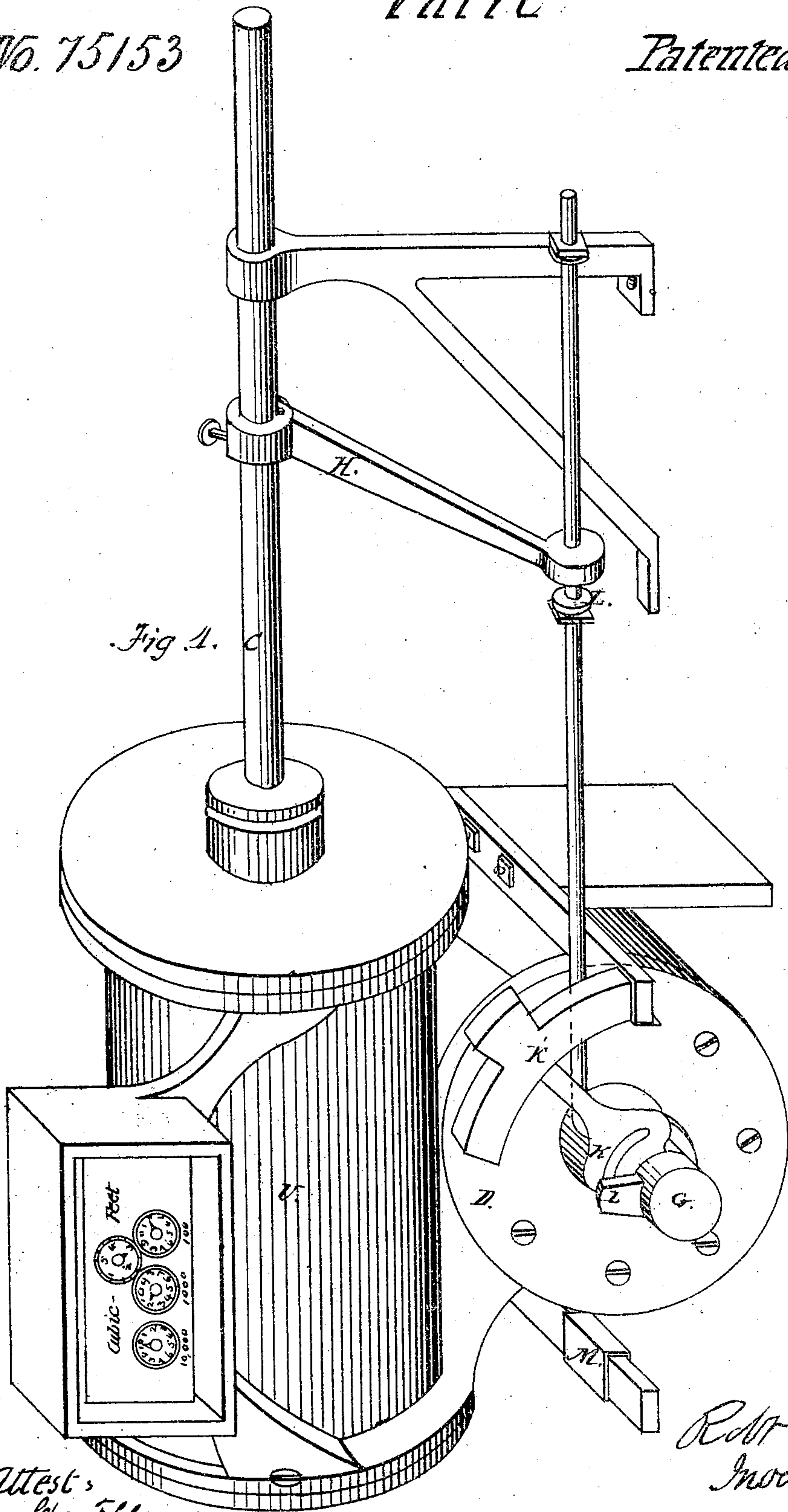


R. D. Gray
Valve

No. 75153

Patented Mar. 3, 1868.

Fig. 1.



Attest:
Chas. T. Glanville
J. H. Sprague.

