

(No Model.)

2 Sheets—Sheet 1.

J. S. BARDEN.

PISTON METER.

No. 336,032.

Patented Feb. 9, 1886.

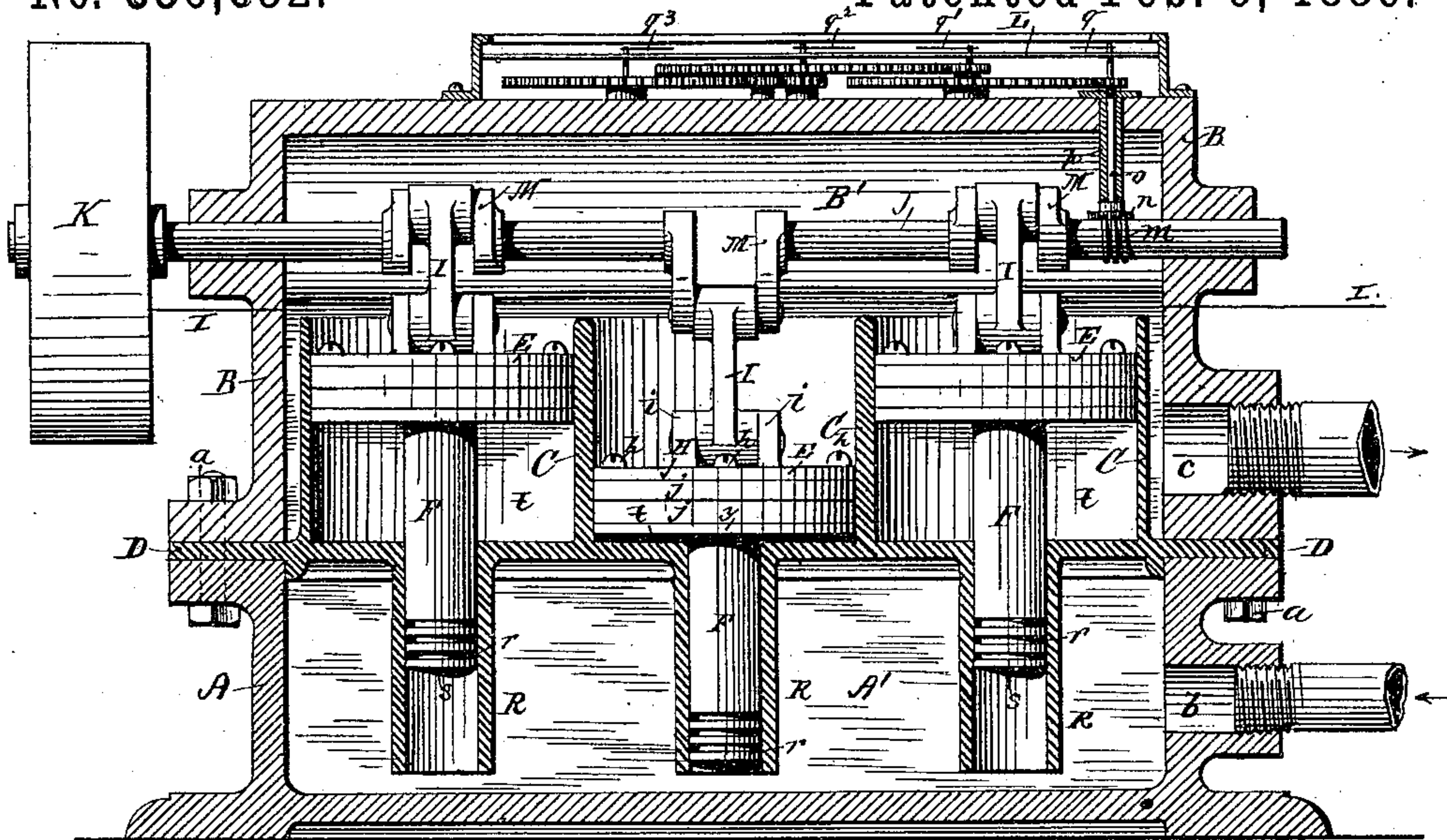


FIG. 1.

