

(No Model.)

3 Sheets—Sheet 1.

L. O. DEHNEL.

HYDRAULIC ENGINE OR MOTOR.

No. 328,299.

Patented Oct. 13, 1885.

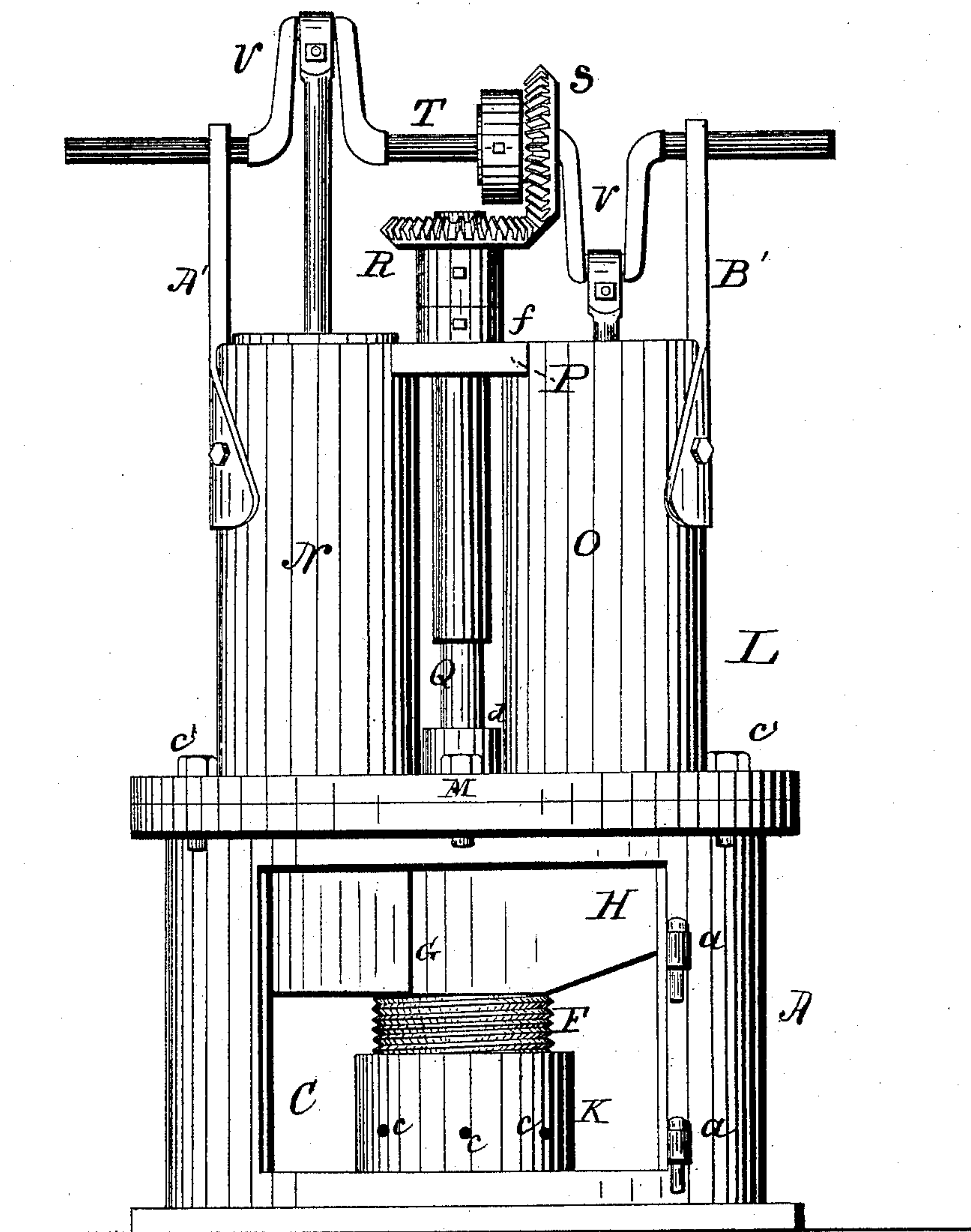


