

(No Model.)

2 Sheets—Sheet 1.

J. B. MUNSLOW.
STEAM ENGINE VALVE.

No. 502,374.

Patented Aug. 1, 1893.

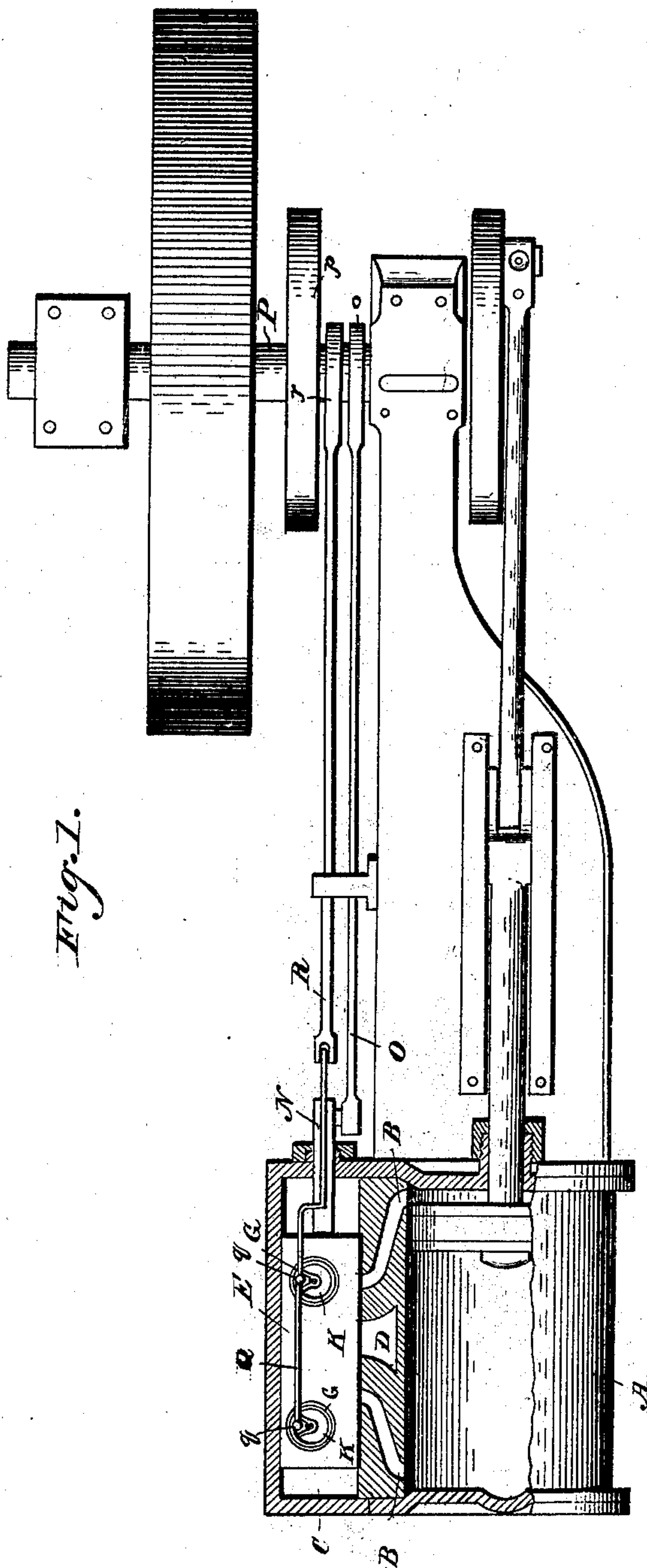


Fig. 1.

