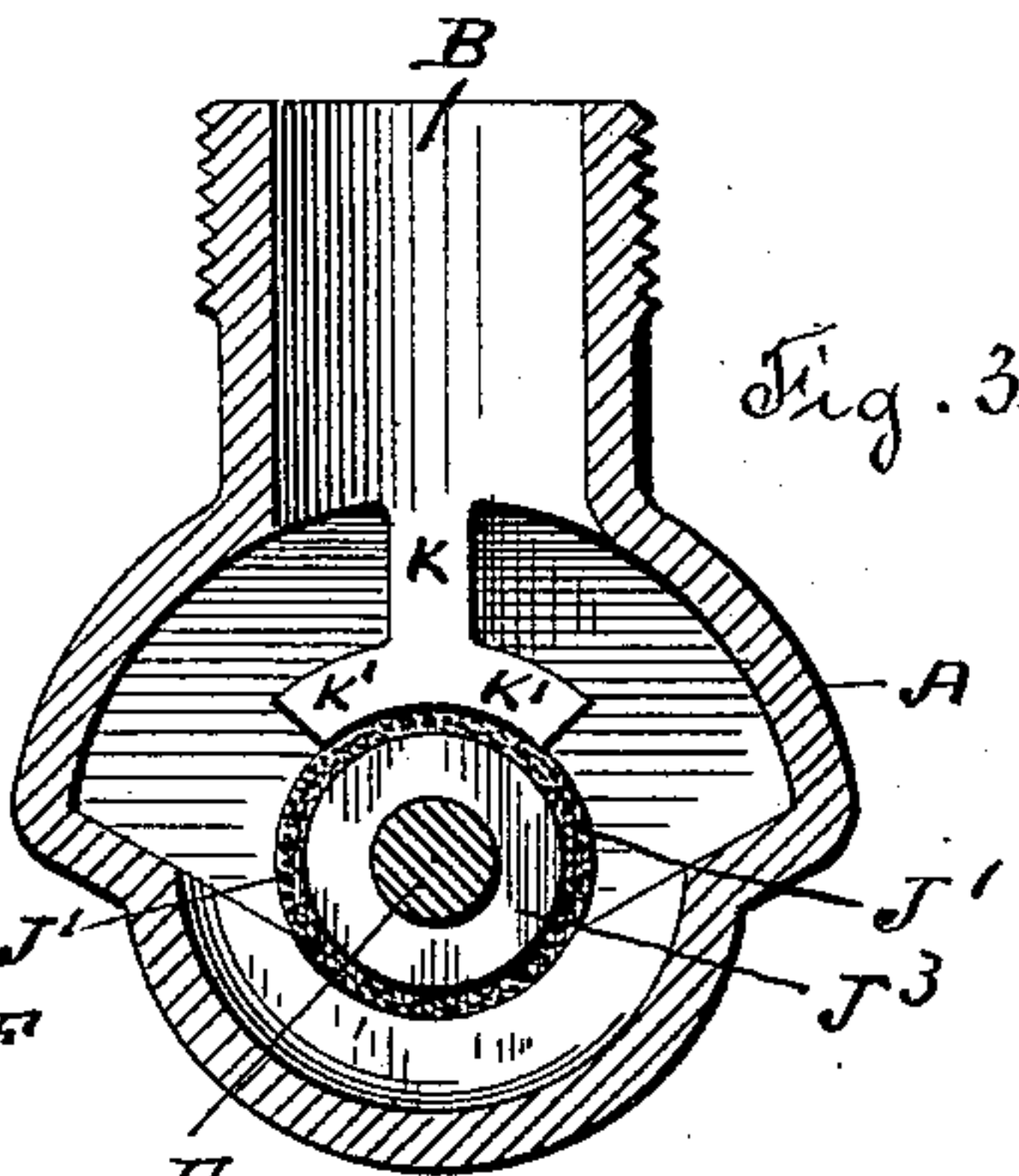