FIG. 1

WITNESSES

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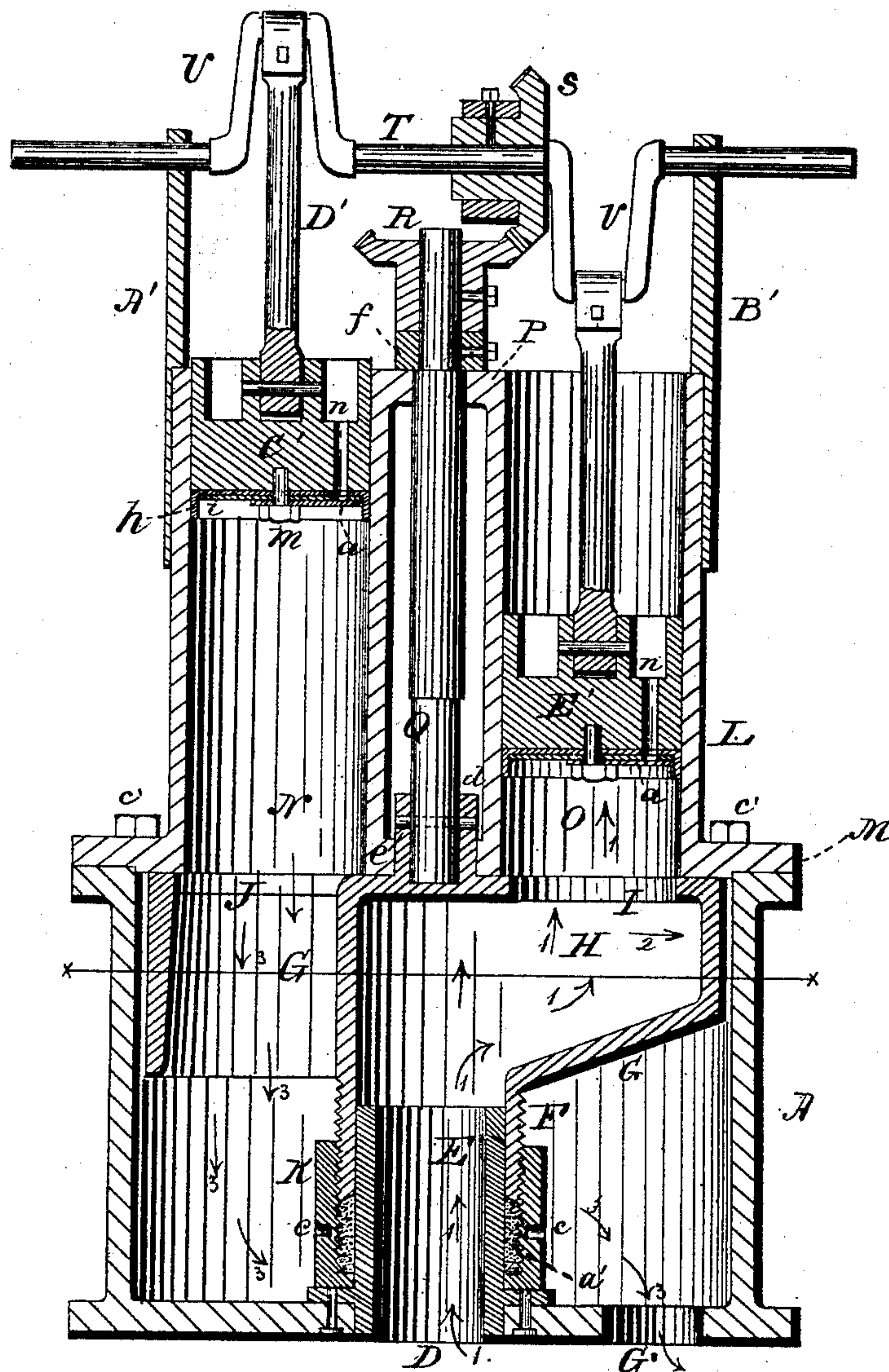


