

UNITED STATES PATENT OFFICE.

JOHN GOULDING, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN OSCILLATING ENGINES.

Specification forming part of Letters Patent No. 115,952, dated June 13, 1871.

To all whom it may concern:

Be it known that I, JOHN GOULDING, of Worcester, in the county of Worcester and State of Massachusetts, have invented an Improvement in Oscillating Engines; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

This invention relates to an improved organization of an oscillating engine, (the improvement being alike applicable to air-compressing engines, pumping-engines, and steam-engines,) the invention consisting in combining with the engine-cylinder (mounted by means of trunnions upon suitable bearings) steam-chambers, upon opposite sides of the cylinder, the cylinder having, at each end and at opposite sides, two ports or steam-passages, each of which communicates at proper times, or as the cylinder oscillates, with an inlet-port and an exhaust-port, the ports on both sides of the cylinder communicating at the same time with the inlet-ports of the opposite steam-chamber, and the surfaces of the adjacent valves or inlet-port covers on both sides of the cylinders being at all other times opposite the inlet-ports, so that the pressure of the steam or other motive fluid, pressing upon both sides equally, relieves the surfaces of the valves or port-covers from friction, and enables the engine to work with greater ease and more power than is attainable by any other construction, the only friction of any moment being the friction of the trunnions upon the bearings.

The drawing represents an engine embodying the invention.

Figure 1 shows the engine in plan. Fig. 2 is a vertical section through one of the steam-chambers and the adjacent exhaust-chamber. Fig. 3 is a section on the line *x x* reduced to a plan.

a denotes the oscillating cylinder, having trunnions *b b* rocking in suitable bearings. *c* is the piston; *d*, the piston-rod, the rod being directly jointed to the crank *e*. On each side of the cylinder is a steam-chamber, *f*, with which the boiler is connected by a suitable pipe, *g*; and below each chamber *f* is an exhaust-chamber, *h*. The chambers *f h* may be

separated by suitable partitions *i*, and each two chambers, *f h*, may be made in the form of annular spaces, concentric with the trunnions of the cylinder. The cylinder is provided at each end with two ports, *k l*, on the diametrically opposite sides. At the upward oscillating movement of either end of the cylinder these two ports *k l* are brought into connection with two inlet-ports, *m n*, of the two opposite steam-chambers; and at the downward oscillating movement of either end of the cylinder the ports *k l* are brought into connection with two opposite exhaust-ports, *o p*, of the exhaust-chambers. To provide for closing the exhaust and inlet ports each end of the cylinder is furnished upon each side with wing-plates, valves, or port-closers *q r* for closing the inlet-ports, and *s t* for closing the exhaust-ports.

The operation of the engine is as follows: Suppose the cylinder, piston, and crank to be in the position shown at Fig. 2, the exhaust-ports *o p* will be open and just beginning to close, and the inlet-ports *m n* at the opposite ends will be open and just beginning to close. As the crank-pin passes the center the inlet-ports *m n* begin to open and the exhaust-ports *o p* at the opposite end of the cylinder begin to open, the action of the steam upon one side of the piston and the exhaust of steam at the other side of the piston being the same as in some other oscillating engines; but it will be observed that, after the inlet-ports are closed by the sliding port-covers *q r*, the pressure of the steam is upon the covers at both sides of the cylinder, thus neutralizing the pressure, no weight or spring being, therefore, necessary to hold the cover to the port, and all force required in other engines to hold the valve to its seat being saved by this construction, where the cylinder, in fact, oscillates between two walls, and the ports are covered by lateral projections from the cylinder.

The construction and action of the apparatus as a pumping-engine are precisely the same, and as an air-compressor the only change required is the addition of any suitable kind of reactionary valve (poppet, flat, or other kind) in the compressed air-reservoir, which valve yields when the air is compressed beyond the pressure of the condensed air behind it, and self-closes when the piston starts back.

W. H. GRAY & SAMUEL ROSS.

Improvement in Lamp-Burners.

No. 115,953.

Patented June 13, 1871.

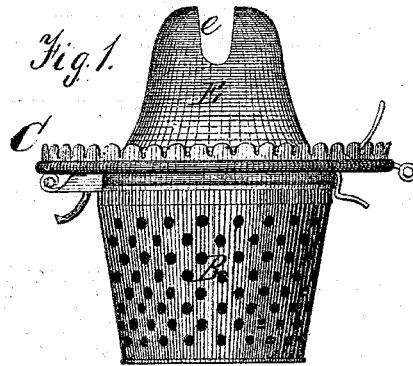
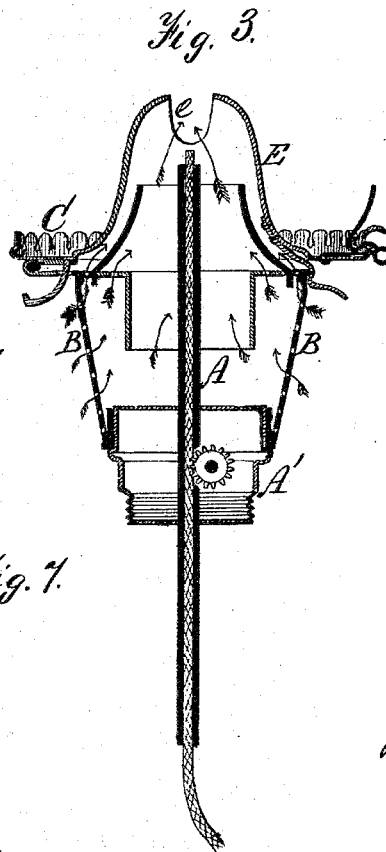
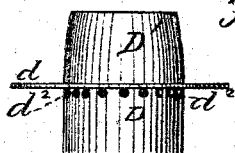
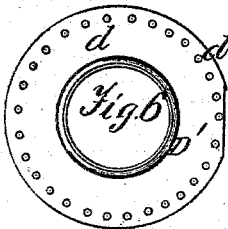
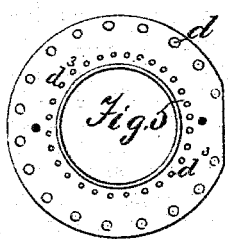
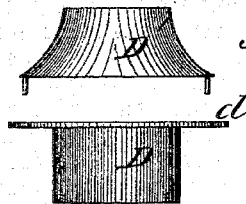
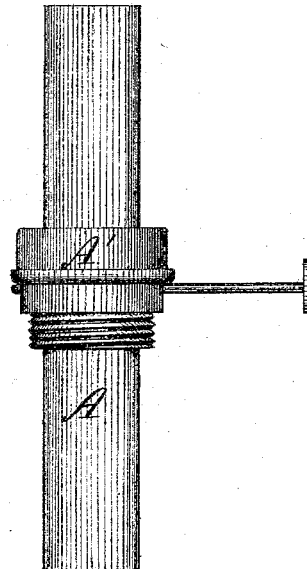


Fig. 2.



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