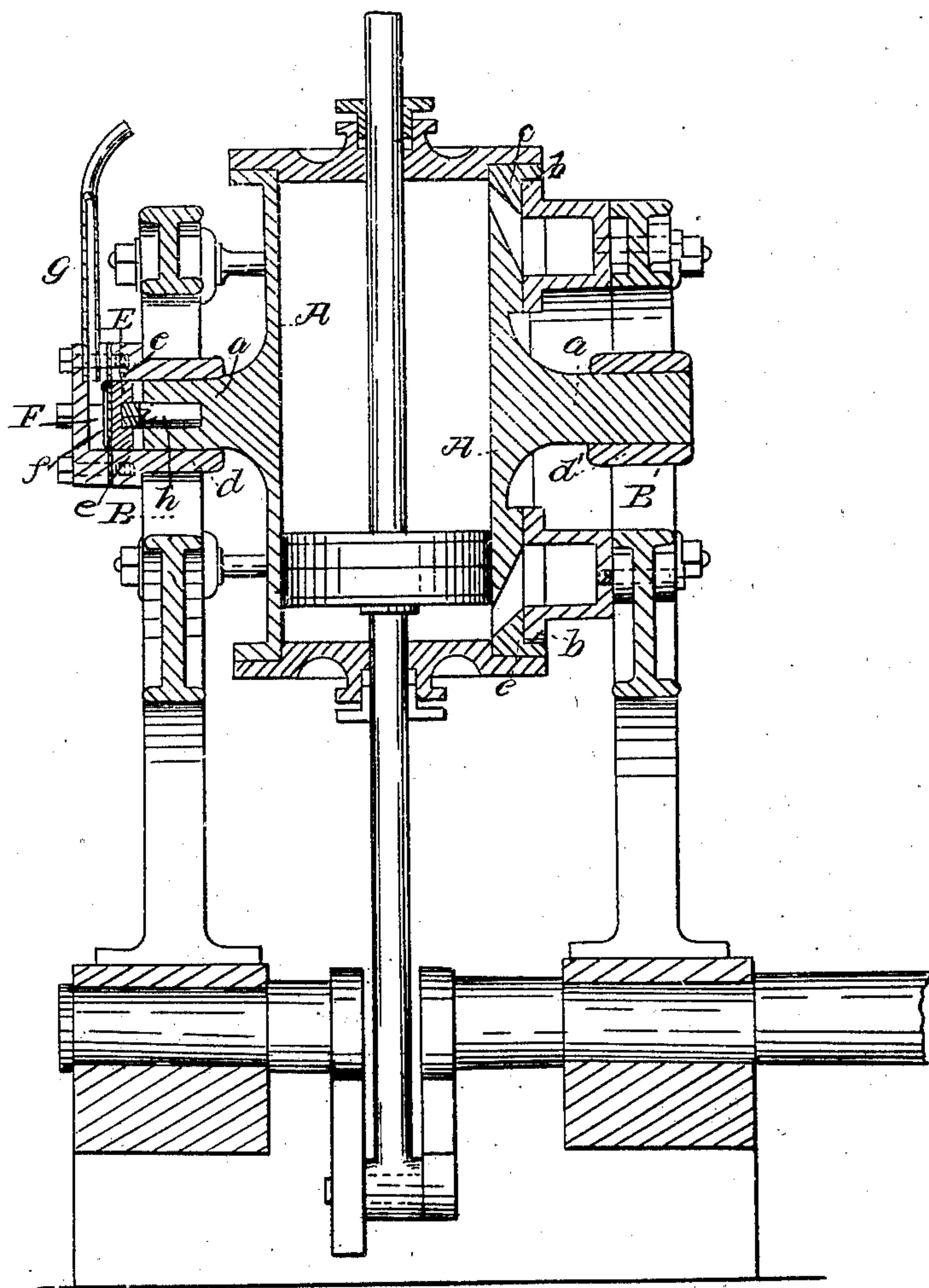


Mackintosh & Hemphill
Oscillating Steam Engine.
N^o 26,853. Patented Jan. 17, 1860.



Witnesses:
James M. Cune.
John A. Parkinson.

Inventors:
W. S. Mackintosh.
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UNITED STATES PATENT OFFICE.

WM. S. MACKINTOSH AND J. HEMPHILL, OF PITTSBURG, PENNSYLVANIA.

OSCILLATING STEAM-ENGINE.

Specification of Letters Patent No. 26,853, dated January 17, 1860.

To all whom it may concern:

Be it known that we, WILLIAM S. MACKINTOSH and JAMES HEMPHILL, both of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Oscillating Steam-Engines; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, said drawing representing a central vertical section of an oscillating engine with our invention applied.

Our invention relates to that class of oscillating engines to and from which the induction and eduction of steam is effected by means of a side pipe, and its object is to counteract the tendency of the steam acting between the side pipe and the side of the cylinder on which the steam is received, to force apart the valve faces and permit an escape of steam.

It consists in so applying a piston or its equivalent in relation to the trunnion on the opposite side of the cylinder to that on which the steam is received and so conveying steam to act upon the said piston or equivalent that it may be thereby forced directly toward the end of the said trunnion, and through interposed bearings of proper character may be made to press against the said trunnion to hold the valve face of the cylinder against the corresponding face of the side pipe.

To enable others skilled in the art to make and use our invention we will proceed to describe its construction and operation.

A, is the cylinder having its trunnions a, a' , supported in the usual manner in boxes d, d' , in the side frames B, B'.

C, is the side pipe bolted securely to the side frame B', and having its face b, b , fitted to the corresponding valve face c, c , of the cylinder.

E, is a piston fitted loosely but snugly to a cylindrical cavity e, e , that may be formed by the extension of the box d , beyond the end of the trunnion a , or may be composed of a separate cylindrically bored piece attached to the outside of the said box or its

frame B. To the outside of this cavity or box e, e , there is attached a small chamber F, between which and the piston E, there is interposed a diaphragm f , of vulcanized india rubber or other flexible material impervious to steam said diaphragm being intended as a substitute for packing to prevent the steam in the chamber F, passing the piston.

g , is a small pipe for admitting steam either from the side pipe C, or from the boiler, to the chamber F, to force the piston toward the trunnion.

h , is a hardened steel pin inserted tightly in the center of the end of the trunnion and i , a hardened steel pin inserted tightly in the piston. The pressure of the steam upon the piston is transmitted to the trunnion through these hardened pins, and the valve face c, c , of the cylinder is thereby held against the corresponding face b, b , of the side pipe. The steel pins h, i , are introduced to make durable wearing surfaces between the piston and the trunnion.

It has been above stated that the steam admitted by the pipe g , to the chamber F, may be taken from the side pipe or directly from the boiler, but it is preferable to take it from the side pipe that the pressure on the trunnion a , may be subject to the same variations as the pressure against the face c, c , and may be always sufficient to prevent leakage between the faces b, c , but never sufficient to produce unnecessary friction between said faces.

What we claim as our invention and desire to secure by Letters Patent, is,

So applying the piston E, in relation to the trunnion a , and so conveying steam to act upon the said piston that it may be forced by the pressure of such steam directly toward the end of the trunnion to counteract the pressure of the steam against the opposite side of the cylinder, substantially as herein described.

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Witnesses:

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