

(No Model.)

W. M. DEAL.

BALANCED SLIDE VALVE.

No. 283,216.

Patented Aug. 14, 1883.

FIG. 1.

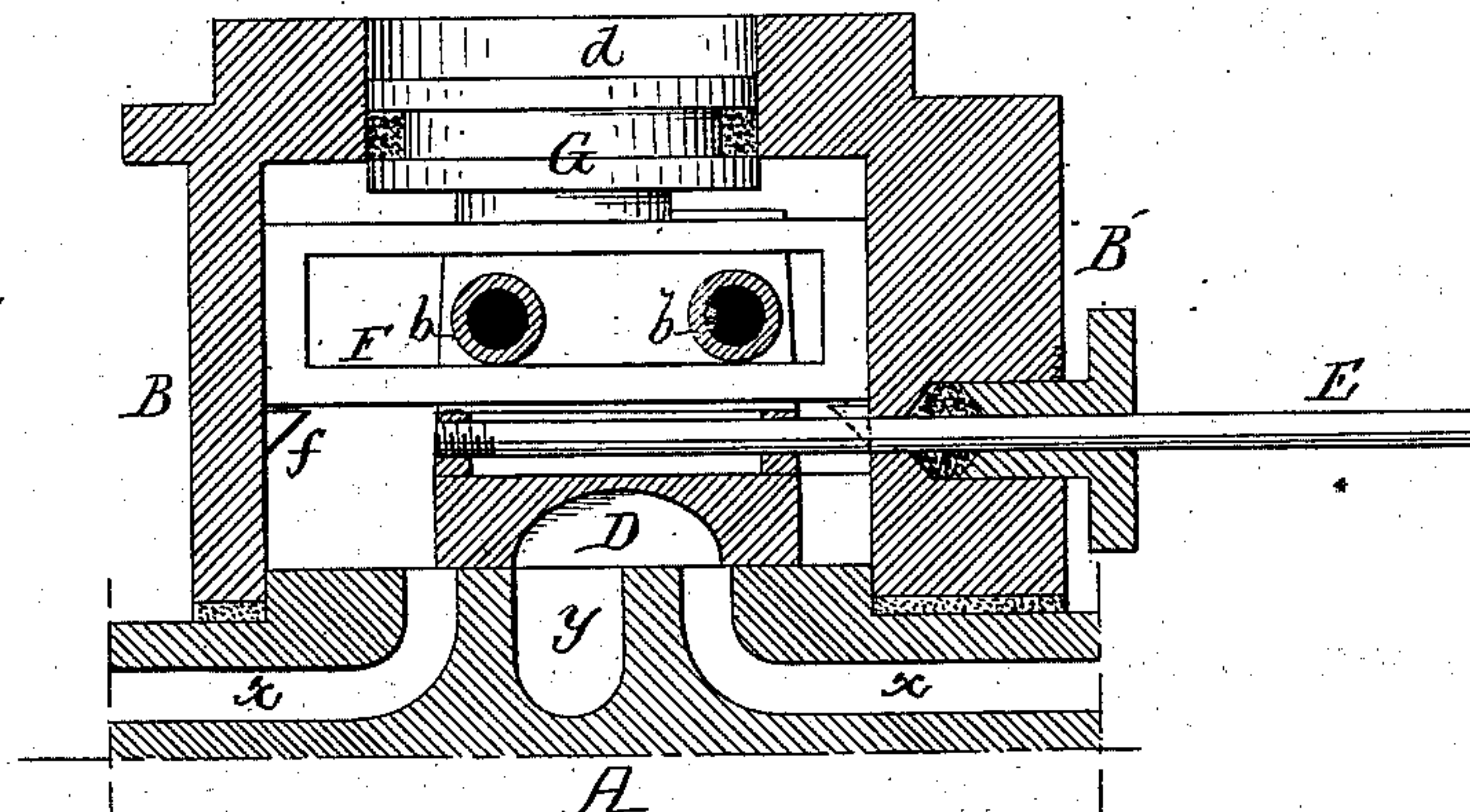


FIG. 2.

