

(No Model.)

2 Sheets—Sheet 1.

H. HARTIG.

GAS ENGINE.

No. 324,554.

Patented Aug. 18, 1885.

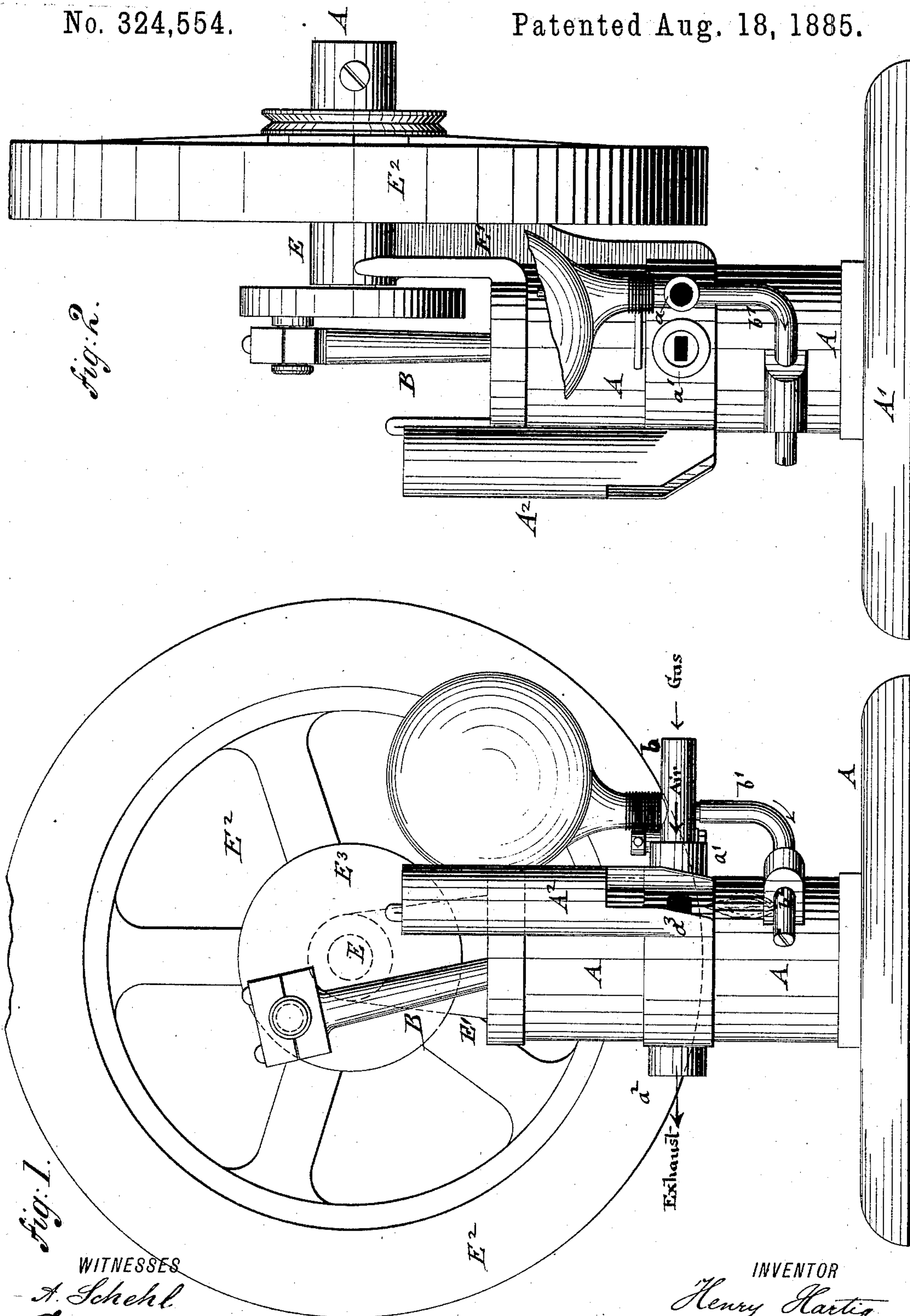


Fig. 1.

WITNESSES

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INVENTOR

Henry Hartig

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(No Model.)

