(No Model.)

O. H. VENNER.

OSCILLATING PISTON ENGINE.

No. 280,974. Patented July 10, 1883.

Fig. 1.

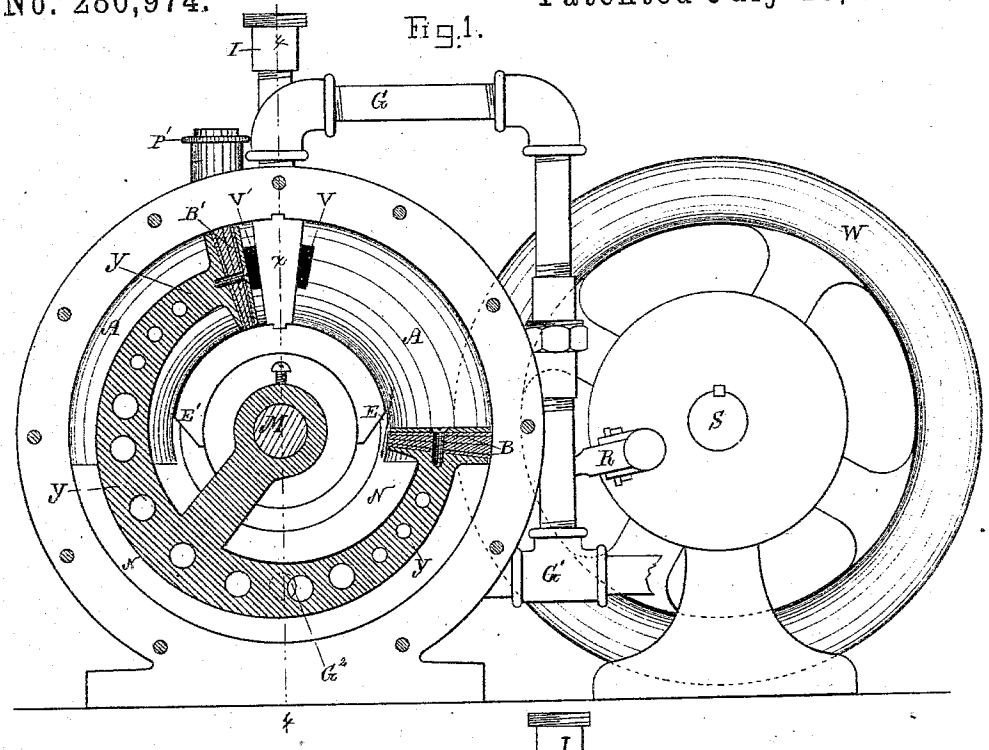
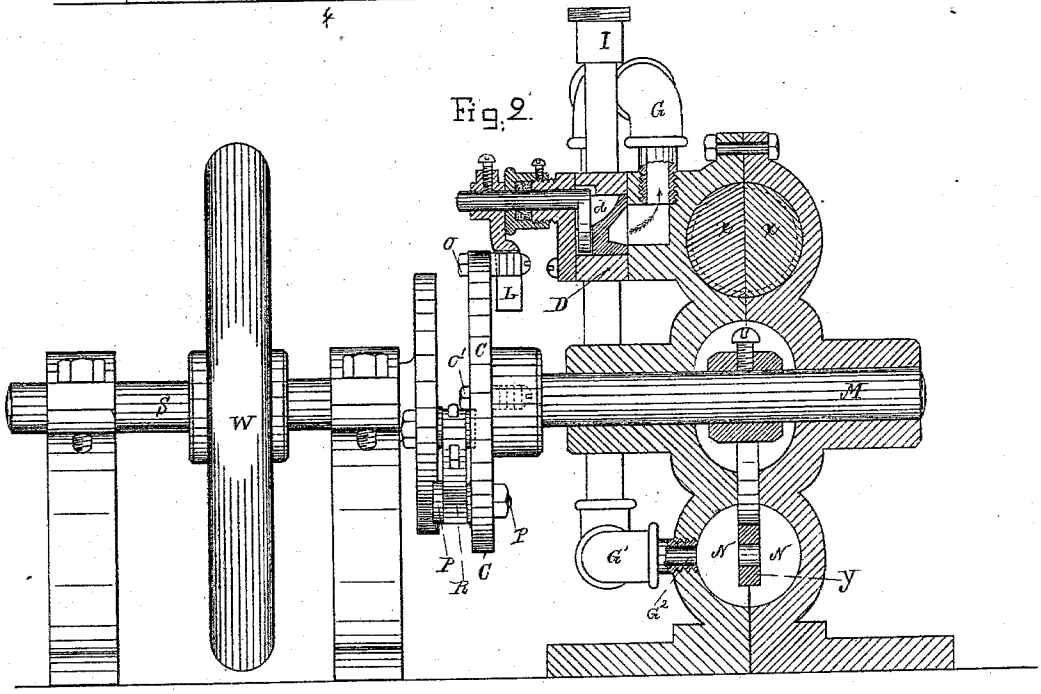


Fig. 2.



Witnesses.

T. B. Williston

C. W. Kettell

Inventor.

Orange H. Venner

per Albert N. Wood

Atty

UNITED STATES PATENT OFFICE.

