A. BLOOD.

VALVE SEAT FOR STEAM ENGINES.

No. 252,012. Patented Jan. 10, 1882.

Fig: 1.

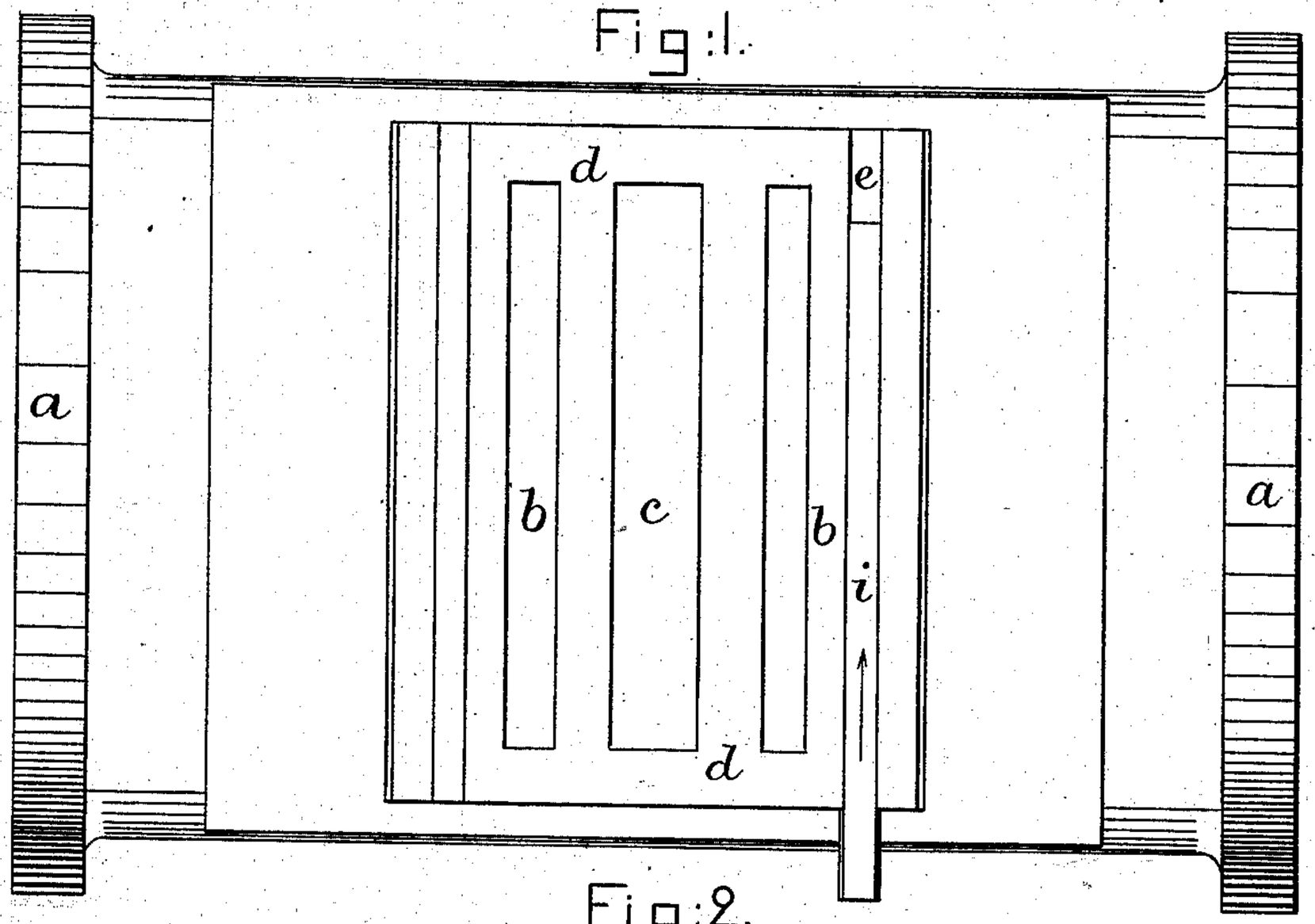

Fig: 2.

