

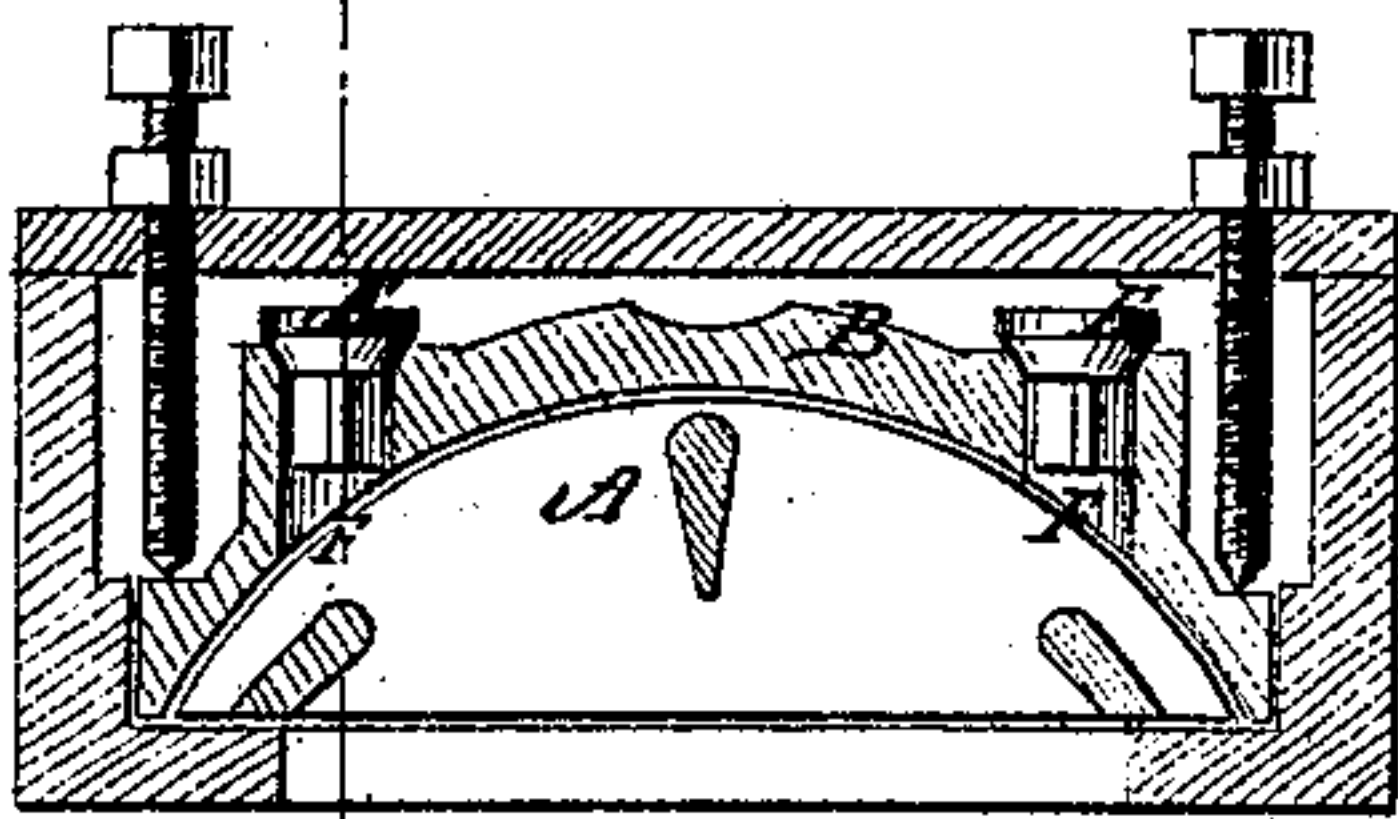
*J. Nesbitt,*

*Balanced Valve.*

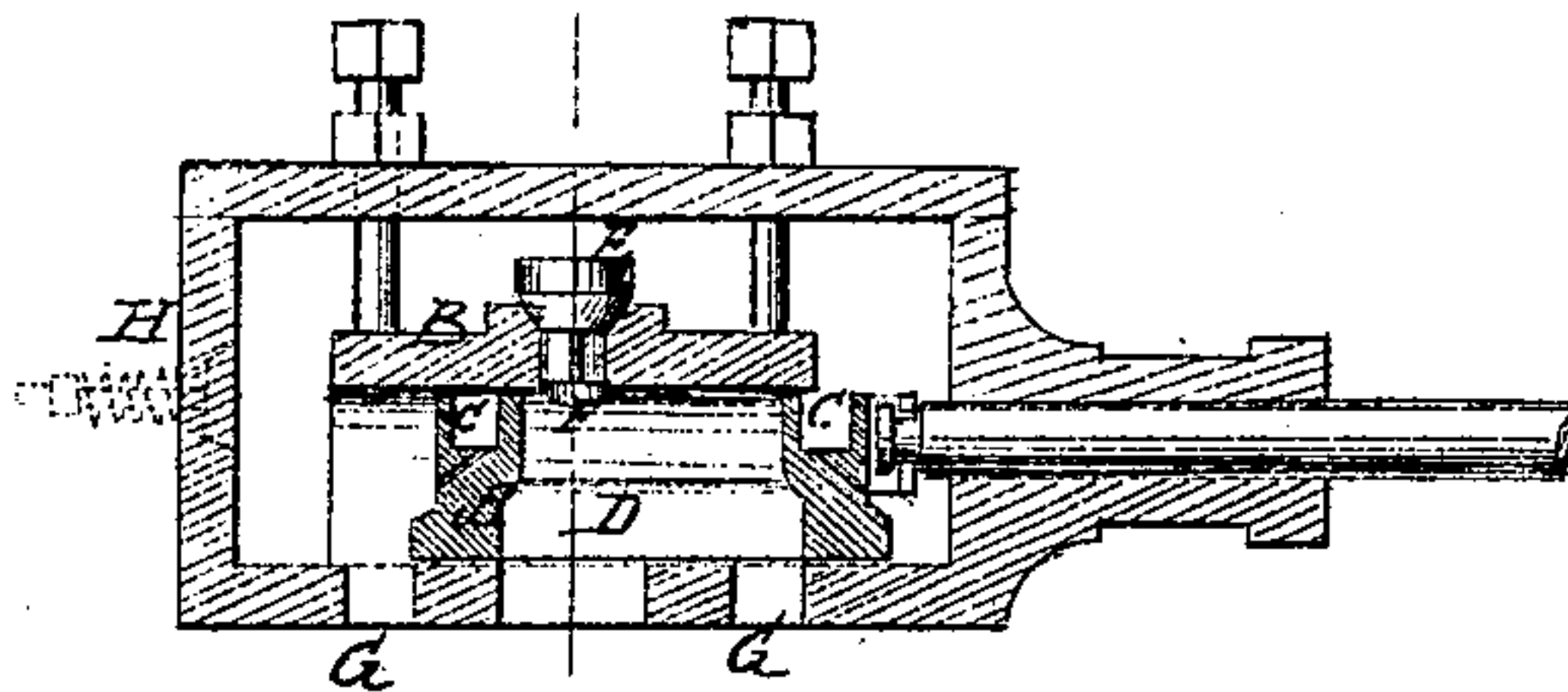
*No. 110490.*

*Patented Dec. 27. 1870.*

*Fig. 1.*



*Fig. 2.*



**Witnesses:**

*Chas. Hida.*  
*L. S. Moore*

**Inventor:**

*J. Nesbitt*  
PER *Wm. H. B.*  
**Attorneys.**

# UNITED STATES PATENT OFFICE.

JOHN NESBITT, OF CONCORD, NEW HAMPSHIRE.

## IMPROVEMENT IN BALANCED SLIDE-VALVES.

Specification forming part of Letters Patent No. **110,490**, dated December 27, 1870.

*To all whom it may concern:*

Be it known that I, JOHN NESBITT, of Concord, in the county of Merrimack and State of New Hampshire, have invented a new and useful Improvement in Balanced Slide-Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification.

This invention relates to improvements in balanced slide-valves, or those which are so arranged that they cannot be raised off their seats when the throttle-valve is closed; and the piston continues in motion by the air for admitting it behind the piston and preventing the forming of a vacuum, which greatly retards the motion, especially in the case of a locomotive going on a downward incline; and it consists in the application to such valves, or to the inclosing-plates thereof, of puppet or other valves opening from the exhaust-space to the steam-space by the action of the air, so that the latter will pass through the steam-ports and fill the space behind the piston; or, instead of arranging the valves to communicate with the exhaust-passage, they may be arranged in the steam-chest and admit the air directly from the exterior.

Figure 1 is a transverse section through a valve-chest and valve, showing the application of my improvements; and Fig. 2 is a longitudinal sectional elevation of the same.

Similar letters of reference indicate corresponding parts.

A is a slide-valve working steam-tight under the case B, for the purpose of balancing it, the said valve carrying sections of packing-rings in the grooves C, working against the under side of case B, to which they are fitted steam-tight.

