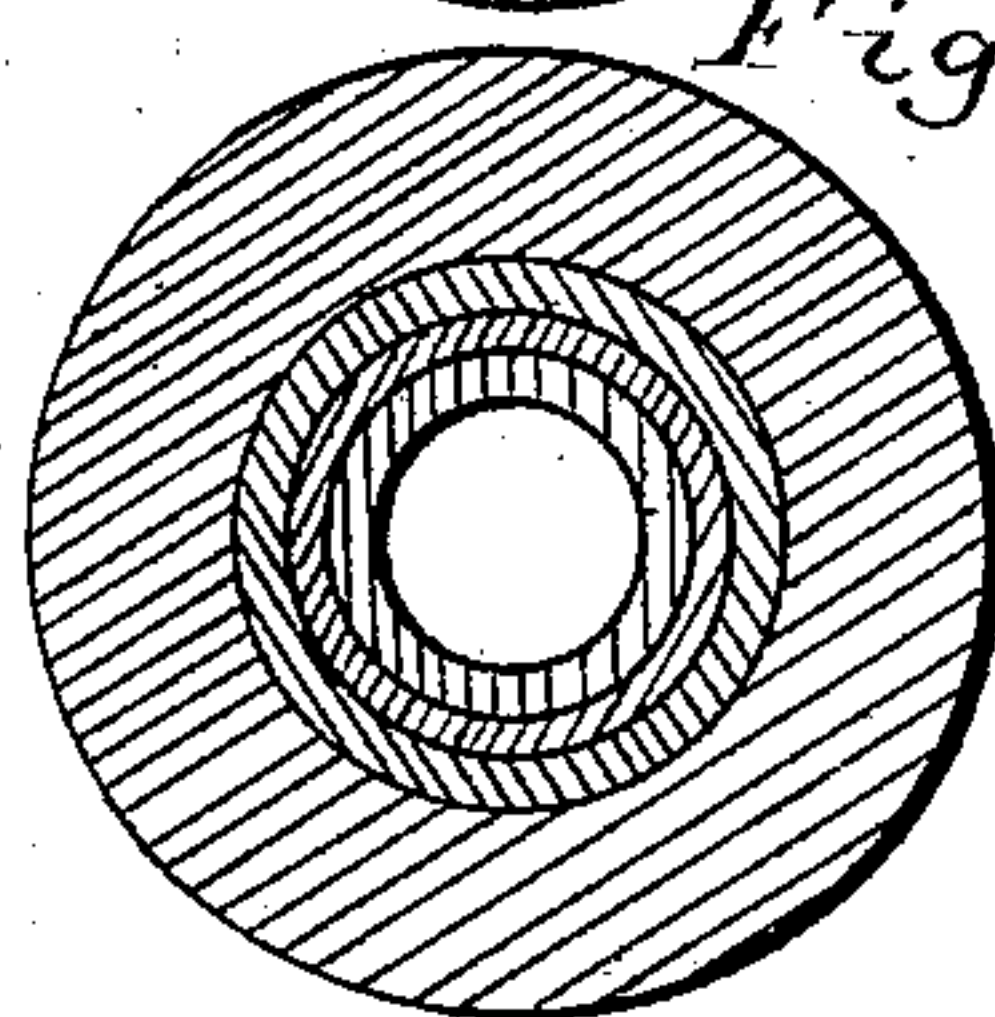