ORANGE H. VENNER, OF MALDEN, ASSIGNOR OF ONE-HALF TO GEORGE W. VENNER, OF BOSTON, AND ALEXANDER M. WOOD, OF SOMERVILLE, MASSACHUSETTS.

OSCILLATING PISTON-ENGINE.

SPECIFICATION forming part of Letters Patent No. 280,974, dated July 10, 1883.

Application filed March 23, 1883. (No model.)

To all whom it may concern:

Be it known that I, ORANGE H. VENNER, of Malden, county of Middlesex, State of Massachusetts, have invented a certain new and useful improvement in reciprocating engines, which may be called an "Oscillating Piston-Engine," of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a longitudinal section through the cylinder. Fig. 2 is a transverse section of the same through the dotted line 4 4, seen in Fig. 1, these sections being made to give special illustration to the improvement offered for patent. As any form of valve or governor is applicable, such parts appear only incidentally in the drawings.

A A, Fig. 1, shows the cylinder seen here, with a single central cylinder head or abutment, X. In Fig. 2 this abutment is seen filling the whole diameter of the cylinder. It is thus seen that the longitudinal section of the cylinder is a concentric segment of a circle, while the transverse section is, as usual, circular.

N is an exhaust-chamber.

E and E′ show a cutting-back of the ends of the cylinder at the inner edges, making openings whereby the greater part of the steam is instantaneously exhausted at the completion of the stroke, the exhaust passing off by the pipe G′ through G^2, as is shown more clearly in Fig. 2.

V V′ (seen in Fig. 1) are the steam-ports on either side of the cylinder-head X. Through these steam is admitted alternately by valves, as usual, which also provide, in the ordinary way, for the exhaust which escapes under the valve-seat to the exhaust-pipe G, which is seen in both figures, joining the main exhaust-pipe G′.

M is a shaft in the axis of the longitudinal section of the cylinder.

Y Y is a disk or arms rigidly fast to the axial shaft M by keys and screws, or other usual device, bearing at either extremity the piston-heads B B′, which are fitted to the cylinder A by the usual ring or other packing. In Fig. 2, Y is seen occupying a very small portion of the exhaust-chamber N. In Fig. 1 the piston-heads are shown in the position where B has just completed its stroke, the arrow indicating the escaping exhaust at E. At the same moment B′ is receiving steam at V′, and the rocking or vibrating movement imparted to the axial shaft M is clearly shown. In Fig. 2 this shaft M is shown projecting to receive the crank or disk C, with crank-pin P, connecting rod R, which is attached to the crank of driving-shaft S, with its fly-wheel W. The valve *d* is shown in valve-chest D as operated by strikers O O′ on the crank-disk C, which alternately move the lever L. As is here shown, O has just opened one port, and we see the opening also under the valve-seat into the exhaust-pipe G, through which a small part of the exhaust escapes. I shows the inlet steam-pipe which drives the engine. P′ is an oil-cap for oiling the valve chest and cylinder.

The advantages which I claim are—

First, great simplicity and compactness of the working parts of the engine. I dispense with slides and cross-head entirely.

Secondly. I claim great economy in the use of steam by greatly reducing friction. I have no piston-rod to pack, no slides or cross-head to absorb power, and almost no labor is used up in forcing out exhaust.

Thirdly. These engines can be run at a rate of speed impossible in any other reciprocating engine, by reason of the instantaneous exhaust at the completion of the stroke. The engine from which these drawings are made has been frequently driven at a speed of about one thousand revolutions per minute. A glance at the drawings shows that steam once escaped into the exhaust-chamber N presses equally on both cylinder-heads in finding vent at G^2.

Lastly, these engines can be built more cheaply, operated at less expense, and be placed within a compass impossible for any other of equal power.

Another advantage is found in the fact that the eccentricity of the cranks is not dependent

on the length of stroke, but can be adjusted independently, the length of stroke depending upon the curve of the cylinder A, and consequent distance from its center to the center of the axial shaft M.

If compactness only is required, combined with cheapness of construction, my engine can be run as an ordinary engine by shortening the cylinder, providing two heads to it, lengthening the valve-chest, and using only one piston-head. Of course in this case there would be no instantaneous exhaust.

What I claim as my invention, and desire to secure by Letters Patent, is altogether in connection with a reciprocating engine.

I am aware that in rotary engines a curved cylinder and an axial shaft have been used.

I therefore claim and desire to secure by Letters Patent—

1. In a reciprocating engine, the curved cylinder A, terminating in the exhaust-chamber N, combined with the cutting-back of the cylinder ends E E′, all substantially as described, and operating as and for the purpose described.

2. In a reciprocating engine, the combination of the curved cylinder A, and the axial shaft M, rocked by one or more piston-heads, B, through the arm or disk Y, all substantially as described, and operating as and for the purpose described.

3. In a reciprocating engine, the combination of the curved cylinder A, terminating in the exhaust-chamber N, the cutting-back of the cylinder E E′, the central head or abutment, X, the axial shaft M, the arms or disk Y, and the double-headed piston B B′, all substantially as described, and operating as and for the purpose described.

ORANGE H. VENNER.

Witnesses:
A. F. TRUEMAN,
J. B. MAYHEW.