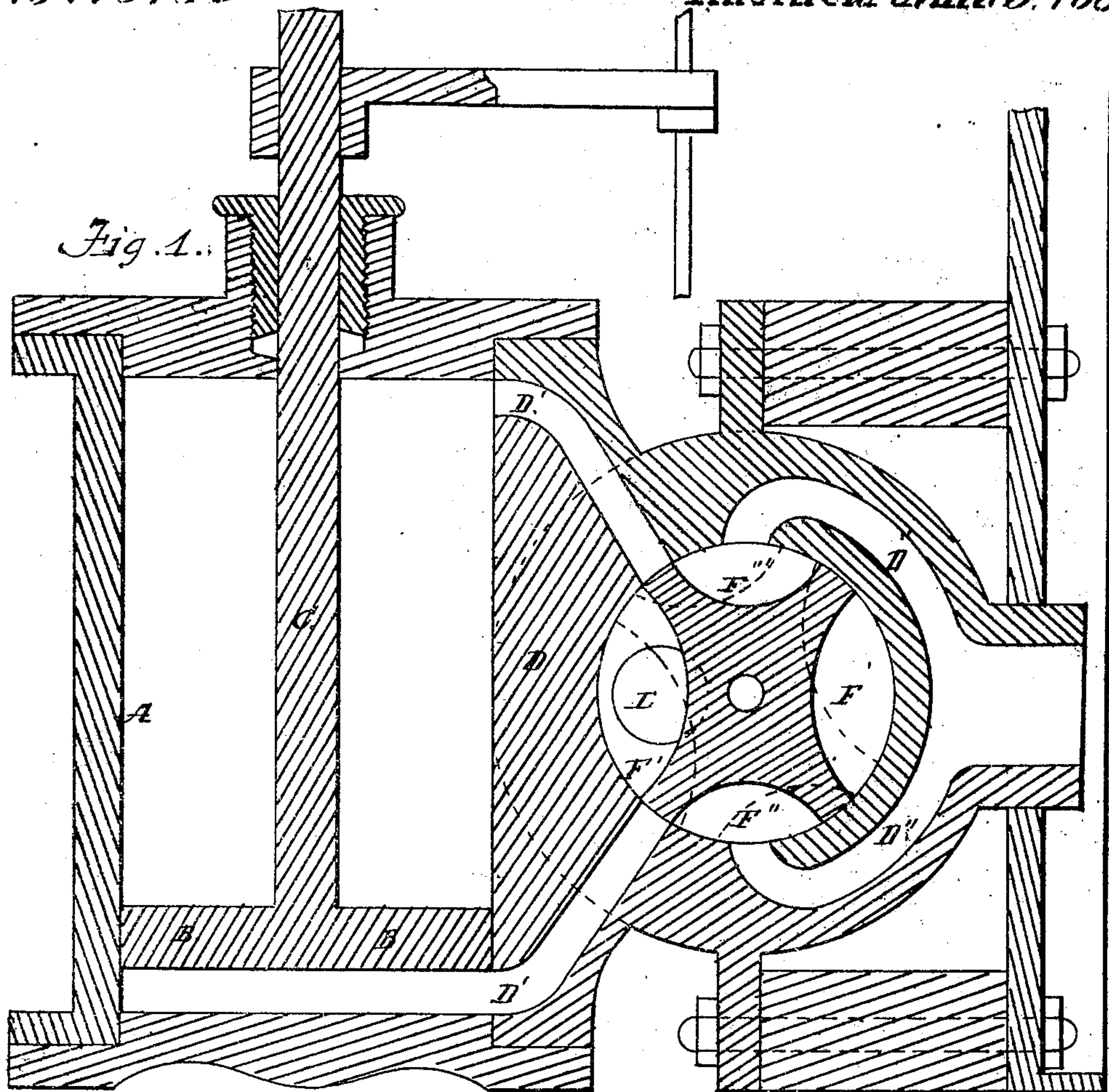
R. D. Gray
Inventor;

