

(No Model.)

3 Sheets—Sheet 1.

F. WALKER.
PISTON WATER METER.

No. 272,607.

Patented Feb. 20, 1883.

Fig. 1.

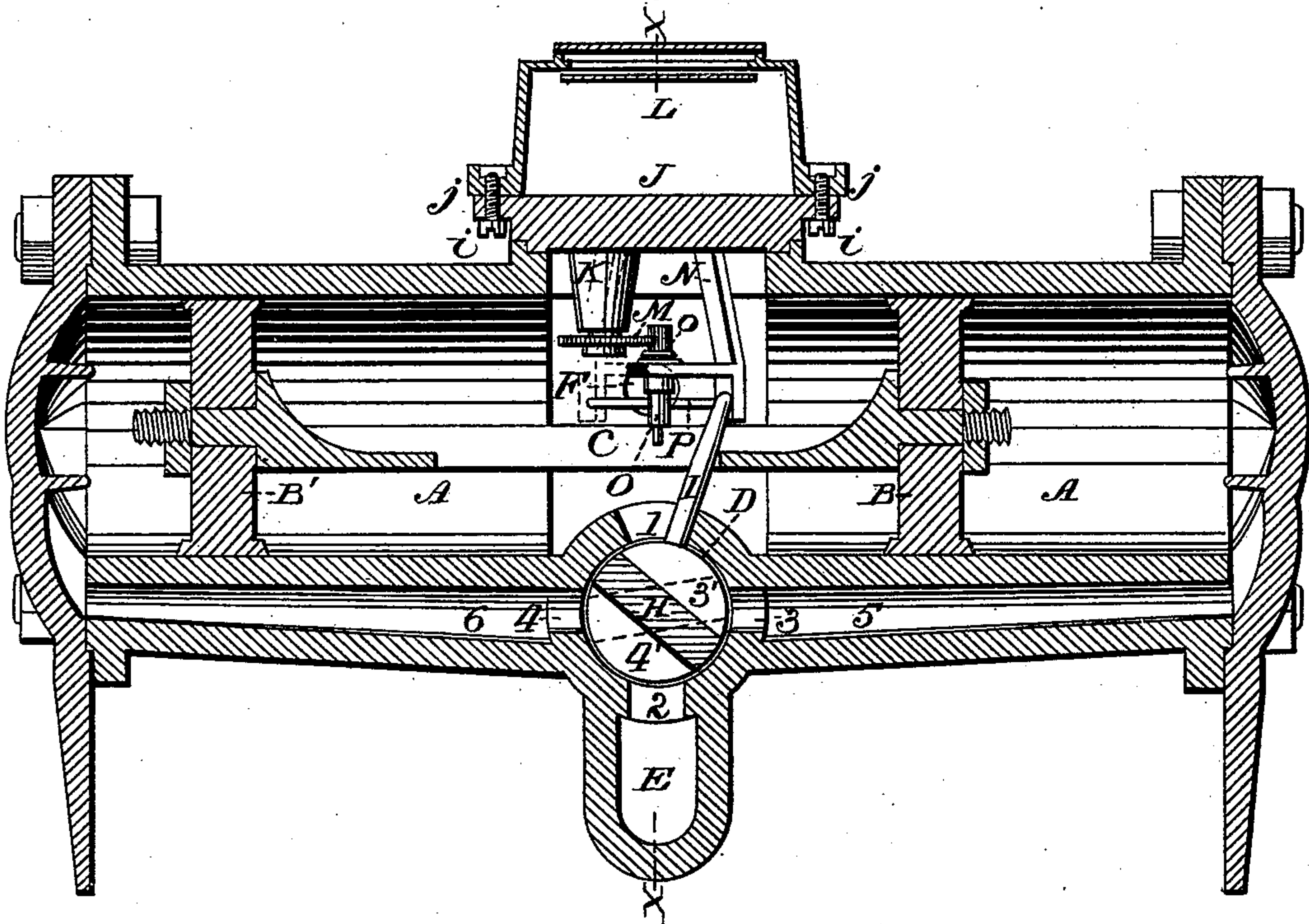
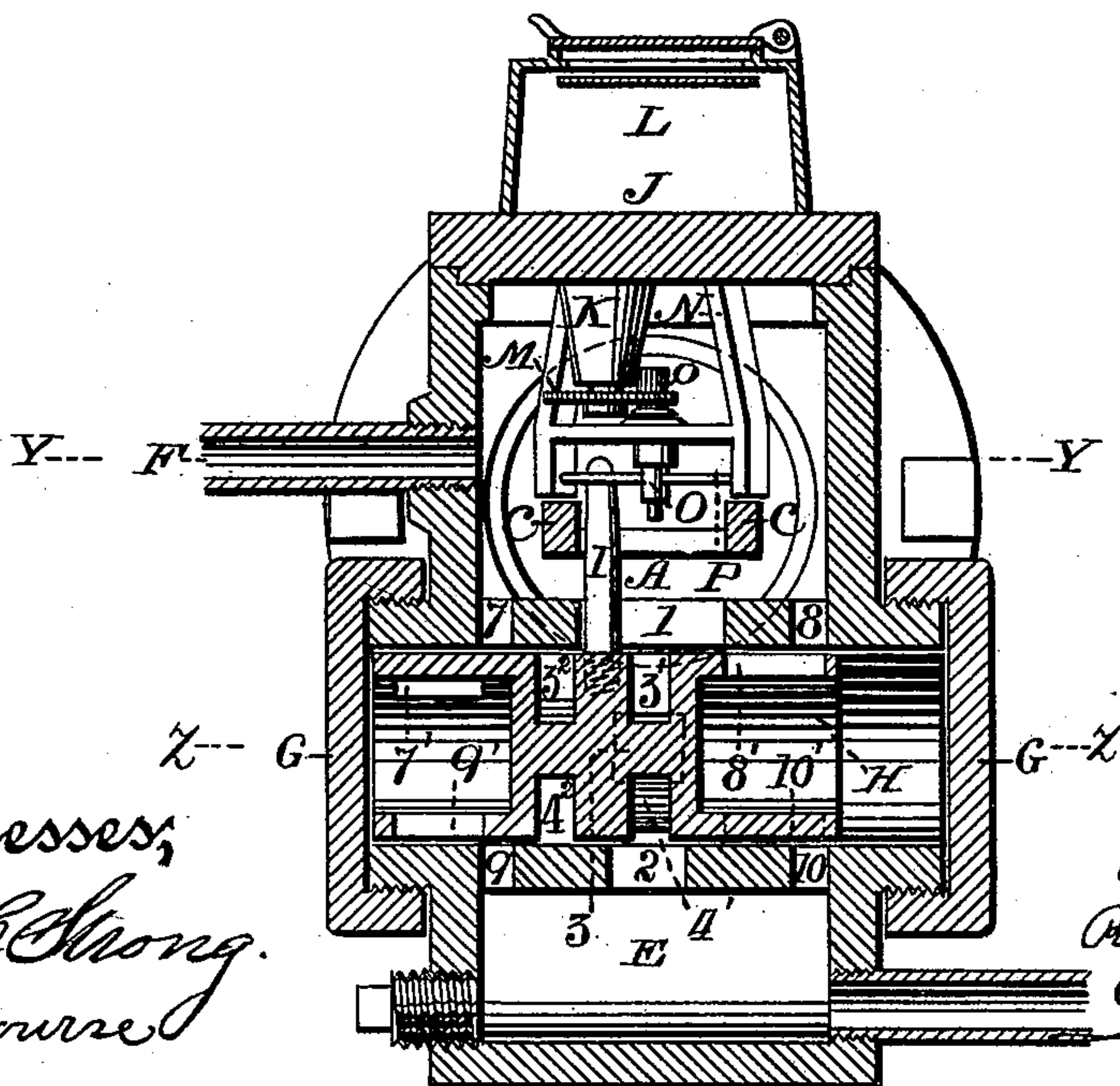