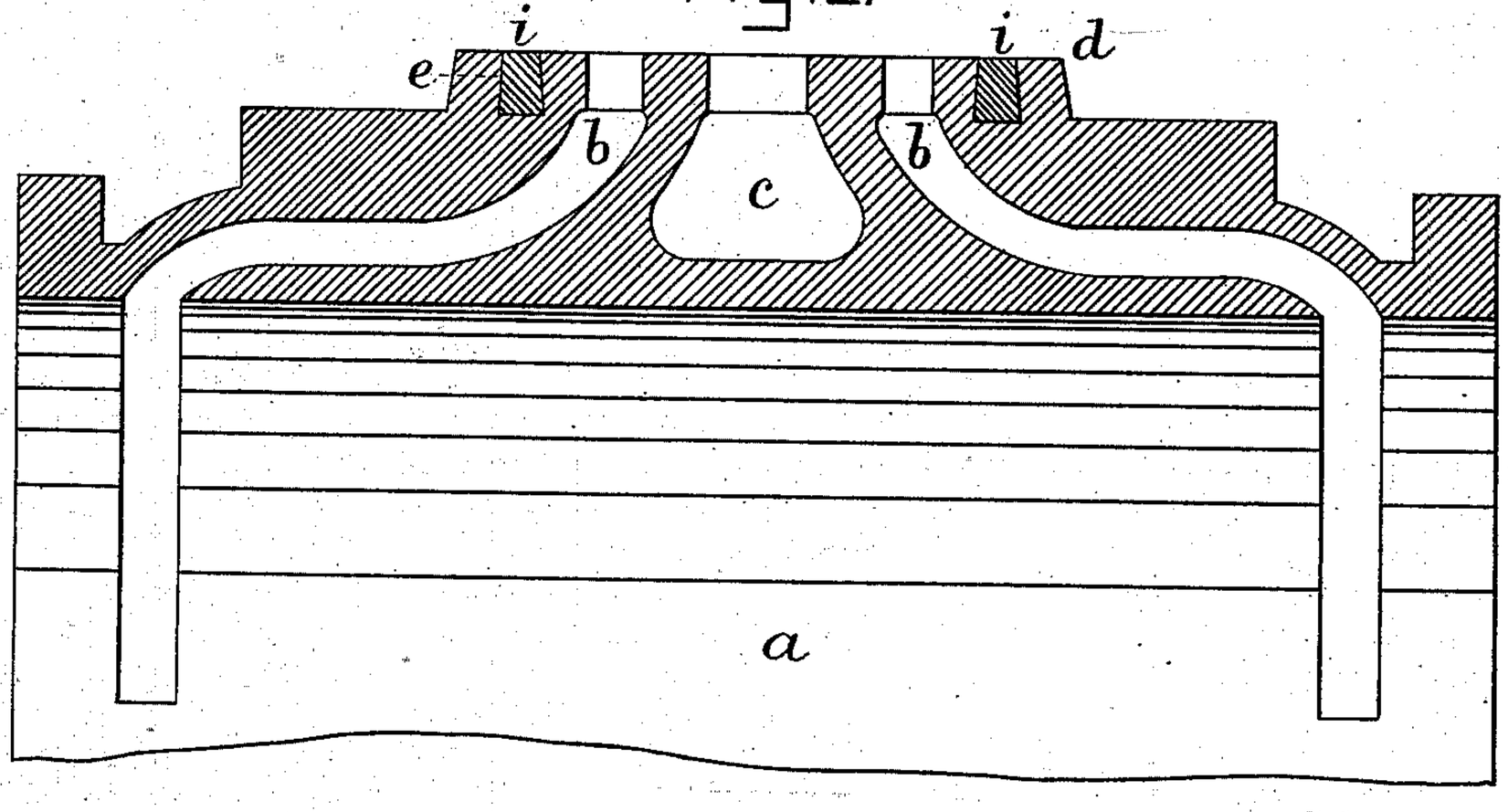

Fig: 3.

Fig: 4.

Witnesses

Jos. P. Livermore

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by Crosby & Gregory. Attys

UNITED STATES PATENT OFFICE

ARETAS BLOOD, OF MANCHESTER, NEW HAMPSHIRE.

VALVE-SEAT FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 252,012, dated January 10, 1882.

