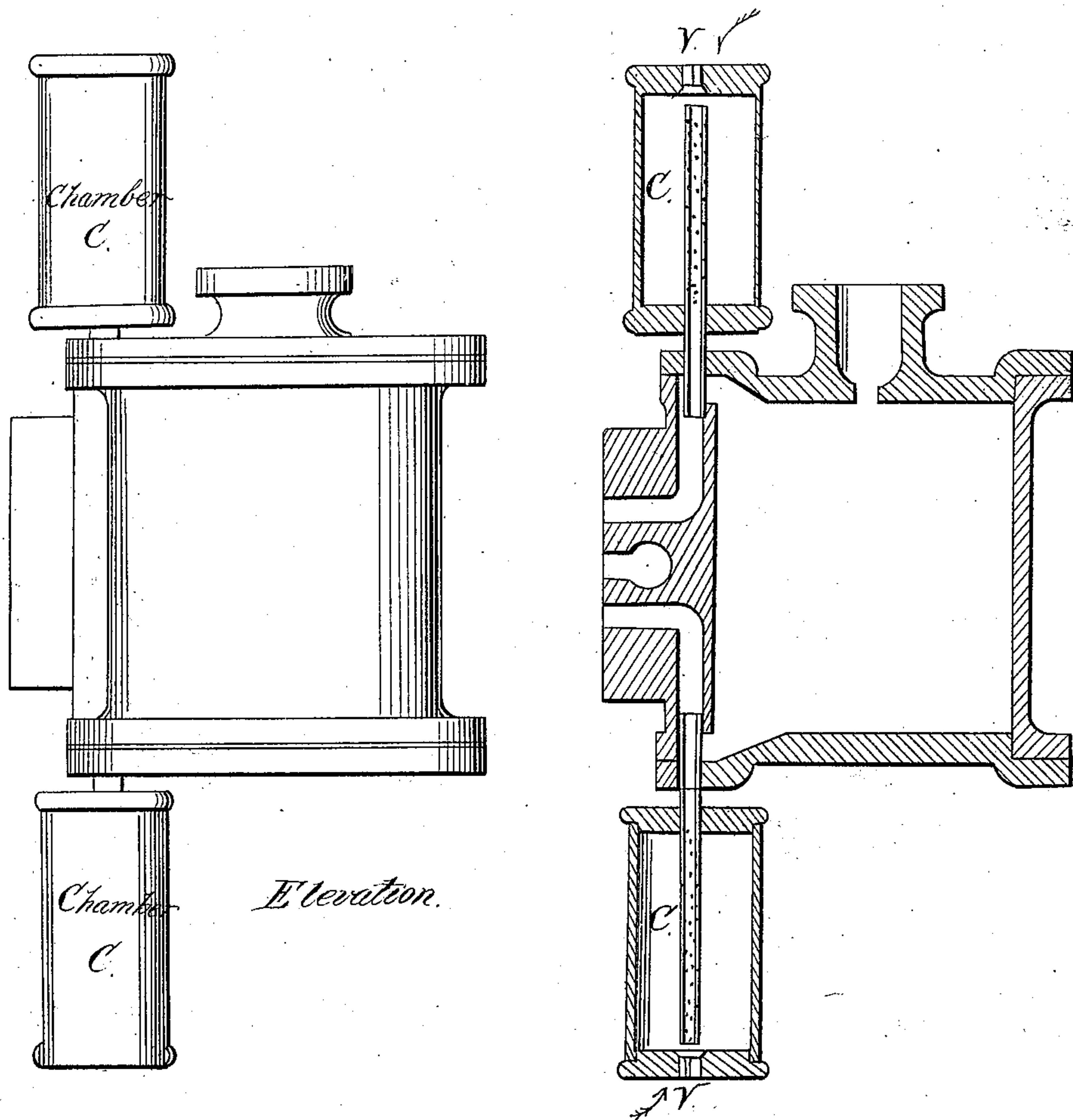


*T. Mc Donough,*  
*Steam Engine Attachment,*  
*No. 43,889,* *Patented Aug. 16, 1864.*



*Witnesses:*  
*Edward C. Pattison.*  
*H. C. Sloughton*

*Inventor:*  
*Thomas Mc Donough*

# UNITED STATES PATENT OFFICE.

THOMAS McDONOUGH, OF MIDDLETOWN, CONNECTICUT.

## IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 43,889, dated August 16, 1864.

*To all whom it may concern :*

Be it known that I, THOMAS McDONOUGH, of Middletown, in the county of Middlesex, in the State of Connecticut, have invented a new and useful Improvement in the Steam-Engine; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Two small cylinders or chambers, *c c*, are made, each with a valve opening inward at one end, and at the other end of each a hole is made and a pipe inserted, reaching through the cylinder *c* toward the end in which the valve is placed. This pipe within the chamber *c* is drilled full of fine holes, so that any air or steam within the chamber *c* may at all times have free ingress and egress through these holes into the interior of the pipe and with any vessel to which the end of the pipe extending beyond the chamber is connected. This end of the pipe is screwed into a hole drilled into the steam-passage of the steam-cylinder, thus securing one chamber *c* onto each steam-passage, so that the interior of one chamber *c* is always in free communication with one side of the piston by means of the holes into the pipe, and the interior of the pipe being open into the steam-passage, while the other chamber *c* is always in free communication with the opposite side of the piston.

This apparatus furnishes additional power

as follows: When the cylinder is full of steam and this steam exhausts, the air flows past the valve *v* into the chamber *c*, because the current flows through the pipe in the direction of the exhausting steam. When next the steam is admitted to this same side of the piston, part of it flowing through the pipe and holes mixes with the air in the chamber, closing the valve and forming a pressure within the chamber greater than the boiler-pressure, because of the fact that if steam and air be mixed, the pressure is increased, although the space filled by the mixture is the same as that filled by both steam and air. This increased pressure of mixed steam and air acts freely upon the piston in the same manner as steam would act if *c* were a small boiler communicating by the pipe and passage directly with the piston.

I am aware that air previously compressed and mixed in a vessel disconnected has been used. I disclaim all such arrangements.

I claim and desire to secure by Letters Patent—

The chambers, substantially as above described, so arranged that the exhaust-steam may also exhaust the chamber, and the steam on entering may reach the piston before the mixed air and steam.

THOMAS McDONOUGH.

Witnesses:

EDWARD C. PATTISON,  
N. C. STUGHTON.