J. WOLF.

Oscillating-Engines.

No. 166,672. Patented Aug. 10, 1875.

Fig. 1.

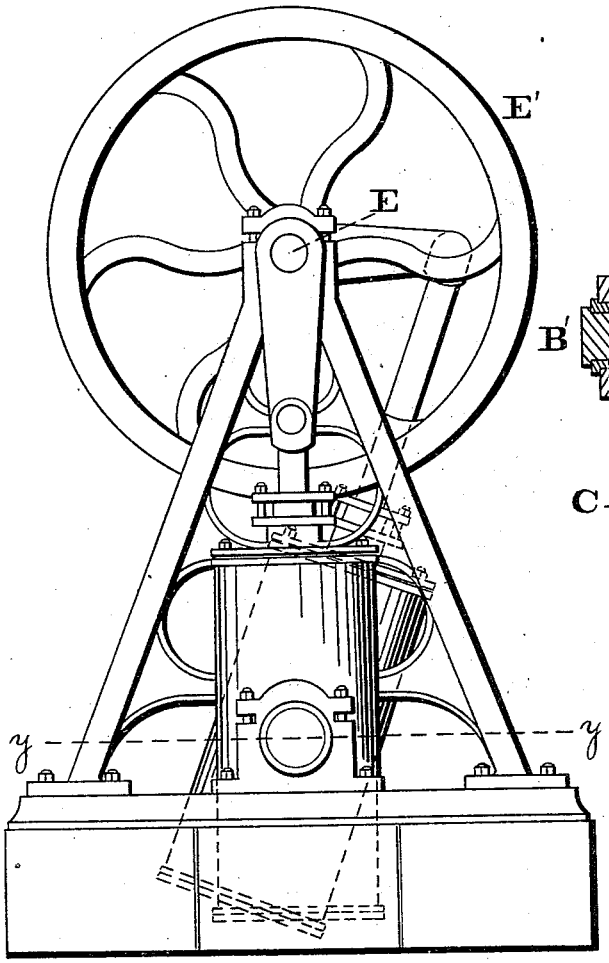


Fig. 2.

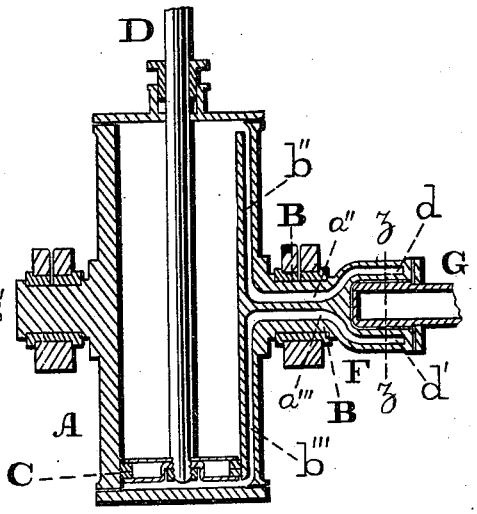


Fig. 4.

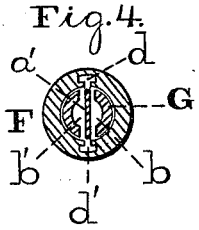


Fig. 3.

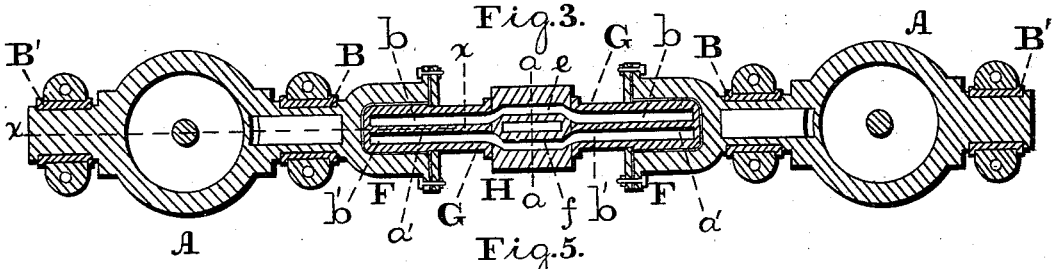
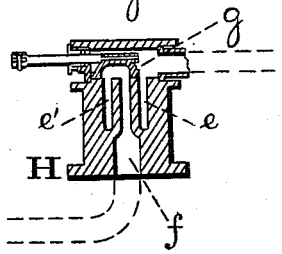


Fig. 5.