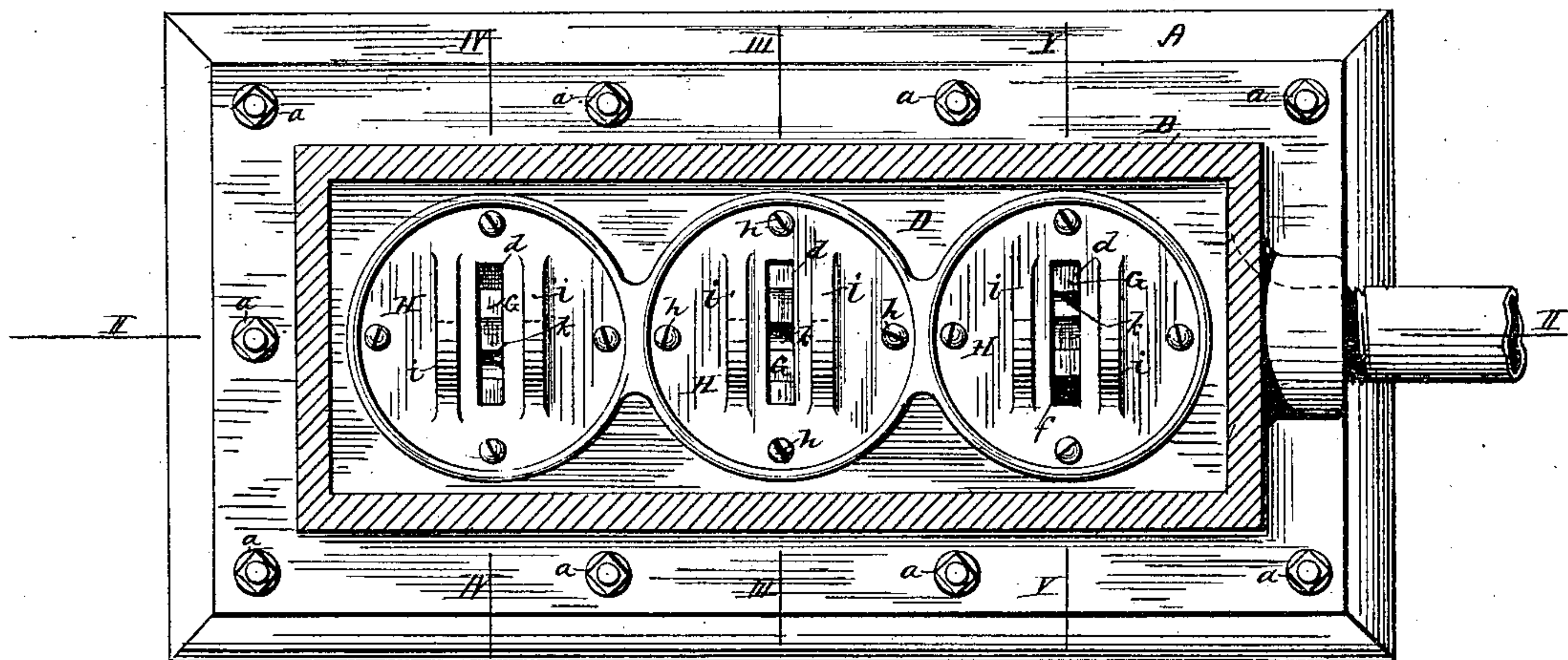
