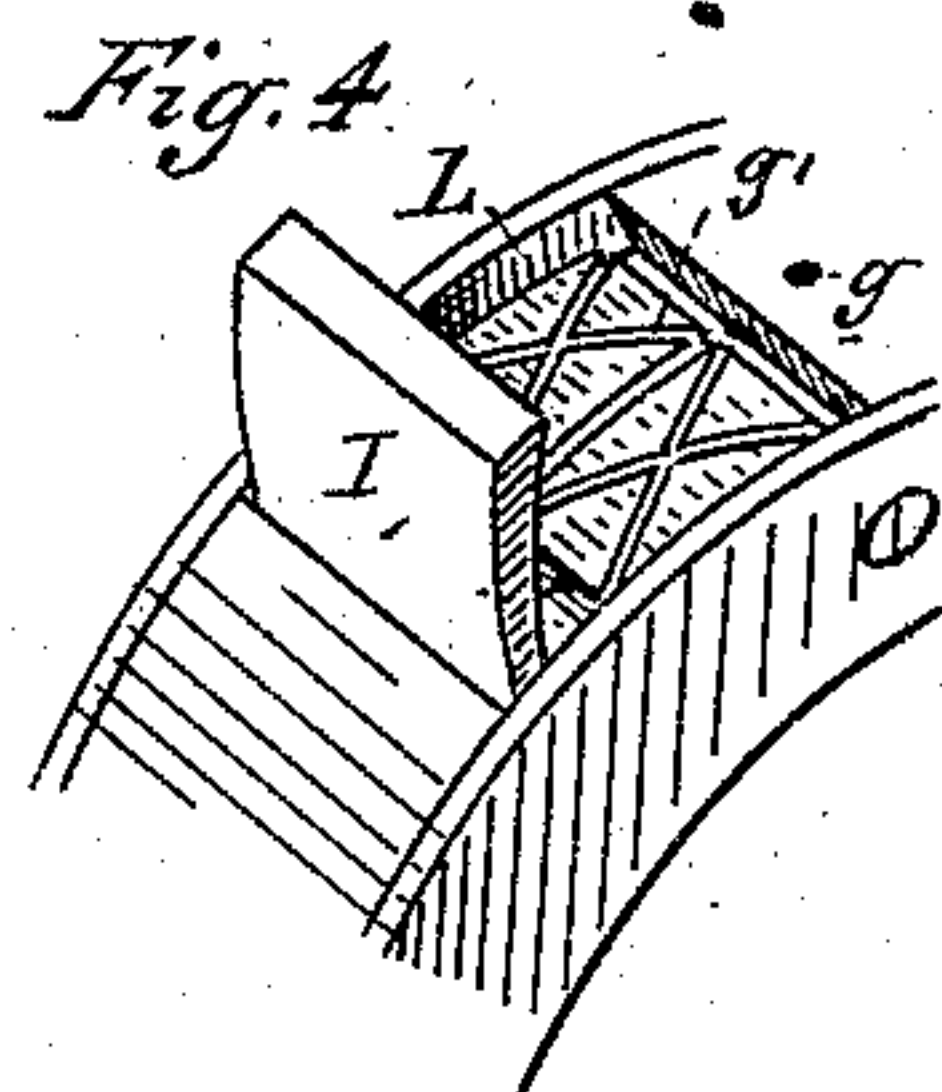
