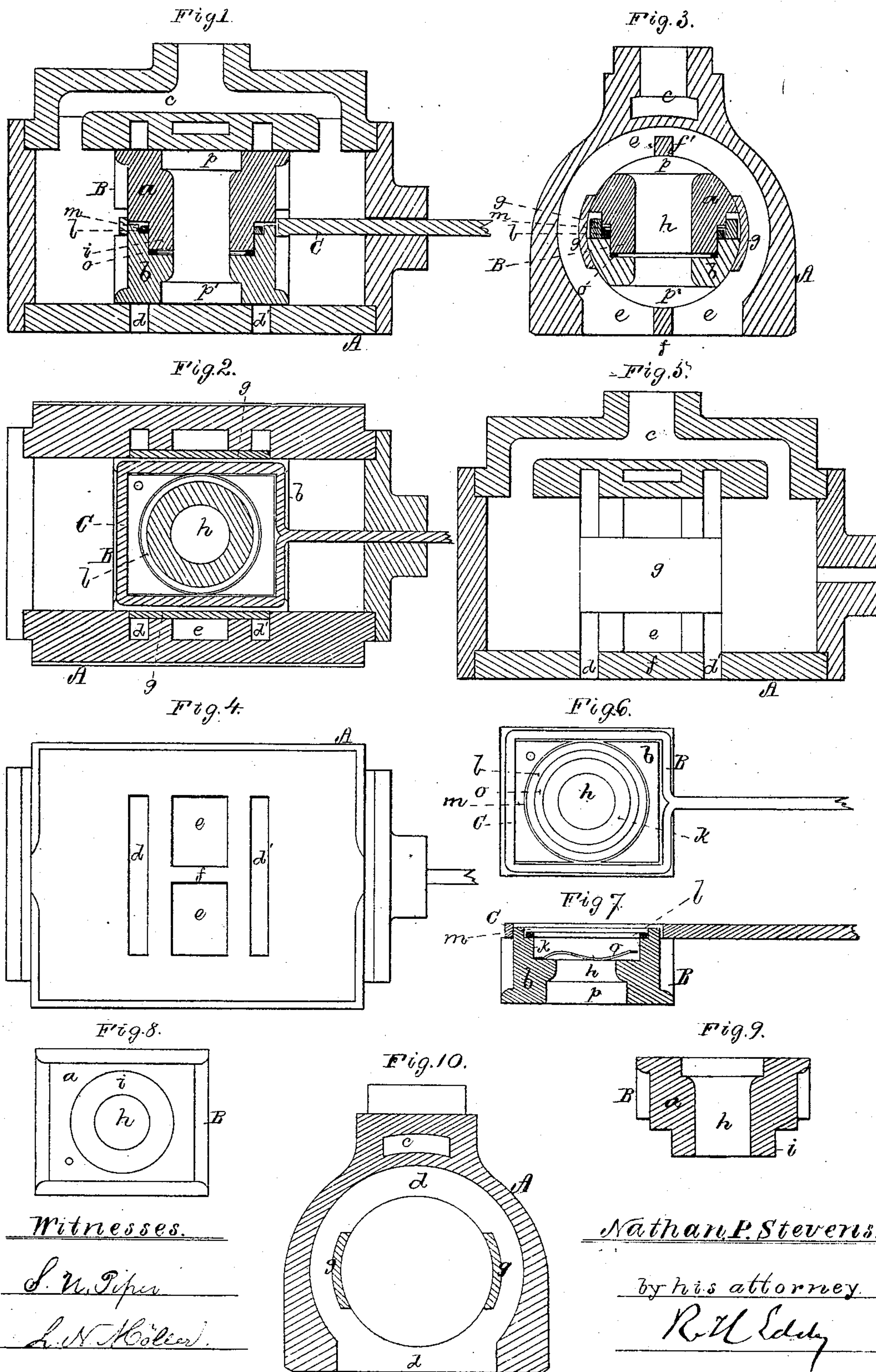


N. P. STEVENS.
Balanced-Valves for Steam-Engines.
 No. 145,764. Patented Dec. 23, 1873.



UNITED STATES PATENT OFFICE

NATHAN P. STEVENS, OF HOPKINTON, NEW HAMPSHIRE.

IMPROVEMENT IN BALANCED VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **145,764**, dated December 23, 1873; application filed November 26, 1873.

To all whom it may concern:

Be it known that I, NATHAN P. STEVENS, of Hopkinton, of the county of Merrimack, of the State of New Hampshire, have invented a new and useful Improvement in Balanced Valves for Steam-Engines; and do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a vertical and longitudinal section, Fig. 2 a horizontal section, and Fig. 3 a transverse section, of the valve and case. Fig. 4 is an under-side view, and Fig. 5 a longitudinal section, of the case without the valve. Fig. 6 is a top view, and Fig. 7 a longitudinal section, of the lower half or portion of the valve and its yoke. Fig. 8 is an under-side view, and Fig. 9 a longitudinal section, of the upper portion of the valve.

The case A has a cylindrical bore to receive the piston B, composed of two semi-cylinders, *a b*. Extending over the said bore and opening into it at or near its opposite ends, as shown, is an induction-passage, *c*, which, at its middle, is open, as shown. There are also leading out of the bottom of the bore three ports, *d e d'*; the middle one being the exhaust-passage, and the two outer ones, when in use, opening into passages leading to the opposite ends of the bore of the steam-engine cylinder. Each of the passages *d e d'* is continued upward in or by a groove entirely around the bore, as shown in Fig. 3, and also in Fig. 10, which is a transverse section of the case taken through the passage *d*, and corresponding with such a section through the passage *d'*. In order to support the partitions between the passages *d*, *e*, and *d'*, a brace, *f*, is extended across the passage *e* at bottom, and there is also another such brace, *f'*, extended across it at top, as shown. Furthermore, at opposite sides of the valve-case there are what I term two "arcual overlaps," *g g*, each of which is a bridge going horizontally across the passages *d e d'*, and formed as shown. The valve

has an exhaust-passage, *h*, extending down through it, or both portions *a b* of it, and such valve is grooved around it to receive the yoke C, formed as shown. The valve is provided with transverse notches, recesses, or passages *p p'*, arranged across it as shown. The upper semi-cylindrical part *a* of the valve is furnished with a cylindrical projection, *i*, to enter a corresponding recess, *k*, made in the lower semi-cylindrical portion *b*; and there is a packing-ring, *l*, extended around the projection *i*, and within a groove, *m*, made in the flat face of the part *b*. Furthermore, there is laid on the bottom of the recess *k* a spring, *o*, whose office is to force the two parts *a b* asunder, in order to keep each of them in contact with the bore.

From the above, it will be seen that the steam, while passing into and escaping from the cylinder by the ports, will encompass the valve, the exhaust going down through the valve, as well as underneath it.

The arcual overlaps are to cover the side grooves of the valve, in order to prevent the exhaust steam from communicating with the induction steam in those parts of the case which are at opposite ends of the valve.

The valve-case may be cast in one piece with the steam-cylinder, or the two may be in separate parts, and be bolted or connected together.

I claim as my invention—

The cylindrical valve made in two semi-cylinders, *a b*, jointed and packed, and having passages *h p p'* through and across them, as described, in combination with the valve-case, having the arcual overlaps *g g* and the steam-passages *d e d'* arranged within it, in manner substantially as specified, all being essentially as represented.

NATHAN P. STEVENS.

Witnesses:

R. H. EDDY,
S. N. PIPER.