W. E. Bird,

Oscillating Steam Engine.

No. 64,940. Patented May 21, 1867.

Fig. 1.

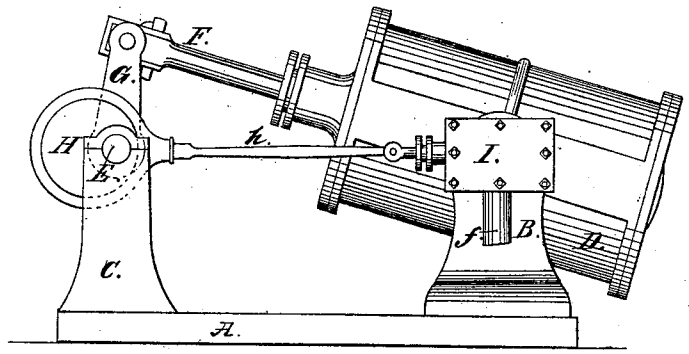
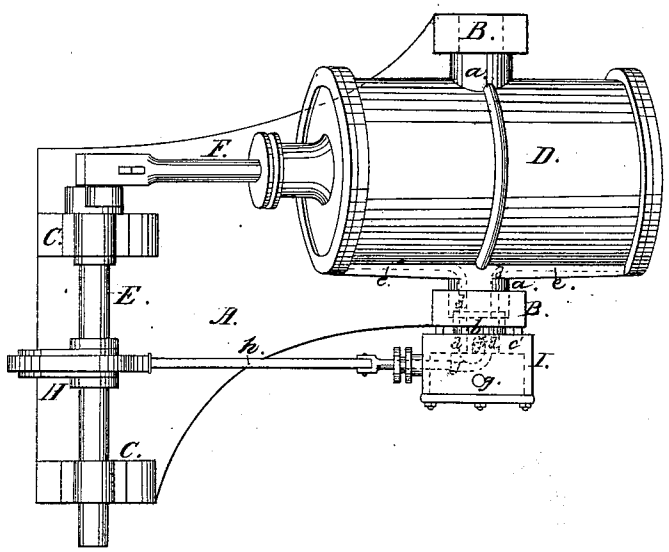


Fig. 2.



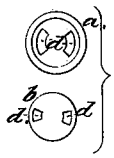


Fig. 3.

Witnesses:

J. H. Coombs

G. W. Reed

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UNITED STATES PATENT OFFICE.

WILLIAM E. BIRD, OF NEW YORK, N. Y.

IMPROVEMENT IN OSCILLATING ENGINES.

Specification forming part of Letters Patent No. **64,940**, dated May 21, 1867.

To all whom it may concern:

Be it known that I, WILLIAM E. BIRD, of the city, county, and State of New York, have invented a certain new useful Improvement on Steam and other Oscillating Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, forming a part of this specification, and in which—

Figures 1 and 2 represent longitudinal views, at right angles to each other, of an oscillating steam-engine with my improvement applied to it; and Fig. 3, a face view of the end of the engine-trunnion and annular projection of the valve-seat, which fits therein, showing the ports or passages thereof.

Like letters indicate corresponding parts.

One great objection which has frequently been raised to oscillating engines is the working of the valve as usually applied to the trunnion of the engine. Not only has there been a want of steadiness in the driving of the valve occasioned by its immediate connection or contact with the oscillating trunnion, but a great difficulty in keeping the valve steam-tight, which difficulty is generally increased by the peculiar construction or shape of the valve, that, where of disk form and vibrating from a central or other axis, travels on its rubbing-surface with an unequal velocity against its seat, the speed being greater and increasing toward the circumference, and wear consequently more excessive, than at or toward the center, where the velocity is less. This inequality of rubbing action, combined with absence of a fixed or stationary and steady valve-seat, has made it almost impossible to keep the valve close circumferentially, even though tightly screwing it down, which induces excessive friction.

My improvement aims at obviating these difficulties in a simple and practicable manner; and the nature of the invention consists in a novel combination, with the trunnion of such engines, of an ordinary or other suitable reciprocating slide-valve, having an equality of travel on its surface, and working against a stationary and steady seat.

Referring to the accompanying drawing, A represents the bed-plate of an oscillating engine, and B and C uprights and standards for support of the trunnions *a* of the cylinder D and driving-shaft E of the engine. F is the piston-rod, G the driving-crank, and H the eccentric for operating the valve. Bolted in an adjustable manner, so as to admit of its being tightened up against the outside of one of the standards B, opposite the one trunnion *a*, and, say, with an annular projection, *b*, made to fit a circular recess in the trunnion, is a valve-box, I, the seat *c* of which has a fixed or stationary character, and through which seat and the trunnion are passages *d d*, communicating with ways *e* to opposite ends of the cylinder. *f* is the exhaust port or passage, and *g* the steam-inlet to the valve-box. The valve J is or may be an ordinary **D** or other slide-valve, serving, as it is reciprocated in a rectilinear direction by the rod *h* of the eccentric H or other driving device, to alternately open the passages *d* to the steam-space of the valve-box and exhaust-passage *f*, and so keep up the requisite reciprocating action of the engine-piston. By this combination of a slide-valve with one of the trunnions of the engine-cylinder, the liability to leakage and amount of friction is reduced, and a simple and steady action of the valve against a fixed or stationary seat, with equality of wear on its rubbing face or surface, secured.

It is important, in order to secure a proper working action, that the ports or passages *d d*, in either the face end of the trunnion or exterior end of the annular projection *b* of the valve-seat, should exceed in width that required for fixed passages, sufficiently to insure a thorough communication between such passages of the ports during the entire oscillating motion of the trunnion; thus said passages are made wider in the trunnion than in the projection *b*, as represented in Fig. 3 of the drawing.

What I claim as new and useful, and desire to secure by Letters Patent, is—

The combination, in steam or other oscillating engines, with the trunnion of the engine-cylinder, of a reciprocating slide-valve working against a fixed or stationary seat, and operating to control the ports or passages of the engine, substantially as described.

WM. E. BIRD.

Witnesses:
J. W. COOMBS,
G. W. REED.