2 Sheets—Sheet 1.

T. M. NAGLE.

BALANCE SLIDE VALVE.

No. 189,055. Patented April 3, 1877.

Fig. 1.

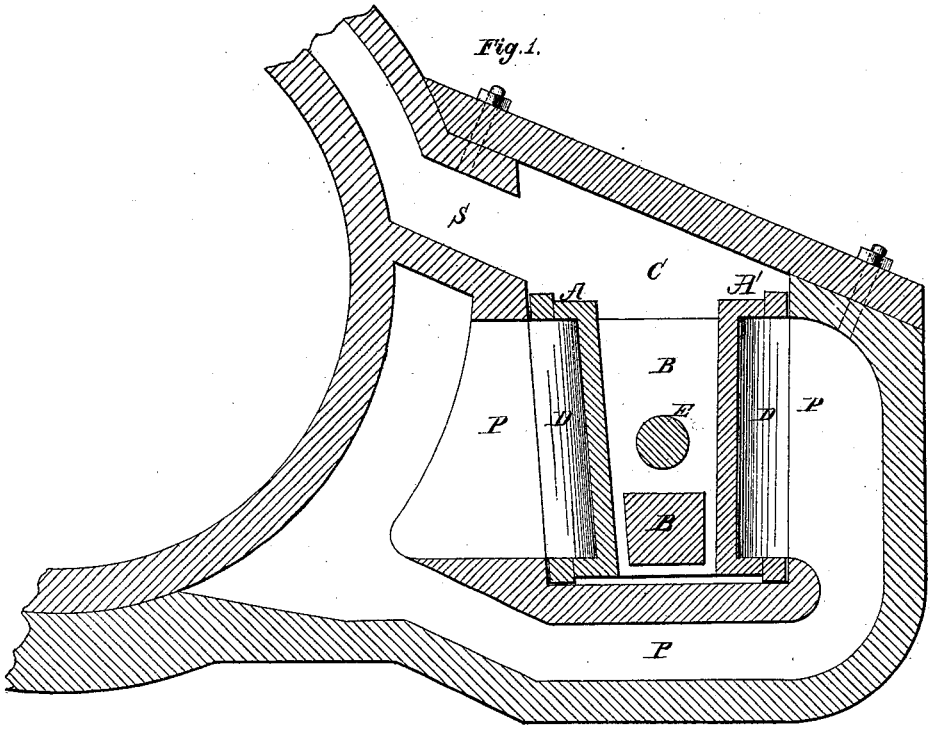


Fig. 2.

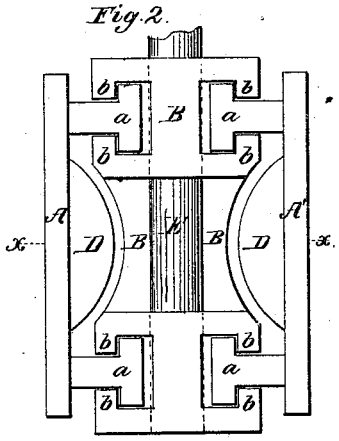


Fig. 3.

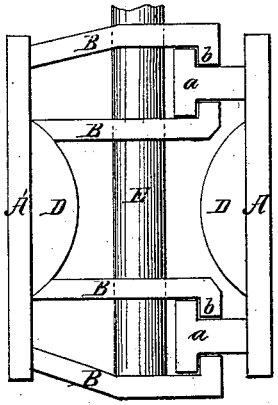


Fig. 4.

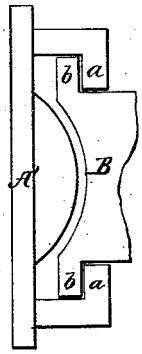
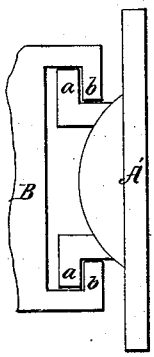


Fig. 5.



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2 Sheets—Sheet 2.

T. M. NAGLE.

BALANCE SLIDE VALVE.

No. 189,055. Patented April 3, 1877.

Fig. 6.

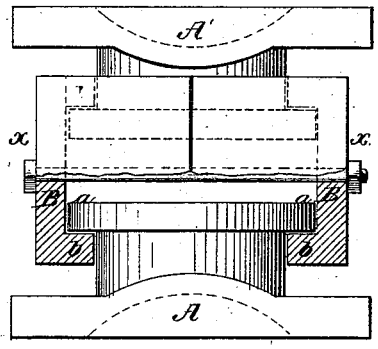


Fig. 7.

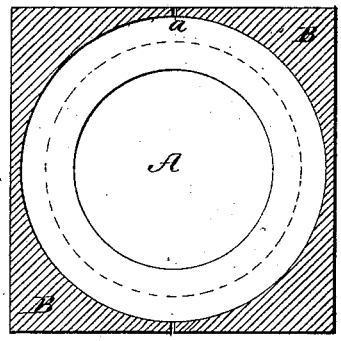


Fig. 8.