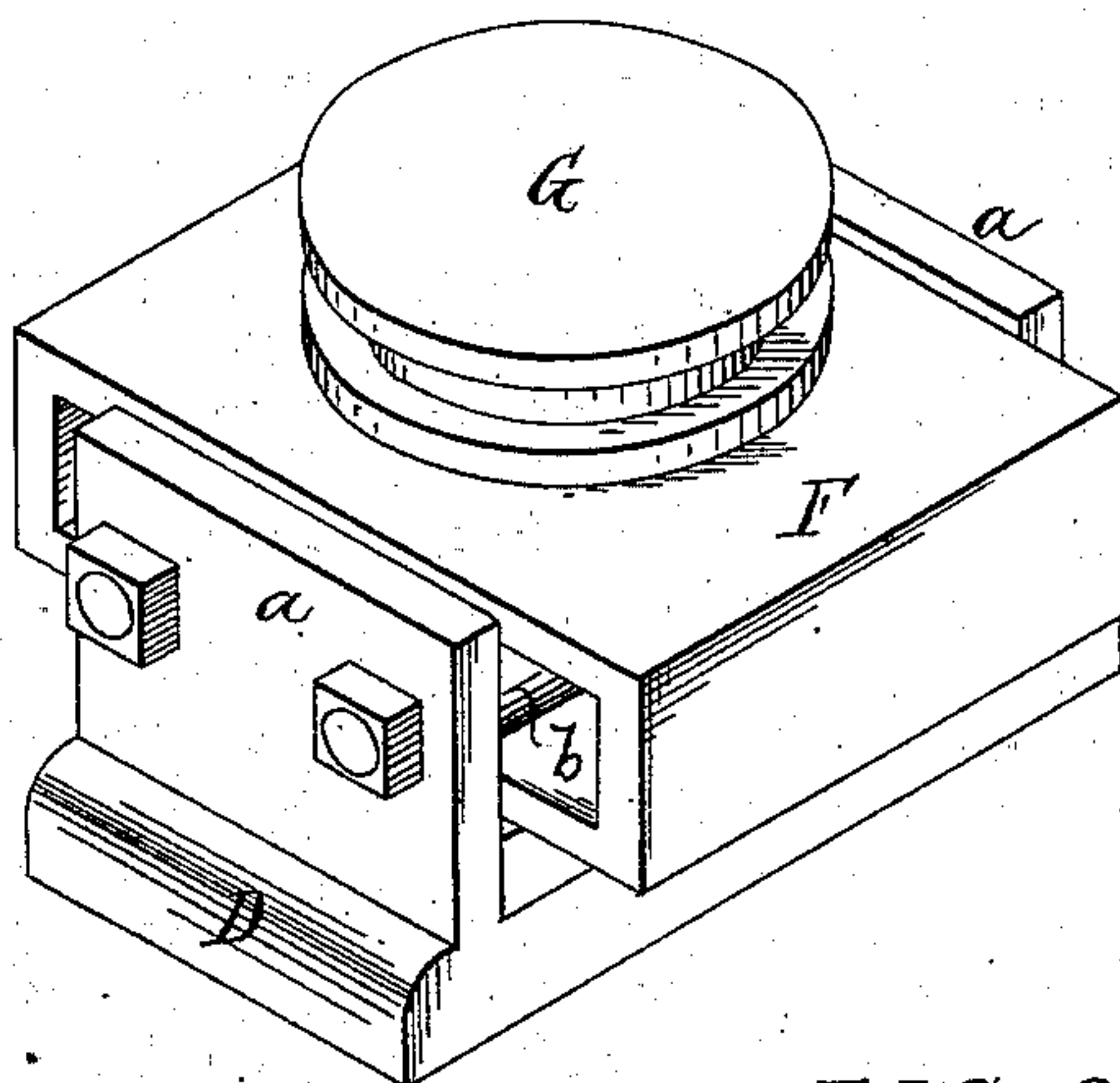
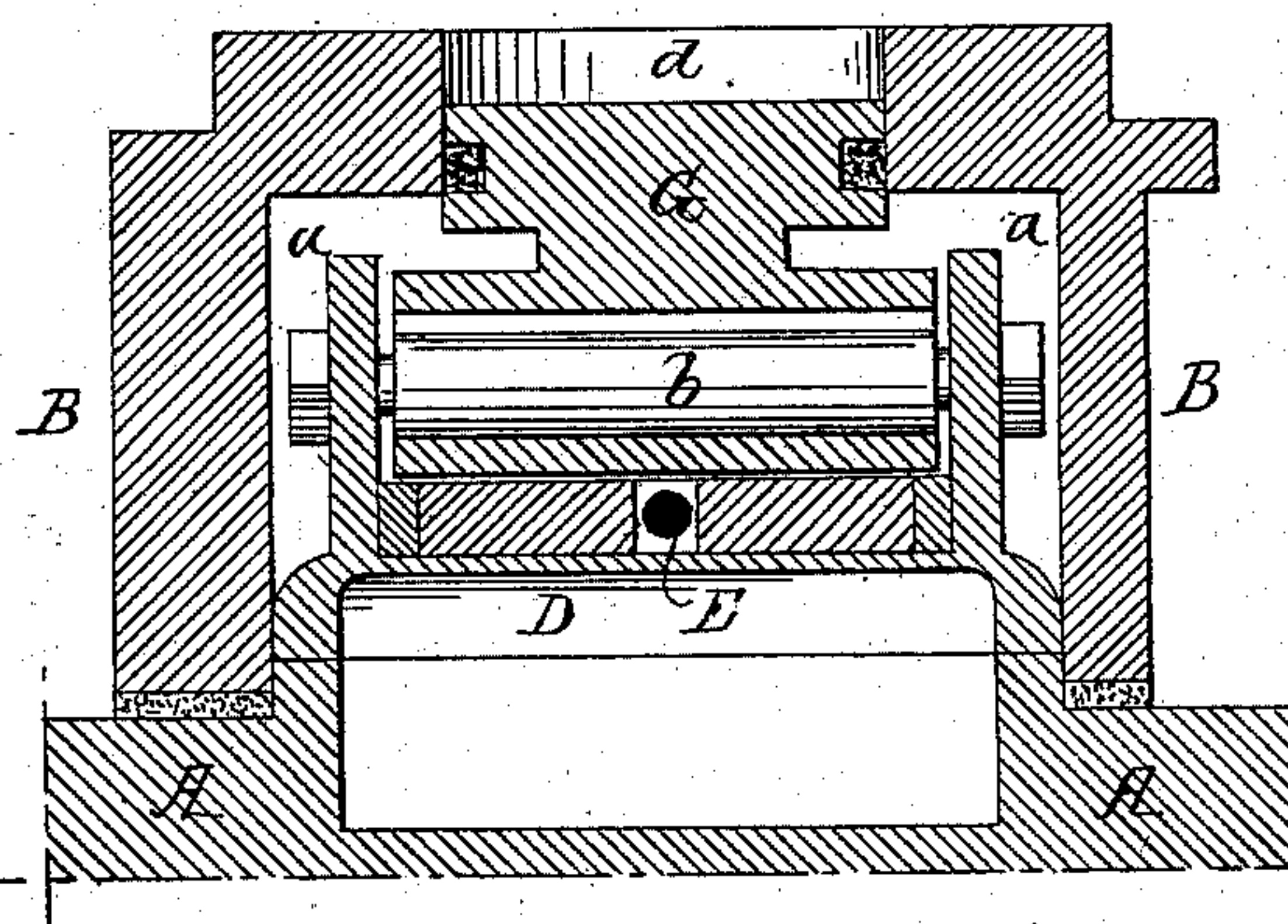