J. P. H. Mowbray, Rev. Secy.

R. D. Gray
Valve

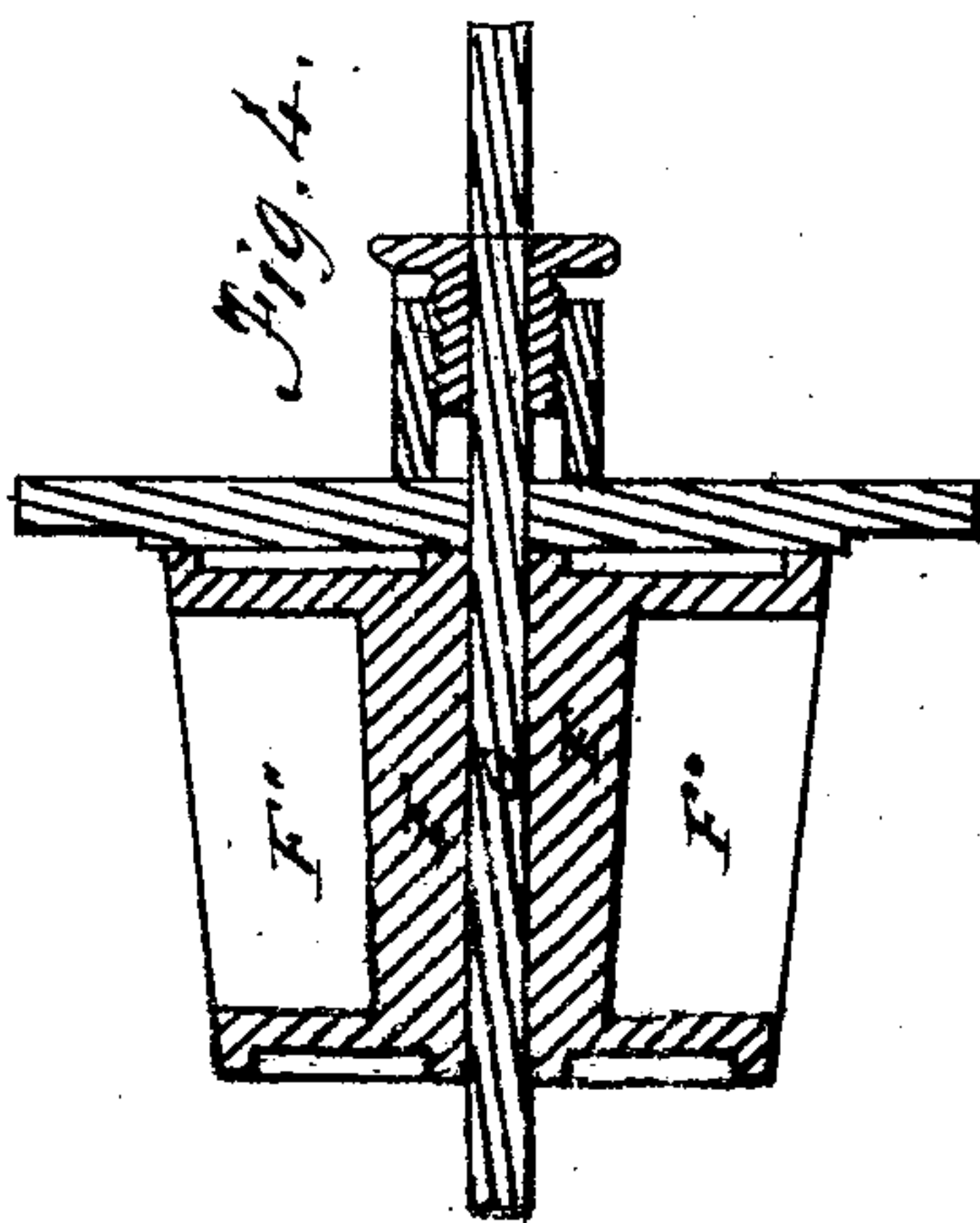