Witnesses

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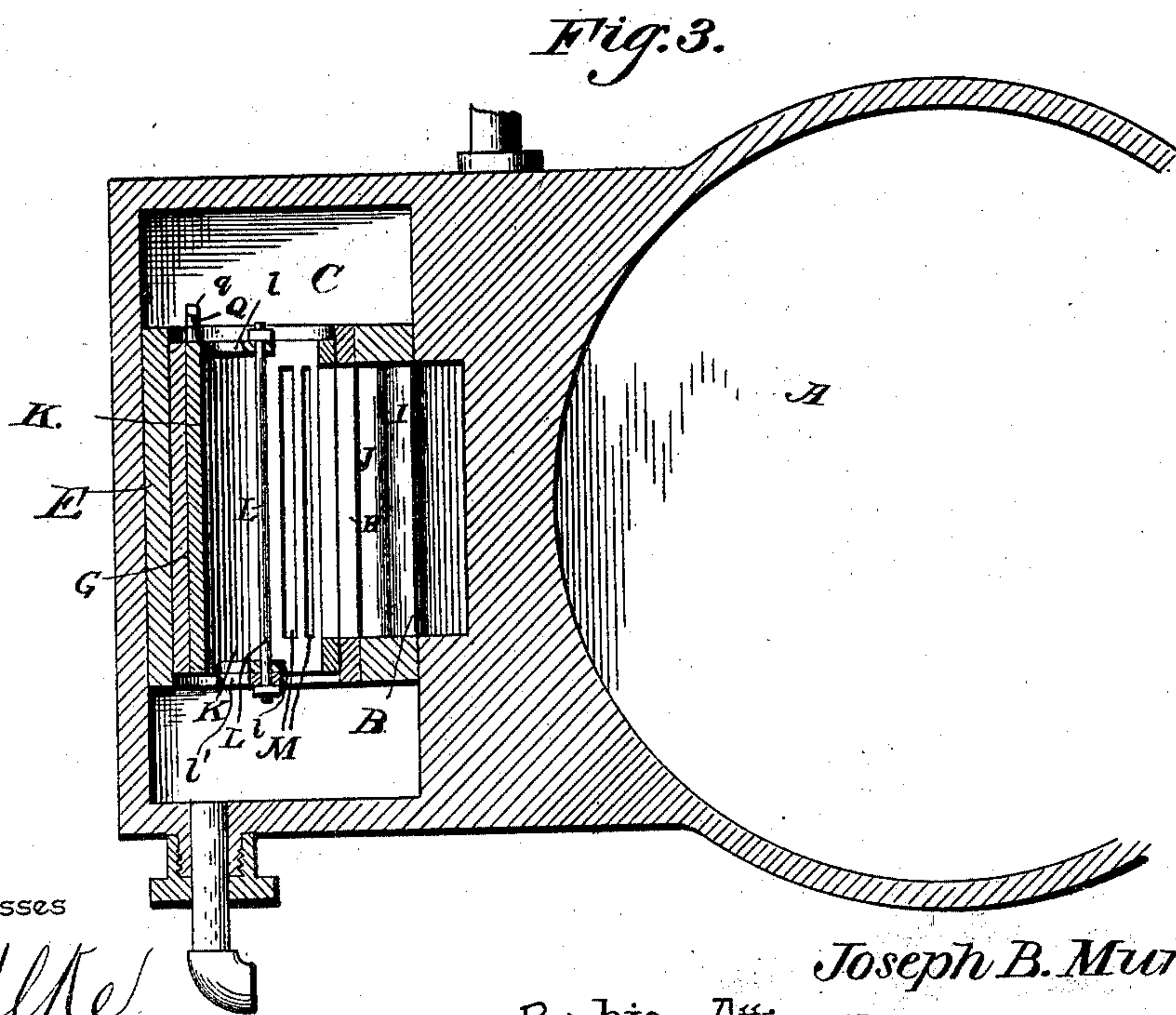
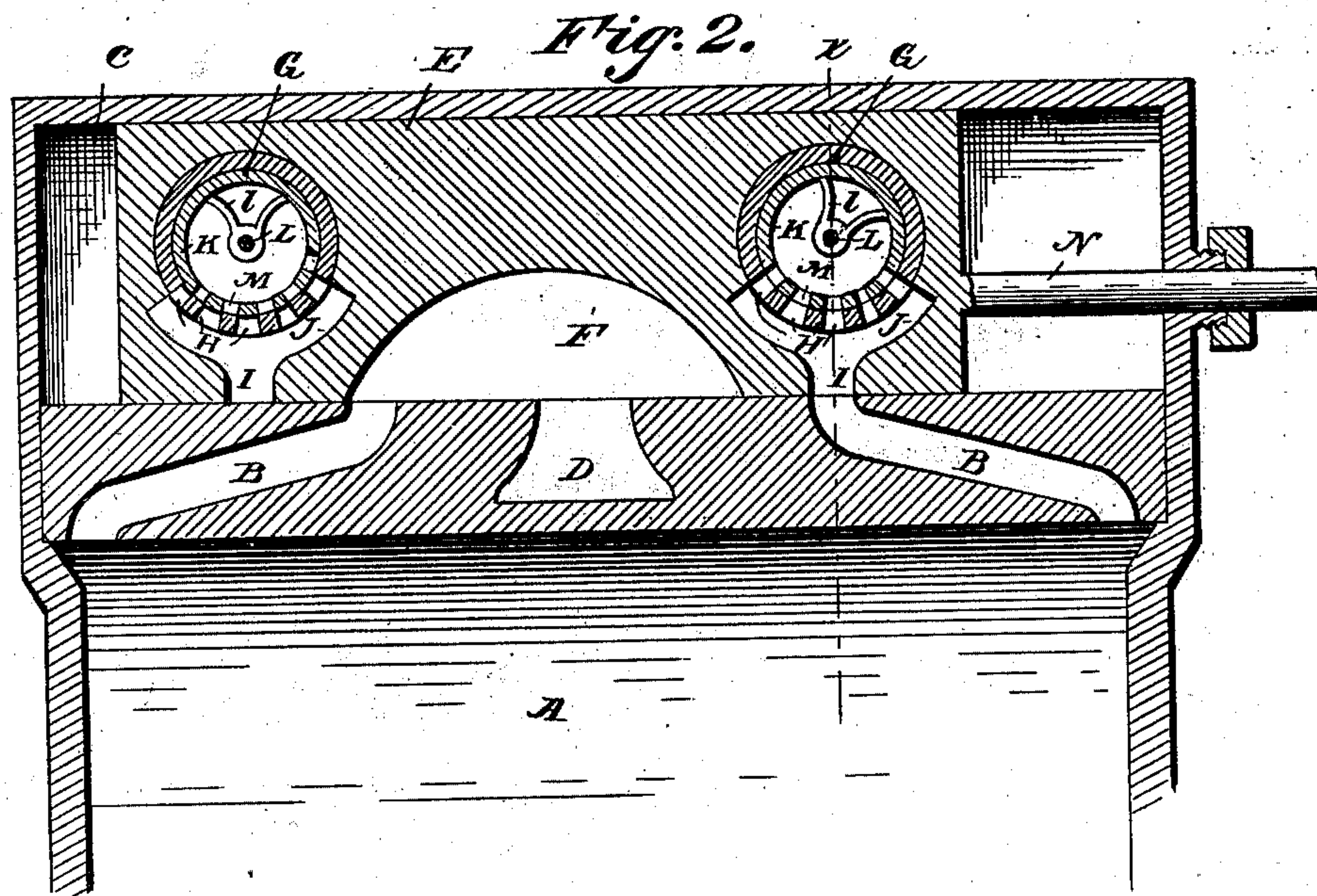
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2 Sheets—Sheet 2.