Fig. 2.



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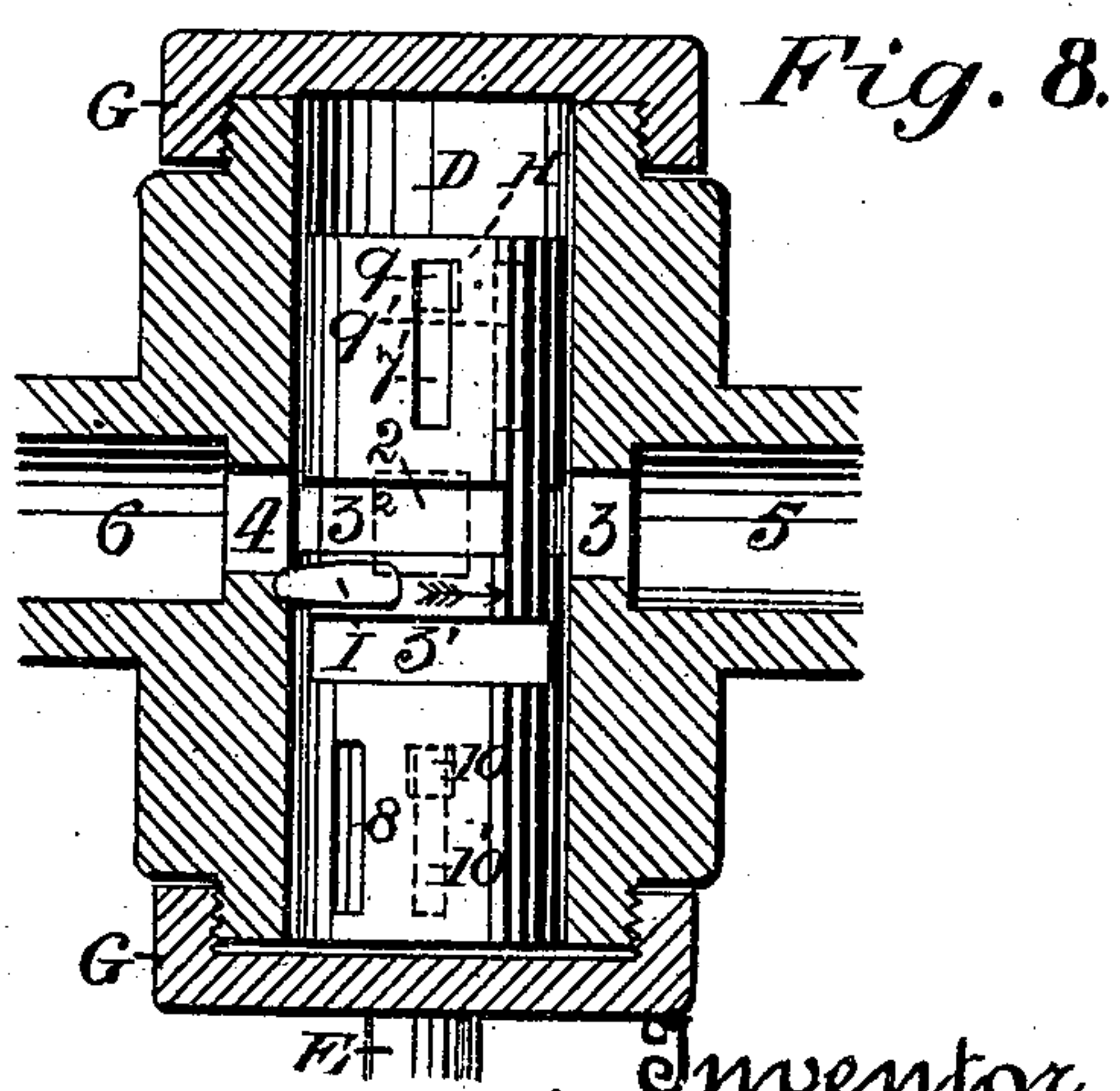
