

S. M. CUMMINGS.  
Steam-Engine Slide-Valves.

No. 149,201.

Patented March 31, 1874.

Fig. 1.

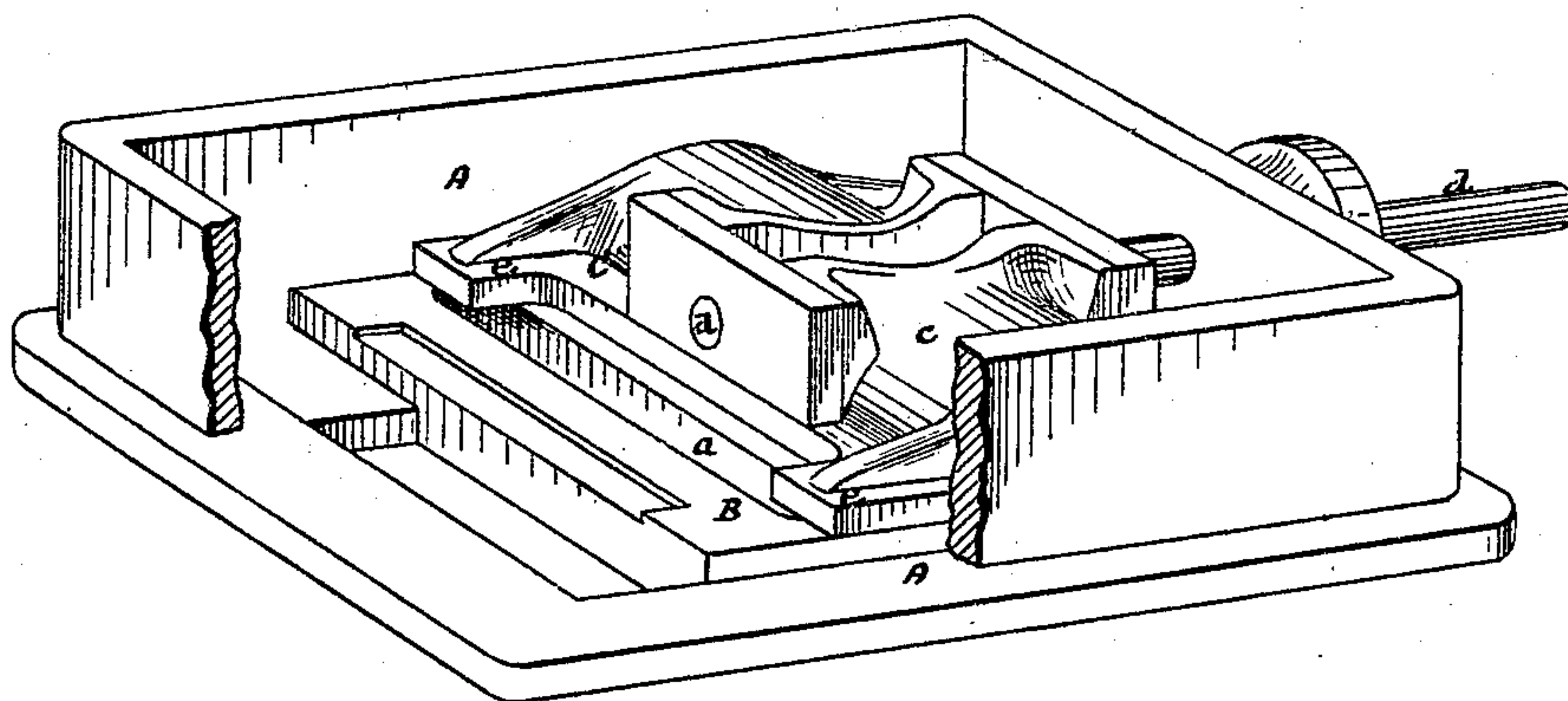


Fig. 2.