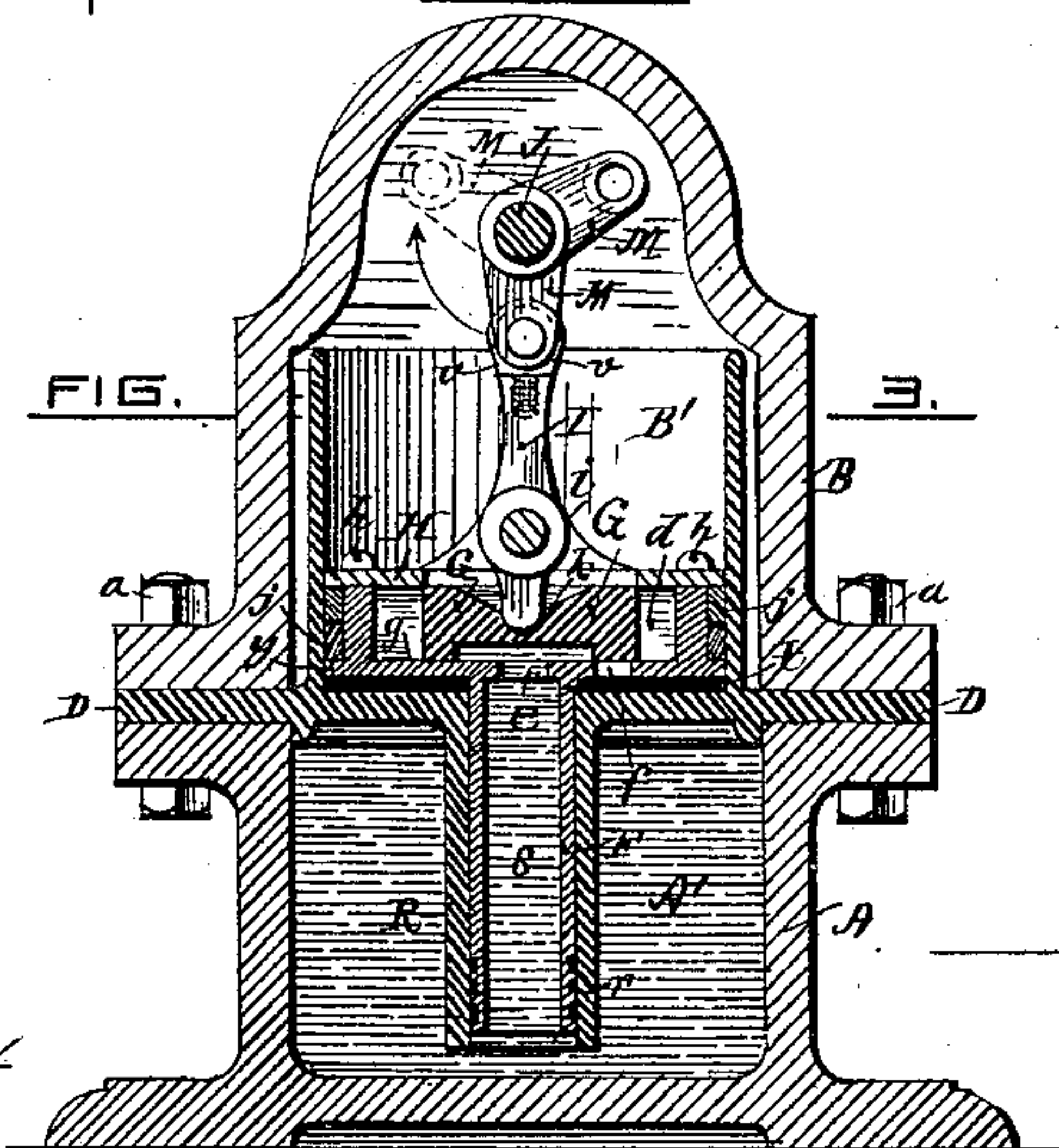