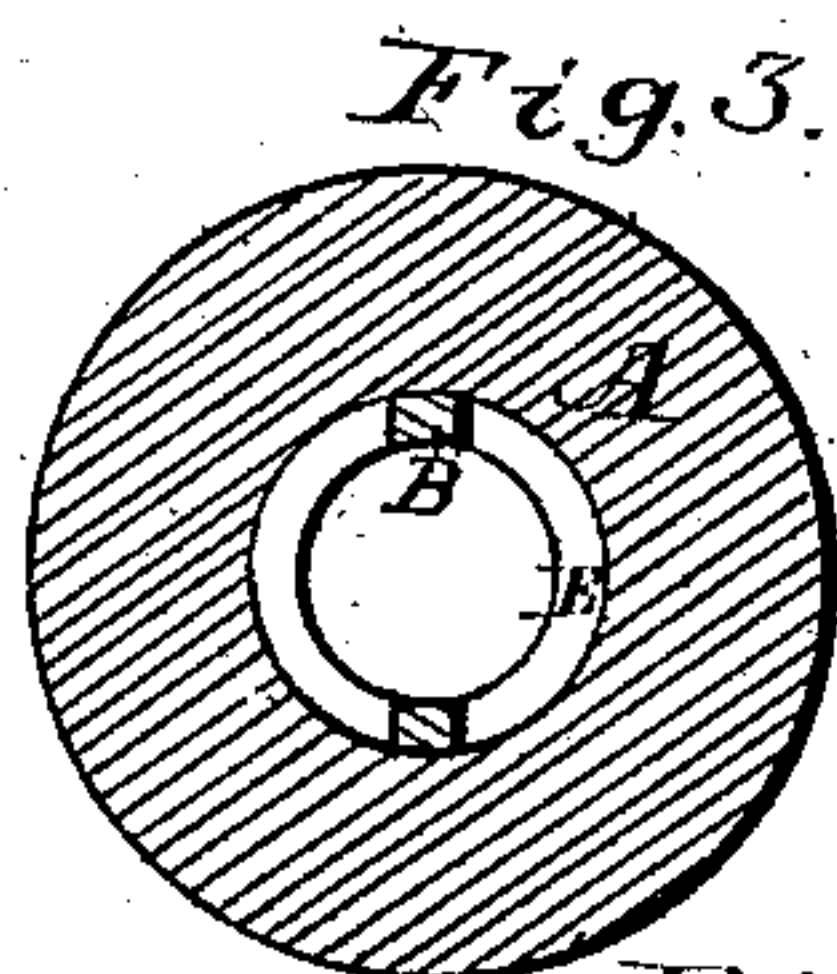
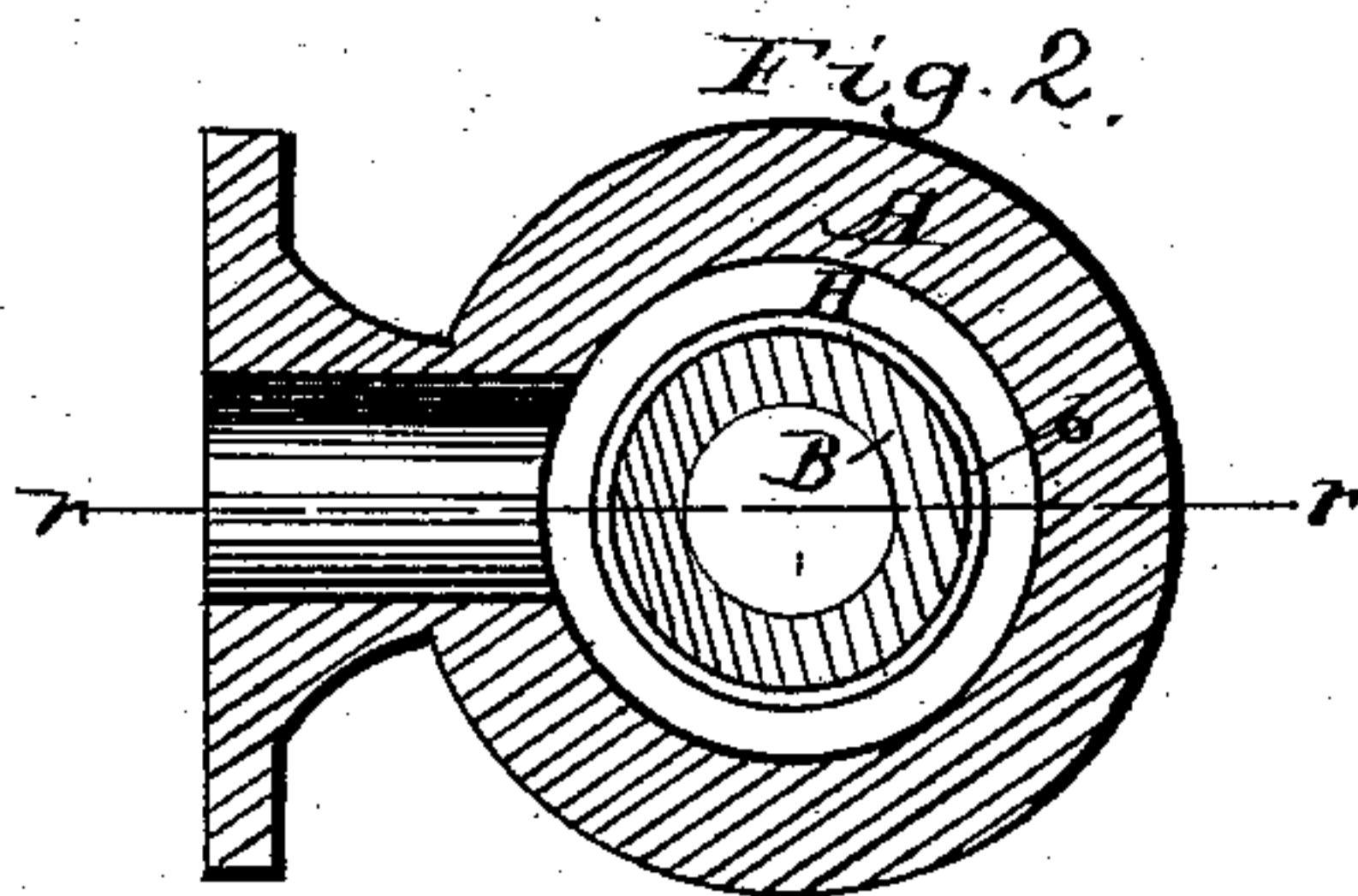