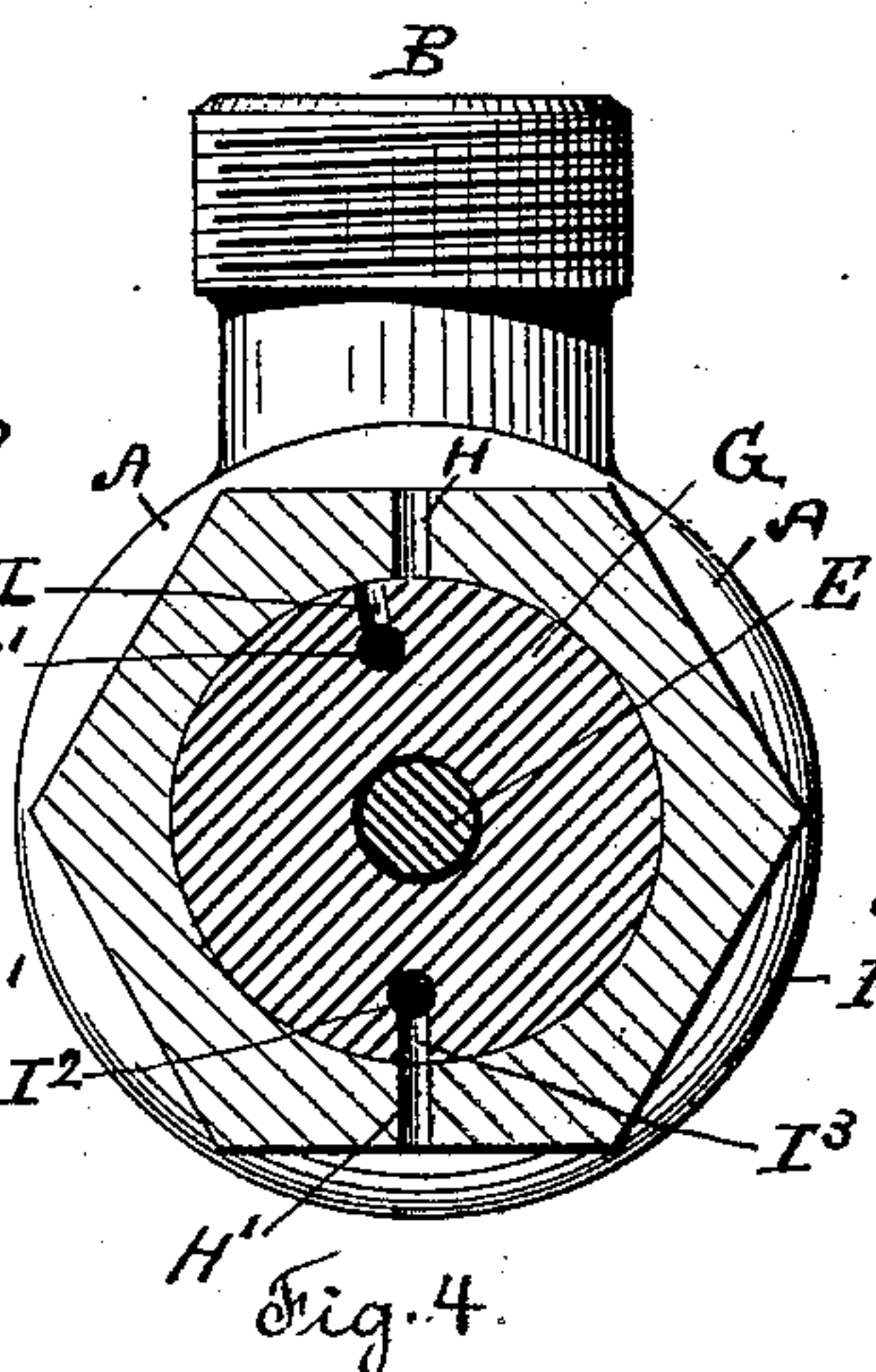
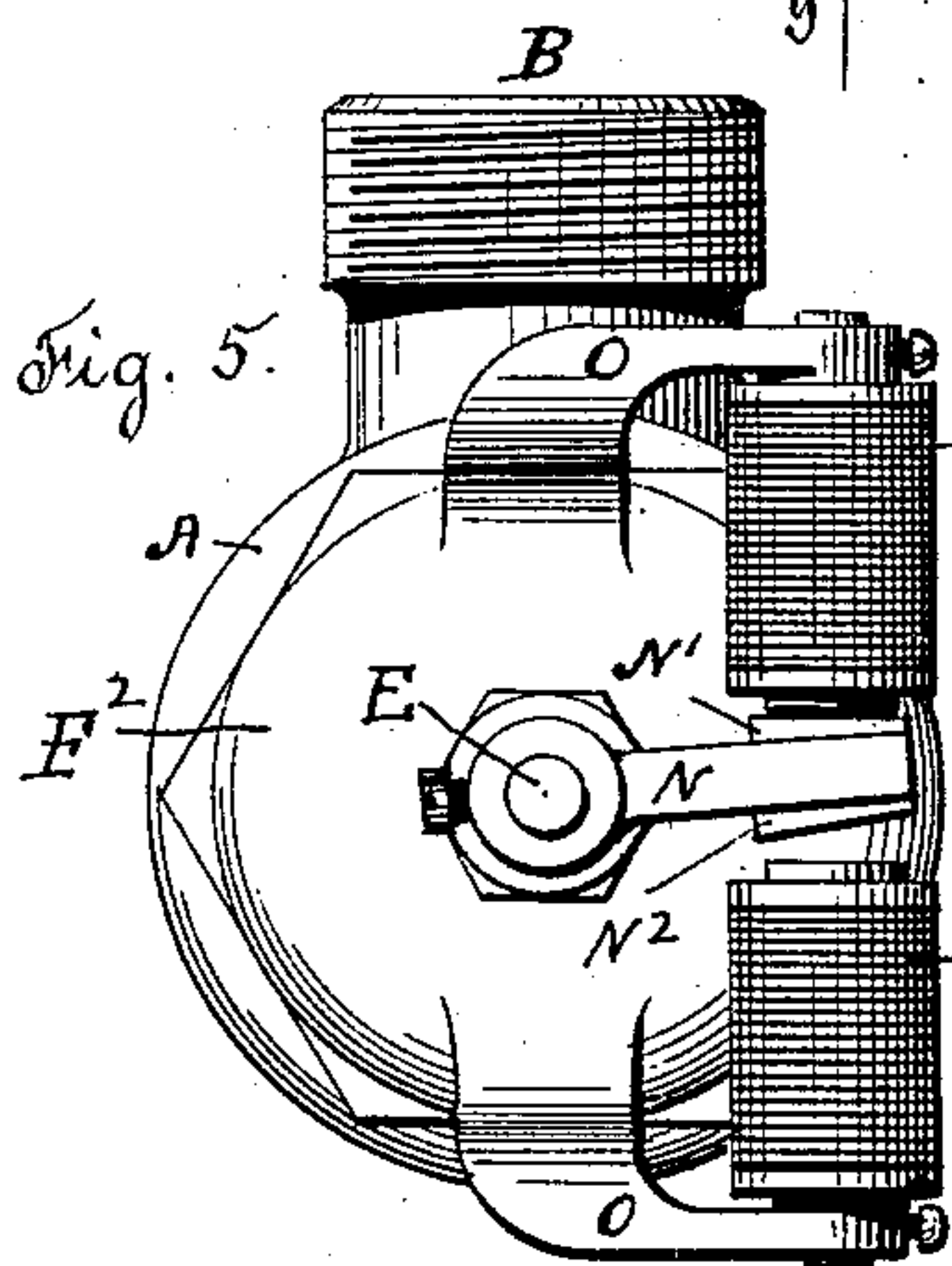