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Witnesses

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UNITED STATES PATENT OFFICE.

JOSEPH BENJ. MUNSLOW, OF FINDLAY, OHIO.

STEAM-ENGINE VALVE.

SPECIFICATION forming part of Letters Patent No. 502,374, dated August 1, 1893.

Application filed March 8, 1893. Serial No. 465,194. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH BENJ. MUNSLOW, a citizen of the United States, residing at Findlay, in the county of Hancock and State of Ohio, have invented a new and useful Steam-Engine Valve, of which the following is a specification.

This invention relates to steam engine valves; and it has for its object to provide a combined slide and rotary cut-off valve, which shall provide efficient means for controlling the admission of steam into the engine cylinder, and for quickly cutting the same off at the proper moment, with but a very slight throw of the valve, thereby avoiding back pressure and an irregular flow of steam.

To this end the main and primary object of the invention is to provide an improved cut-off in connection with a balanced slide valve to insure the quick and effective cutting on and off of the steam.

With these and many other objects in view which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a top plan view of a steam engine showing the steam chest and cylinder partly in section. Fig. 2 is an enlarged central longitudinal sectional view of the steam chest and a portion of the engine cylinder, showing my improved valve in position within the steam chest. Fig. 3 is a detail sectional view on the line $x-x$ of Fig. 2.

Referring to the accompanying drawings, A represents an engine cylinder from the opposite ends of which lead the steam passages B, and which open into the steam chest C, of ordinary construction, the usual exhaust port D, being arranged in the side or top of the cylinder, according to the location of the steam chest, between the said end ports B, so as to be connected with either of said end ports to provide for the exhaust of the steam from either end of the cylinder.

Arranged to slide inside of the cylinder steam chest C, is the balanced slide valve E. The balanced slide valve E, is provided with a central concaved or rounded exhaust chan-

nel F, which is designed to connect either end port of the cylinder with the exhaust D, in the ordinary manner, as said valve slides back and forth in the steam chest. The slide valve E, works flat upon the valve seat in which the end ports B, are arranged, and the outside of the steam chest, but the opposite sides thereof are out of contact with the opposite sides of the steam chest, in order to allow the steam admitted to the steam chest, to balance the valve in position, as well as to enter inside of said valve from both sides thereof, in a manner to be described.

