C. E. LAMB.

Reciprocating Steam-Engines.

No. 133,784. Patented Dec. 10, 1872.

Fig. 1.

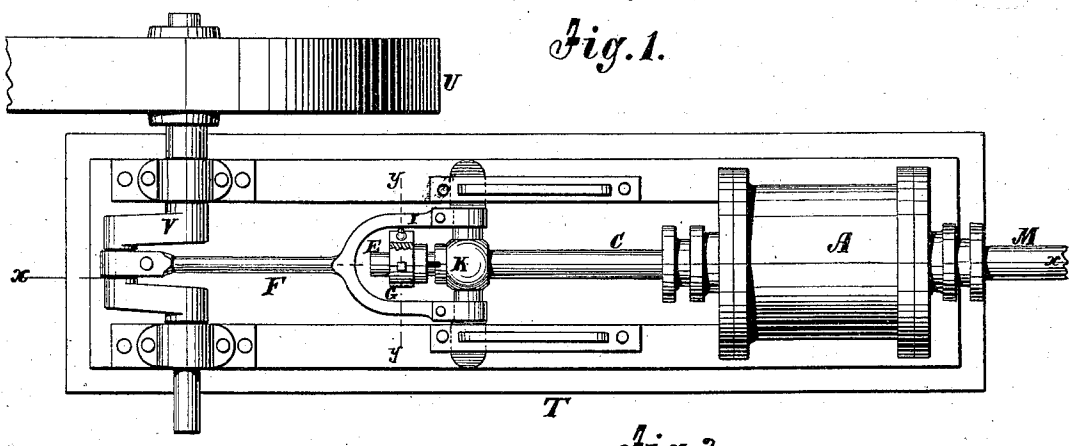


Fig. 3.

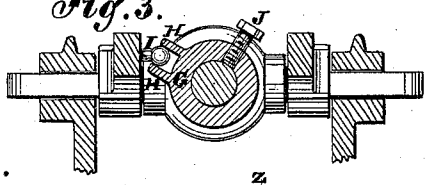


Fig. 2.

Fig. 4.

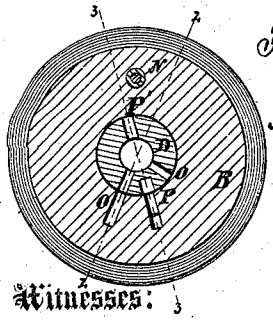


Fig. 5.

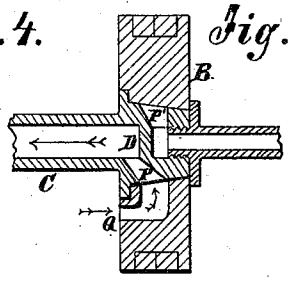


Fig. 6.

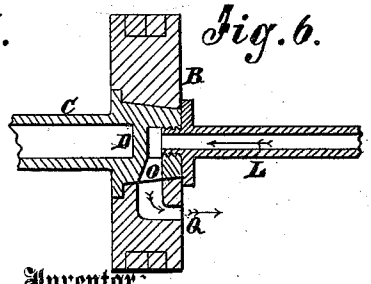
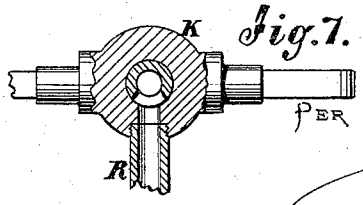


Fig. 7.



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UNITED STATES PATENT OFFICE.

CHARLES E. LAMB, OF WAUSEON, OHIO.

IMPROVEMENT IN RECIPROCATING STEAM-ENGINES.

Specification forming part of Letters Patent No. **133,784**, dated December 10, 1872.

To all whom it may concern:

Be it known that I, CHARLES E. LAMB, of Wauseon, in the county of Fulton and State of Ohio, have invented a new and useful Improvement in Steam-Engines, of which the following is a specification:

This invention relates to new and useful improvements in steam-engines; and consists in the construction and arrangement of parts hereinafter described.

