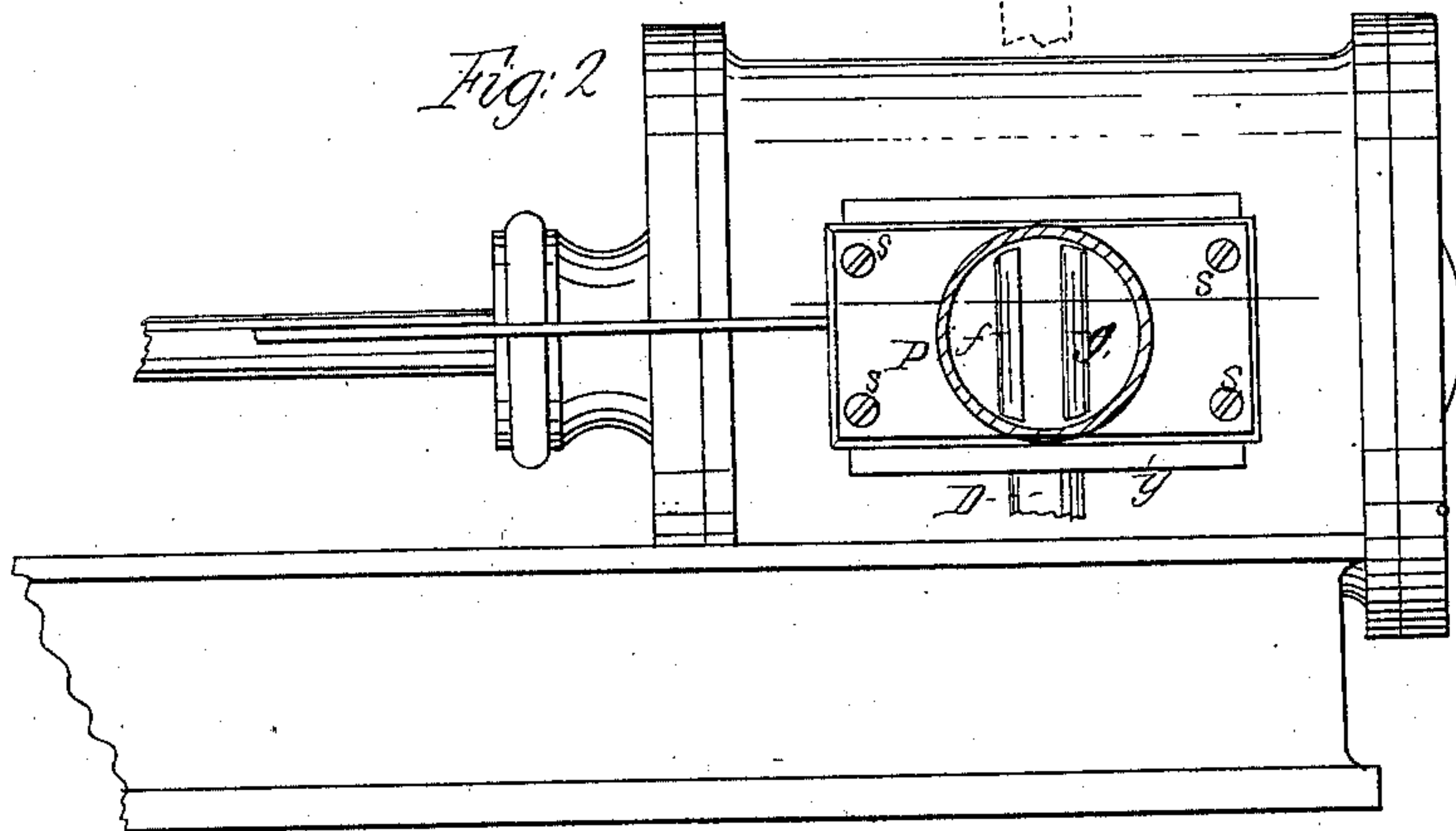
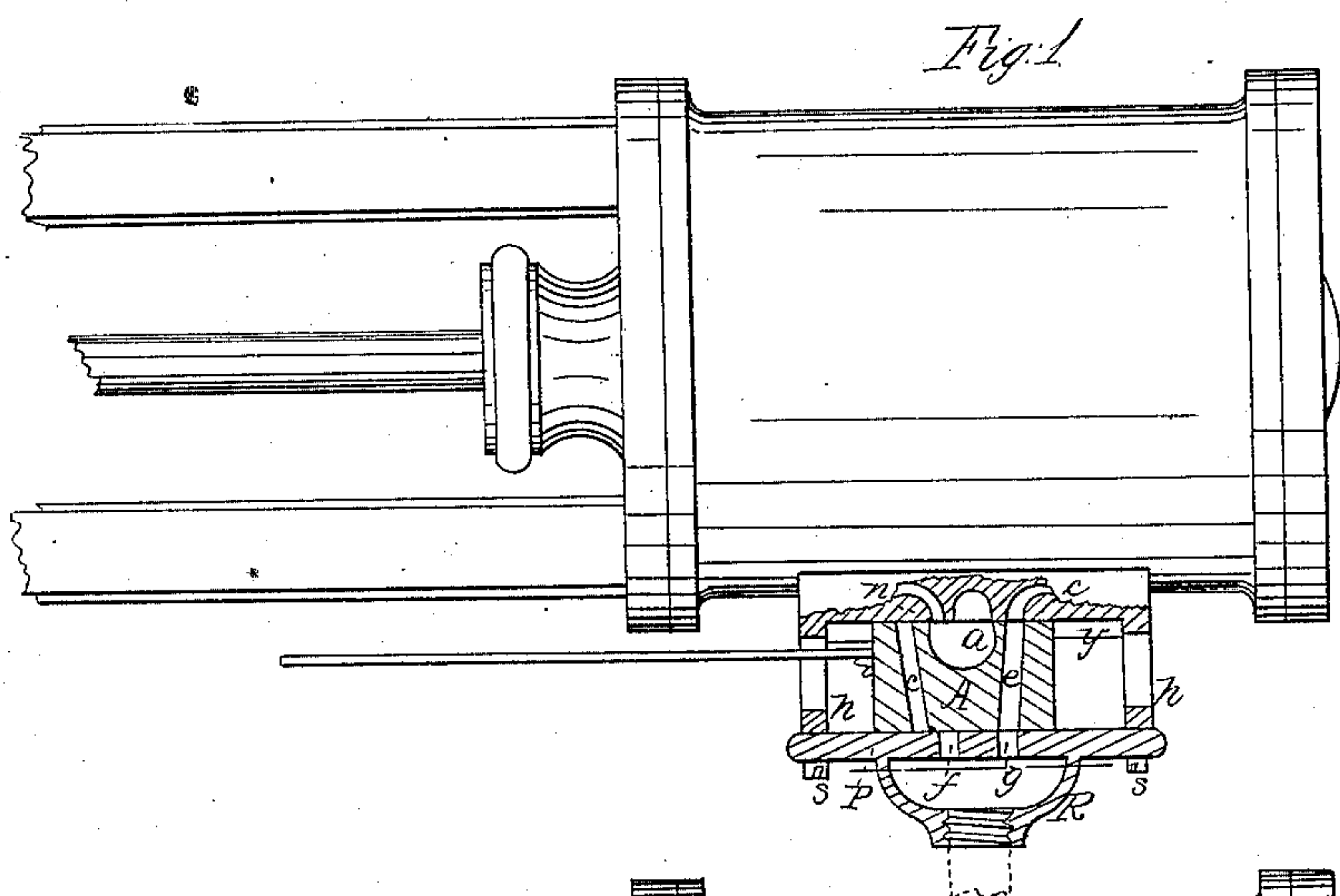