Application filed November 10, 1879.

To all whom it may concern:

Be it known that I, ARETAS BLOOD, of Manchester, county of Hillsborough, State of New Hampshire, have invented an Improvement in Valve-Seats for Steam-Engines, of which the following description, in connection with the accompanying drawings, is a specification.

My invention relates to steam-engines, and has for its object to render, by a simple and inexpensive means, the valve-seat more durable.

It is well known in steam-engines provided with the common slide-valve that the said valve, owing to its own weight and the unbalanced pressure of the steam upon it, acts upon its valve-seat with great friction and soon wears it out, so that the valve is no longer steam-tight, which renders the operation of the engine very defective. Various forms of balanced valves have been invented to obviate this difficulty; but, so far as I am aware, they are complicated, expensive, and not adapted for use in locomotives.

The valve and its seat in locomotives and small stationary engines are usually of the same material—namely, cast-iron.

I have ascertained by experiment that by making a small portion of the wearing-surface of the valve-seat of a different material having a different grain or texture the wear is greatly diminished and an engine will run a much longer time without the necessity of dressing off the valve-seat.

To add this different metal in a proper manner is the object of my invention, which consists in providing a valve-seat with two strips or tenons of metal, preferably of brass or an alloy of similar nature, of about the same hardness as, or harder than, the valve-seat, but of different nature or texture, arranged in grooves across the valve-seat—that is, with their length at right angles with the direction in which the valve moves—and preferably placed just outside of the induction-ports; and in order that the surface of said strips may not be broken by screw-holes I make said strips of dovetail or other irregular-sided shape in cross-section, and undercut the grooves to correspond, whereby said strips may be driven in place longitudinally and retained securely in position, yet be so held that they may be readily struck and driven out when it is desired to renew them.

I do not broadly claim metals of two different kinds in contact in a box or valve; nor do I claim, broadly, the employment of two different metals, one embedded in the other, in a surface exposed to wear.

Figure 1 is a top view of a valve-seat and steam-engine cylinder provided with my improvement, one of the metal strips being partially removed; Fig. 2, a longitudinal section thereof; Fig. 3, a side and end view of one of the metal strips detached; and Fig. 4 shows some different forms of cross-section for the metal strip.

The cylinder *a*, induction-ports *b*, and exhaust-port *c* are all of usual construction.

The valve-seat *d* is provided with long grooves *e*, placed just outside the induction-ports *b*, where the wear is greatest, which are preferably of dovetail shape, as shown—that is, larger at the bottom than at the top. The metal tenons or strips *i* are shaped to just fit the grooves *e*, into which they are driven longitudinally, as shown by the arrow, Fig. 1, and there held, on account of their shape, unable to be removed from said grooves otherwise than longitudinally. The wear or abrasive action between the valve of cast-iron and the strips *i* of brass, or an alloy of similar nature, or steel, is much less than if the two bodies were both of the same material, as cast-iron.

The shape of cross-section of the grooves and tenons may be varied, as shown at Fig. 4, the essential feature being that their wearing-faces be flat, and that when inserted in the grooves they cannot be taken therefrom, except by being moved transversely across the valve-seat, or so that their tops are smaller than their bottoms, so that the tenons are prevented from any movement other than longitudinal. In use they are prevented from longitudinal movement by the sides of the steam-chest, which abuts against their ends.

I am aware that linings of soft metal have been used to diminish friction; but such could not answer as a substitute for the tenons of hard metal used by me, the object of which is to reduce the wear or abrasive action rather than the friction.

I am also aware that portions of different metal have been embedded in a surface exposed to wear by casting the main body of the metal around such embedded portions; but such a method is not applicable to a valve-seat, and

the said portions are not removable nor capable of being replaced by others when desired, as in the present invention.

I claim—

The combination, with the slide-valve, of the valve-seat and its ports, the said valve-seat being provided with transverse grooves undercut or dovetail-shaped in cross-section, as described, combined with independent strips or tenons fitted to slide longitudinally in the said grooves, substantially as and for the purpose set forth.

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

ARETAS BLOOD.

Witnesses:
G. W. GREGORY,
N. E. C. WHITNEY.