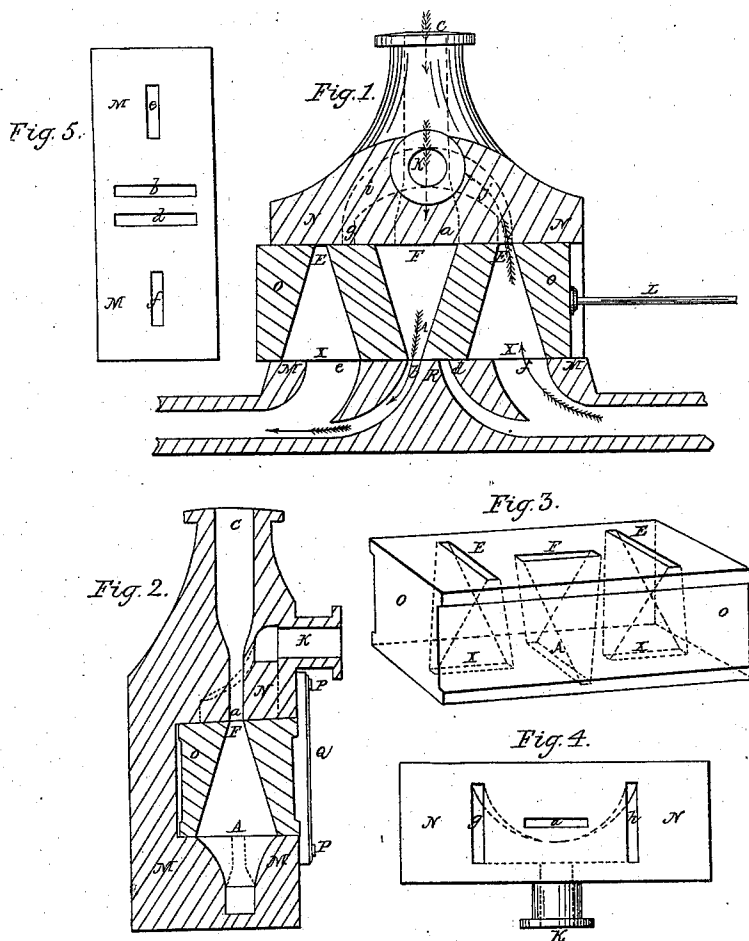


L.R. Conard,
Steam Balanced Valve.

N^o 11,320.

Patented July 18, 1854.



UNITED STATES PATENT OFFICE.

LEWIS R. CONARD, OF PHILADELPHIA, PENNSYLVANIA.

BLOCK SLIDE-VALVE FOR STEAM-ENGINES.

Specification of Letters Patent No. 11,320, dated July 18, 1854.

To all whom it may concern:

Be it known that I, LEWIS R. CONARD, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Slide-Valves of Steam-Engines, which consists in forming the openings or passages in a sliding valve, in such manner and shape, that they enter longitudinally on one surface of the valve and pass out transversely, or at right angles at the opposite surface, whereby all pressure of steam upon the valve, tending to press it upon adjoining surfaces, is removed, and the friction consequent upon such pressure is obviated; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings and the letters of reference thereon, making a part of this specification.

Figure 1, is a sectional elevation of the sliding valve, and seats, the upper portion of the figure showing the steam or feed pipe, and exhaust openings, the lower portion, showing a broken section of the passages leading to either end of the cylinder. Fig. 2, is a vertical transverse section through the center of Fig. 1, showing the steam pipe and passage, and the clamp for tightening the valve in its chamber. Fig. 3, is a perspective view of the sliding valve, showing the relative position and form of the openings therein, by dotted lines. Fig. 4 is an inverted view of the upper side of the valve box or cover. Fig. 5, is a plan of the valve seat, showing the ingress and egress openings, to the side pipe of the cylinder.

Where the same letters occur in different figures they indicate the same parts.