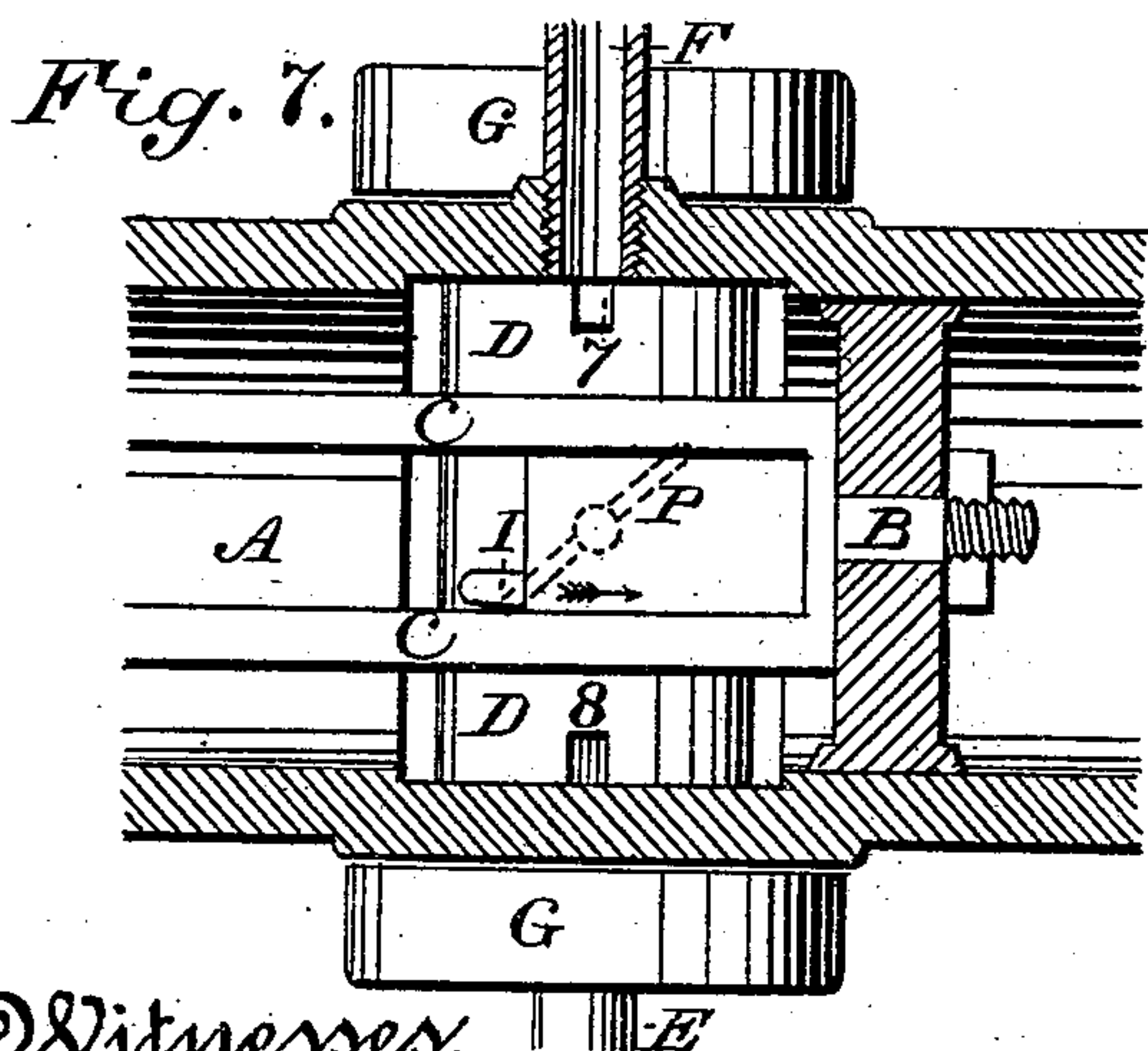
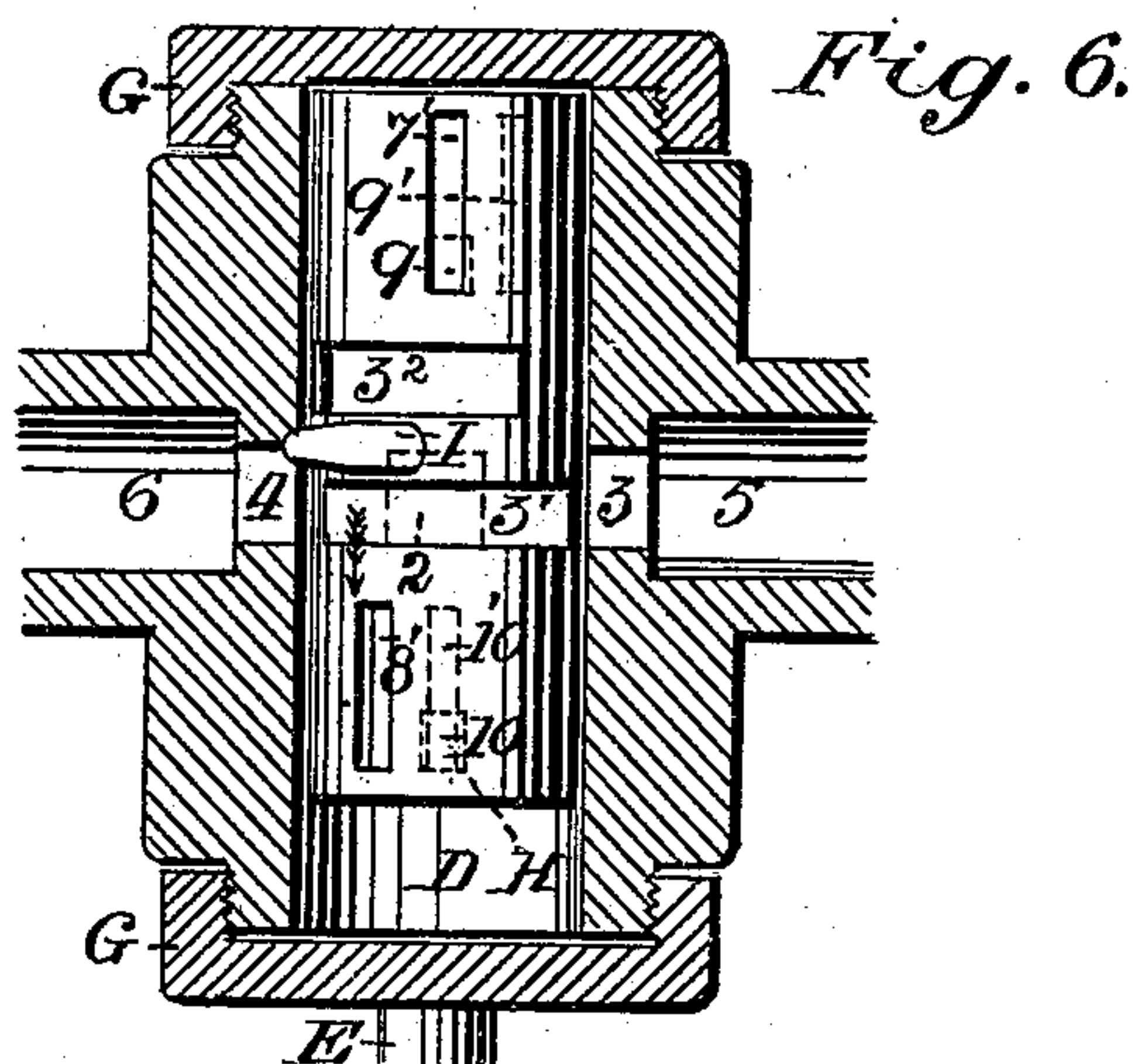