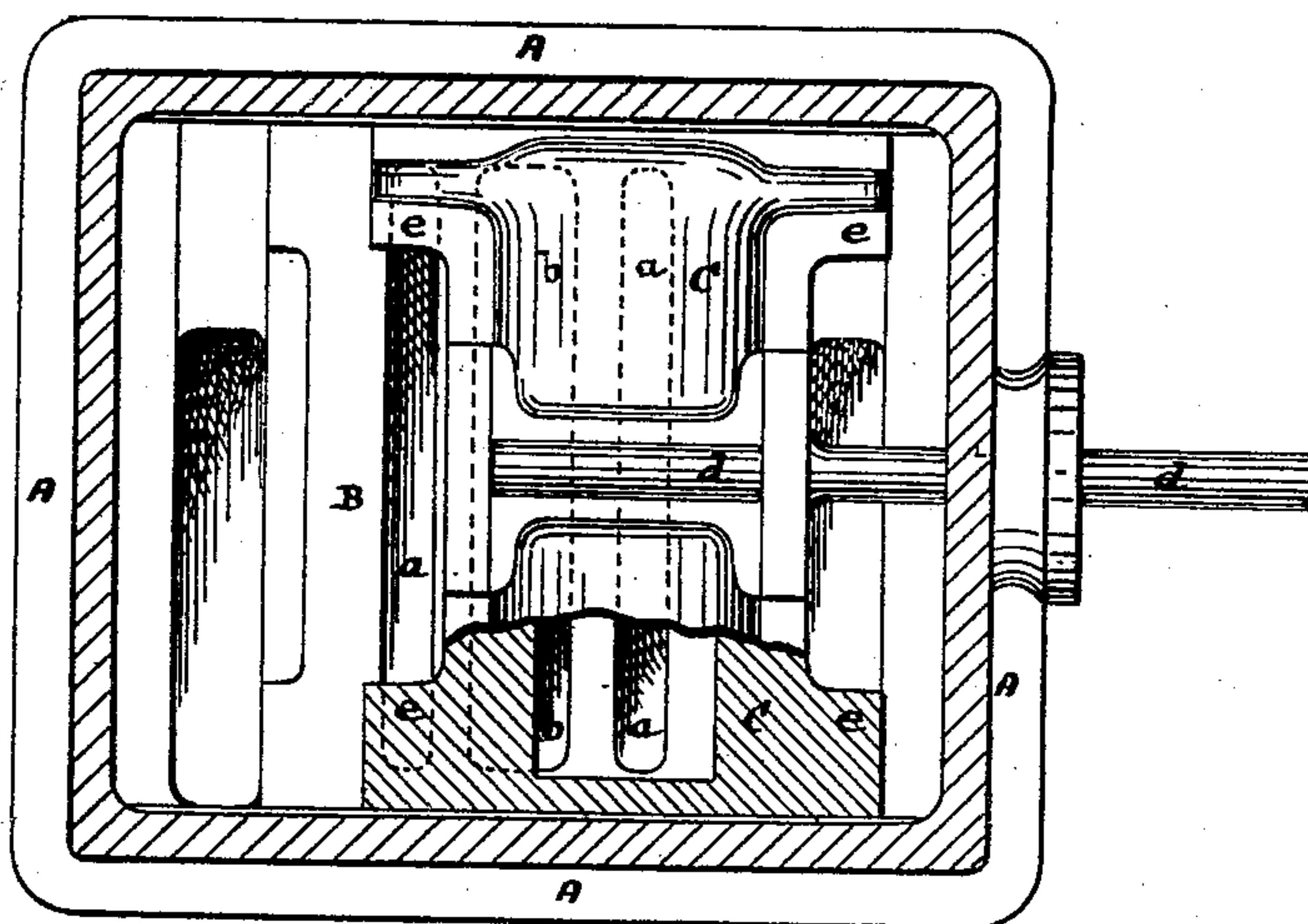