Witnesses:
A. P. Grant
L. F. Brous

Inventor:
Jacob Wolf
by
John A. Wiedersheim
Atty.

UNITED STATES PATENT OFFICE.

JACOB WOLF, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN OSCILLATING ENGINES.

Specification forming part of Letters Patent No. **166,672**, dated August 10, 1875; application filed June 16, 1875.

To all whom it may concern:

Be it known that I, JACOB WOLF, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Oscillating Engines; and I do hereby declare the following to be a clear and exact description of the nature thereof, sufficient to enable others skilled in the art to which my invention appertains to fully understand, make, and use the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side view of the device embodying my invention. Fig. 2 is a vertical section thereof in line *x x*, Fig. 3. Fig. 3 is a longitudinal horizontal section thereof in line *y y*, Fig. 1. Fig. 4 is a transverse section in line *z z*, Fig. 2. Fig. 5 is a transverse section of the valve in line *a a*, Fig. 3.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists in a two-passage pipe, communicating with two oscillating cylinders, whose trunnions have ports communicating with the pipe, in combination with a valve operating in relation to the passages of the pipe, so that the live and exhaust steam will be alternately directed through said passages to and from the cylinders in a simple and expeditious manner, and movable valves in the trunnions are dispensed with.

Referring to the drawings, A represents two oscillating cylinders, and B B′ the trunnions which constitute the bearings of said cylinders. C represents the pistons; D, the rods thereof; and E, crank-shaft, on which is fixed the band-wheel E′, and which receives motion from the engine. The two cylinders have their inner trunnions B formed with hollow bosses F, into each of which projects one end of a pipe, G, which pipes are thus interposed between the two cylinders. Each pipe G has a partition, *a′*, extending in the direction of its length, so that there are formed two longitudinal passages, *b b′*. On opposite sides of the inner faces of the bosses F there are formed ports *d d′*, (see Fig. 4,) which are adapted to communicate with the passages *b b′* of the pipes G, and leading to the top and bottom of the cylinders are passages *b″ b‴*, which communicate with passages *a″ a‴*, formed in the inner trunnions B, said passages *a″ a‴* being continuous of the ports *d d′* of the bosses F. The ends of the pipes opposite to the bosses F are connected to a valve-chamber, H, which has ports *e e′* for live steam, and a port, *f*, for exhaust steam, the ports *e* communicating with the passages *b b′* of the pipes G. A sliding valve, *g*, is adapted to cover and uncover the ports *e* in a manner known, and the stem of the valve is attached to the operating portion of the engine, in order to receive reciprocating motions therefrom.

The operation is as follows: Steam is admitted to the valve-chamber H, and passes through one of the uncovered ports, *e*, into the passages *b* of the pipes G, from whence it reaches the ports *d d′* of the bosses F. When one cylinder oscillates to the right, the other oscillates to the left. Now, the partition-plates *a′* in the pipes G act as seats for the ports *d d′*. Consequently, when the bosses oscillate, and the ports move beyond the plates, the parts are uncovered, so that there is communication between the passages *b b′* and said ports. In one side of the engine one passage, *b*, communicates with the port *d*, and in the other side the passage *b′* communicates with the port *d′*, whereby the steam enters the upper passage *a″* in the trunnions B of one cylinder, and the lower passage *a‴* in the trunnion of the other cylinder, thereby acting on the upper and lower sides of the pistons of the two cylinders, respectively, and operating the engine. The subsequent oscillations of the cylinders cause the communication of the passage *b′* and port *d* on one side of the engine, and of the passage *b* and port *d′* of the other side of the engine. The valve *g*, meanwhile moving, uncovers the port *e′* and closes port *e*. Steam now reaches the ports *d d′*, and, owing to the position of parts, it acts on the pistons in order the reverse of that previously stated, thus continuing the motion of the engine. The exhaust steam returns through the passages which first took live

steam, and now communicates with the exhaust-port *f*, whereby the exhaust steam is passed out through said port *f*.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The herein-described oscillating engine, composed of the cylinders A A, formed with trunnions B B′ and bosses F, the ports *d d′*, passages *a″ a‴* and *b″ b‴*, pipes G G, and valve H *e f g*, constructed and arranged as shown, and co-operating as specified.

JACOB WOLF.

Witnesses:

JOHN A. WIEDERSHEIM,

ALBERT H. HOECKLEY.