S. GIBSON.

OSCILLATING STEAM-ENGINE.

No. 184,609. Patented Nov. 21, 1876.

FIG. IV

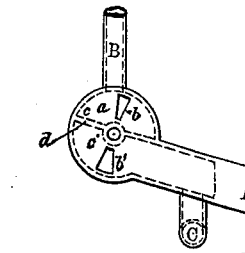



FIG. I

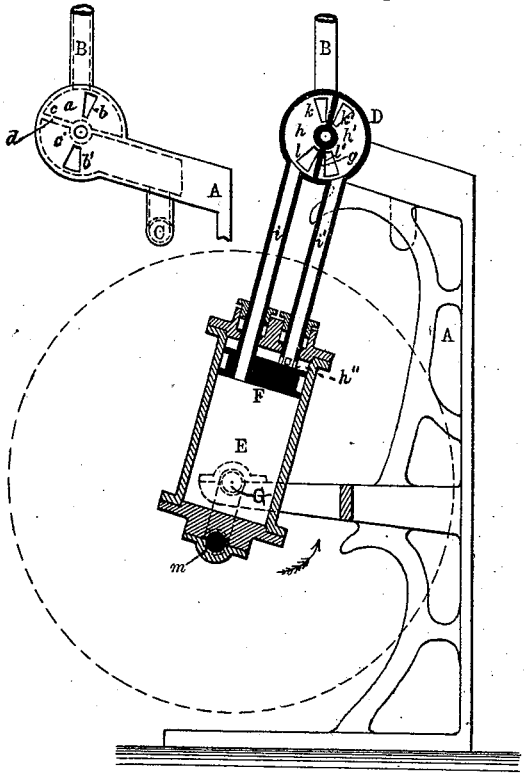



FIG. II

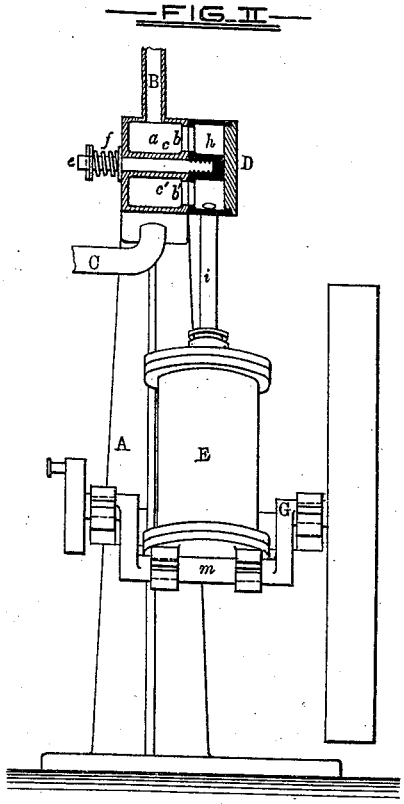
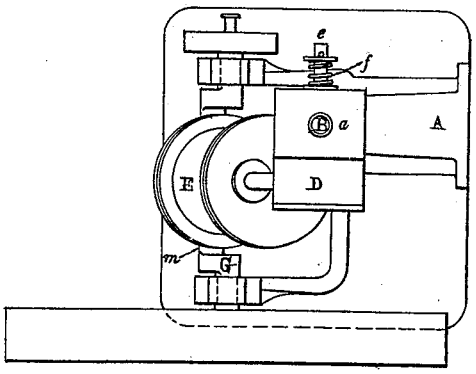



FIG. III




WITNESSES.

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# UNITED STATES PATENT OFFICE.

SAMUEL GIBSON, OF SHREWSBURY, PENNSYLVANIA, ASSIGNOR OF ONE-THIRD HIS RIGHT TO DAVID C. EVERHART, OF SAME PLACE.

## IMPROVEMENT IN OSCILLATING STEAM-ENGINES.

Specification forming part of Letters Patent No. **184,609**, dated November 21, 1876; application filed September 6, 1876.