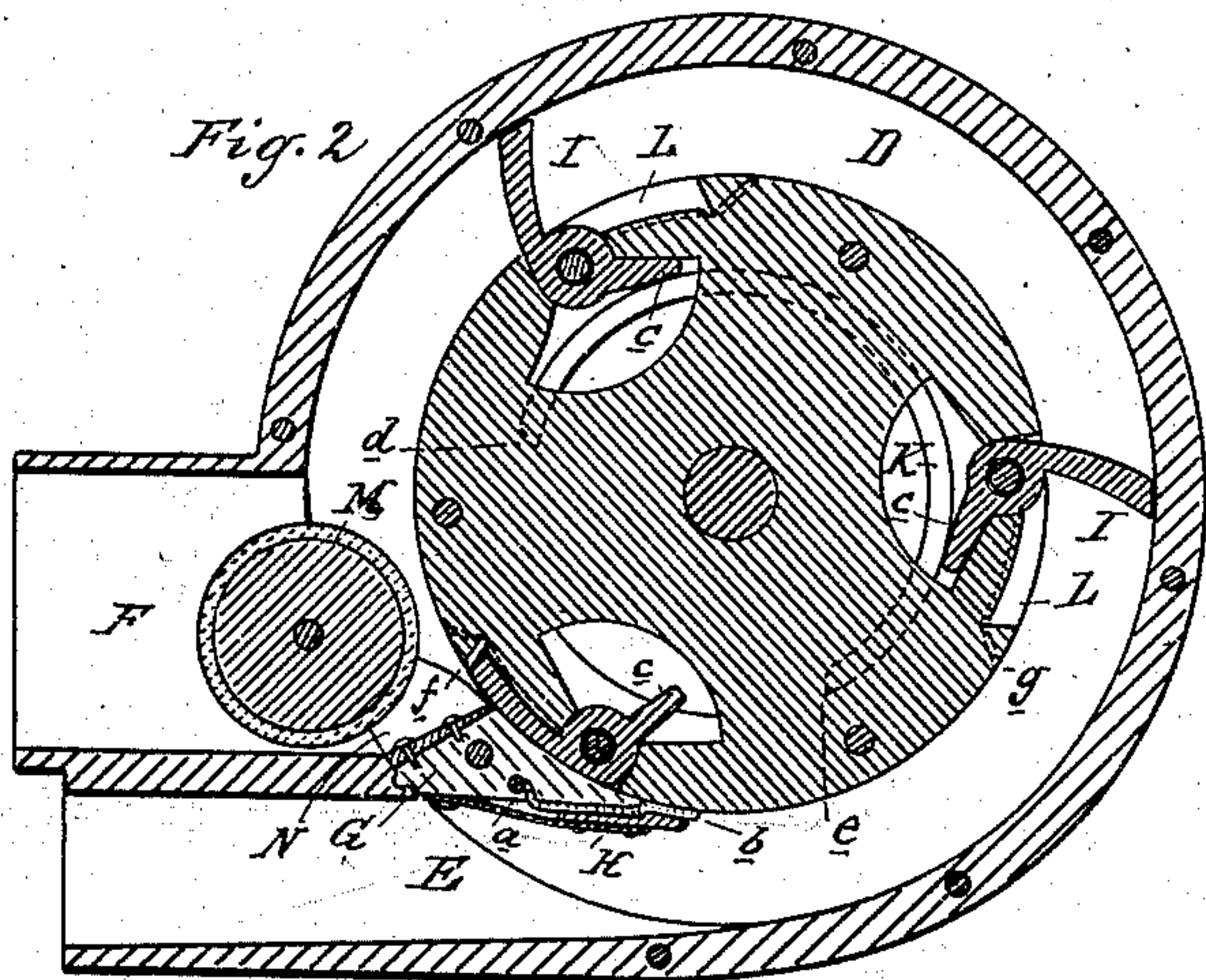
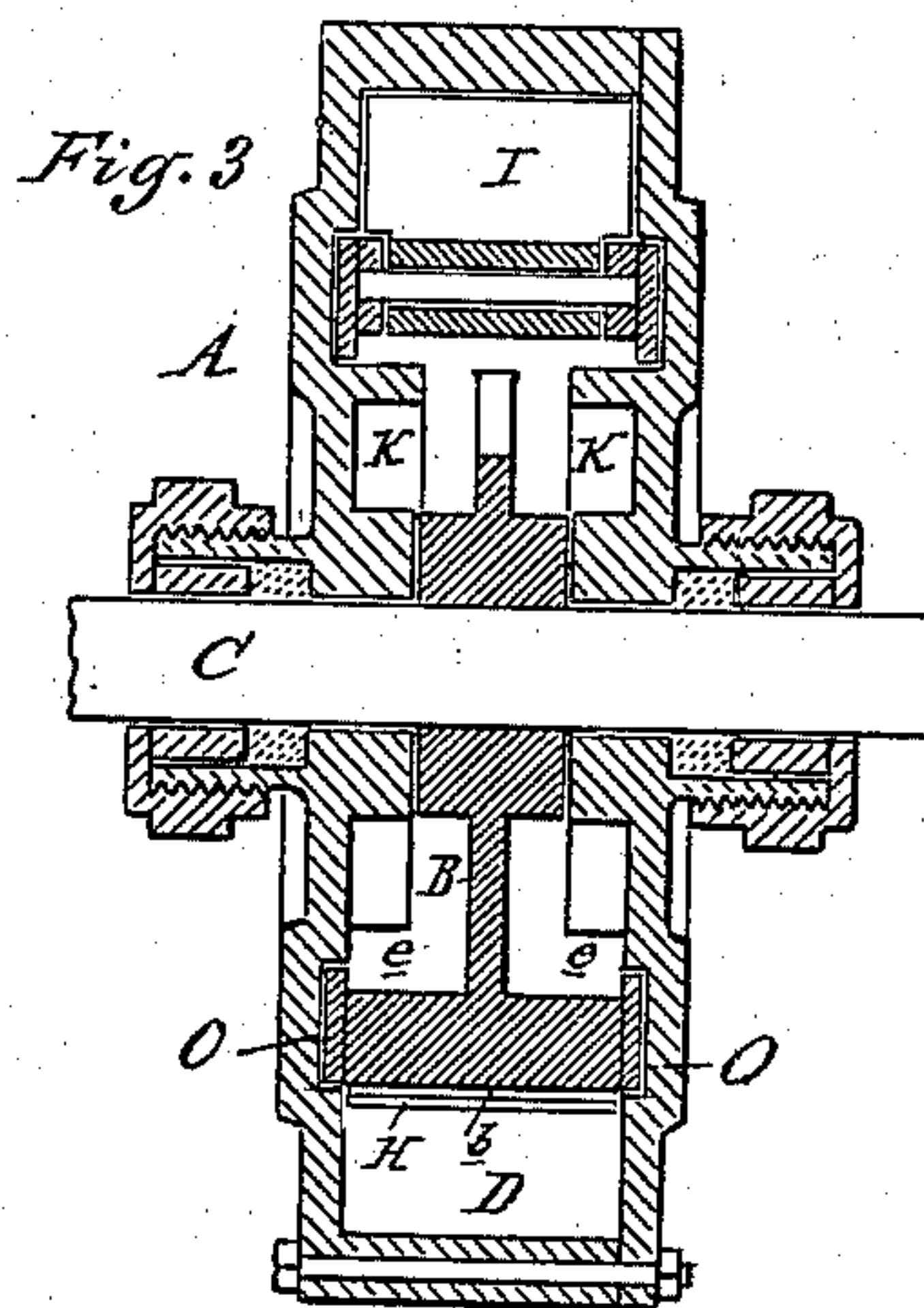