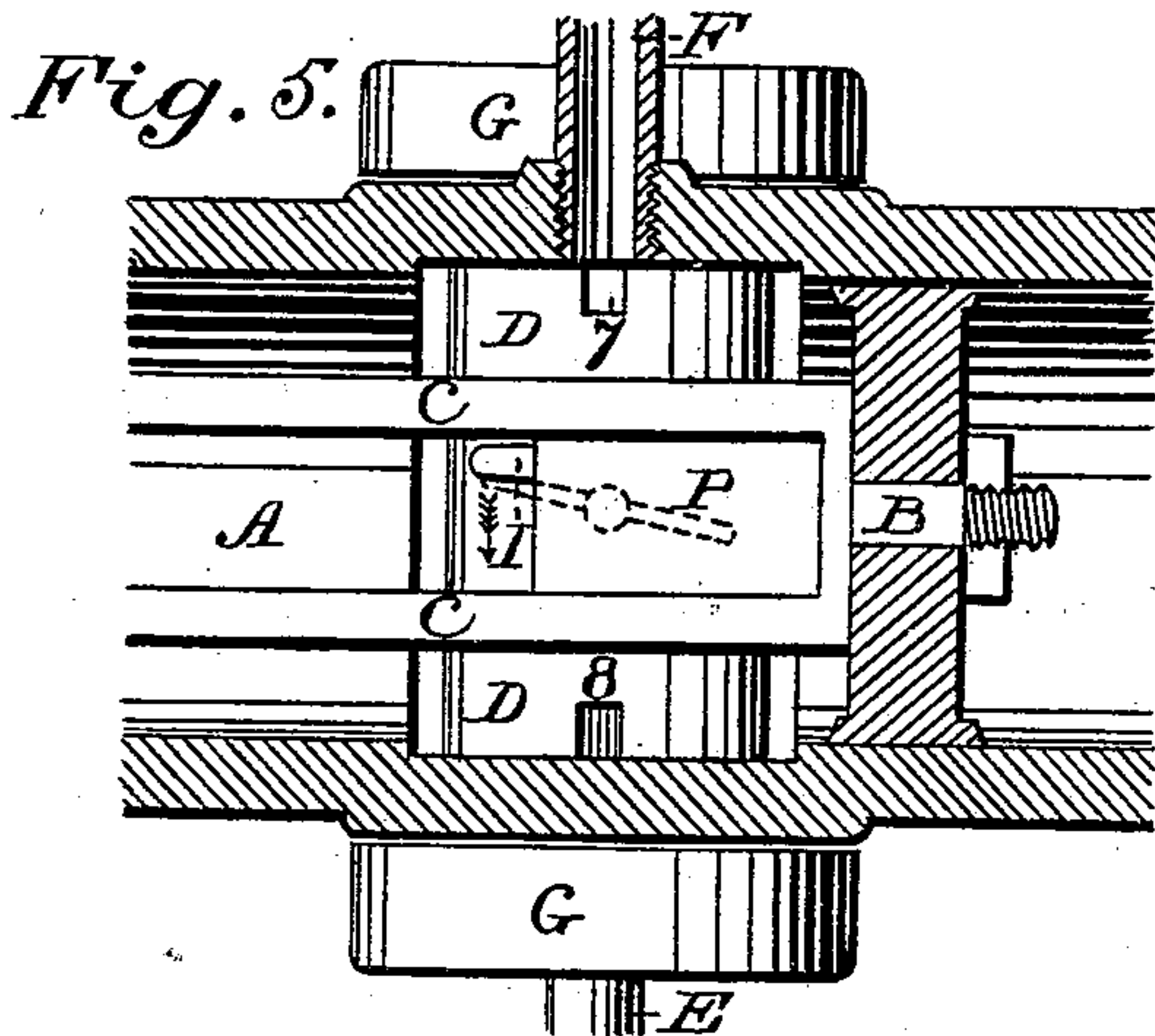
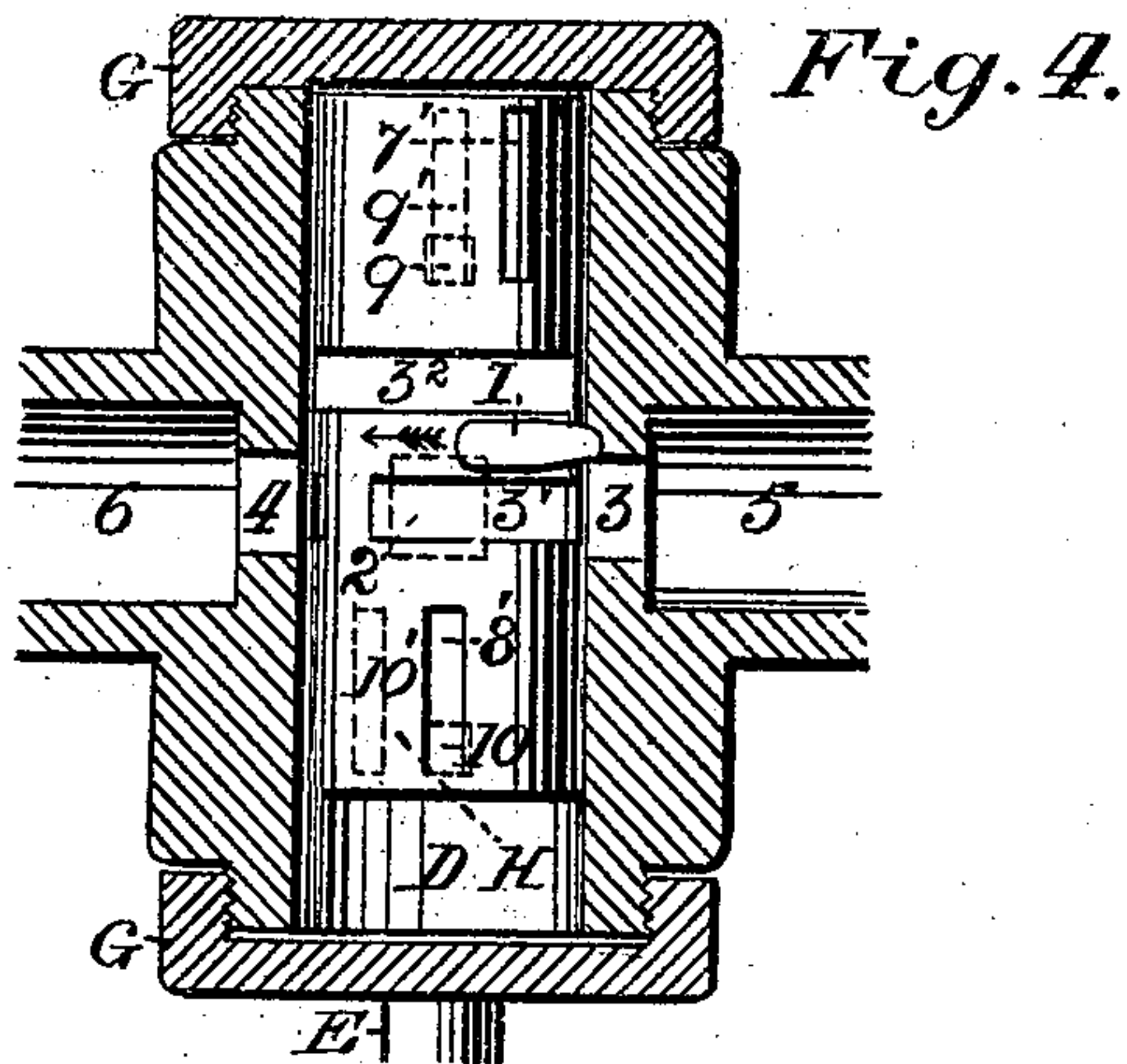