FIG. 2.



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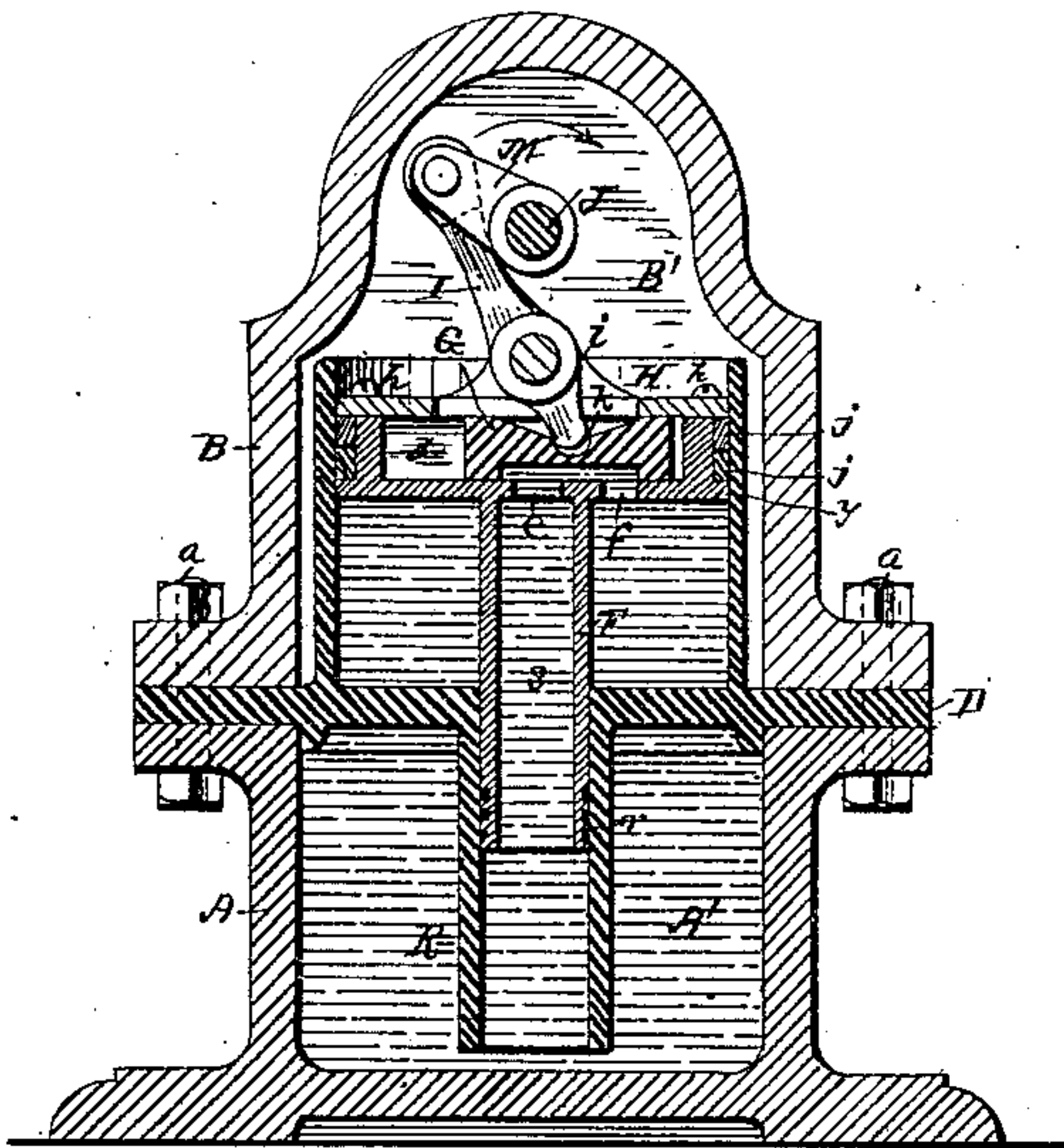


FIG. 4.