FIG. 2

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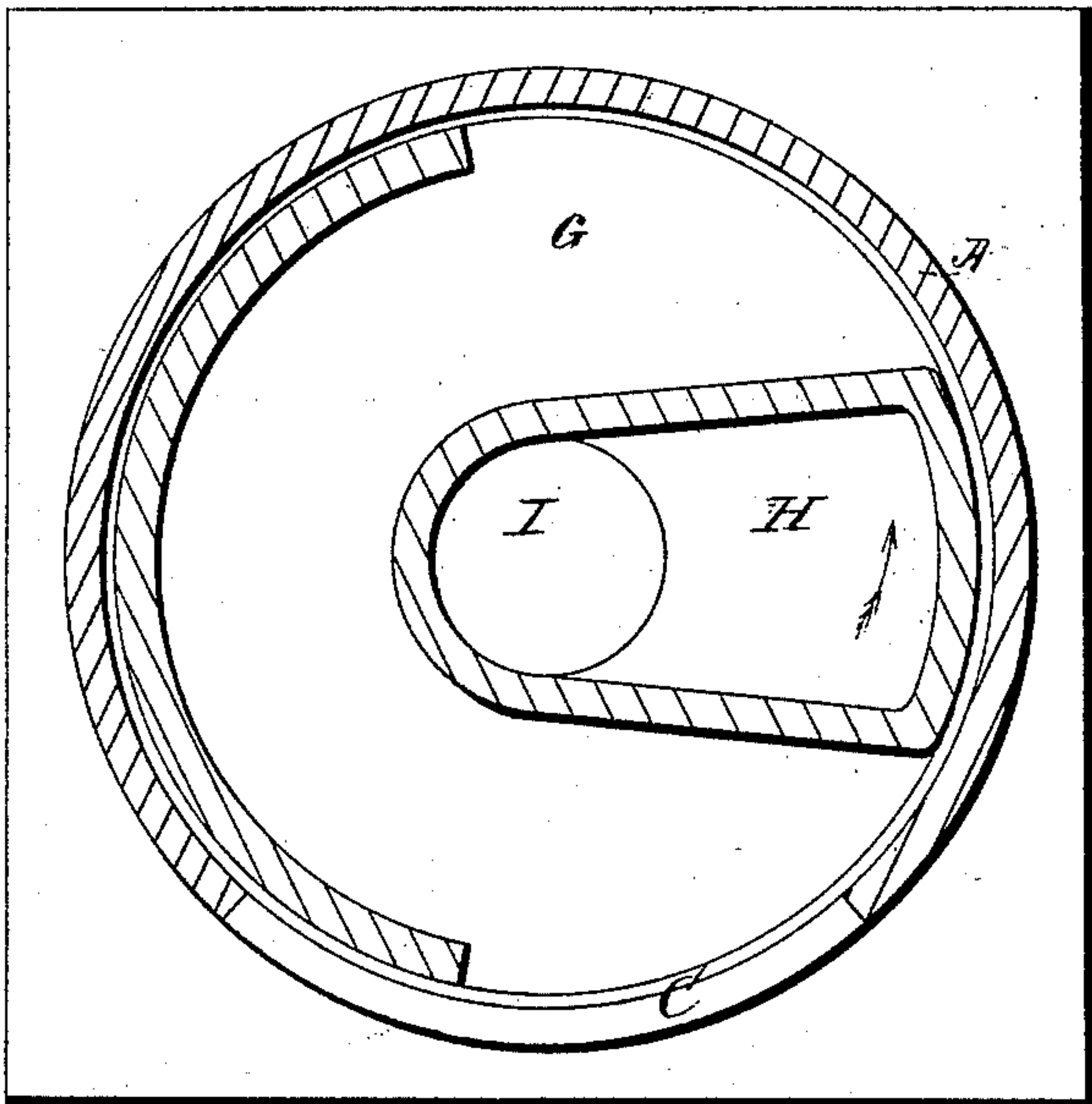