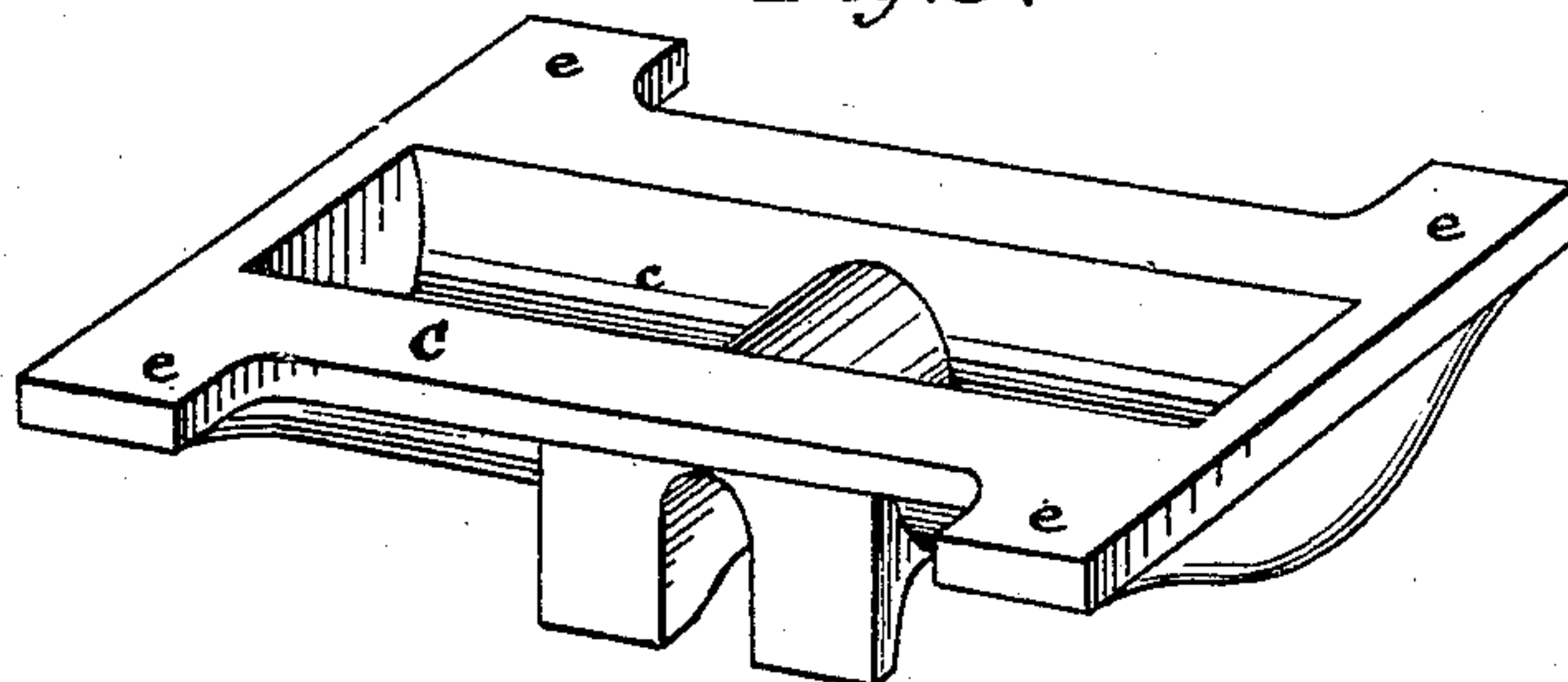


