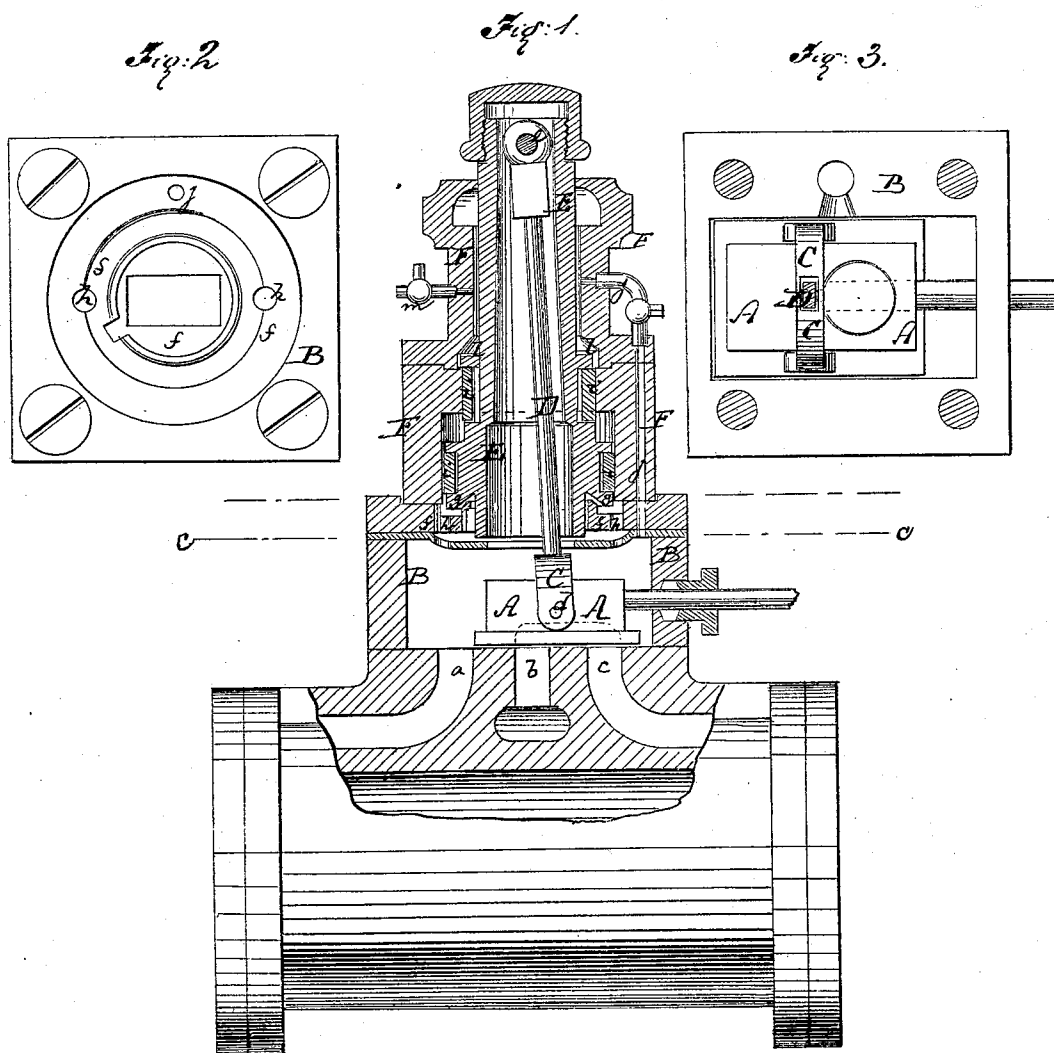


H. HENDRICKSON.
Balanced Slide-Valves.

No. 134,203.

Patented Dec. 24, 1872.



Witnesses:

Chas. Nida
C. Scudgine

Inventor:

H. Hendrickson

PER

Munnell
Attorneys.

UNITED STATES PATENT OFFICE.

HUBBARD HENDRICKSON, OF RED BANK, NEW JERSEY.

IMPROVEMENT IN BALANCED SLIDE-VALVES.

Specification forming part of Letters Patent No. 134,203, dated December 24, 1872.

To all whom it may concern:

Be it known that I, HUBBARD HENDRICKSON, of Red Bank, in the county of Monmouth and State of New Jersey, have invented a new and Improved Slide-Valve, of which the following is a specification:

Figure 1 is a vertical longitudinal section of my invention. Fig. 2 is a top view of the steam-chest with all appendages removed. Fig. 3 is a horizontal section on the line *c c*, Fig. 1.

Similar letters of reference indicate corresponding parts.

This invention relates to a new means of balancing the slide-valves of steam-engines with such exactness and regularity that the motion of the valve will be made easy, its wear prevented, and friction avoided. The invention consists, first, in connecting a pivoted yoke with the slide-valve, said yoke having a vertical stem that swings at its upper end on a horizontal pivot. This pivot is supported in a tube or cylinder, which is held balanced by the steam, so that the actual support is applied to the valve by the steam, but indirectly under said cylinder, and thence to the pivot at the upper end of the rod. The invention also consists in the arrangement of the various details of the invention, whereby the main idea, above set forth, is more fully carried out.

In the accompanying drawing, the letter *A* represents the slide-valve, of suitable size, shape, and kind. It works in the steam-chest *B* over the ports *a*, *b*, and *c*, substantially in the same manner as other slide-valves. *C* is a yoke straddling the slide-valve and pivoted thereto at its ends. *D* is a rod projecting upward from the yoke into a vertical cylinder, *E*, that is applied above the steam-chest, as shown. The upper end of the rod *D* is by a pin, *e*, pivoted in the upper end of the tube *E*. As the slide-valve moves back and forward in the steam-chest the rod *D* will swing on its pivot *e* in conformity with and following the motions of the slide-valve. The lower end of the tube *E* enters an opening in the top of the steam-chest, and has directly above

said top *f* an outwardly-projecting flange, *g*. Steam is admitted under this flange through holes *h* in the top of the steam-chest, so that the cylinder *E* will be balanced—that is to say, held on the steam-cushion under its flange *g*, there being thus steam under the tube *E*, which tends to elevate the same. The valve that is suspended by the pin *e* from said tube will be raised off its seat at least as much as is necessary to avoid friction. The tube *E* is held and guided in a cylindrical projection, *F*, that is built upon the steam-chest, as shown. Suitable packing-rings *i* prevent the escape of steam around *E* within *F*. Steam is, in a pipe or steam passage, *j*, also carried to above a flange or shoulder, *l*, of the tube, so that by this means the tube can also be depressed by steam-power. The proportionate differences in the areal extents of the shoulders *g* and *l* will determine the greater or less pressure upward applied to the cylinder *E*, so that thus the balancing of the valve can be regulated by enlarging or reducing the respective flange-surfaces. *m* is a pipe projecting from the cylinder *F*, for the discharge of steam therein contained. The pipes *j* and *m* are provided with cocks to control the passage of steam through them.

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

1. The means described for exerting a yielding pressure upon a slide-valve to hold it firmly to its seat at all parts thereof, but without unnecessary friction, consisting of the pivoted yoke-rod *C D* and a steam-balanced cylinder, *E*, as set forth.

2. The means described for enabling the downward pressure of a steam-balanced cylinder, *E g h*, to be increased, consisting of the flange *l*, cavity thereabove, and steam-inlet, all arranged as specified.

HUBBARD HENDRICKSON.

Witnesses:

A. V. BRIESEN,
T. B. MOSHER.