G. A. ANDERSON.

OSCILLATING CYLINDER ENGINE.

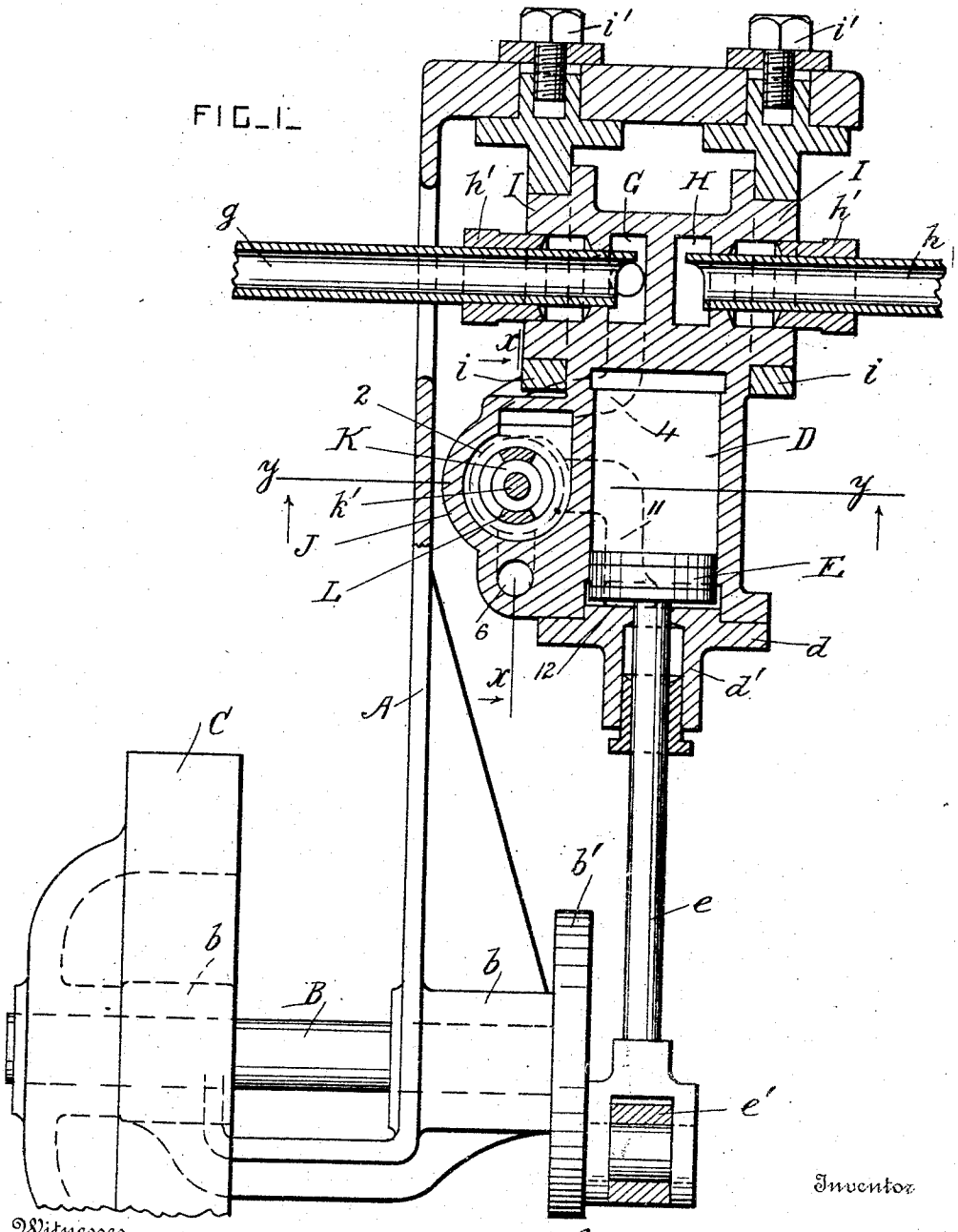
APPLICATION FILED MAR. 25, 1911.