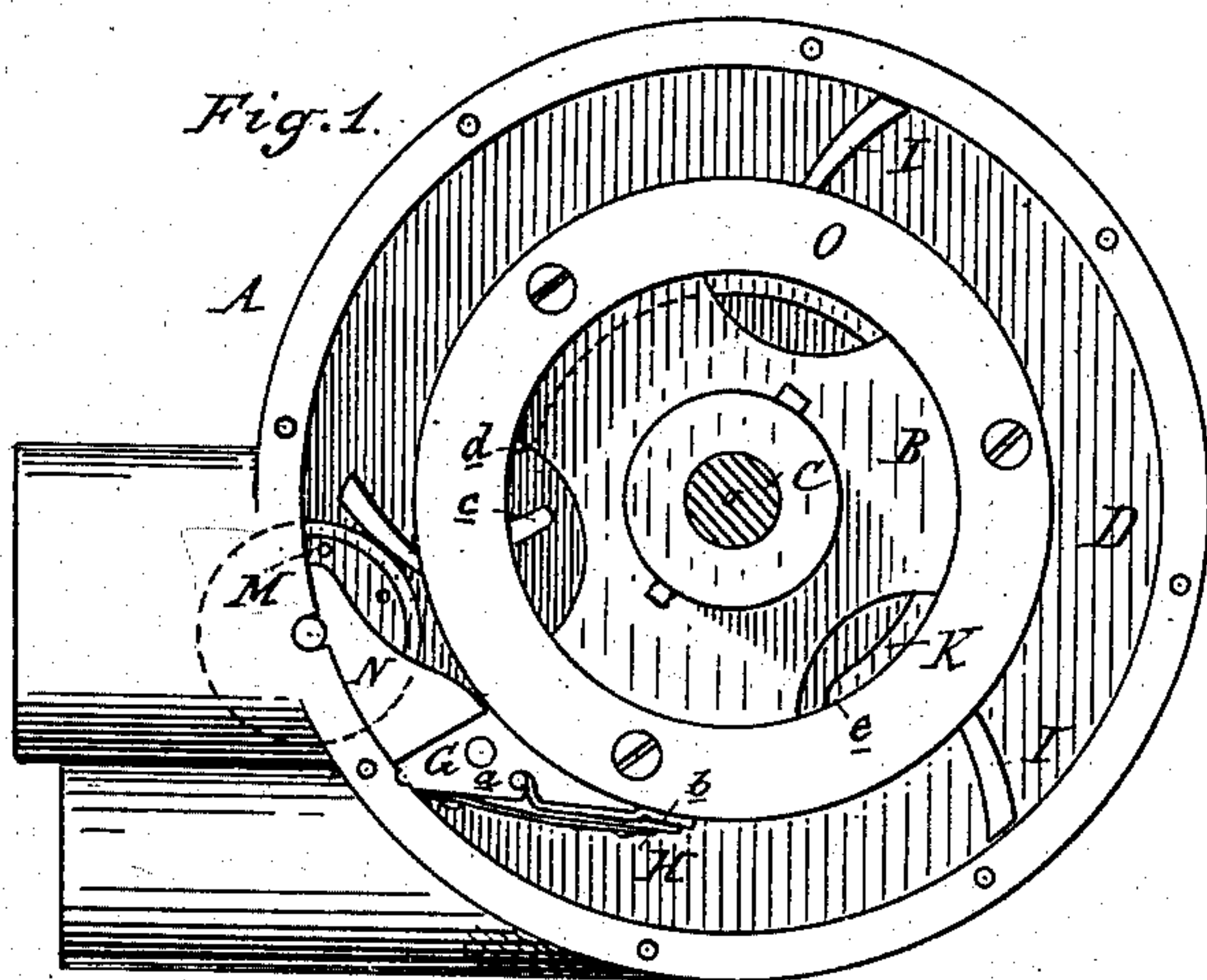