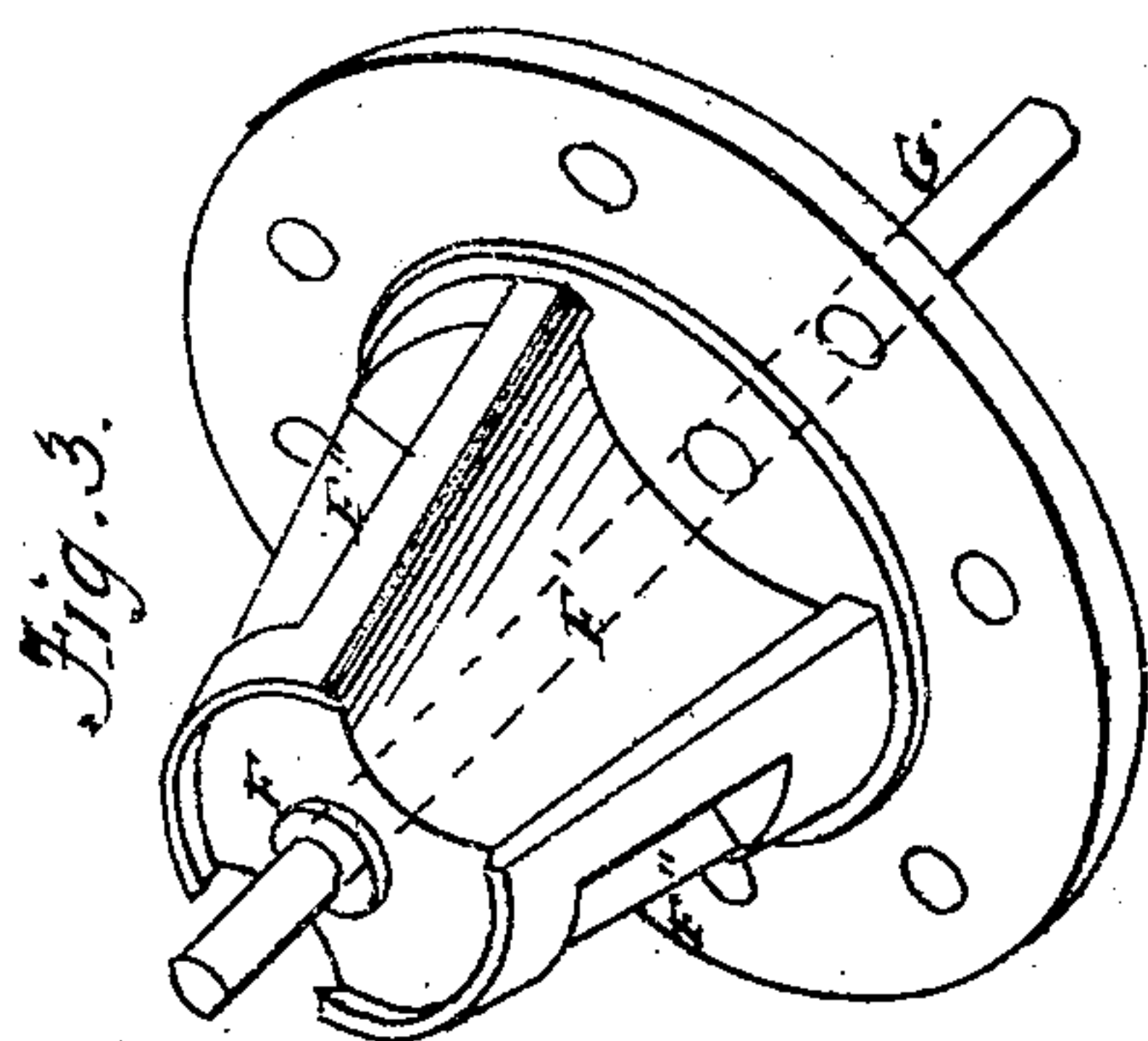
No. 75153