1,025,605.

Patented May 7, 1912.

2 SHEETS—SHEET 1.

FIG. 1.



Witnesses

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2 SHEETS—SHEET 2.

FIG. 2.

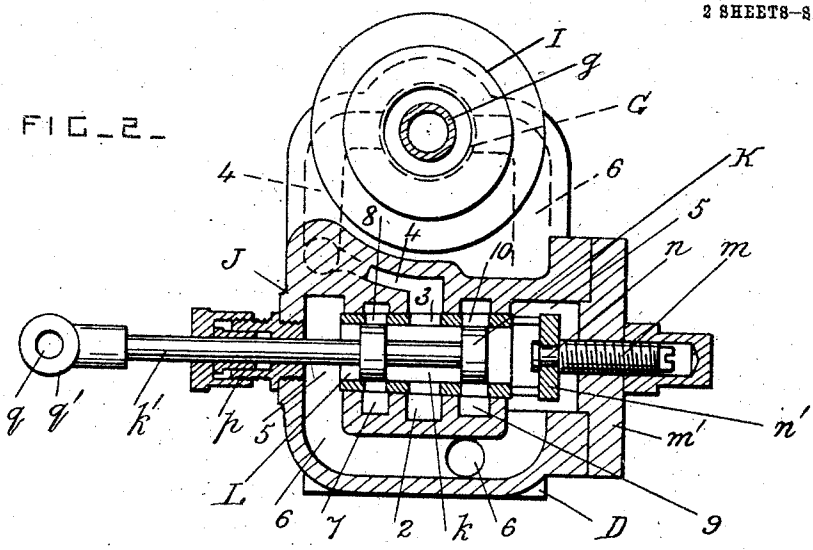


FIG. 3.

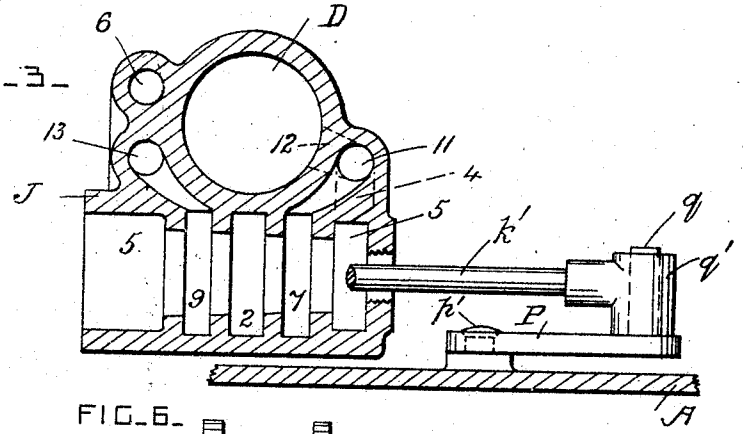


FIG. 5.

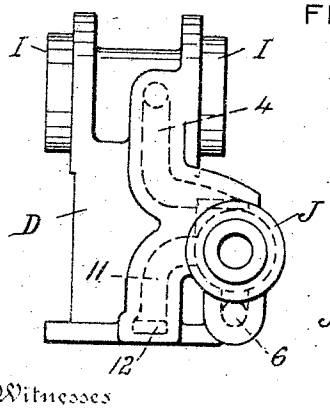


FIG. 6.

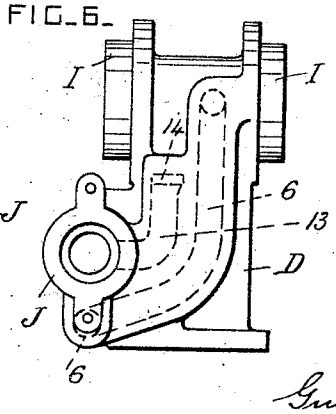
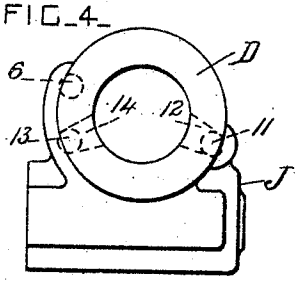


FIG. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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OSCILLATING-CYLINDER ENGINE.