(No Model.)

W. J. GURD.
MOTOR.

No. 257,864.

Patented May 16, 1882.



Witnesses:
C. J. Shipley
E. Scully.

Inventor:
William J. Gurd
per A. Barthel
Att'y

UNITED STATES PATENT OFFICE.

WILLIAM J. GURD, OF SARNIA, ONTARIO, CANADA.

MOTOR.

SPECIFICATION forming part of Letters Patent No. 257,864, dated May 16, 1882.

Application filed January 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. GURD, of Sarnia, in the county of Lambton and Province of Ontario, Canada, have invented new and useful Improvements in Motors; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to improvements in that class of rotary motors wherein the pressure of the water, steam, or other fluid is made to act upon a series of wing-pistons attached to the face of a revolving hub, which is secured upon a horizontal shaft and inclosed in an outer stationary case; and my improvement consists in the arrangement, construction, and combination of the various parts, all as more fully described in the following specification, and specifically pointed out in the claims.

In the drawings which form a part of this specification, Figure 1 is an elevation of an improved water-motor with the front portion of the inclosing case broken away. Fig. 2 is a vertical central section thereof, taken at right angles to the axis. Fig. 3 is a vertical central cross-section. Fig. 4 is a perspective of part of the hub, showing the construction of the recesses for the wing-piston.

In the drawings, A is a cylindrical case inclosing the cylindrical hub B, which is secured to the shaft C, and placed concentrically within the case A.