*J. B. Dougherty,*  
*Steam Balanced Valve.*  
*No 56,385. Patented July 17, 1866.*



*Witnesses*  
*A. M. Badger*  
*Wm. B. Longborough*

*Inventor*  
*John B. Dougherty*

# UNITED STATES PATENT OFFICE.

JOHN B. DOUGHERTY, OF ROCHESTER, NEW YORK.

## IMPROVEMENT IN SLIDE-VALVES.

Specification forming part of Letters Patent No. 56,385, dated July 17, 1866.

*To all whom it may concern:*

Be it known that I, JOHN B. DOUGHERTY, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Balanced Valves for Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a top view of an ordinary steam-cylinder with my invention attached, it being shown in horizontal section. Fig. 2 is a side elevation of the same, the receiver or spherical chamber R being removed.

Like letters indicate corresponding parts in both figures.

This invention relates to the same class of steam-valves as that presented in my first application for a patent, herewith presented; and it consists in the arrangement of the steam-ports in such valves, in combination with the relieving-plate, for the purpose of more perfectly balancing the valve.

To enable others to make and use my invention, I will describe it more fully.

The valve A is provided with the exhaust-cavity *a* and the live-steam ports *c* and *e*, the latter extending through from back to face.

The valve is nicely fitted to slide between its seat and the relieving-plate P. The latter is attached to the hangers *h* by set-screws *s*, similar to the supporting-bars in my former application above mentioned, and for the same purpose—viz., as a means for compensating

for any wear that may occur on the valve or seat or on the plate P. This plate has a receiver, R, to which the steam-pipe is attached, and there are two ports, *f* and *g*, through the plate P, to which the ports *c* and *e* register alternately as the valve works.

It will be seen that there will be a constant pressure of the steam through one or the other of the ports *f* or *g* against the back of the valve A, and it is intended that this shall be just sufficient to counteract the "lift" of the valve, caused by the pressure of the exhaust against the face. This counter-pressure may be very nicely adjusted by increasing or diminishing the area of the ports *f* and *g*.

This construction of the parts admits of the employment or use of a fixed steam-pipe, and also avoids the necessity of rollers to relieve the friction otherwise produced by the pressure of the steam through the seat-ports *n* and *o* alternately against the face of the valve.

D represents the exhaust-pipe, which may be placed above, if desired. The valve rests upon the rib *y*.

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

The arrangement of the ports *c* and *e*, in combination with one or more ports through the relieving-plate P and the exhaust-port *a*, substantially as and for the purposes set forth, when the valve is used without a steam-chest.

JOHN B. DOUGHERTY.

Witnesses:

A. M. BADGER,  
L. M. NEWTON.