1,025,605. Specification of Letters Patent. Patented May 7, 1912.

Application filed March 25, 1911. Serial No. 616,919.

To all whom it may concern:

Be it known that I, GUSTAF ARVID ANDERSON, a citizen of the United States, residing at Waynesboro, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Oscillating-Cylinder Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to oscillating cylinder engines, and it consists in the novel construction and combination of the parts hereinafter fully described and claimed whereby the pressure fluid, such as steam or compressed air, is distributed to the ends of the cylinder.

In the drawings, Figure 1 is a longitudinal section through the cylinder of an oscillating cylinder engine constructed according to this invention, showing the valve chest in cross-section. Fig. 2 is a longitudinal section through the valve chest, taken on the line x—x in Fig. 1. Fig. 3 is a cross-section through the cylinder, taken on the line y—y in Fig. 1 and showing also the connection of the valve spindle with the frame. Fig. 4 is an end view of the cylinder with the cover removed, drawn to a smaller scale. Figs. 5 and 6 are detail side views of the cylinder looking from the left and from the right in Fig. 2, respectively.

A is a supporting frame of any approved construction, and B is a crankshaft journaled in bearings b on the frame, and provided with a crank b' and a flywheel C.

D is the power cylinder provided at one end with a cover d and a stuffing-box d'.

E is the piston, and e is the piston-rod which slides in the stuffing-box and which is connected to the crank b'.

In carrying out this invention two similar power cylinders are preferably used, and each of them is provided with similar valve gearing. These two power cylinders are arranged in any approved manner, and e' is a portion of the piston-rod of the other power cylinder which is also connected to the crank b'. The cylinder D is provided with two chambers G and H, arranged side by side, at its outer end which is farthest from the crankshaft, and g and h are two pipes mounted in stuffing-boxes g' and h' respectively, and projecting into these chambers.

I are trunnions formed integral with the cylinder and arranged concentric with the pipes g and h which project in opposite directions. Bearings i are secured to the frame A by bolts i', and the trunnions I are mounted to oscillate in these bearings. One of these two pipes is used for admission and the other for exhaust, and it is immaterial which pipe is used for admission and which for exhaust except so far as it determines the direction of the revolution of the crankshaft. In practice a reversing valve of approved construction is connected to the pipes g and h so that the engine can be run in either direction at will.

J is the valve chest which is formed on or secured to one side of the cylinder D at about the middle of its length, and with its axis arranged crosswise of the longitudinal axis of the cylinder.

K is the valve, which is a piston valve, and which is provided with a circumferential groove or chamber k and a valve spindle k'. The piston valve is arranged in a cylindrical valve chamber or sleeve L which is secured in the valve chest. The piston valve and its sleeve are formed of hardened metal, and they are ground together so that they work with very little friction and do not wear away quickly.

The sleeve L is conical or plug-shaped externally, and m is an adjusting and fastening screw which engages with a screw-threaded hole in a cover m' which is bolted to one end of the valve chest. The screw m has a bearing n which is journaled in a bar n' formed on one end of the sleeve L. The sleeve is held permanently in position by the screw which forces it into steam-tight relation with its tapering socket in the valve chest.

The valve spindle k' projects through a stuffing-box p on the valve chest, and P is a link which is pivoted by a pin q to an eye q' on the outer end of the valve spindle. The link P is pivoted to the frame A by a pin p', and it prevents the piston valve from sliding longitudinally but permits it to move laterally with the cylinder when the cylinder is oscillated on its trunnions.

The valve chest is provided with a chamber 2 which encircles the middle part of the sleeve L, and the sleeve is provided with a

port or ports 3 which communicate with this chamber. The chamber 2 is connected with the chamber G by means of a passage 4 formed in the wall of the cylinder and valve chest.