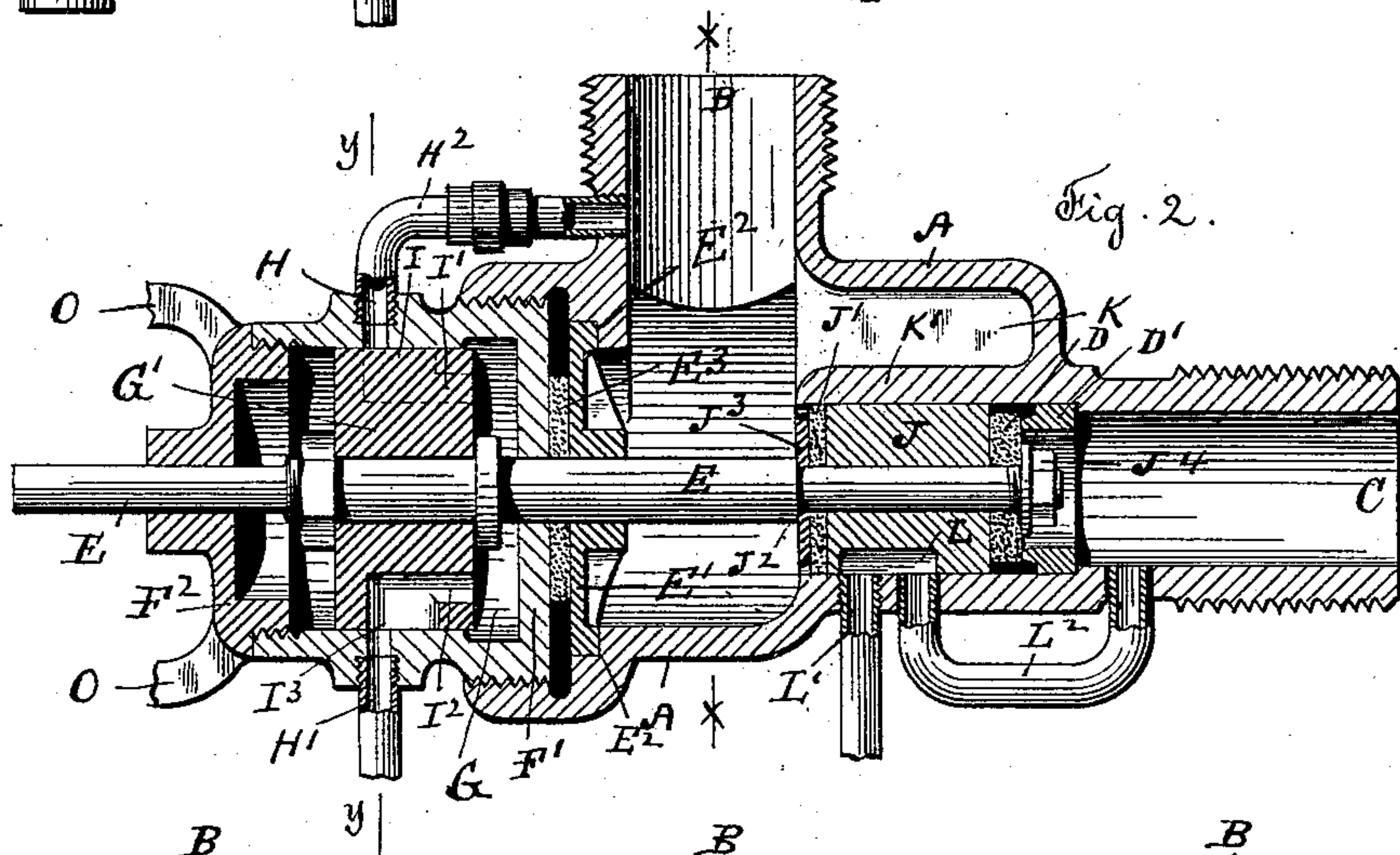