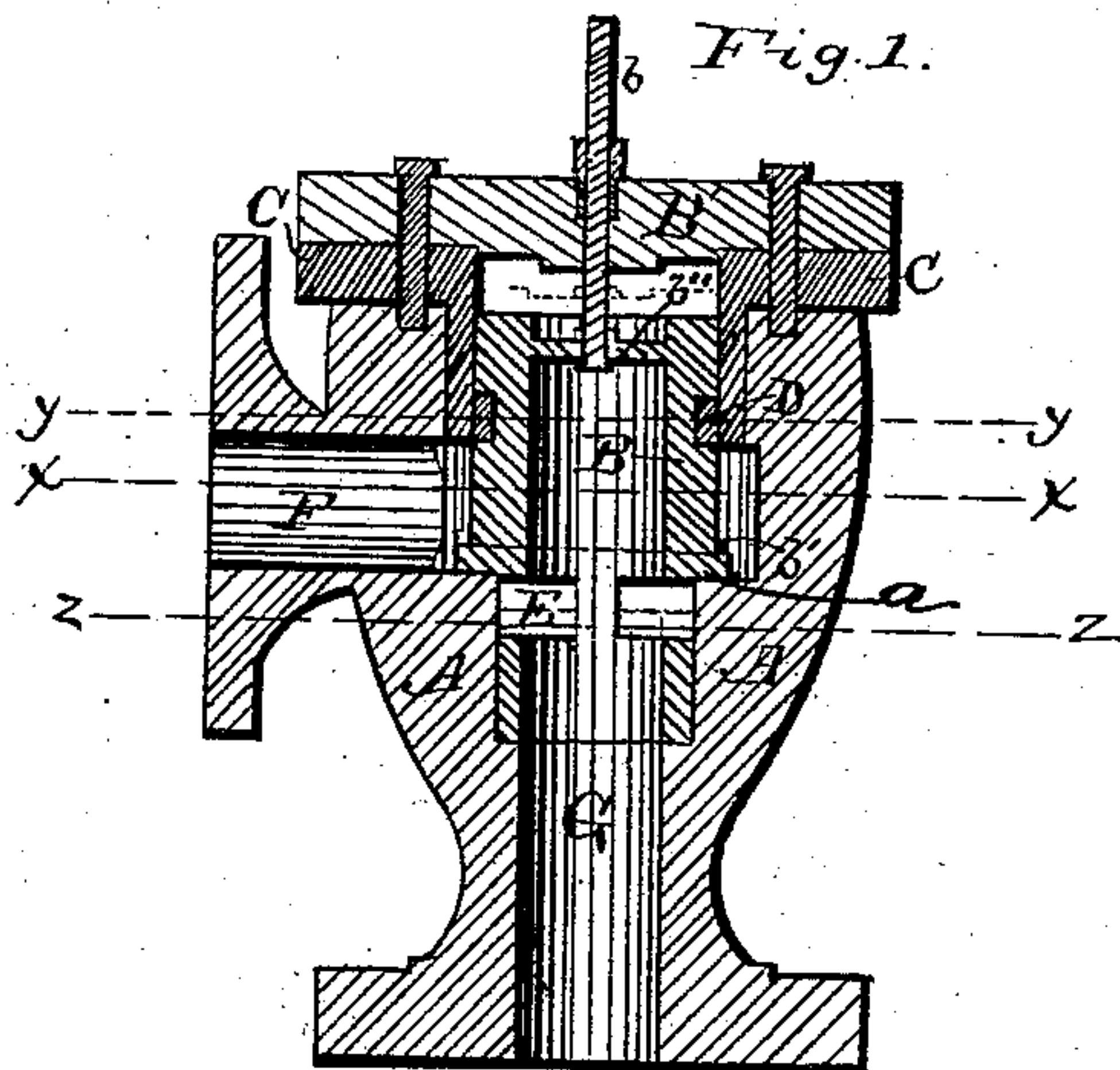