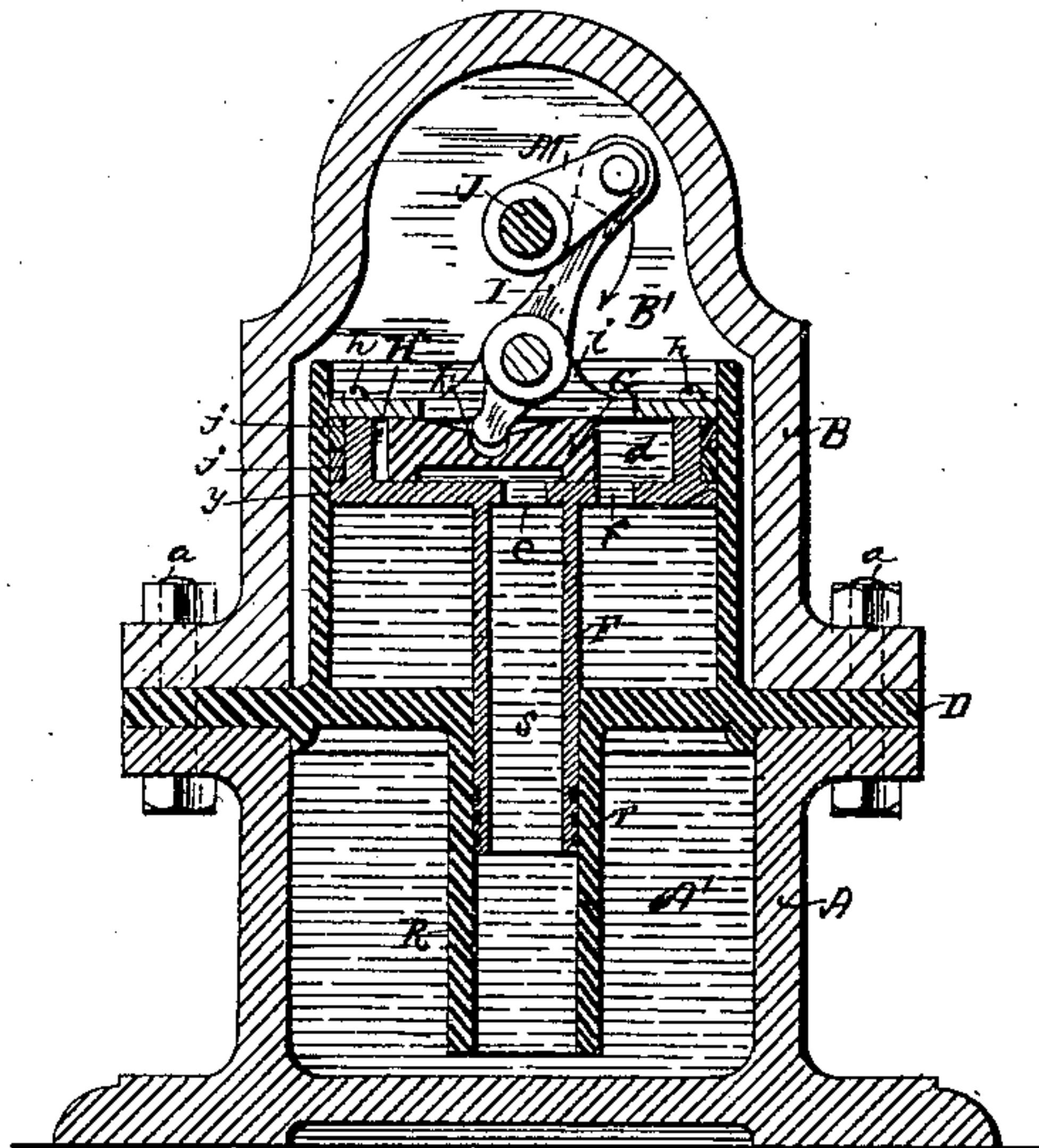


FIG. 5.