D is the annular water-way formed between the face of the hub and the inner face of the case A. It begins at the induction-opening E and leads around the hub into the eduction-opening F.

G is an abutment dividing the annular water-way between the induction and eduction openings, and its construction is as follows: The lower face, *a*, of this abutment is inclined so as to form a throat between the induction-opening E and water-way D, compensating thereby for the necessary contraction of a stream of water entering through the round induction-pipe into the rectangular-shaped water-way. To this face *a* is secured, in any convenient manner, the leather flap *b*, whose free end overlaps the abutment and impinges upon the face of the hub.

H is a spring-plate secured to the face *a* of the abutment, and with its free end pressing upon the leather flap, so as to hold it firmly down upon the face of the hub. The tension of this spring-plate, aided by the pressure of the inflowing water, insures a water-tight partition between the induction and eduction ports, which at the same time is yielding enough to prevent unnecessary friction.

A series of wing-pistons, I, are pivoted at equal distances apart in proper recesses in the rim of the hub. Each of these pistons has a rear extension, *c*, which projects into the interior of the hollow hub, and is forced to travel upon the circular guideways K, one of which is secured to each of the inner sides of the case A. To allow the wing-pistons to pass the abutment, a portion of the guideways K from *d* to *e* is cut away, allowing the pistons to turn upon their pivots and fold down into corresponding recesses, L, cut into the face of the hub. When folded in their recesses L the outer faces of the pistons correspond exactly with the face of the hub, thus enabling the same to pass the abutment.

To provide for the easy escape of the water when a piston is forced into its recess, the latter is made slightly longer than the piston, leaving a slit, *f*, open for the escape of the water, for which an additional exit is provided through the small hole *g*, which communicates with the channels *g'* along the bottom of the recess. The object of this slit *f* and the channels *g'* is also to insure the proper closing down of the piston when the water is carrying impurities with it, and to obviate the suction, which would otherwise form a resistance to the opening of the piston after passing the abutment.

The folding of the pistons into their recesses is brought about by their striking against the rubber-faced wheel M, which is journaled across the eduction-opening F, just in advance of the abutment. To complete the closing of the piston two horns, N N, one on each side of the wheel M, may be provided, which would force down the pistons into their recesses in a more positive manner than could be obtained by the exclusive use of the rubber-faced wheel.

The use of the wheel M, which is free to rotate, diminishes the friction and obviates all noise. It has the additional advantage that

by its use the folding of the pistons can be accomplished in a very short interval, thus getting the longest possible effective water-way. To each side of the hub are secured the rings

5 O, which are made to fit nicely into the corresponding recesses in the case, so as to prevent the water from forcing its way on the sides of the hub to the eduction-opening. They are made just small enough consistent with such
10 object, so as to give the minimum of friction between the hub and case.

It will be seen that the action of the piston-wings is positive in all their functions, as the guideways K keep the pistons rigidly extended during their travel through the water-way, and also force them again from their recesses as soon as they pass the abutment.
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While I have described and shown in the drawings a water-motor as a special adaptation of a rotary motor, I do not intend to limit myself to this particular class of rotary motors only, as it is evident that the construction herein described may be adapted for other rotary motors wherein the motive power is derived from steam, gas, &c.
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What I claim as my invention is—

1. In a rotary motor, the combination, with the pivoted wing-pistons, of the rubber-faced wheel M, as and for the purpose specified.

2. In a rotary motor, the combination, with the pivoted wing-pistons, of the rubber-faced wheel M and inclined planes or horns N, substantially as and for the purpose specified. 30

3. In a rotary motor, the combination, with a series of pivoted wing-pistons, of the circular guideway K, the rubber-faced wheel M, and the inclined planes or horns N, substantially as and for the purpose specified. 35

4. In a rotary water-motor, the pivoted wing-pistons I, in combination with the hub having recesses L, and with the water-exits *f* and *g*, as and for the purposes specified. 40

5. In combination with a rotary motor, the abutment G, provided with the leather flap *b* and spring-plate H, as and for the purpose described. 45

WM. J. GURD.

Witnesses:

FRED. W. KITTEMASTER,
W. J. BARBER.