J. HALL.

Oscillating Engine.

No. 163,186. Patented May 11, 1875.

Fig. 1.

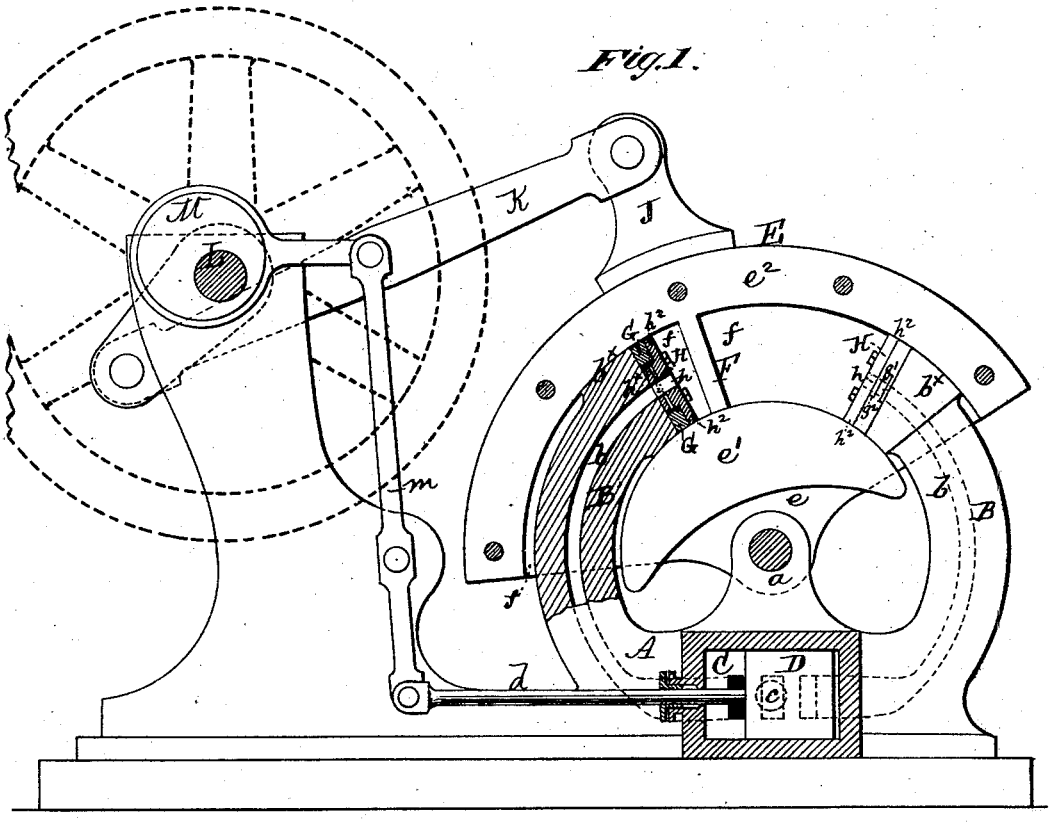


Fig. 2.

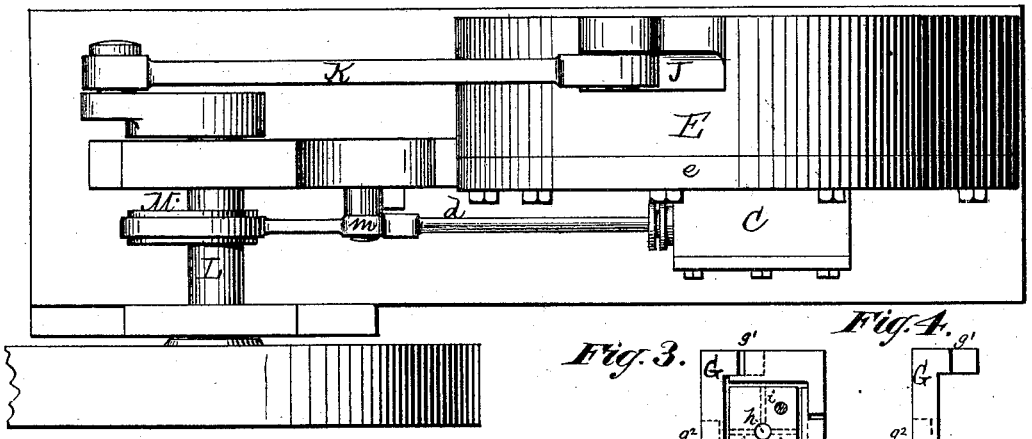


Fig. 3.