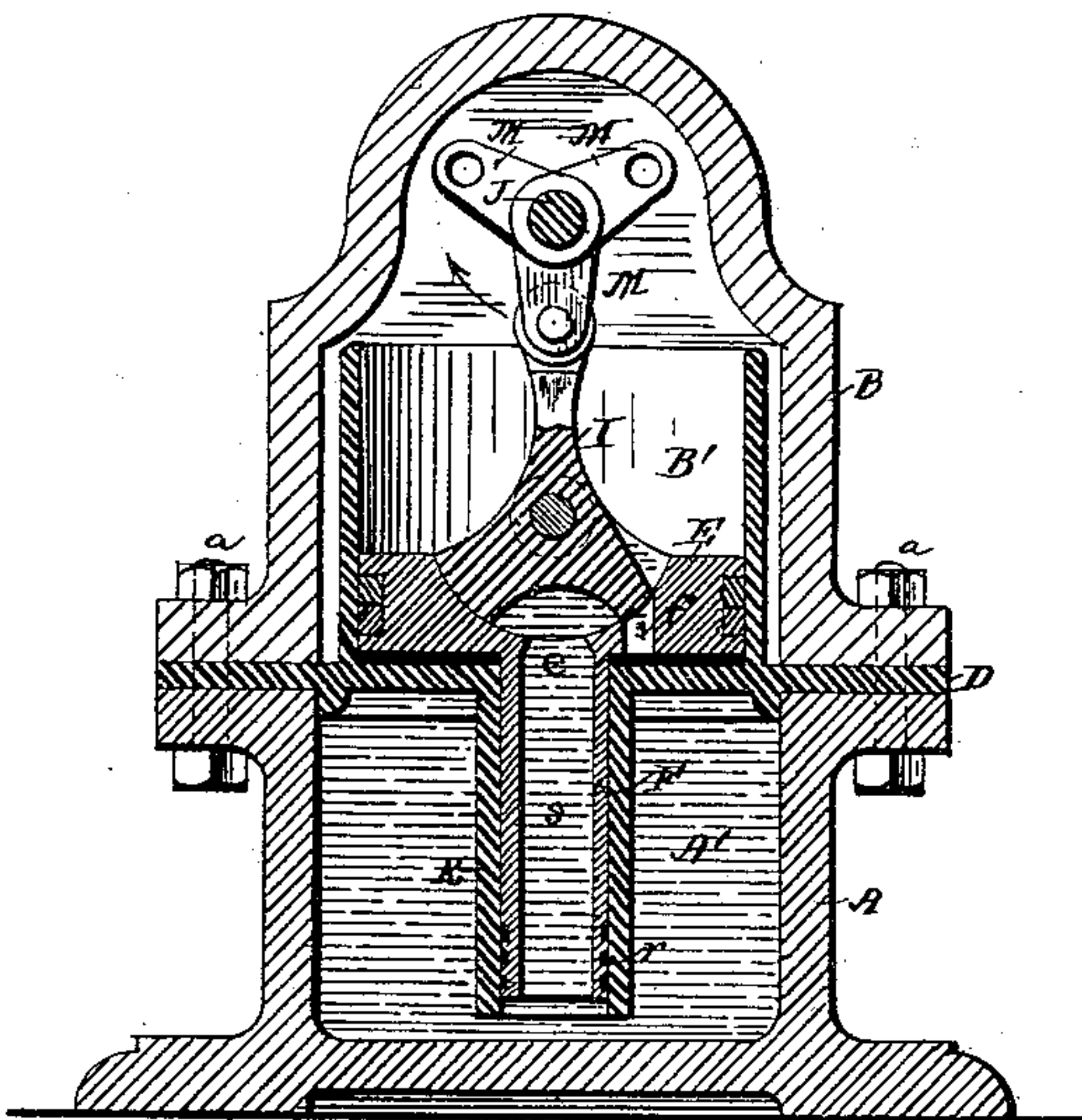


FIG. 9.

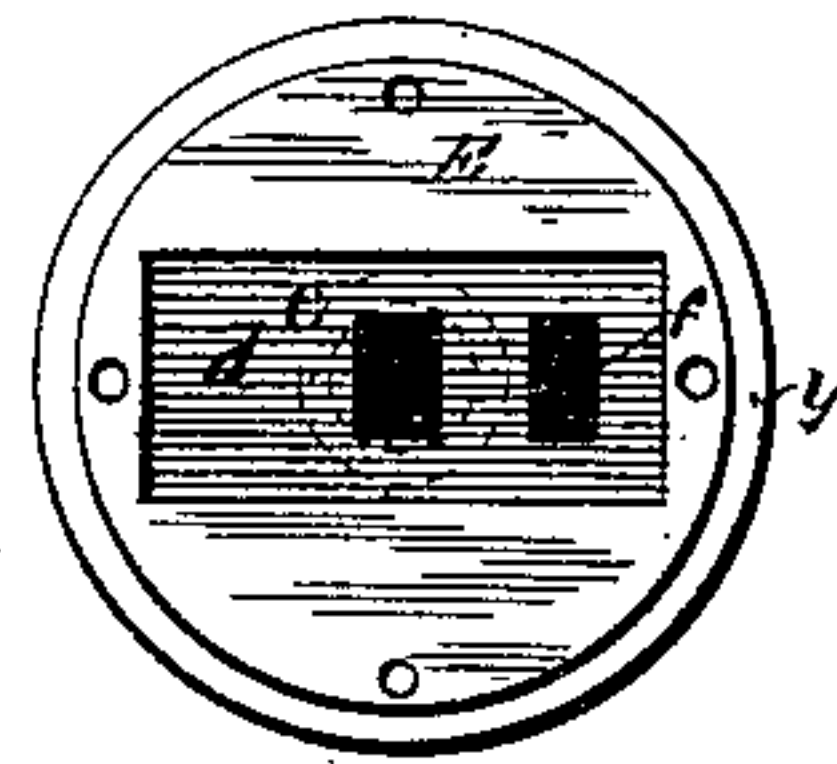


FIG. 6.