The slide valve E, is provided near each end and in the body thereof with the transverse circular bearing openings G, which open at each end into the steam chest, and which are provided in the bottom thereof with a series or multiplicity of steam ports H, which lead into the valve end ports I, opening from the said valve onto the valve seat so as to be aligned with the end ports B, of the engine cylinder when brought to a proper position.

As clearly shown in the drawings, the packing G', consists of cylindrical tubes which are inserted or fitted in the transverse circular bearing openings G, and therefore not only serve as a packing, but also as the bearings proper for the rotary valves to be presently described, and the ports H, are formed in one side of said tubes. The ports I, of the valve are enlarged at their inner ends into the circular steam spaces J, which are of a width to embrace the several ports H, opening thereinto. Now it will be apparent to those skilled in the art, that the width of the steam spaces J, is the combined width practically, of the ports which connect the circular bearings with the ports I, but by breaking up such ports into a multiplicity of smaller ports H, it will be only necessary to provide a valve having a throw of but a fraction of an inch to open the several ports H, and therefore open the entire steam space for the passage of steam therethrough. Without the multiplicity of ports H, it would be necessary to provide a valve having a throw equal to the entire width of the spaces J.

Mounted to oscillate in the circular bearing openings G, or more properly in the tubes therein of the valve E, are the rotary cut-off

valves K. The rotary cut-off valves K, are cylindrical in cross section to fit the bearing and packing tubes G' in the circular bearing openings G, and are open at both ends to provide for the admission of steam into the same. The said rotary cut-off valves K, are supported to turn truly in their bearings by means of the rod or shaft L, passing through bearing brackets l, at each end of the valves K, and corresponding bearing brackets l' at each end of the circular bearing openings G, and extended from the body of the valve E. The said rotary cut-off valves K, are provided in one side with a longitudinal series of valve openings M, which correspond in number to the longitudinal series of ports H, in the slide valve, so that, when aligned with such ports, a free passage is left for the steam through the rotary cut-off valves and the end ports of the slide valve and into the cylinder. A very slight throw of the rotary valves K, throws the valve openings thereof out of alignment with the ports H.

The slide valve E, is moved back and forth in the steam chest by the valve stem or rod N, connected to one end of the eccentric rod O, which is controlled by the ordinary eccentric o, mounted on the engine drive shaft P, adjacent to an ordinary disk governor p. The rotary cut-off valves K, are set to oscillate properly by means of the connecting rod Q, loosely attached to the crank pins q, projecting from one end of said valve, and also connected with the independent eccentric rod R, driven by the eccentric r, arranged alongside of the eccentric o.

Now by reference to the drawings it will be clearly seen that simultaneous with the movement of the slide valve, the rotary cut-off valves K, are slightly oscillated so as to cover and uncover the ports H, inside of the slide valve to provide for the admission of the steam into either end of the cylinder. It will also be apparent that by reason of the very slight throw which is only necessary in controlling the rotary cut-off valve, any change in the speed which affects the disk governor p, will immediately affect the movement of the rotary cut-

off valves, which are so sensitive and susceptible to quick work.

From the foregoing it is thought that the construction, operation and many advantages of the herein-described steam engine valve will be apparent without further description.

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

1. The combination of a slide valve for steam engines having transverse circular bearing openings formed directly in the body thereof near each end, end ports piercing one side of the valve and enlarged at one end inside of the valve into widened steam spaces, and a multiplicity of steam ports covering the widened steam spaces and connecting the same with said transverse bearing openings, and rotary cut-off valves mounted to oscillate in said circular bearing openings and provided with a series of valve openings adapted to cover and uncover the multiplicity of steam ports in the slide valve, substantially as set forth.

2. The combination of a steam engine slide valve having transverse bearing openings near each end, end ports piercing one side of the valve and leading into widened steam spaces, a cylindrical packing and bearing tube inserted in each of said openings and provided with a longitudinal series of steam ports connecting the transverse bearing openings into said enlarged steam spaces, circular rotary cut-off valves mounted to oscillate in said inserted tubes, said cut-off valves being open at each end and provided with a longitudinal series of valve openings adapted to register with the series of steam ports in the tubes, and means for simultaneously moving the slide valve and the rotary cut-off valve carried thereby, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOSEPH BENJ. MUNSLOW.

Witnesses:

CHAS. SMITH,
WILBER WINDER.