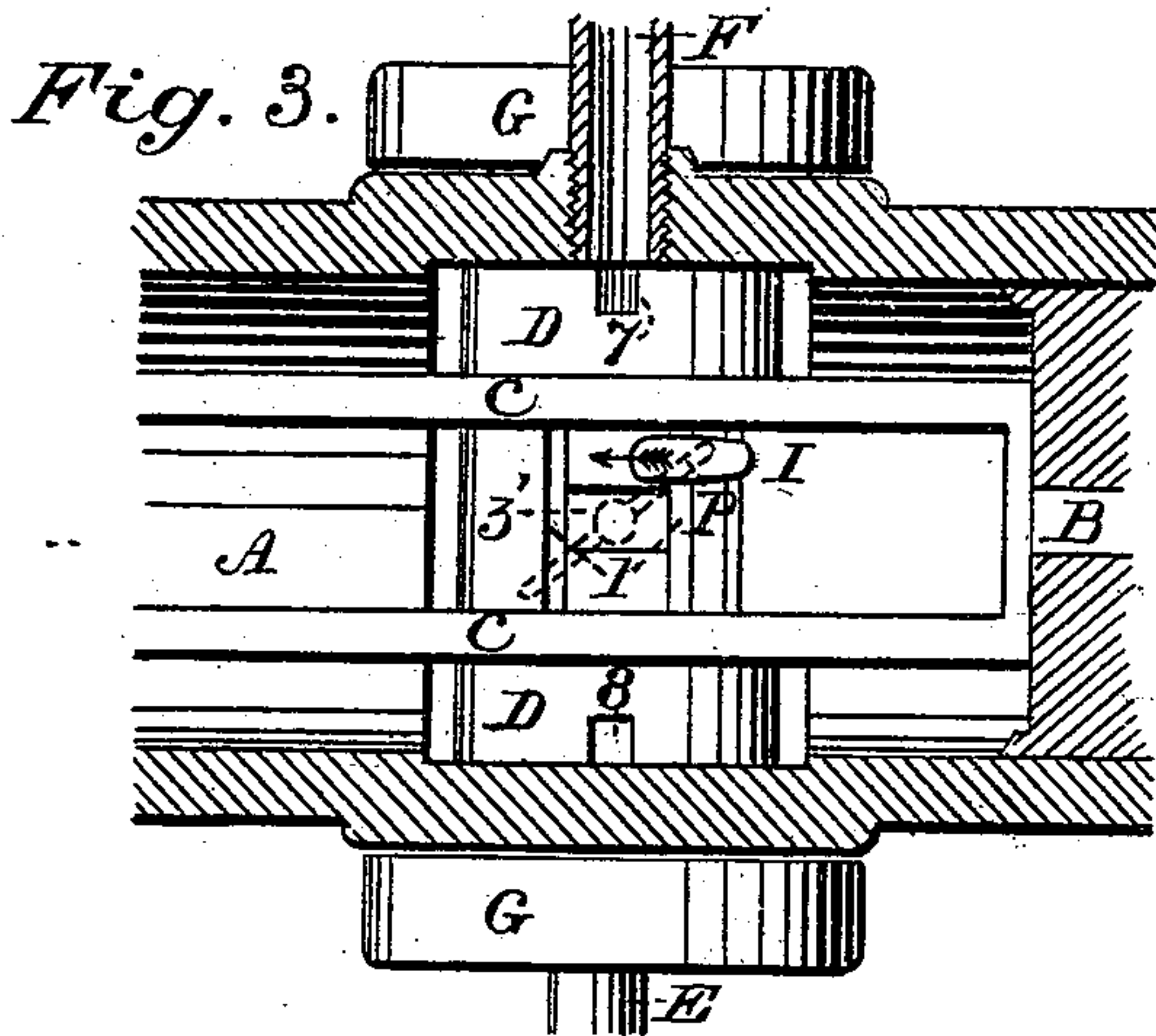
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3 Sheets—Sheet 2.