*To all whom it may concern:*

Be it known that I, SAMUEL GIBSON, of Shrewsbury, in the county of York and State of Pennsylvania, have invented certain Improvements in Oscillating Steam-Engines, of which the following is a specification; and I do hereby declare that in the following is contained a full, clear, and exact description of my said invention, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

This invention relates to an oscillating engine having its cylinder attached directly to the crank-pin, thereby being adapted to have a reciprocating and an oscillating movement, and having its piston suspended from an oscillating valve, or valve-chamber, by tubular piston-rods, which serve as the induction and eduction passages for the steam in its flow to and from the cylinder.

In the description of my improvements which follows, due reference must be had to the accompanying drawing, forming a part of this specification, and in which—

Figure 1 is a vertical section of my improved engine; Fig. 2, a partly-sectional side view of the same; Fig. 3, a plan of the engine, and Fig. 4 a view of a part of the same.

Similar letters of reference indicate similar parts in all the figures.

A is the frame of the engine, the upper end of which constitutes the steam-chest, (represented by *a*.) One side of the steam-chest *a* is ported, and serves as the steam-valve seat, the ports *b b'* communicating with the steam and exhaust compartments *c c'*, formed in the said chest by the partition-plate *d*. The steam and exhaust pipes are indicated in the drawing, respectively, by B and C. The steam-valve or valve-chamber D is a cylindrical box, secured to the valve-seat by means of a bolt, *e*, which passes through an enlarged part of the partition *d*. A spiral spring, *f*, on the bolt *e* serves to keep the valve in close contact with the valve-seat, and prevent leakage of steam as the surfaces are worn. The valve D is divided by the partition *g* into the chambers *h h'*, which communicate, by means of the tubular piston-rods *i i'*, with the interior of the steam-cylinder E.

By referring to the drawing, it will be seen that the rod *i* connects interiorly with the cylinder below the piston F, while the one *i'* is closed by the piston, and communicates with the space above the piston by means of the apertures *h''*.

The chambers *h h'* are provided with the steam-openings *k k'* and exhaust-openings *l l'*, arranged with reference to the steam and exhaust ports *b b'*, to change the direction of steam in the operation of the engine, as hereinafter described.

The lower end of the cylinder E is attached directly to the crank-pin *m* of the crank-shaft G, which revolves in bearings located on the frame A.

Supposing the engine to occupy the position shown in the drawing, except that the crank-pin is turned off the lower "dead-center," and slightly in the direction indicated by the arrow, steam from the steam-chest enters the cylinder above the piston F by means of the port *b*, steam-opening *k'*, and piston-rod *i'*. The steam thus introduced into the cylinder causes the cylinder and crank-pin, to which it is attached, to be elevated until the said crank-pin reaches its upper "dead-center." (Indicated in the drawing by a dotted circle.) As the cylinder approaches its highest point, the steam introduced through the opening *k'* is discharged, by means of the opening *l'* and exhaust-port *b'*, to the exhaust-compartment *c'*, and thence to the exhaust-pipe C. The crank being carried past the upper "dead-center" by its momentum, steam passes to the under side of the piston through the port *b*, steam-opening *k*, and piston-rod *i*, and causes the cylinder and crank to descend to their original positions. The engine has thus completed a double stroke, or the crank and shaft have completed a revolution, and steam is again admitted to the upper side of the piston, as described.

Having thus described my invention, what I claim as new, and wish to secure by Letters Patent of the United States, is—

In combination with a steam-cylinder at-

tached directly to the crank-pin of a crank or crank-shaft, and constructed to have the combined reciprocating and oscillating movement described, the tubular piston-rods *i i'*, adapted, in connection with an oscillating steam-valve, to introduce steam alternately to the upper and lower sides of the piston to which they are rigidly connected, substantially as set forth.

In testimony whereof I have hereunto subscribed my name this 19th day of July, in the year of our Lord 1876.

SAMUEL GIBSON.

Witnesses:
WM. T. HOWARD,
THOS. MURDOCH.