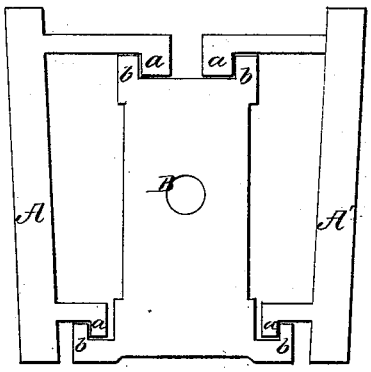
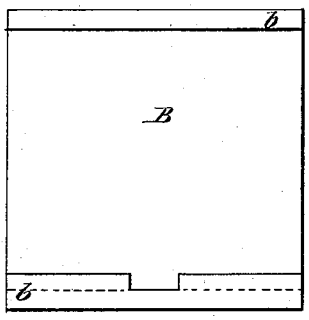


Fig. 9.



Attest:

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UNITED STATES PATENT OFFICE.

THEODORE M. NAGLE, OF ERIE, PENNSYLVANIA.

IMPROVEMENT IN BALANCE SLIDE-VALVES.

Specification forming part of Letters Patent No. **189,055**, dated April 3, 1877; application filed February 7, 1877.

To all whom it may concern:

Be it known that I, THEODORE M. NAGLE, of Erie, in the county of Erie and State of Pennsylvania, have invented a new and useful Balance Slide-Valve; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the construction of balance slide-valves for steam-engines. More particularly it relates to the construction of flexible duplex or double-faced slide-valves; and consists in so constructing the same that they shall at all times be perfectly balanced and require no adjustment.

The object of my invention is to construct such a valve in such a manner that it shall be, first, perfectly flexible—that is, capable of yielding to excessive pressure from the cylinder; second, it shall receive the full pressure of the steam upon the backs of its faces, which shall be held against their seats wholly by said pressure, and not by the use of springs or any adjusting device; third, it shall be so constructed that the valve-faces cannot be unnecessarily or unduly forced upon their seats by the pressure of the steam, but to accomplish which no adjustable or adjusting device shall be used.

The manner in which I accomplish my aim will fully appear in the following general description.

My invention is shown in the accompanying drawings, as follows:

Figure 1 is a vertical transverse section through the steam-chest and valve, and shows a fragment of the cylinder. The line of section is taken through one of the steam-ports, and on the line *x x*, Fig. 2. Fig. 2 is a plan view of my valve. Figs. 3, 4, 5 are modifications. Fig. 6 is also a modification. Fig. 7 is a vertical section of Fig. 6, on the line *x x* of that figure. Fig. 8 is also a modification; and Fig. 9 is a side view of part B, as formed in the manner shown in Fig. 8.

My valve is constructed of three parts, A, A′, and B, of which A and A′ are the valve-faces, and B is the driver, to which the valve-stem is connected, and by which the faces are moved. The driver B also serves the purpose of retaining the faces A A′ from being pressed unnecessarily against their seats by the pressure of the steam. The driver B forms the core or web of the valve. (In Fig. 3 the driver B is shown as part of and cast upon one of the faces.) This core or web part is attached to the valve-stem, and hence I call it the "driver." The part B is provided with projections or flanges, (or they may be called lugs or arms,) *b b b b*, which extend from it toward the valve-faces A A′. These extensions are so formed as to interlock and reach behind similar projections extending from the parts A A′. This gives them an L or T shaped appearance. As just intimated, the parts A A′ are provided with similar extensions *a a a a*. When the valve parts are in place these parts *a a a a* and *b b b b* interlock, or, I may say, dovetail together. Sufficient play-room is left between the overlapping parts and the main body of the parts A, A′, and B to allow the valve-faces to recede from their seats, if necessary. The object of these interlocking arms or extensions is to, first, retain the valve-faces from unduly pressing their seats; second, to move the faces with the core or web B.

It will be seen that the valve-faces are permitted to rest upon their seats; they are prevented from unduly pressing their seats; and they can recede from their seats when the pressure from within the cylinder exceeds the pressure in the chest. These effects are accomplished by the interlocking arms *a a a a* and *b b b b*. The valve needs no adjusting, for it is self-adjusting and automatically flexible.

I show in the drawings various modifications; but they all resemble each other, and embody the same features—viz., the two faces A and A′ and the carrier or web B, which parts are connected together by interlocking or overlapping arms, lugs, or flanges, which retain the valve-faces from unduly pressing their seats, move the faces with the web or core, and allow the faces to recede from their seats. These are the essential features of my invention.

In Figs. 6 and 7 the extensions *a a* are cylindrical, with a flange, which gives it the overlapping or L or T shaped effect. In this case the carrier B is a shell made of two parts and bolted together.

In Figs. 8 and 9 the device is so made that

either of the faces can be lifted out and not disturb the remaining parts of the valve. In this case the L or T shaped projections run lengthwise of the parts, while in all the other cases, except Figs. 6 and 7, they run crosswise. So in this case the projections simply serve as retainers, and the driving or carrying is accomplished by a lug and notch, (the notch being shown in Fig. 9,) or some similar manner.

What I claim as my invention is—

The combination, within a flexible, double, or duplex slide-valve, of the faces A A′ and the web or carrier B, when the same are provided with projections *a a a a* and *b b b b*, which interlock or overlap, substantially as and for the purposes mentioned.

In testimony whereof I, the said THEODORE M. NAGLE, have hereunto set my hand.

THEODORE M. NAGLE.

Witnesses:

JNO. K. HALLOCK,

MYRON E. DUNLAP.