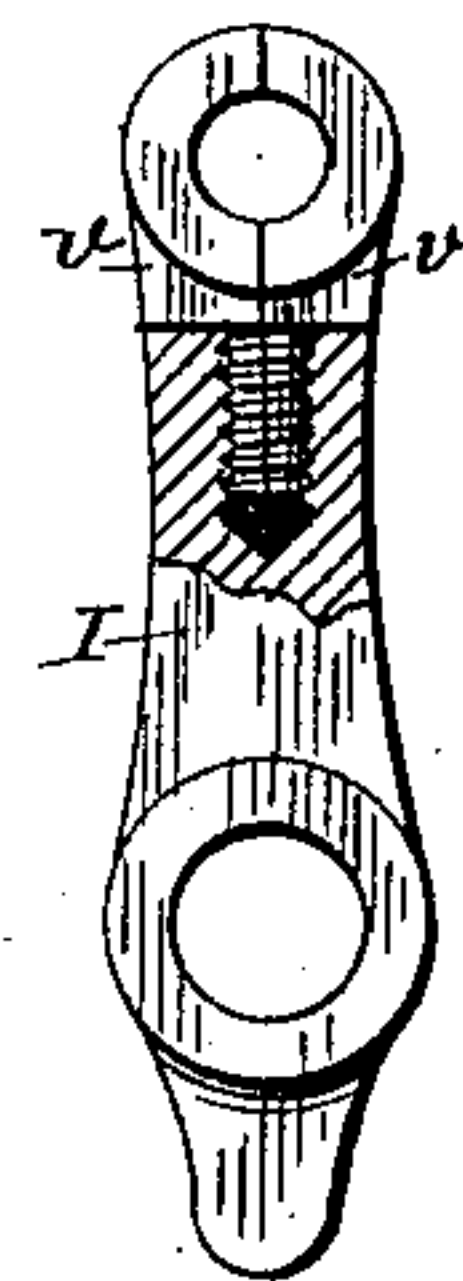


FIG. 7.

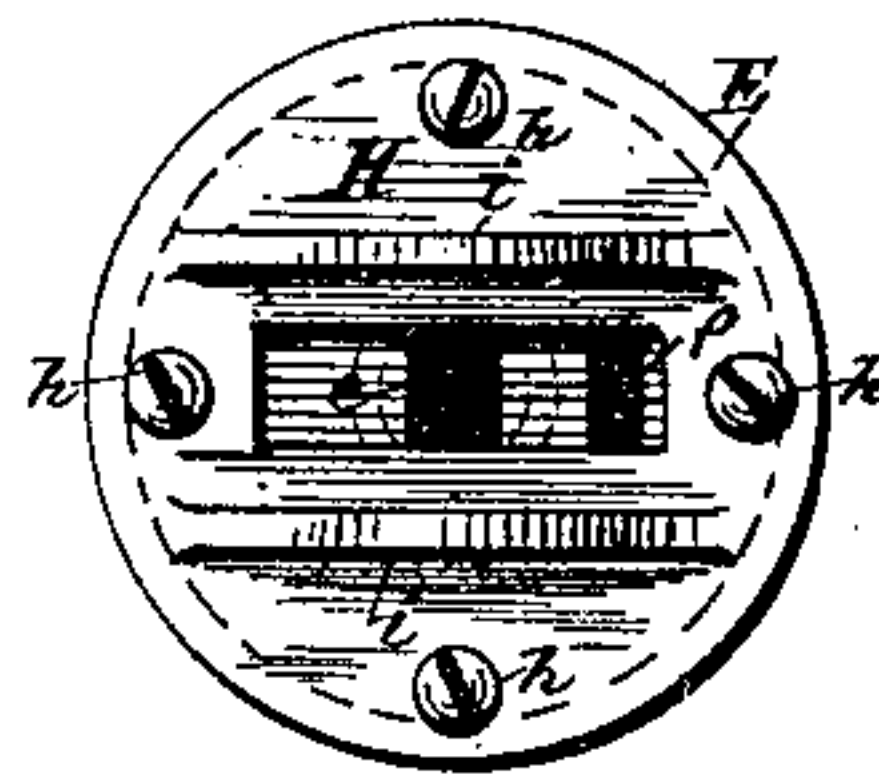


FIG. 8.

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UNITED STATES PATENT OFFICE.

JOHN S. BARDEN, OF WARREN, ASSIGNOR TO JAMES O. DRAPER, OF
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PISTON-METER.

SPECIFICATION forming part of Letters Patent No. 336,032, dated February 9, 1886.

Application filed October 26, 1885. Serial No. 181,007. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. BARDEN, of Warren, in the county of Bristol, in the State of Rhode Island, have invented a new and useful Improvement in Hydraulic Motors or Water-Meters, of which the following is a specification.

My invention consists in the improved construction and arrangement of the pistons and valves of the motor or meter, as hereinafter fully set forth.