O, is the sliding valve, having a reciprocating motion, produced by the valve rod L being connected with an eccentric, or other device for producing the required stroke at the proper time, in the manner of the common slide valve, and has three openings entirely through as E, X, F, A, and E, X, the two openings E, X, enter at the top of the valve, (supposing it to lie horizontally) transversely to its length, and pass out at the lower side, longitudinally thereto. The center or steam passage F, A, enters at the top at F, longitudinally and passes out at the lower side at A, transversely as seen in Fig. 3.

M is the seat on or against which the valve moves back and forth, and is pierced with two oblong parallel transverse steam ports *b, d*, leading to either end of the cylinder, which are opened and closed alternately, by the reciprocating movement of the valve; and two longitudinal exhaust openings *e, f*, corresponding in position, with the exhaust openings X, X, in the under part of the sliding valve, but of less length, so that in whatever position the valve may be, the openings *e, f*, shall be always fully open.

N, is the cover of the valve chamber, pierced with three oblong openings *a, g, h*, (Fig. 4) the same size as those in plate M, (that is to say, the longitudinal opening *a*, corresponding with the openings *e, f*, in said plate M; and the transverse openings *g, h*, with those *b, d*,) but each at right angles to its opposite. *g, h*, are the two exhaust openings, leading to the outlet K, through the curved ways *i, j*, and are opened and closed alternately, by the action of the valve, while the longitudinal opening *a*, is always open to the valve, and communicates directly with the steam boiler through the steam pipe C.

The valve above described is made narrower, or of less thickness, at its inner than its outer surface, its upper surface being inclined so as to act as a wedge against the corresponding inclined surface of the cover or top of the valve chamber, in such manner as to enable it to be forced inward by clamps Q and set screws P, to tighten it between the upper and lower surfaces of its chamber, to the required degree to prevent the escape of the steam.

By referring to Fig. 1, it will be seen that the steam is admitted at C, passing in the direction of the arrows, through the longitudinal openings *a*, and F, which are never even partially closed, during the regular reciprocating movement of the sliding valve O; as shown in that figure, it passes on through the transverse opening A, into the corresponding aperture *b*, in the valve seat or side pipe, to one end of the cylinder, at the same time the exhaust steam from the opposite end of the cylinder is passing out through the longitudinal openings *f, X*, in the seat and valve, in the direction of the arrow, through the transverse openings, E, *h* at the opposite surface of the valve and the cover thereof, while the other exhaust passage is stopped by the transverse

opening E, coming against the upper surface of the valve chamber, and vice versa, when the valve is at the opposite end of its stroke; the passages being all cut off only 5 during the moment that the opening A, is over the transverse central face R, of the valve seat, this valve never presents any exterior surface to the pressure of the steam, and the inlet and outlet openings in it being 10 of the same area, and the steam in the passages of the valve pressing against the dead or stationary surfaces of the upper and lower portions of the chamber in which it is contained, when, not communicating with 15 the transverse openings in said surfaces, corresponding with their transverse outlets and inlets, therefore, has no inclination to press against either surface of the chamber inclosing it, and is consequently very durable, and is easily adjusted and kept steam 20 tight by the clamp and set screws without even stopping the engine.

By making the outlets and inlets of the openings in the valve, at right angles to each 25 other, in the peculiar manner represented and described, to correspond with the openings in the surfaces of the chambers, with which they communicate, the longitudinal oblong entrances from the steam pipe and 30 exhaust openings of the cylinder, into the

valve will at all times communicate with the corresponding openings from the said steam pipe and exhaust openings from either end of the cylinder; and the transverse outlets from the valve to the similar 35 oblong inlet openings to the cylinder, and exhaust openings in the upper surface of the chamber being narrow, will allow the valve to perform its functions of alternately admitting and discharging the steam to and 40 from either end of the cylinder, by simply moving the valve alternately a little more than double the widths of the openings, which shortness of throw of the valve would not accomplish the object, were the 45 openings in said valve of any other form than that represented and described.

What I claim as my invention and desire to secure by Letters Patent is—

Forming the passages through said valve, 50 so that the oblong steam and exhaust openings shall enter from the upper and lower surfaces, longitudinally to its motion, and leave the opposite surfaces, transversely thereto, as herein described.

LEWIS R. CONARD.

Witnesses:

C. BRAZER,
W. P. BRAZER.