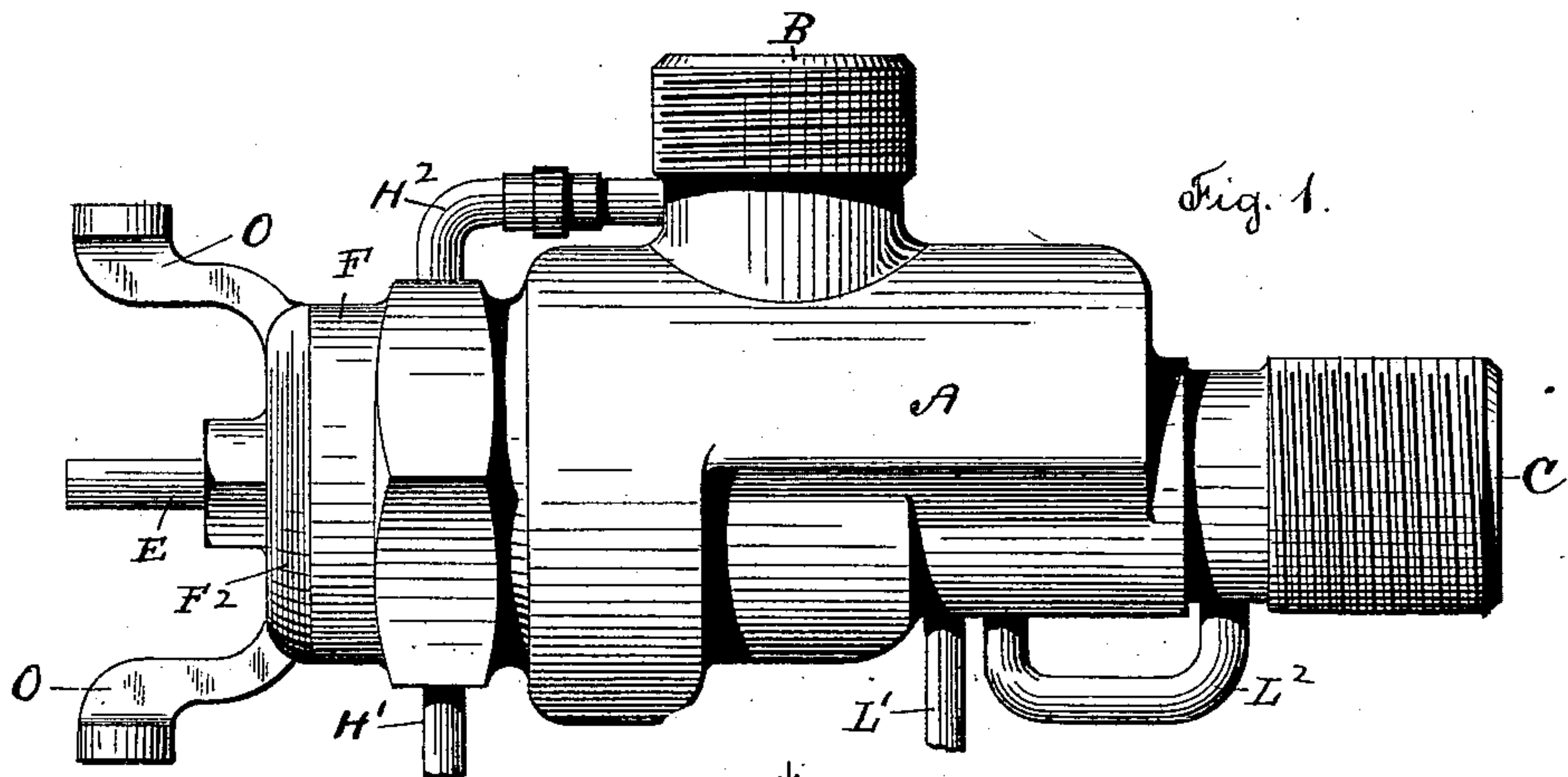


