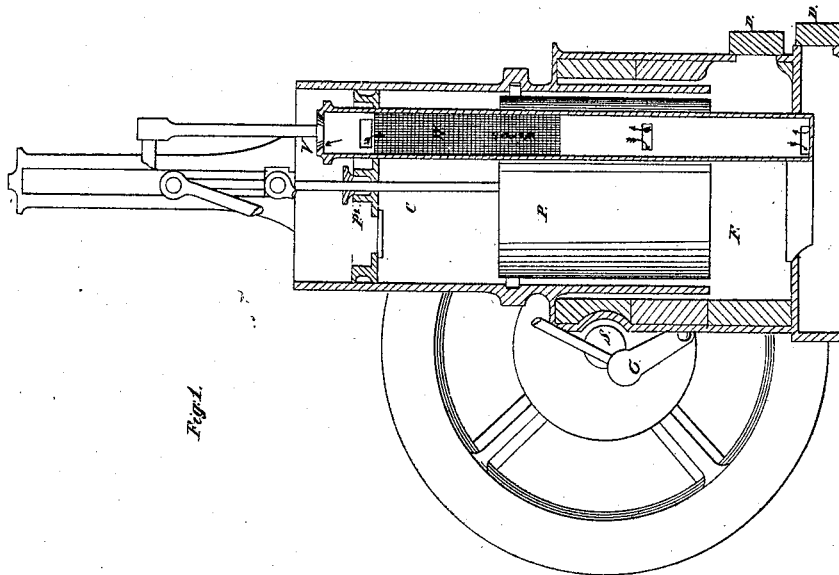
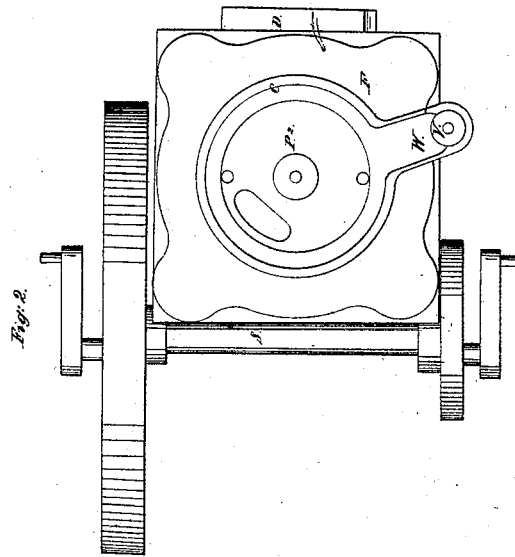


T. McDONOUGH.
HOT AIR ENGINE.

No. 52,305.

Patented Jan. 30, 1866.



Witnesses:
W. H. Sprad.
John R. Wilcox

Inventor
Thomas McDonough

UNITED STATES PATENT OFFICE.

THOMAS McDONOUGH, OF MIDDLETOWN, CONNECTICUT.

IMPROVEMENT IN HOT-AIR ENGINES.

Specification forming part of Letters Patent No. 52,305, dated January 30, 1866.

To all whom it may concern:

Be it known that I, THOMAS McDONOUGH, of Middletown, in the county of Middlesex and State of Connecticut, have invented new and useful Improvements in the Gas-Engine; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a section in elevation, and Fig. 2 is a transverse section.

The engine is constructed as follows: The furnace F is cast with two doors, *d d*, for draft and fuel. These are filed and scraped to airtight joints on the furnace. Another opening in the furnace F is at top where the cylinder is bolted upon it. One of the doors *d*—that for fuel—is made double when it is required to put in fuel without stopping the machine. Upon the furnace is bolted with a faced joint the cylinder C, open at both ends and bored. This contains a plunger, P, that moves through the lower part of the cylinder and down upon the fuel in the furnace. A piston, P², with a self-acting valve opening inward, moves in the upper part of the cylinder, and is packed airtight with any usual packing.

A pipe, W, filled with wires is bolted to an opening in the upper part of the cylinder, and also to the furnace with openings into it above and below the fuel. This furnishes a passage from the upper part of the cylinder to the furnace. The pipe W has at top a loaded valve, V, opening as an exhaust by any usual mechanism.

The piston P² is connected by a cross-head and side rods to cranks on the driving-shaft S, and the plunger P is similarly connected to cranks *c c* fastened upon the crank-pins of the first-mentioned cranks.

The action of the moving parts is as follows:

When the shaft S is turned and the plunger lowered upon the fuel the gas is expelled from the furnace and exhausted through the pipe W and the valve V, heating the wires in the pipe in passing. The space which the plunger leaves in the upper part of the cylinder is at the same time filled with air passing in past the valve in the piston. The piston now moves down, the exhaust-valve V is closed, and the air held in the upper part of the cylinder is compressed by the piston. As the revolution of the shaft S is continued the plunger rises till it meets the piston, and, displacing the compressed air, moves it through the pipe W down into the furnace, both above and below the fuel. By this method of introducing the air through the piston into the cylinder and then by displacing it by the plunger the fire is furnished with air without the use of any pump, the cylinder being the pump itself. The combustion of the air thus introduced furnishes the power that is utilized in moving up the piston. By this combination of a cylinder to hold the air, and also to utilize the power with the pipe to conduct the air, and also to retain the escape heat in its wires with the furnace, an efficient machine is obtained, requiring no pump to feed it with air and utilizing all the heat of combustion.

I claim and desire to secure by Letters Patent—

1. The arrangement of the pipe W, by means of which the inflowing air and outflowing gas pass alternately through the same passage and over the same surfaces.

2. The combination of the cylinder and pipe with the furnace, substantially as described, forming parts of a gas-engine.

THOMAS McDONOUGH.

Witnesses:

JNO. MILLER,
S. W. PEARCE.