FIG. 3

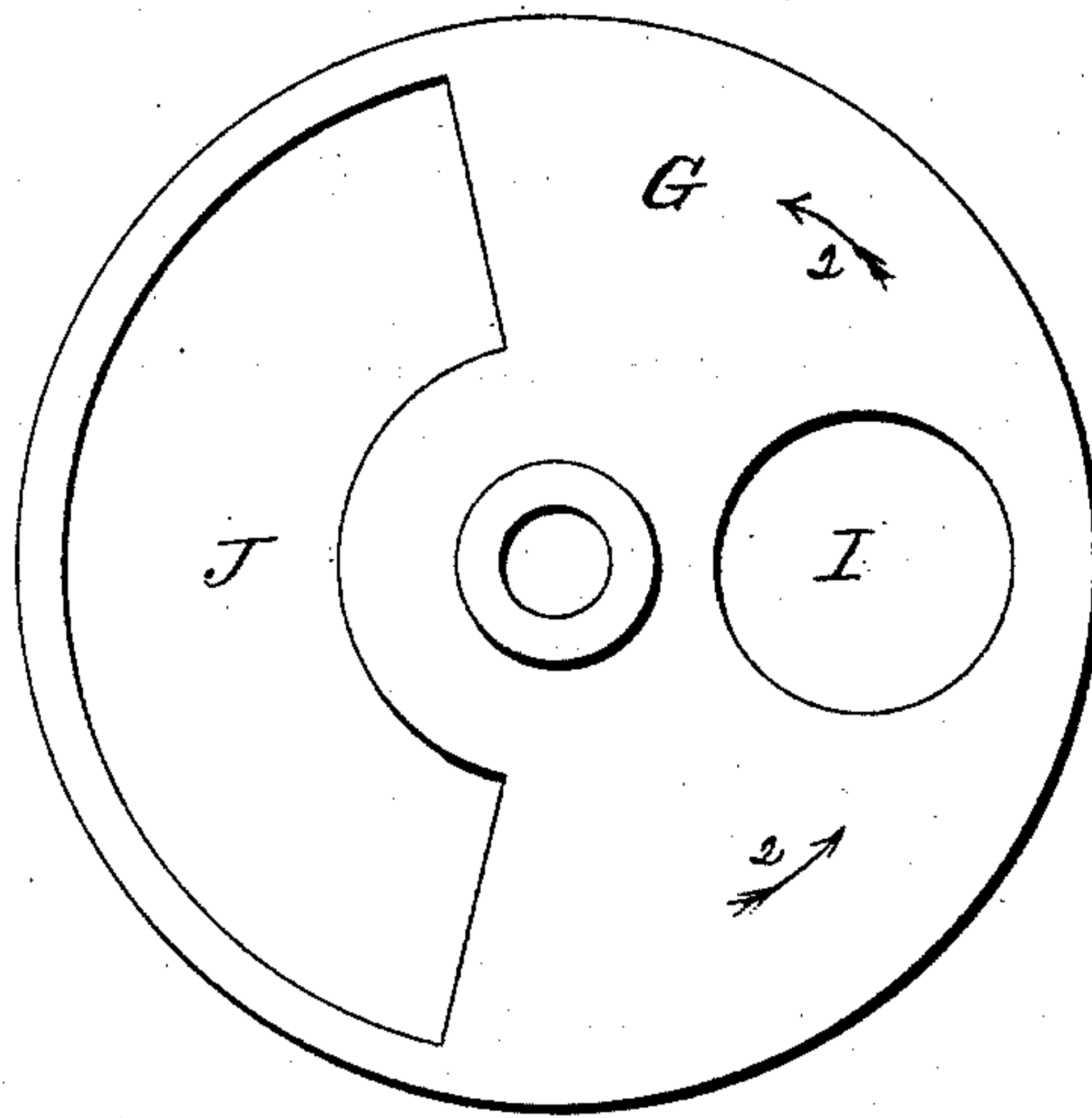


FIG. 4

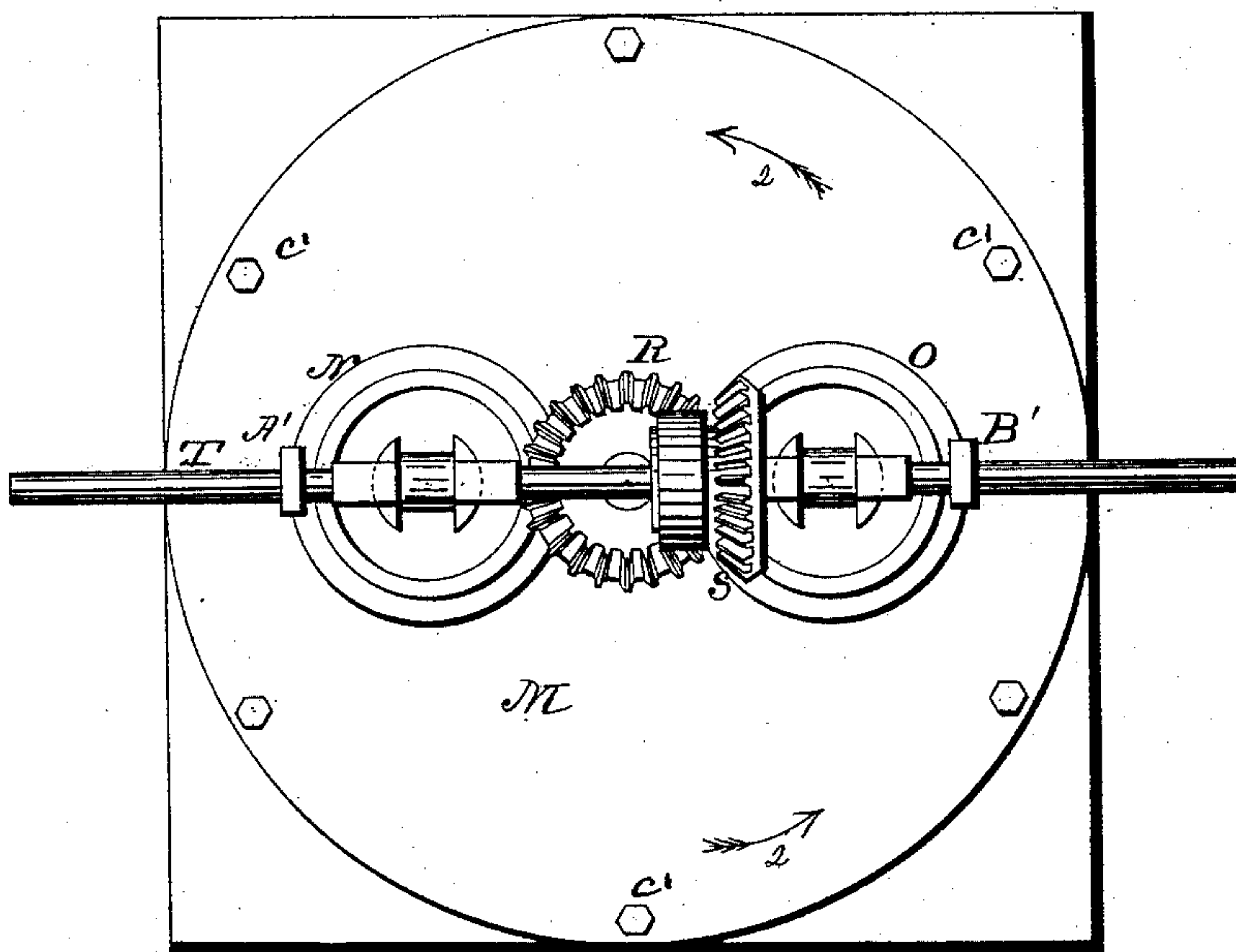


FIG. 5

WITNESSES.

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UNITED STATES PATENT OFFICE.

LOUIS O. DEHNEL, OF SANDUSKY, OHIO.

HYDRAULIC ENGINE OR MOTOR.

SPECIFICATION forming part of Letters Patent No. 328,299, dated October 13, 1885.

Application filed July 28, 1885. Serial No. 172,857. (No model.)

To all whom it may concern:

Be it known that I, LOUIS O. DEHNEL, of Sandusky, in the county of Erie and the State of Ohio, have invented a certain new and Improved Hydraulic Motor or Engine; and I hereby declare the following to be a full and complete description of the same.