F. WALKER.
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No. 272,607

Patented Feb. 20, 1883.



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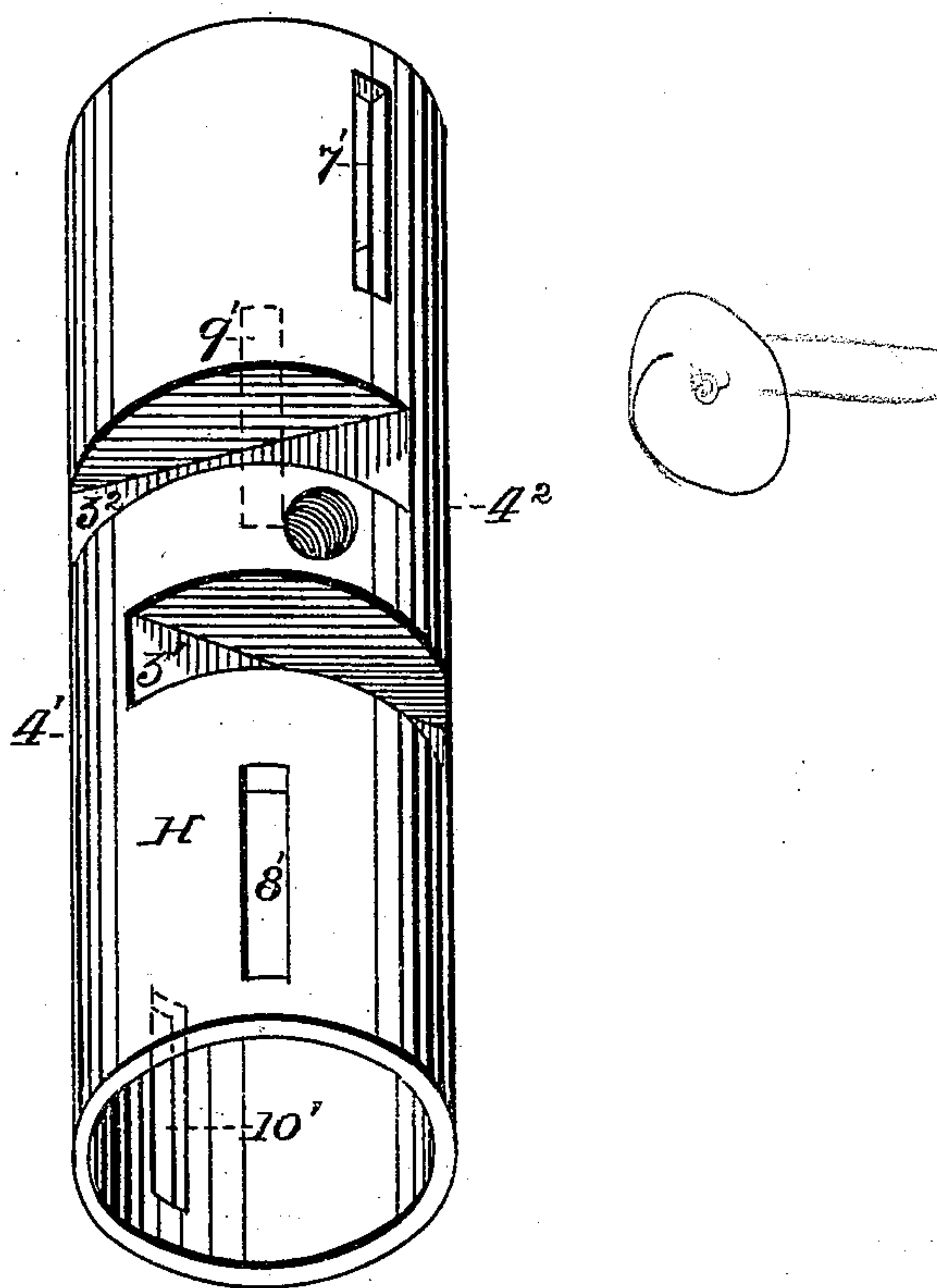
3 Sheets—Sheet 3.