(No Model.)

R. B. FOWLER.  
VALVE.

No. 528,933.

Patented Nov. 13, 1894.



Witnesses  
Chas. F. Schmeltz.  
Halter Brown

Inventor  
Rufus Bennett Fowler.



# UNITED STATES PATENT OFFICE.

RUFUS BENNETT FOWLER, OF WORCESTER, MASSACHUSETTS.

## VALVE.

SPECIFICATION forming part of Letters Patent No. 528,933, dated November 13, 1894.

Application filed March 31, 1890. Serial No. 345,960. (No model.)

*To all whom it may concern:*

Be it known that I, RUFUS BENNETT FOWLER, a citizen of the United States, and a resident of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Valves, of which the following is a specification, reference being had to the accompanying drawings representing a valve embodying my invention, and in which—

Figure 1 represents a side elevation of a valve, embodying my invention. Fig. 2 represents a central vertical sectional view. Fig. 3 is a sectional view on line X, X, Fig. 2. Fig. 4 is a sectional view on line Y, Y, Fig. 2, and Fig. 5 is an end view.

Similar letters refer to the same parts in the different figures.

A denotes the shell or body of the valve having an opening at B to receive water, or steam, as the case may be and an opening at C serving as an exit for the same, and provided with a passage between the openings, which is closed by the valve disk D, resting against the annular seat D'. E is a spindle carrying the valve disk D and capable of a reciprocating motion by which the valve disk is raised from the seat and also of an oscillating motion, as hereinafter set forth.

Within the shell A is placed the circular plate E' having a central opening in alignment with the axis of the valve seat D' and forming a bearing for the valve spindle E. The plate E' is held from movement by the projecting shoulder E<sup>2</sup> and the end wall F' of the cylinder F, which is screwed into the shell or body A, with a packing E<sup>3</sup> interposed between the wall F' and the plate E'.

The cylinder F is closed at the end by the cap F<sup>2</sup> inclosing the chamber G, which contains the piston G' attached to the valve spindle E, and closely fitting the chamber G. Openings H and H' are formed in the cylinder F the former communicating by means of a pipe H<sup>2</sup> with the interior of the shell, A, and serving as a port through which water is admitted to the interior of the cylinder F; the opening H' forming an exhaust opening from the interior of the cylinder F.

An elongated opening I, in the piston G' leads to a passage or channel I' communicating with the chamber G upon the right

hand side of the piston G', and similarly the passage I<sup>2</sup> and opening I<sup>3</sup> allow an exit from the chamber G at the right of the piston G' through the exhaust opening H'. The port and exhaust openings H and H' are placed diametrically opposite, but the openings I and I<sup>3</sup> in the piston are out of diametrical alignment so that as the piston is oscillated through a small angular movement the openings I and I<sup>3</sup> are alternately made to coincide with the openings H and H', alternately opening and closing the port and exhaust.