The hydraulic motor or engine above referred to is constructed and operated substantially as follows, and the same is illustrated in the accompanying drawings, making a part of this specification.

In said drawings, Figure 1 represents an external side view of the engine. Fig. 2 is a vertical transverse section. Fig. 3 is a horizontal section through the line *xx*, Fig. 2. Fig. 4 is a top view of a detached section. Fig. 5 is a plan view of the engine.

Like letters of reference denote like parts in the several figures.

The lower part or body of the engine consists of a cylindrical case, A, in the side of which is an opening, C, to obtain access to the interior of the case. Said opening, when the engine is in practical use, is closed with a door, (not shown in the drawings,) but of which *a a* are the hinges. Centrally through the bottom of the case is a tubular induction-port, D, over the pipe E of which is closely fitted the tubular neck F, Figs. 1 and 2, of a revolving head, G, of which H is a pocket in open communication with the said tubular port D, as seen in Fig. 2. Fig. 4 is a detached view of the said head, showing the top thereof. It will be noticed that in the top of the head is an induction-port, I, in open relation with the pocket H, as seen in Fig. 2. There is also in the top of the head an exhaust-port, J, in communication with the interior of the said case A, as seen in said Fig. 2. The neck of the revolving head is free to rotate on the pipe E, and is made water-tight in its connection therewith by a collar, K, provided with a female screw, by which it is screwed onto the neck F of the head. Said collar, together with the neck, forms a stuffing-box, whereof *a'* is the packing, which on screwing up the collar by a suitable implement inserted in the holes *c* compresses the packing around the pipe E, thereby making the neck of the head tight in its connection with the said pipe. The neck, in its connection with the pipe E, forms the pivotal axis of the head of the ma-

chine as it revolves in the case A, as and by the means hereinafter shown.

The upper section, L, of the machine consists of a plate or cover, M, secured to the top of the case A by bolts *c'*. Said cover forms the top of the case, as seen in Fig. 5. On the top of the said case and an integral part of the cover is a pair of cylinders, N and O, in open communication with the interior of the case, as seen in Fig. 2. The upper ends of the cylinders are connected to each other by a bar, P, through which projects the shaft Q. The lower end of the shaft passes through the cover of the case and is made fast to the head G, above described, by means of a socket, *d*, projecting upward from the head through the cover of the case, and in which socket the end of the shaft is inserted, and secured therein by a pin, *e*. Said socket is an integral part of the head, and in its connection with the cover of the case serves as an axis for the upper end of the head, as shown in Fig. 2.

The upper end of the shaft Q is journaled in the bar P, above referred to, and is suspended thereon by a collar *f*, thereby relieving the stuffing-box, above alluded to, from the weight of the revolving head G. To the upper end of the said shaft is secured a bevel-pinion, R, adapted to engage a corresponding pinion, S, on the shaft T, provided with the cranks U and V. Said shaft has its bearings in the standards A' and B', respectively, attached to the sides of the cylinders, as seen in the drawings. In the cylinder N is a piston, C', attached to the crank U by a connecting-rod, D'. The connection of the said rod to the crank and to the piston is or may be by the ordinary devices adapted for similar purposes. The said piston consists of a solid head, C', provided with a packing, *h*, secured to the head by a plate or follower, *i*, made fast to the head by a screw-bolt, *m*. Upward through the head of the piston is a conduit, *n*, the lower end of which is closed by a valve, *a'*. The use of said conduit will presently be manifest. The cylinder O is also provided with a piston, E', a duplicate of the piston in the cylinder N, and is connected to the crank V substantially in the same way as the piston in the cylinder N is connected to its respective crank, hence a specific description of it is not essential, as the one is descriptive of the other.

Having described the construction of the

machine, the practical working of the same is substantially as follows:

By means of a pipe the induction-port D is put in communication with a hydrant, or with any other source of water having a moving force or momentum. The abovesaid connection having been made, let it be supposed, for illustration, that the engine is in the working condition shown in Fig. 2, in which the piston E' is at the lower end of the cylinder O and the piston C' at the upper end of its cylinder N. In this condition of the engine it will be noticed that the pocket H is directly under the cylinder O and in open relation therewith, while the cylinder N is over the exhaust-port J, Fig. 4, in the top of the abovesaid revolving head G.