F. WALKER.
PISTON WATER METER.

No. 272,607.

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Fig. 9.



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UNITED STATES PATENT OFFICE.

FRANK WALKER, OF TOMBSTONE, ARIZONA TERRITORY.

PISTON WATER-METER.

SPECIFICATION forming part of Letters Patent No. 272,607, dated February 20, 1883.

Application filed November 4, 1882. (No model.)

To all whom it may concern:

Be it known that I, FRANK WALKER, of Tombstone, county of Cochise, Territory of Arizona, have invented an Improved Piston Water-Meter; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to a new and useful water-meter of that class in which reciprocating pistons work in a cylinder of known capacity.

My invention consists in a novel valve and valve-chamber, and the arrangement of ports therein, whereby the pistons are operated and the valve reciprocated longitudinally; and it further consists, in connection with this valve and valve-chamber, in a slotted connecting-rod between the pistons, and an intervening lever in the valve, whereby the strokes of the pistons are transmitted to the register, as will hereinafter fully appear.

The object of my invention is to furnish a simple and effective water-meter.

Referring to the accompanying drawings, Figure 1 is a longitudinal section of the meter. Fig. 2 is a transverse section of the same on the line X X, Fig. 1. Fig. 3 is a plan taken on line Y Y, Fig. 2, showing the lever I in the first position. Fig. 4 is a plan taken on line Z Z, Fig. 2, showing the valve in first position. Fig. 5 is a plan taken on line Y Y, Fig. 2, showing the lever I in second position. Fig. 6 is a plan taken on line Z Z, showing the valve in the second position. Fig. 7 is a plan taken on line Y Y, Fig. 2, showing the lever in the third position. Fig. 8 is a plan taken on line Z Z, showing the valve in the third position. Fig. 9 is a perspective view of the valve H. The fourth position of the lever and valve I have not shown, as a similar relation exists between it and the third position here shown as exists between the first and second positions, as will be clearly seen in the course of the following description.

Let A represent the cylinder, in which the pistons B B' are suitably packed and reciprocate. A slotted rod, C, connects the pistons, so that they operate as one.

In the bottom center of the cylinder is a cylindrical valve-chamber, D, having a top central square port, 1, and a bottom central port,

2, which latter opens into a cylindrical passage under the valve-chamber, forming the exit or discharge E. The valve-chamber has a central side port, 3, and an opposite side port, 4, each of which opens respectively into an elongated passage or port, 5 6, under the cylinder A. The outer ends of these ports 5 6 connect with the spaces behind each piston, between it and the cylinder-heads. The valve-chamber is further provided with end top ports, 7 8, and end bottom ports, 9 10, the latter of which open into the discharge E, while the former open from the main cylinder A, Fig. 2.

H represents the valve which occupies the valve-chamber. It has a solid center and hollow open ends, as shown, and is shorter than the chamber which it fits. (See Figs. 9 and 2.) Its center is grooved or cut out to form ports 3' 4' and 3² 4², the former two being cut in from opposite sides, and the latter two likewise, though each set is inclined to the other at about an angle of forty-five degrees. The hollow ends of the valve are provided with ports 7' 9' at one end and 8' 10' at the other end, the former two being both on one side of a longitudinal axis, and the latter two being both on the other side thereof, Fig. 9. When the valve is in its chamber it is inclosed by caps G, screwed on the ends of the chamber. The valve is adapted to turn in its chamber and to move lengthwise as well, by what means and to what effect will be presently explained.

Screwed into the top of the valve is a lever, I, which projects upwardly through the square top port, 1, and between the sides of the slotted connecting-rod C. (See particularly Figs. 1 and 2.)

F is the entrance to the cylinder, where the induction-pipe is joined, Fig. 2.

The top center of cylinder A is open and receives the cap J, which is suitably bolted down upon it. The cap J has a downwardly-projecting stuffing-box, K, and supports upon its top the register L, the mechanism of which (which need not here be described) is connected through the stuffing-box K with a horizontal gear-wheel, M, at its lower end.

Bolted to the under side of the cap J is a yoke, N, extending down within the cylinder

A, its arms coming nearly to the sides of the slotted connecting-rod C, whereby the latter is prevented from turning, Figs. 1 and 2; but the yoke N serves the further purpose of a bearing for the spindle O, the top of which carries a pinion, *o*, meshing with the gear M. Its lower end has a cross-bar, P, against which the lever I of the valve comes in contact, as will be hereinafter explained.

It will be observed, Fig. 1, that I secure my register L to the cap J by means of side lugs, *j*, through which screws *i* pass from below, so that when said screws are in and the cap J bolted to its place on the cylinder the heads of the screws will be so close to the cylinder that it will be inconvenient, if not impossible, to withdraw them, in order to remove the register, without first turning the water off and removing the whole cap J. This I do simply as a precautionary measure.