Figure 1 is a longitudinal vertical section of the machine. Fig. 2 is a horizontal section taken in the line I of Fig. 1. Fig. 3 is a transverse vertical section taken in the line III of Fig. 2. Fig. 4 is a transverse vertical section taken in the line IV of Fig. 2. Fig. 5 is a transverse vertical section taken in the line V of Fig. 2. Figs. 6, 7, and 8 are detail views of the piston and connecting-rod. Fig. 9 is a transverse vertical section showing a modification of the valve.

In the accompanying drawings, A is the lower portion of the outer case, and B the upper part of the same, which is secured to the portion A by means of the bolts *a a*. The piston-cylinders C C C are made integral with a plate, D, which is held between the parts A and B, as shown in Figs. 1 and 3. At the lower side of the plate D, and coincident with the downward continuation of the axial line of the cylinders C, are formed the tubes R, which are adapted to receive the sliding tubular extension F of the pistons E. The lower chamber, A', which is separated from the upper chamber, B', by the plate D, is provided with an inlet-aperture, *b*, and the upper chamber, B', is provided with an outlet-aperture, *c*. The tubular extension F is made integral with the piston, as shown in the vertical section views of the drawings, and the upper side of the piston is provided with a rectangular depression or chamber, *d*, in which the valve G is made to reciprocate over the ports *e* and *f*, the valve being firmly held to its seat *g* by means of the perforated plate H, which is secured to the upper side of the piston by means of the screws *h*, and which is provided with the upright ears *i i*, to which the connecting-rod and valve-operating lever I is pivoted. The plate H also serves with the flange *y* to

securely hold the piston packing-rings *j*. The lower end of the connecting-rod and lever I is made to enter a circular recess, *k*, so that the vibrating movement of the lever I will serve to cause the desired reciprocating movement of the valve G.

The shaft J is provided with the cranks M, set at an angle of one hundred and twenty degrees with each other, as shown in the vertical section, Fig. 3, and the outer end of the shaft J is provided with the pulley K. Upon the shaft J, within the chamber B', is secured the worm *m*, which engages with the worm-gear *n*, secured to the lower end of the shaft *o*, the said shaft being held in the sleeve *p*, which extends upward through the case B. The worm-gear *n* may be provided with ten teeth, and in this case the pointer *q* at the upper end of the shaft *o* will register the number of complete revolutions of the shaft J, up to ten revolutions, upon the dial-plate L, and by means of suitable intermediate gearing the pointers *q' q'' q'''* may be made to register the complete revolutions of the shaft J to one hundred, one thousand, and ten thousand, respectively, and by continuing the series of pointers the registration may be carried to any point desired.

The lower end of the tubular piston-extension F is provided with annular packing-grooves *r*, which serve to secure a tight joint around the sliding tube.

In the operation of the machine the water may pass upward from the lower chamber, A', through the bore *s* of the tube F, and through the port *e* under the valve G, and downward through the port *f* to the cylinder-chamber *t*, as shown in Fig. 4, and upon the downward movement of the crank, as shown in Fig. 5, the valve G will be thrown back by the action of the lever connecting-rod, so that the port *f* will be opened to the chamber B', from which the water will flow out at the opening *c*.

The lever connecting-rod is made in three parts, as shown in the plan view, Fig. 7, a portion of which is broken away in order to show the screw-thread of the separate oppositely-arranged joint-pieces *v v*, which serve to provide for the convenient attachment of the lever connecting-rod to the crank of the shaft J.

A modification is shown in Fig. 4, where the valve is made circular and integral with the lever connecting-rod, the operation of the machine being substantially the same; but the flat valve is preferred, on account of its desirable adjustability to the valve-seat.

The machine may be employed as a meter for registering the quantity of water or other fluid passing through the same; or it may be employed as a motor; and, in the latter case, steam may be employed as the motive power, if desired. The machine may also receive the operating-fluid through the opening *c* and exhaust the same from the opening *b*, and in this case the direction of movement of the crank-shaft will be reversed.

I claim as my invention—

The combination of the crank-shaft, the connecting-rod lever pivoted to the piston, the valve adapted to reciprocate over the ports of the piston, the tubular extension of the piston, the upper and lower sections of the outer case, and the intervening plate provided at one side with the piston-cylinder and at the other with a tube adapted to receive the tubular extension of the piston through which the fluid passes, substantially as described.

JOHN S. BARDEN.

Witnesses:

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