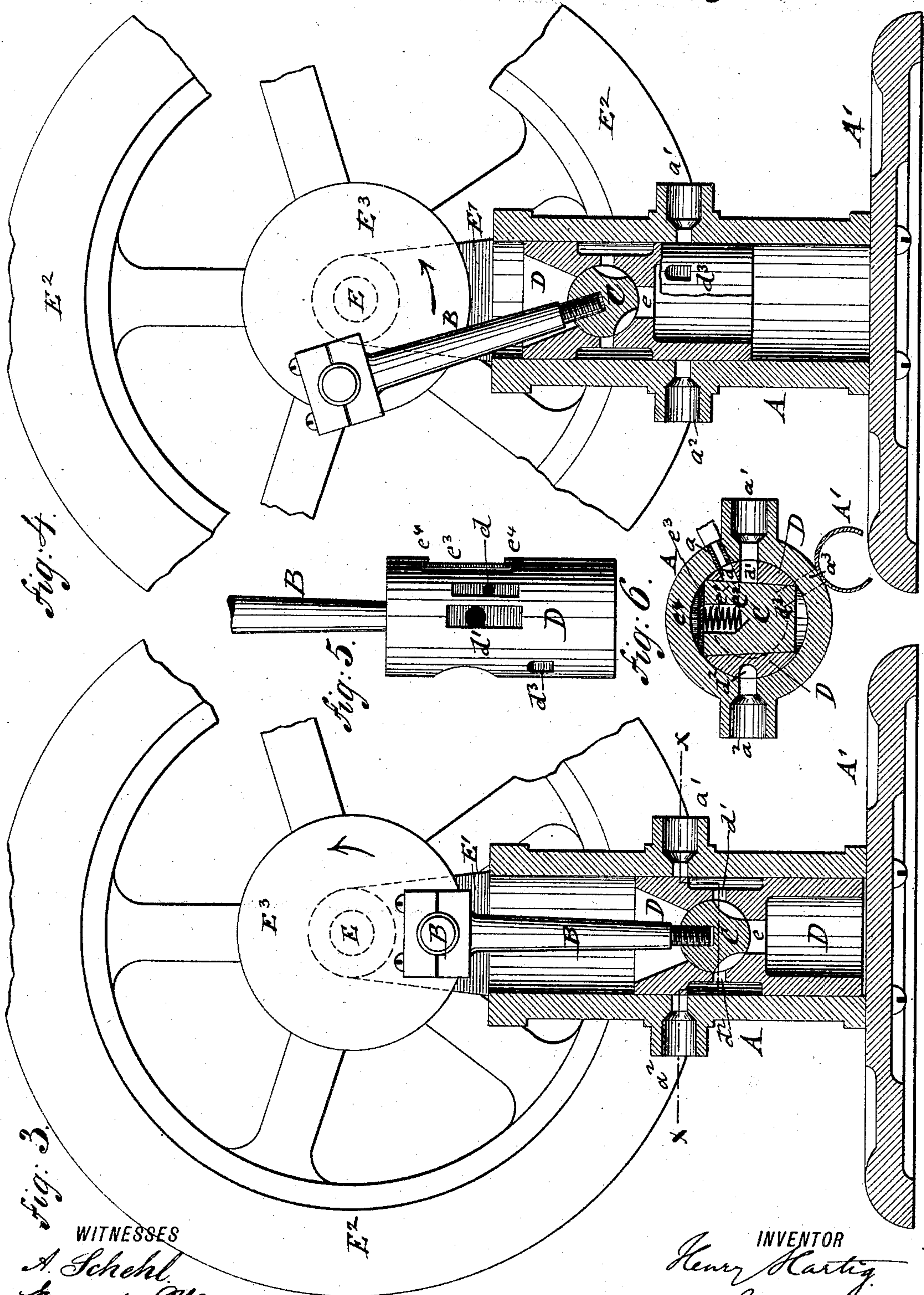
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INVENTOR
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By his Attorney
G. J. Raegenner.

UNITED STATES PATENT OFFICE.

HENRY HARTIG, OF BROOKLYN, NEW YORK.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 324,554, dated August 18, 1885.

Application filed June 10, 1885. (No model.)

To all whom it may concern:

Be it known that I, HENRY HARTIG, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification.

This invention relates to a gas-engine in which the valve for supplying the explosive gas and air mixture is located at the interior of the reciprocating piston and oscillated by the piston-rod, whereby the construction of the engine is simplified and made very compact, so as to be specially adapted for running sewing-machines and similar machines; and the invention consists of a cylinder having inlet-ports for the gas and air, an exhaust-port for the products of combustion, and an ignition-port, a hollow reciprocating piston having inlet and exhaust ports communicating with the inlet and exhaust ports of the cylinder, and a hollow extension having an ignition-port. An oscillating slide-valve is located in a cavity at the interior of the piston and connected by the piston-rod to the driving-shaft, which turns in bearings of a supporting-standard attached to the cylinder.