Fig. 3.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN STEAM-ENGINE SLIDE-VALVES.

Specification forming part of Letters Patent No. **149,201**, dated March 31, 1874; application filed  
March 20, 1874.

*To all whom it may concern:*

Be it known that I, SAMUEL M. CUMMINGS, of the city of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Engine Slide-Valves, of which the following is a specification:

The object of my invention is twofold: First, and principally, it is my object to so construct the valve that by it any given size of opening or length for the steam-admission ports in the valve-seat may be easily and quickly obtained; secondly, I have it in view to construct the valve in such manner as to overcome its tendency to wear or hollow out the valve-seat.

With reference to the object first above noted, I may remark that in steam-engines (particularly locomotive-engines) it is difficult to get rid of the steam in the cylinder quickly enough. To remedy this trouble the length of the induction-ports in proportion to that of the exhaust has in some instances been considerably reduced. As, for example, in exceptional cases, induction-ports, which ordinarily are from fifteen to seventeen inches in length, have been cast ten inches long for freight-engines, and twelve inches long for passenger-engines, with exhaust-ports in each case of ordinary dimensions, with the result that the engines do much better service, by reason of the fact that thereby no greater volume of steam is admitted into the cylinder than can be got rid of at each stroke of the piston.

The trouble that arises in carrying out the above plan is, that once the cylinder is cast with ports of a given size it is a difficult matter to either enlarge or contract them, either of which operations might be needed in order to so proportion the induction and the exhaust as to obtain the best results. I obviate this by making the valve itself the agent by which the proper size of opening for the induction-ports is secured.

The construction I have adopted does not in the least unfit my valve for use with the ordinary valve-seat, so that I am enabled to apply it to any ordinary engine without requiring any change in the structure, form, or size of the valve-seat or ports. This result is obtained by casting the valve with elongated

pieces or projecting plates at each corner of the valve, and overlapping the induction-ports at the ends thereof, the under faces of said parts taking their bearing upon the valve-seat, and being a prolongation of the bearing-surface of the valve. By cutting away these pieces so as to cause them to overlap the ends of the induction-ports more or less, as desired, the length of the ports can be accurately determined. This formation of the valve also causes the bearing-surface of said valve on each side to be extended beyond the induction-ports, thus giving a bearing-surface sufficiently increased and spread to prevent the irregular wear and hollowing out of the valve-seat without unduly augmenting the friction.

In the accompanying drawings I have represented what I consider to be the best way of carrying my invention into effect.

Figure 1 is a perspective view of a valve-chest with cover removed and sides partly broken away in order to expose the valve. Fig. 2 is a top view of the same with the valve partly in horizontal section. Fig. 3 is an under-side view of the valve.

The valve-chest is shown at A, the valve-seat at B with the induction-ports *a* and exhaust *b*. The valve is represented at C with exhaust-cavity *c*. These parts, except in the particulars about to be noted with respect to the valve, are of ordinary construction and require no further description. The induction and exhaust ports are of the usual formation, and the valve is provided with a valve-stem, *d*, coupled to it in suitable manner. The valve C at each corner is elongated or formed with a projecting piece, *e*, which, as seen in Figs. 1 and 2, overlaps that end of induction-port at which it is located. The under faces of these projecting pieces constitute a part or prolongation of the bearing-surface of the valve, and they operate, as seen, to contract in length the induction-ports, the length of each port being determined by the distance between the interior opposite edges of the pair of projecting pieces by which its ends are overlapped. The valve can, in the first instance, be cast with these projections so proportioned as to give a ten-inch opening to the induction-ports. If this opening is not large enough it can be in-

creased to eleven, twelve, fourteen, or fifteen inches; or, if need be, to the full length of the induction-port, by simply removing the valve from the chest, and cutting from the interior opposite edges of the projections as much as may be needed to give an opening of the requisite size.

The valve may be so made that but one projecting piece, *e*, of each pair shall overlap the induction-port, in which case the overlapping piece would, of course, be the only one to cut away. I prefer, however, the arrangement shown in the drawings.

It will be noted that the projecting pieces *e* operate also as bearing-pieces, to extend the bearing-surface of the valve, and prevent undue and irregular wear.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A steam-engine slide-valve provided at its ends with projecting pieces to overlap the ends of the induction-ports of the valve-seat, substantially as and for the purposes shown and set forth.

2. The combination of the valve-seat, the induction and exhaust ports, and the valve, provided with projecting pieces, taking their bearing on said valve-seat, and adapted to overlap the ends of the induction-ports, substantially as shown and described.

In testimony whereof I have hereunto signed my name this 13th day of March, 1874.

S. M. CUMMINGS.

Witnesses:

WM. CUBBAGE,  
ALBERT PITCAIRN.