In Fig. 4 the piston G' is represented in position to bring the opening I<sup>3</sup> in alignment with the opening H' opening the exhaust and allowing the water contained in the chamber G to escape. By a slight angular movement of the piston G' the opening I<sup>3</sup> is brought out of alignment with the opening H', thereby closing the exhaust and bringing the opening H into alignment with the opening I, thereby opening the port admitting water to the chamber G. The valve spindle has attached thereto the piston J placed between the valve disk D and a packing disk J', and between the packing disk J' and a shoulder J<sup>2</sup> upon the valve spindle is the metallic washer J<sup>3</sup>, the nut J<sup>4</sup> serving to retain the several parts carried upon the valve spindle against the shoulder J<sup>2</sup>. A web K extends downward from the shell or body A supporting the curved flanges K', K', forming a partial bearing for the piston J.

The operation of the valve is as follows: When the piston G' is in the position represented in the drawings, or with the port H closed, the pressure of water, or steam as the case may be, against the rear end of the piston J, will hold the valve disk D against the valve seat D' closing the passage, but if the valve spindle E is rocked so as to open the port H and allow the water to flow through the pipe H<sup>2</sup>, opening I and passage I' to the chamber G, the area of the piston G' being greater than the area of the piston J, the increased pressure upon the piston G' will cause the valve spindle E to be moved toward the left raising the valve disk D from its seat and opening the passage between the openings B and C. By reversing the rocking motion of the piston G' the exhaust opening H' is opened and the port H closed, causing the



pressure to be removed from the piston G' and allowing the pressure upon the piston J to move the spindle E to the right closing the valve disk upon the seat D', and allowing the  
5 water within the chamber G to escape through the exhaust opening H'.

A chamber L is formed in the lower side of the piston J from which an outlet is provided through the pipe L', and a pipe L<sup>2</sup> connects  
10 the chamber L with the space inclosed in the shell A at the right of the valve seat D', when the disk D is held upon the seat, but as the piston J is moved to the left it closes the end of the pipe L<sup>2</sup> closing the communi-  
15 cation between the space at the right of the valve seat and the chamber L. Whenever the valve disk D is held upon the annular seat D' the pipe L<sup>2</sup> and pipe L' allow the water in the space at the right of the seat D' to es-  
20 cape, forming a "waste" by which the pipes at the right of the valve are emptied.

The arrangement and operation of the above described parts are not dependent upon the means by which the valve spindle E is rocked,  
25 and any suitable means can be employed for that purpose.

I attach to the valve spindle E a radial arm N, having the armatures N', N<sup>2</sup> and to arms O, O, projecting from the cap F<sup>2</sup> I attach the  
30 magnets P, P', properly connected with the poles of a battery and including in the circuit any of the known forms of switching devices. The method of connecting the magnets with a battery in such a manner as to cause the mag-  
35 nets to be alternately brought into circuit and alternately energized is too well understood

to require detailed illustration or description. By the shifting of an electric current to the magnets P and P' alternately the armatures N' and N<sup>2</sup> are alternately attracted imparting  
40 an angular movement to the radial arm N and oscillating the valve spindle E.

I am aware that valves have been constructed embodying a spindle or valve stem capable of both a reciprocating and an oscil-  
45 lating motion. Such I do not therefore claim broadly, but

What I do claim, and desire to secure by Letters Patent, is—

1. The combination of the shell or body A  
50 provided with the shoulder E<sup>2</sup>, plate E', having a central bearing for the valve spindle, valve spindle E, valve disk D and piston G' at-  
tached to said spindle, packing disk E<sup>3</sup>, cyl-  
inder F, inclosing said piston and having  
55 openings H and H', pipe H<sup>2</sup>, forming a water way from the shell, A and cylinder F, said piston G' having passages by which a com-  
munication is formed between the chamber  
60 G and the openings H and H' by the oscilla-  
tion of the piston, substantially as described.

2. The combination with the shell or body A of valve seat D' valve disk D, piston J pro-  
vided with the chamber L, outlet pipe L', and  
65 bent pipe L<sup>2</sup> forming a waste pipe substan-  
tially as described.

Dated the 25th day of March, 1890.

RUFUS B. FOWLER.

Witnesses:

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PETER BAKER.