(No Model.)

C. O. SMALL.
BALANCE PUPPET VALVE.

No. 275,722

Patented Apr. 10, 1883.



Witnesses:

Wm. A. Garner
Chas. J. Williamson

Inventor:

Charles O. Small
per S. W. Bates
his Atty.
L. D. Bates

UNITED STATES PATENT OFFICE.

CHARLES O. SMALL, OF HALLOWELL, MAINE.

BALANCE PUPPET-VALVE.

SPECIFICATION forming part of Letters Patent No. 275,722, dated April 10, 1883.

Application filed January 13, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES O. SMALL, a citizen of the United States, residing at Hallowell, in the county of Kennebec and State of Maine, have invented certain new and useful Improvements in Balance Puppet-Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to that class of steam-valves known as "puppet" or balance valves, and is designed to be used as a throttle-valve or as a cut-off valve for a steam-engine.

The object of my invention is to produce a balance-valve which shall have but one seat, and in which the balance may be easily adjusted.

In the drawings, Figure 1 shows a longitudinal section through *rr* of Fig. 2. Fig. 2 shows section through *xx* of Fig. 1. Fig. 3 shows section through *zz* of Fig. 1. Fig. 4 shows section through *yy* of Fig. 1.

A is the valve chamber or covering. F is the steam-inlet, and G the outlet.

B is the balance-valve. This valve is made in the form of a hollow cylinder, having a clear opening throughout the center. The bar *b''* across the upper part supports the valve-stem *b*. The lower end of valve B is turned smaller than the upper end, forming a shoulder, which rests upon the valve-seat *a* and forms the steam-joint when the valve is closed. A small flange, *b'*, is turned on the valve immediately above the valve-seat. A chamber, H, is turned in the valve-casing, and, connecting with the inlet F, it entirely surrounds the valve B.

E E are the steam-ports, and are openings through the side of the valve, immediately below the flange *b'*, connecting with the interior.

C is a bushing, with a flange on its upper part, by which it is secured to the casing by screws passing through the covering B'. The bushing C incloses the valve B, and these two parts are made tight by the packing-rings D.

The valve-stem is packed where it passes through the covering B'.

When the valve is closed and the steam is admitted through the inlet F it fills the chamber H, surrounding the valve, and presses the valve equally in all directions. The pressure exerted against any point on the side of the valve is balanced by equal pressure on the opposite side; but there will be a downward pressure on the flange *b'*, which will tend to keep the valve closed by pressing it down upon its seat. When the valve is opened it must be lifted against the pressure on flange *b'*. The moment the valve rises the steam enters the interior of the valve through the steam-ports E E, and the pressure on *b'* is removed. The steam now fills the interior of the valve, passes up through it and fills the space above, and passes off through the outlet G. It is evident that after the steam is first admitted the valve is perfectly free to move up and down until the moment when it is again completely closed. Dotted lines show valve when open. If the upper part of the valve at *b''* were made tight instead of having an opening, as described, the pressure of the steam would tend to raise the valve.

The width of the flange *b'* may be varied, causing a greater or less force to be applied in opening the valve; or the flange may be left off altogether, leaving the weight of the valve, or some outside pressure applied to it, to stop the steam.

A valve thus constructed works with great ease, and has few parts which are liable to get out of order.

I claim—

In a valve-chamber, A, a balance-valve, B, smaller at its lower than at its upper end, and having flange *b'* on its outside, and ports E, combined with chamber H and bushing C, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES O. SMALL.

Witnesses:

J. Q. A. HAWES,
J. WALTER BRITTON.