upon its bearings.

6. In combination, a casing provided with an outlet-port and with a tapered valve-seat, a plug-valve movably mounted within said valve-seat and provided with an interior chamber and with a passage adapted to lead from said chamber to said outlet-port, end caps secured to opposite faces of said casing and provided with inwardly-projecting hubs, upon which said valve-piece is mounted, one of said end caps being provided with an inlet-port adapted to communicate with the chamber in said valve-piece and one of said end caps being provided with an inwardly-projecting flange adapted to engage one end of said valve-piece so as to bring said valve-piece in operative contact with said tapered seat.

7. In combination, a valve-casing, end caps secured to opposite faces of said casing and provided with inwardly-projecting hubs, a valve-piece rotatably mounted upon said hubs, the hubs of said end caps comprising a plurality of disks secured together and having means mounted thereon for making a pressure-tight joint between said hubs and said valve-piece.

8. In combination, a casing provided with a bearing therein for a rotary valve-piece, and an inlet-port through said bearing, with two outlet-ports, and two exhaust-ports, a valve-piece mounted in said casing and provided with an interior chamber and with two passages leading therefrom and adapted to alternately communicate with one or the other of said outlet-ports, said valve-piece

being also provided with other passages whereby either of said outlet-ports will be in communication with its corresponding exhaust-port whenever the other of said outlet-ports is in communication with said interior chamber of said valve-piece.

9. The combination with a casing provided with two outlet-ports and two exhaust-ports and provided with an interior tapered valve-seat, of a valve-piece mounted within said casing and adapted to said seat, said valve-piece being provided with an interior chamber, end caps mounted upon opposite faces of said casing and provided with inwardly-projecting hubs, upon which hubs said valve-piece is rotatably mounted, said hubs being provided with means for forming a pressure-tight joint between said hubs and said valve-piece, one of said end caps being provided with an inlet-port leading to the interior of said valve-piece, and one of said caps being provided with an inwardly-projecting flange arranged to engage said valve-piece so as to take up wear and hold said valve-piece to its seat, said valve-piece being provided with two passages leading from said interior chamber and adapted to alternately communicate with one or the other of said outlet-ports, said valve-piece also being provided with means whereby each of said outlet-ports will be brought in communication with an exhaust-port whenever the other of said outlet-ports is brought in communication with the interior of said valve-piece.

10. A valve, comprising in combination a casing having a chamber therein, the cap secured to one end of the casing and having a hub projecting into the chamber, a cap secured to the opposite end of the casing and having a hub projecting into the chamber, and a valve-piece rotatably sustained upon the hubs.

11. A valve, comprising in combination a casing having a chamber therein, a cap secured to one end of the casing and having a hub projecting into the chamber, a suitable hub projecting into the chamber and disposed opposite said first-named hub, and a valve-piece rotatably sustained upon the hubs.

12. A valve, comprising in combination a casing having a chamber therein, an outlet-port leading from said chamber, a bearing within said chamber, a cap secured to one end of the casing and having a bearing disposed opposite said first-named bearing, an inlet-port opening through said cap, a valve-piece rotatably sustained upon said bearings and having a central chamber in communication with said inlet-port, and a passage lead-

ing from said chamber adapted, when the valve-piece is oscillated, to be thrown alternately into and out of register with said outlet-port.

13. A valve, comprising in combination a casing having a chamber therein, a pair of outlet-ports leading from said chamber, one or more exhaust-ports leading from said chamber, a hub projecting into the chamber adapted to serve as a bearing, a rotary valve-piece adapted to be sustained upon said hub and to oscillate within the chamber, said valve-piece having a central chamber therein, an inlet-port opening through said hub into said central chamber, a pair of passages leading from said central chamber and adapted when the valve-piece is at the limit of its rotation in one direction, to establish communication between said central chamber and one of the outlet-ports and at the same time to establish communication between the other outlet-port and an exhaust-port.

14. The combination with an engine-cylinder, of a valve comprising a valve-casing having a port in communication with one end of the cylinder, a port in communication with the opposite end of the cylinder, an exhaust-port, a bearing within the chamber, an inlet-port through the bearing, a rotary valve-piece adapted to be sustained upon said bearing and to oscillate in the casing, and conducting means within the valve-piece adapted, when the valve-piece is at the limit of its rotation in one direction, to establish communication between the inlet-port and one end of the cylinder and at the same time to establish communication between the other end of the cylinder and the exhaust-port.

15. The combination with a casing provided with an inwardly-projecting bearing therein for a rotary valve-piece and an inlet-port opposite said bearing, of a pair of outlet-ports and an exhaust-port, a valve-piece mounted in said casing upon said bearing and provided with an interior chamber having one of its walls formed by said bearing, two passages leading therefrom and adapted to alternately communicate with one or the other of said outlet-ports, said valve-piece being also provided with another passage whereby either of said outlet-ports will be in communication with an exhaust-port whenever the other of said outlet-ports is in communication with said interior chamber of said valve-piece.

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