In the accompanying drawing, Figure 1 represents a top or plan view of the engine; Fig. 2 is a vertical longitudinal section of Fig. 1 taken on the line *x x;* Fig. 3 is a detail section on the line *y y* of Fig. 1, showing the mode of producing the revolving movement of the valve; Fig. 4 is a vertical section of Fig. 2 on the line *z z*, showing the piston and valve-ports; Figs. 5 and 6 are sections through Fig. 4, showing the valve in two different positions, the sections being on the lines 2 2 and 3 3; and Fig. 7 is a sectional detail taken on the line *z z'* of Fig. 2.

Similar letters of reference indicate corresponding parts.

The distinguishing features of this invention are the arrangement and operation of an oscillating valve in the piston of the engine and manner of introducing and exhausting the steam.

A is the steam-cylinder. B is the piston. C is a tubular piston-rod, on the end of which is the valve D, which valve is arranged within the center of the piston and receives a rotary motion sufficient to change the ports and allow the cylinder to take and exhaust steam at both ends at each stroke of the engine. This rotating motion is produced by means of a pin, I, in the crotch E of the connecting-rod F. On the end of the hollow piston-rod C is a collar, G, with two projecting lugs, H H, between which lugs the pin I works. The collar is made adjustable by means of the set-screw J. By means of this adjustment the valve is changed or set so as to cut off the steam sooner or later, as may be required. The extent of this revolving motion depends upon the distance of the pin I from the center of the cross-head K. This distance is always supposed to be sufficient to turn the valve and change the ports as the crotch of the connecting-rod is carried up and down by the engine-crank. The steam is admitted through the tube L, which is screwed into the end of the valve on the opposite side of the piston, as seen in Figs. 5 and 6. This tube L reciprocates in and is inclosed by the outside tube *m*, which connects with the boiler. As the piston works back and forth in the cylinder it is prevented from turning or partaking of the revolving motion of the valve by means of the straight rod N, (see Fig. 2,) which passes through the piston and is confined in the cylinder-heads, as represented. O O are the steam-ports, and P the exhaust-port of the valve. P' is a port for simply balancing the valve. *q q* are ports in the piston through which the steam is admitted to and exhausted from each end of the cylinder by means of the revolving motion of the valve.

In Fig. 5, which is the section on the line 3 3, the steam is exhausting from one end of the cylinder, while in Fig. 6 the other end of the cylinder is taking steam. These positions of the valve are reversed at every stroke of the engine, and the steam is admitted and performs its work and is exhausted with the same regularity and precision as with the ordinary slide-valve, all the steam being admitted through the pipe L and exhausted through the hollow piston-rod C. The steam is exhausted from the piston-rod C by the pipe R, and discharged into the pipe S beneath the engine, the latter pipe being stationary.

The engine is mounted on an ordinary frame, T, with a fly-wheel, U, and crank-shaft V, and with a cross-head and slides arranged in the ordinary manner; but there is no steam-chest or valve apparatus visible, although a valve is operated by a positive motion and can be set to cut off the steam according to the requirements of the engine, with the greatest ease, as heretofore described.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The oscillating valve D, in combination with the piston of a steam-engine, when arranged to operate substantially as and for the purposes described.

2. The combination of the valve D and tubular piston-rod C, tube L, and piston B, as shown and described.

3. The rod C, provided with the adjustable collar G having the lugs H and the pin I projecting from one of the arms of the connecting-rod F, in combination with the crank V and the piston B, as specified, whereby the vertical oscillation of the connecting-rod serves to oscillate the valve, as set forth.

4. The rod N, connecting the cylinder-heads and passing intermediately through the piston B, as and for the purpose specified.

5. The combination of the reciprocating exhaust B, hollow piston-rod C, piston B, valve D, and tube L, all shown and described.

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