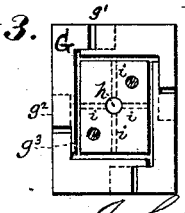
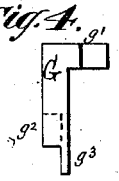


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN HALL, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN OSCILLATING ENGINES.

Specification forming part of Letters Patent No. **163,186**, dated May 11, 1875; application filed April 10, 1875.

To all whom it may concern:

Be it known that I, JOHN HALL, of Brooklyn, in the county of Kings and State of New York, have invented an Improved Oscillating Engine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, making part of this specification.

The invention consists of a novel construction of a packing for the abutments of steam-engines, whereby said packing is expanded and made to fit closely to the cylinder by the pressure of the steam.

In the accompanying drawing, Figure 1 is a side view, partly in vertical section, of my improved engine. Fig. 2 is a top view of the same. Fig. 3 is a side view of the piston-packing. Fig. 4 is a detail view of a portion of the same.

A represents a base, from which rises a standard, *a*, and from which extend in opposite directions two hollow or tubular arms or abutments, B B, forming arcs of a circle, of which the upper end of the standard *a* constitutes the center. C is a steam-chest attached to the base A, and communicating with the tubular portions *b b* of the arms B B, which tubular portions constitute steam-passages. The steam-chest C is provided with a slide-valve, D, for admitting steam to the steam-passages *b b*, and exhausting it therefrom through the exhaust-port *c*. The slide-valve D may be of any ordinary construction. E represents the oscillating curved cylinder, which is of hollow semi-cylindrical construction, and is hung or pivoted to the standard *a*, so as to oscillate thereon in an arc of a circle concentric with the arc-shaped abutments B B. The sides of the hollow portion are formed by the semicircular end pieces *e*, and by a solid central portion, e^1 and peripherical portion e^2, and said hollow portion is divided into two arc-shaped chambers, *f f*, of equal dimensions, by a diaphragm or partition, F, which constitutes the piston. These chambers *f f* are of corresponding form, both longitudinally and transversely, with the abutments B B, and surround or inclose said abutments, so that the steam issuing from the passages *b b* impinges against the piston F and drives it alternately in opposite directions. These chambers *f f* are smoothly dressed and finished, but the abutments need not be, as they are sufficiently smaller than the chambers to allow of the free and easy working the parts. The upper ends of the abutments, however, are enlarged, as at $b^\times$, to nearly equal dimensions with the chambers, and are provided with packing, the construction of which is shown more clearly in Figs. 3 and 4, in which G represents a right-angled or L-shaped plate, having a tenon, g^1, at one end, and a mortise, g^2, at the outer end, with the inner side of the mortised end extended to form a lip or flange, g^3, extending beyond said mortise g^2. Four of these plates are placed together to form a hollow square or oblong, as shown in Fig. 3, with the tenons g^1 engaging with the mortises g^2 and with the lips or flanges g^3 overhanging and covering the mortise-and-tenon joints. H is a plate, corresponding in form with the chambers *f f*, and sufficiently smaller than the same to allow it to work freely therein. In the center of the plate is an opening, *h*, corresponding in size with the steam-passages *b b*. The inner side of the plate H is formed with a projecting portion, $b^\times$, of equal or slightly greater thickness than the angular plates G, and of a length and breadth equal to the smallest dimensions of the hollow square or oblong, formed by said plates when put together. The front or outer side of the plate H is wider than the rear portion $h^\times$, and overhangs said portion in the shape of flanges h^2. In the rear portion $h^\times$ are ports or channels *i*, extending radially from the openings *h* toward the outer edges of the plate. The packing thus constructed is attached to the face of the enlarged portion $b^\times$ of the abutment B by screws passing through the plate H.

As the steam passes through the passages *b b* and issues from the opening *h* to strike the piston F, a quantity of steam passes through the channels *i*, impinging against the inner sides of the plates G and forcing them outward so as to fit closely in the chambers *f*, and thus forms a tight packing by expanding it in every direction. The mortise-and-tenon joints allow of sufficient play for such expansion. Said joints are covered by the lips g^3,

and the flanges h^2 overhanging the packing prevent displacement thereof.

The oscillating cylinder is connected by an arm, J, and pitman K, with a driving-shaft, L, on which shaft is an eccentric, M, by means of which the valve D is operated through a lever, *m*, and valve-rod *d*.

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

The packing, composed of the angle-plates G, fitted together with tenons g^1, mortises g^2, and lips or flanges g^3, and the plate H, provided with the opening *h*, extension $h^\times$, steam-ports or channels *i*, and flanged edges h^2, in combination with the abutments B B and the chambers *f f* of the cylinder, substantially as herein described.

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