It is obvious that this valve, or any balanced in a similar manner, cannot be raised off its seat, as the ordinary slide-valves can, by the atmospheric pressure in the exhaust-port D, when steam is shut off from the engine and

the latter continues in motion, as in the case of a locomotive going down an incline; consequently a vacuum will be formed behind the piston, which will powerfully resist the forward motion of the engine. I therefore propose to provide for admitting the air to the steam-chest to enter the cylinder at the ports in the same manner that the steam does, to prevent the formation of the vacuum.

The plan which I prefer for accomplishing this is to arrange the puppet-valves E in suitable openings F through the case B, leading from the space D to the steam-space, so that they will be kept closed while steam is admitted to the engine by the steam, but will be opened by the back-pressure of the air through the exhaust as soon as the steam is shut off. The air so admitted to the steam-chest will flow through the steam-ports G and follow up the piston, thereby preventing the forming of a vacuum behind it. I propose, however, in some cases—for instance, when the inclosing-case for the valve is not so well adapted for the application of the valves E—to arrange them in the shell of the steam-chest, as indicated by the dotted lines at H, either placing the valve in the side or top of the chest, as may be found best, and, if preferred, a spiral spring may be employed to assist in closing the valve, as is common with other valves or cocks; but I prefer to arrange the said valves in the confining-case for the slide-valve, as here shown, when the nature of the case will admit of it.

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

A slide-valve, A, having an exhaust-cavity cut therethrough, combined, as described, with the case B, having puppet-valves E arranged to admit air to the interior of the steam-chest, at the time and in the manner set forth.

JOHN NESBITT.

Witnesses:

JOHN H. ALBIN,

JOHN M. COCHRAN.