In the accompanying drawings, Figure 1 represents a side elevation of my improved gas-engine; Fig. 2, an end elevation. Figs. 3 and 4 are vertical central sections of the same, showing the piston at different positions of its stroke. Fig. 5 is a detail side view of the piston; and Fig. 6 is a horizontal section on line *x x*, Fig. 3.

Similar letters of reference indicate corresponding parts.

A in the drawings represents the cylinder of my improved gas-engine, the cylinder being supported in vertical or horizontal position on a suitable foundation-plate, A'. The cylinder A is closed at one end and open at the opposite end, through which a piston-rod, B, extends into the recessed outer end of a reciprocating piston, D, the piston-rod being attached to an oscillating slide-valve, C, that turns in bearings at the interior of the piston D. The driving-shaft E is supported in bearings of a standard, E', attached to the main cylinder A, and provided at the outer end with a fly-wheel, E², and a crank-disk, E³, at the inner end of the main shaft.

The cylinder A is provided at one side with gas and air admission ports *a a'*, and at the other side with an exhaust-port, *a''*, for the products of combustion. The gas-inlet port *a* is connected with a gas supply pipe, *b*, having a stop-cock and gas-bag, as customary in gas-engines, for regulating the supply of gas to the engine. A downwardly-extending gas-pipe, *b'*, extends from the gas-pipe *b* toward the lower part of the cylinder A, and is provided with a jet-hole, *b''*, through which the gas for the ignition-jet is supplied. A chimney, A², is attached to the cylinder A vertically above the ignition-jet for drawing the flame in upward direction toward the ignition-port *a''*, which is located in the cylinder A above the ignition-jet.

The piston D is provided at one side with gas and air ports *d d'*, and at the opposite side with an exhaust-port, *d''*, which ports register at the proper time with the inlet and exhaust ports *a, a'*, and *a''* of the cylinder A. The inner end of the piston D is made in the shape of a hollow cup, so as to form, with the closed end of the cylinder A, a combustion-chamber for the air and gas mixture. The hollow end or extension of the piston D is provided with an ignition-port, *d''*, that registers with the ignition port *a''* of the cylinder A. The combustion-chamber communicates by a central port, *e*, of the piston with the inlet-cavity or exhaust-cavity of the slide-valve, and with the inlet or exhaust ports of the piston and cylinder, according to the position of the piston and slide-valve.

The slide-valve C is made of slightly-tapering shape and fitted accurately into a corresponding cavity of the piston. The slide-valve C is held in position in the piston by a spiral spring, *e'*, which is set into a socket, *e''*, of the slide-valve, and retained by a plate, *e'''*, that is supported by transverse lips *e⁴* of the piston, as shown in Figs. 5 and 6.

When the piston D arrives at the extreme ends of its stroke, the slide-valve C shuts off completely the communication between the combustion-chamber of the cylinder and the inlet and exhaust ports, as shown in Fig. 1. When the piston is moved by the fly-wheel away from the closed end of the cylinder, it turns the slide-valve C, so as

to establish communication between the combustion-chamber and the gas and air admission ports until the required quantity of gas and air is sucked in. At this point the ignition-ports of the cylinder and piston register with each other, the ignition-jet is sucked in, and the explosion takes place. By the force of the explosion the piston is moved toward the opposite end of its stroke, and the slide-valve turned by the fly-wheel and crank-disk, so as to establish communication between the combustion-chamber and the exhaust-ports of the piston and cylinder for the escape of the products of combustion. The fly-wheel moves the piston back to its first position, when the same operation is repeated, the successive explosions of the gas and air mixtures and the momentum of the fly-wheel keeping up the regular motion of the driving-shaft, as customary in gas-engines of this class.

The advantages of my improved gas-engine are simplicity of construction, as there are few working parts, compactness of construction, as the slide-valve is located within the piston, and easy and effective motion, with but little wear of the working parts.

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

1. The combination of a cylinder having the usual inlet, exhaust, and ignition ports, a hollow reciprocating piston having similar ports registering with the ports of the cylinder, an oscillating slide-valve located at the interior of the piston, and a piston-rod secured to the slide-valve and connected to the driving-shaft, substantially as set forth.

2. The combination of a cylinder provided with gas and air inlet ports, an ignition-port, and an exhaust-port, a hollow reciprocating piston having gas and air inlet ports, an exhaust-port, and a cup-shaped extension with an ignition port, and an oscillating slide valve located at the interior of the piston and connected by a piston-rod with the driving-shaft, substantially as set forth.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

HENRY HARTIG.

Witnesses:

PAUL GOEPEL,
CARL KARP.