FIG. 3.



Witnesses

Hamilton D. Turner,  
Harry Drury

Inventor

William M. Deal  
By his attys.  
Howson and Fox



# UNITED STATES PATENT OFFICE.

WILLIAM M. DEAL, OF PHILADELPHIA, PA., ASSIGNOR TO HIMSELF, JAMES W. COURTNEY, AND ROBERT F. FRANKENFIELD, OF SAME PLACE.

## BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 283,216, dated August 14, 1883.

Application filed November 6, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM M. DEAL, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Balanced Slide-Valves, of which the following is a specification.

The object of my invention is to so reduce the pressure on the slide-valve of a steam or other engine that the friction between the valve and its seat will be reduced, wear of the valve and seat correspondingly diminished, and less power required to move the valve than when the latter is subjected to the full pressure.

My invention consists in combining a guide-bar, connected to a balancing-piston, with a valve having guide-rollers at each end, and also in adapting said guide-bar to bearings in the chest, so as to insure parallel movement of all portions of the bar.

In the accompanying drawings, Figure 1 is a longitudinal section of part of a steam-engine cylinder, valve-chest, and valve with my improvements; Fig. 2, a perspective view of the valve and balancing device detached from the chest; Fig. 3, a transverse section of Fig. 1.

A represents part of the cylinder of a steam-engine, having the usual steam-inlet ports, *x x*, and exhaust-port *y*, and a chest, B, in which is a slide-valve, D, of the ordinary form, operated by a valve-rod, E, in the usual manner.

On the back of the valve D are wings *a a*, which carry the journals of a pair of rollers, *b b*, adapted to a slotted bar, F, the latter being suspended from a piston, G, which is properly packed, and is fitted to a cylindrical opening, *d*, in the top of the chest.

It will be seen that the pressure of steam exerted on the piston G tends to raise the bar F and the valve, and thus counteracts, to a certain degree, the downward pressure exerted upon the valve, so that by properly proportioning the area of the piston to the area of

the valve exposed to downward pressure, said downward pressure may be balanced or nearly balanced, and the friction between the valve and its seat thus diminished, so as to reduce the wear of the surfaces in contact and lessen the power required to move the valve.

Lugs *f f* are preferably formed on the inside of the chest, to support the bar F and relieve the valve from the weight of said bar and its piston when steam is cut off from the chest.

The rollers *b b* are arranged one near each end of the valve, so that said valve is guided near each end, and the face of the same must move in a plane exactly parallel with the guide-bar, and in order to prevent change in the position of the guide-bar tending to interfere with the proper performance of its guiding duty, each end of the said bar bears against the end of the chest B, as shown in Fig. 1, the bearing-surfaces of the bar and chest being rendered perfectly true, so as to insure the proper vertical guidance of the bar.

I claim as my invention—

1. The combination of the valve-chest B, the valve D, having side lugs, *a*, carrying rollers *b*, one near each end of the valve, the guide-bar F, for said rollers, and a piston, G, connected to the guide-bar and exposed to the pressure in the chest, all substantially as specified.

2. The combination of the valve-chest B, the valve D and its rollers *b*, the guide-bar F, having at each end a bearing against the end of the chest, and the piston G, connected to the bar F and exposed to the pressure in the chest, as set forth.

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

WILLIAM M. DEAL.

Witnesses:

HARRY DRURY,  
HARRY SMITH.