The operation of my device is as follows: Suppose the pistons to be in the position shown in the longitudinal section, Fig. 1, and the valve H so turned that one end of its port 3' is in connection with the central top port, 1, of the chamber, and its other end in relation with the side port, 3, of said chamber and the long port 5 under the cylinder A. The water comes in through entrance F, passes down through ports 1, 3', 3, and 5, and up at the end behind the piston B. The pistons are thereupon forced over to the left to make a stroke. The water to the left of the piston is forced out through ports 6 4 4' and bottom port, 2, into discharge E, these ports being the opposite of those through which it enters. In moving over, the slotted connecting-rod, coming in contact with the lever I, rotates the valve H, moving the lever from one corner of the square port 1 to the other corner in a straight line, as shown in Fig. 6. By so moving the valve H the following ports are opened: the top end port 7 of the chamber D, the top end port 7' of the valve, and the bottom end ports, 10 10', at the opposite ends of the chamber D and valve H. The water thereupon passes through ports 7 7' into the hollow end of the valve H, and, meeting with no resistance from the other end on account of the open ports 10 10', it forces the valve to move longitudinally, causing the lever I to move from the corner to which it was moved by the connecting-rod C to the next corner in line, Fig. 8. This longitudinal movement of the valve H closes ports 1, 3', 3, and 5, and opens ports 1, 3², 4, and 6 to admit water behind piston B', and opens the opposite ports, 5, 3, 4², and 2, (not shown,) to discharge water from in front of piston B, and the pistons now make the return-stroke, the connecting-rod moving the lever I over to the fourth corner of the square port 1, and rotating the valve H to open top end ports, 8 8', and bottom end ports, 9 9', whereby the valve is again moved lengthwise and carries its lever over to the first corner and point of beginning, at the same time opening the first main system of central ports

for a repetition of the operation. The opening of end ports 9 9' and 8 8' at the fourth position is not shown except in Figs. 4, 3, in which, however, the valve has moved longitudinally to the first position. From this it will be seen that the central ports, 3' 4' 3² 4², of the valve H are used to effect the stroke of the piston and the end ports 7' 9' 8' 10' are used to effect the change of stroke. At the same time, the lever I, which rotates the valve, is caused by the connecting-rod C and the end ports 7' 9' 8' 10' to describe a quadrilateral course about the circumference of port 1, as shown in Figs. 3, 5, and 7. Its end is in contact with the cross-bar P of the spindle O, and causes it to move around to operate the register L, as described. One complete stroke of the piston causes a single rotation of the spindle O. The capacity of the cylinder A being known, the result may be readily computed.

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

1. In a piston water-meter, the slotted connecting-rod C, joining the pistons, in combination with the valve-lever I, extending through said slotted rod, a valve mechanism operated by said lever, and a register connected with said lever, whereby the strokes of the pistons may be recorded, substantially as herein described.

2. In a piston water-meter having an inlet, exit, and ports 5 6, and pistons B B', with slotted connecting-rod C, the valve-chamber D, having ports 1 2 3 4, in connection with said inlet, exit, and ports 5 6, respectively, in combination with a valve in said chamber, having ports, the valve-lever I, projecting through the slotted rod C, and operated thereby to rotate the valve and close and open its ports, and a register connected with said lever, whereby the strokes of the pistons may be recorded, substantially as herein described.

3. In a piston water-meter having an inlet, exit, and ports 5 6, and pistons B B', with slotted connecting-rod C, the valve-chamber D, having ports 1 2 3 4, in connection with said inlet, exit, and ports 5 6, respectively, in combination with the valve H, having ports 3' 4' 3² 4², the valve-lever I, actuated by the slotted rod C to turn said valve, a means for reciprocating said valve longitudinally, whereby its ports may be opened and closed, and a register connected with said valve-lever, whereby the strokes of the pistons may be recorded, substantially as herein described.

4. In a piston water-meter having an inlet, exit, and ports 5 6, and pistons B B', with slotted connecting-rod C, the valve-chamber D, having central ports, in connection with said inlet, exit, and ports 5 6, respectively, and end ports 7 9 8 10, in combination with the valve H, having open hollow ends, ports 7' 9' 8' 10' in its ends, and ports at its center, connected with the central ports of the chamber D, the valve-lever I, operated by the slotted

rod C to turn the valve, whereby it is reciprocated longitudinally by means of its end ports, and the strokes of the pistons effected by means of its central ports, and a register connected with said valve-lever, whereby the strokes of the pistons may be recorded, substantially as herein described.

5. In a piston water-meter, as described, the valve H, having open hollow ends and ports 7' 9' 8' 10', in combination with the valve-chamber D, having corresponding ports, and a means for turning said valve at each stroke of the piston to bring its ports and those of its chamber into connection to reciprocate said valve longitudinally, substantially as and for the purpose herein described.

6. In a piston water-meter, as described, the valve H, having open hollow ends and end ports 7' 9' 8' 10' and central ports 3' 4' 3² 4², in combination with the valve-chamber D, having corresponding end and central ports, and a means for turning said valve at each stroke of the piston to bring its ports and those of its chamber into connection to reciprocate said valve longitudinally and to change the stroke of the piston, substantially as herein described.

7. In a piston water-meter, the rotating and longitudinally-reciprocating valve H, and the valve-lever I, connected therewith, in combination with the cross-bar P, against which said

lever moves to rotate it at each stroke of the piston, the spindle O, pinion o, the register L, and intermediate mechanism connecting said register and spindle, substantially as herein described.

8. In a piston water-meter, the reciprocating pistons B B', having a slotted connecting-rod, C, the rotating and longitudinally-reciprocating valve H, and valve-lever I, connected therewith and extending through the slotted rod C, whereby it is made to describe a quadrilateral course, in combination with the cross-bar P, against which said lever moves to rotate it at each stroke of the piston, the spindle O, pinion o, the register L, and intermediate mechanism connecting said register and spindle, substantially as herein described.

9. In a water-meter, the cylinder A and detachable or removable cap J, in combination with the register L, secured to the cap by screws i passing through lugs j from beneath, whereby said register cannot be removed without first removing the cap J, substantially as and for the purpose herein described.

In witness whereof I hereunto set my hand.

FRANK WALKER.

Witnesses:

ROBT. W. KENNY,
M. B. CLAPP.