Now, as the current of water pours into the induction-port D it passes upward in the pipe E into the pocket H, thence through the port I into the cylinder O, as indicated by the arrows 1, and impinges upon the piston E', forcing it upward, and thereby turns the crank V and shaft, causing the piston in the cylinder N to descend while the piston E' is moving upward. During this reverse movement of the two pistons the gearing R and S, operated by the crank-shaft, revolves the head in the direction of the arrows 1, thereby closing the lower end of the cylinder O from its open relation to the port I, and puts it in open communication with the exhaust-port J, and the port I is now in communication with the cylinder N, into which the water rushes as it did into the cylinder O. The diversion of the inflowing water from the cylinder O to the cylinder N forces upward the piston C' to its former position, while the piston E' descends as the water that was poured therein escapes through the exhaust-port J into the case A, and runs therefrom through the outlet G', as indicated by the arrows 3.

The continual revolution of the head G brings the port I again to the cylinder O and the exhaust-port J to the cylinder N. The water again forces upward the piston E', causing a downward movement of the piston C', while the water previously forced into its cylinder falls therefrom into the case A, as indicated by the arrows 3, and is discharged from the case through the outlet G', as in the former instance, and so on continuously. The piston in one cylinder ascends while the piston in the other descends, thereby causing such timely movement of the revolving head G by the crank and gearing as to bring in due time the exhaust-port J under one cylinder, and at the same time bring the induction-port I to the other. By this alternate action of the ports the head is continued in a uniform revolving movement, thereby giving to the crank-shaft a continuous revolution, from which, by a suitable drum and belt, power is taken for any desirable purpose. That the engine may have a steady and regular movement, a fly-wheel is or may be placed on one

end of the shaft, and a governor of any suitable construction may be attached to the engine to regulate the speed of the same.

Should the impelling-current of water be shut off before the piston has made its full upward stroke, a partial vacuum will be formed in the cylinder between the water therein and the piston. That the external air may not react on the ascending piston and cause a consequent loss of power of the engine is the use of the conduits *n* in the pistons, above alluded to. Should there be a vacuum below the piston the air will rush down through the conduits and force open the valves *a* and fill the vacuum, thereby relieving the piston from the external pressure of the air.

Although the above-described machine is especially intended for water-power, it will be obvious that it may be driven by steam or air without changing the essential feature of the machine.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In the construction of a hydraulic engine or motor, the combination, with the case A, of the cylinders N and O, arranged in relation to each other, as described, and in communication with the interior of the case, and the said cylinders provided with pistons respectively connected by suitable connecting-rods to the cranks of the shaft T, journaled in the standards A' and B', and having on said shaft a bevel-pinion adapted to engage a corresponding pinion on the driving-shaft Q, substantially as described, and for the purpose set forth.

2. In a hydraulic motor, the revolving head, driving-shaft Q, connected to said head, and pinion R, arranged relatively between the cylinders N and O, and the upper end of the shaft journaled in the bar P, collar *f*, secured to the shaft Q, and by which it is suspended from the said bar for relieving the tubular axis of the revolving head from the weight thereof, in combination with the pinion S and crank-shaft, substantially as set forth.

3. In a hydraulic motor or engine, the case A, provided with an outlet, revolving head having a tubular axis, and a pocket in open relation with the tubular axis, and in the top or plane of the head an induction-port, I, related to said pocket, and an exhaust-port, J, related to the interior of the case A, driving-shaft, and pinion R, connected to the revolving head and journaled in and supported on the bar P by the collar *f*, constructed as described, in combination with the cylinders N O, with their respective pistons and connecting-rods, crank-shaft, and pinion S, substantially as set forth, and for the purpose specified.

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

LOUIS O. DEHNEL.

Witnesses:

J. H. BURRIDGE,
JOSEPH MAYER.