Patented Mar. 3, 1868



Attest:
R. Mason
Chas. F. Clausen.

R. D. Gray - Inventor.
D. P. Hollaway & Co.
his attys



United States Patent Office.

ROBERT D. GRAY, OF LAFAYETTE, INDIANA, ASSIGNOR TO HIMSELF AND
WILLIAM B. BRITTINGHAM, OF SAME PLACE.

Letters Patent No. 75,153, dated March 3, 1868.

IMPROVEMENT IN ROTARY VALVES FOR STEAM AND OTHER ENGINEERY.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ROBERT D. GRAY, of Lafayette, in the county of Tippecanoe, and State of Indiana, have invented a new and useful Improvement in Rotary Valves for Steam-Engines, Water-Meters, &c.; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a perspective view.

Figure 2 is a vertical longitudinal section.

Figure 3 is a perspective view of the valve.

Figure 4 is a longitudinal section of the valve.

The same letters are used in all the figures for the purpose of indicating the same parts.

My invention consists in the construction of an oscillating-valve, and devices appertaining thereto, for a steam-engine or water-meter, whereby the valve shall be perfectly balanced, and made to cut off at any part of the stroke by means of mechanism hereinafter fully set forth and described.

A is the cylinder, B the piston-head, and C the piston-rod of a steam-engine or water-meter. D is the valve-chest, connecting with each end of the cylinder by the ports D¹ D¹. The valve-chamber is a recess in the form of the frustum of a cone in the centre of the valve-chest, and it communicates with the cylinder through the ports D¹ D¹, and outwardly into the open air through the eduction-ports D² D². The steam enters the valve-chamber through the induction-pipe E, and its flow is regulated by the valve F. The valve is metallic, and cast in the form of the frustum of a cone. It turns freely with the valve-stem G, which has its bearings in suitable boxes in the valve-chest, one end resting against a set-screw, by which the jamming of the valve in its chamber is prevented. Recesses are formed in each end of the valve to permit the steam to flow freely around the valve, passing through the longitudinal recesses F' formed in each side, so that the steam may flow from the induction-pipe entirely around the valve, pressing alike upon both ends, and on each side a chamber, F², is formed, on each side of the valve, intermediately between the recesses F'. The parts of the valve surrounding the chamber F² are carefully fitted to form a steam-tight joint with the sides of the valve-chamber, the conical form of the valve and valve-seat or sides of the chamber preserving the entirety of this junction of the surfaces, even though the parts become worn.

It will be seen by fig. 2 that when the valve is in the position shown by the black lines, both the induction-ports are closed, the steam filling the spaces in the valve-chamber at the ends and on the sides of the valve at F'. As the pressure is balanced, the valve has no tendency to move. Let it now be turned into the position shown by red lines, and the steam will flow through the induction-port into the end of the cylinder behind the piston-head, driving it towards the other end of the cylinder. The steam, filling that end of the cylinder, will now escape by flowing through the port D¹ into the chamber F² in the valve, and, passing through it, escape through the eduction-port D², the chamber forming a connection between the ports on the opposite side from that through which the steam is being admitted into the cylinder. The valve being reversed with each motion of the piston, the steam will be thus regularly admitted into and discharged from each end of the cylinder alternately.

The valve is actuated by a tappet-arm, H, fastened adjustably to the piston-rod. An eye on the end of the arm passes over the tappet-rod I, sliding freely thereon until it strikes against the adjustable stops, when it communicates motion to the tappet-rod. This latter rod is fastened to a wrist on the oscillating-arm K, which is attached to, but made to revolve freely on, the valve-stem G. The arm L is fastened by a set-screw firmly on to the end of the valve-stem G. It is constructed with a wrist projecting from its back, which passes through a circular slot in the base of the oscillating-arm K. A weight, K', is necessary upon the arm K, where the valve is used in connection with a water-meter. It will not be necessary when it is used in connection with a steam-engine.

The valve is operated, then, as follows: The steam being admitted at one end of the stroke, the piston is immediately driven towards the opposite end of the cylinder. The tappet-arm, traversing at first the tappet-rod, does not move it until it strikes against one of the stops I'. The tappet-rod is then immediately moved,

raising the arm K, the slot in the latter traversing upon the wrist upon the arm G. The valve is not moved until the wrist reaches the end of the slot, when the valve is turned, closing the induction-port, and opening the eduction-port on that side, and opens the induction-port on the opposite side, admitting steam into the other end of the cylinder. When the cylinder is used as a water-meter, clock-work must be attached to regulate the number of strokes.

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

1. The construction of the conical valve F, with recesses and ends with reference to the chambers F¹ and F², valve-chest D, and ports D¹ and D², substantially as herein set forth.
2. The arrangement of the oscillating-valve F, valve-stem G, arms L and K, tappet-rod I, stops I', and tappet-arm H, substantially as described.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT D. GRAY.

Witnesses:

ROSWELL C. SMITH,
WALTER WILSTACH.