The valve chest is provided with two chambers 5 at the ends of the sleeve L, and these chambers 5 are connected together and to the chamber H by means of a passage 6, also formed in the wall of the cylinder and valve chest.

Two annular chambers 7 and 9 are formed in the valve chest around the sleeve L and are arranged one on each side of the middle chamber 2. The sleeve is provided with ports 8 and 10 in its side which communicate with the chambers 7 and 9 respectively.

The chamber 7 is connected with one end of the cylinder by a passage 11 terminating in a cylinder port 12 as shown in Figs. 3 and 4. The chamber 9 is connected with the other end of the cylinder in a similar manner by means of a passage 13 terminating in a cylinder port 14. Supposing pipe *g* to be the admission pipe, for the time being, and pipe *h* the exhaust. The steam or compressed air passes from the pipe *g* through chamber G, passage 4, chamber 2, port 3 to the annular groove or chamber *k* of the piston valve, and thence to one end of the cylinder by way of the port 8, chamber 7, passage 11 and port 12. The steam from the other end of the cylinder is exhausted through port 14, passage 13, chamber 9, port 10, past one end of the piston valve into the chamber 5, and thence by passage 6 and chamber H into the exhaust pipe *h*. The rotary motion of the crank oscillates the cylinder on its trunnions, and the valve chest is reciprocated upon the piston valve, said piston valve being retained in position by the link P which only permits it to have motion laterally to accommodate itself to the curvature of the arc on which it moves with the valve chest. The steam is admitted to and exhausted from the opposite ends of the cylinder alternately by the longitudinal motion of the valve chest on the valve.

What I claim is:

1. The combination, with a stationary frame, and a crankshaft journaled therein; of an oscillatory cylinder pivoted to the said frame and operatively connected with the crankshaft, a valve-chest secured crosswise of the axis of the cylinder and having a cylindrical valve chamber arranged to oscillate longitudinally upon the same pivot as the cylinder, a substantially stationary piston-valve arranged in the said valve chamber, and means for preventing the said valve from moving longitudinally, the said valve chamber, chest, valve and cylinder being provided with passages for admission and exhaust, and the said valve chamber being adapted to reciprocate longitudinally upon the said valve.

2. The combination, with a stationary frame, and a crankshaft journaled therein; of an oscillatory cylinder pivoted to the said frame and operatively connected with the crankshaft, a valve-chest secured crosswise of the axis of the cylinder and having a cylindrical valve chamber arranged to oscillate longitudinally upon the same pivot as the cylinder, a substantially stationary piston-valve arranged in the said valve chamber and provided with a spindle which projects from the valve-chest, and a link pivoted to the projecting end portion of the valve spindle and to the stationary frame, the said valve chamber being adapted to reciprocate longitudinally upon the said valve, and the said valve chamber, chest, valve and cylinder being provided with passages for admission and exhaust.

3. The combination, with a cylinder provided with a valve chest having a tapering socket, of a plate having a screwthreaded hole and secured to one end of the valve chest, a sleeve tapered externally to fit the socket and provided with a bar extending across one end of it, a valve working in the said sleeve, and a fastening screw for the sleeve engaging with the said plate and provided with a bearing which is journaled in the said bar upon the axis of the sleeve, said screw also affording a means for extracting the sleeve from the socket.

4. The combination, with a stationary frame, and a crankshaft journaled therein; of an oscillatory cylinder pivoted to the said frame and operatively connected with the crankshaft, a valve-chest secured crosswise of the axis of the cylinder and having a valve chamber arranged to oscillate longitudinally upon the same pivot as the cylinder, a substantially stationary valve arranged in the said chamber, and means for preventing the said valve from moving longitudinally, the said valve chamber, chest, valve and cylinder being provided with passages for admission and exhaust, and the said valve chamber being adapted to reciprocate longitudinally over the said valve.

In testimony whereof I have affixed my signature in the presence of two witnesses.

GUSTAF ARVID ANDERSON.

Witnesses:
DANIEL S. BEARD,
H. E. KUHNER.