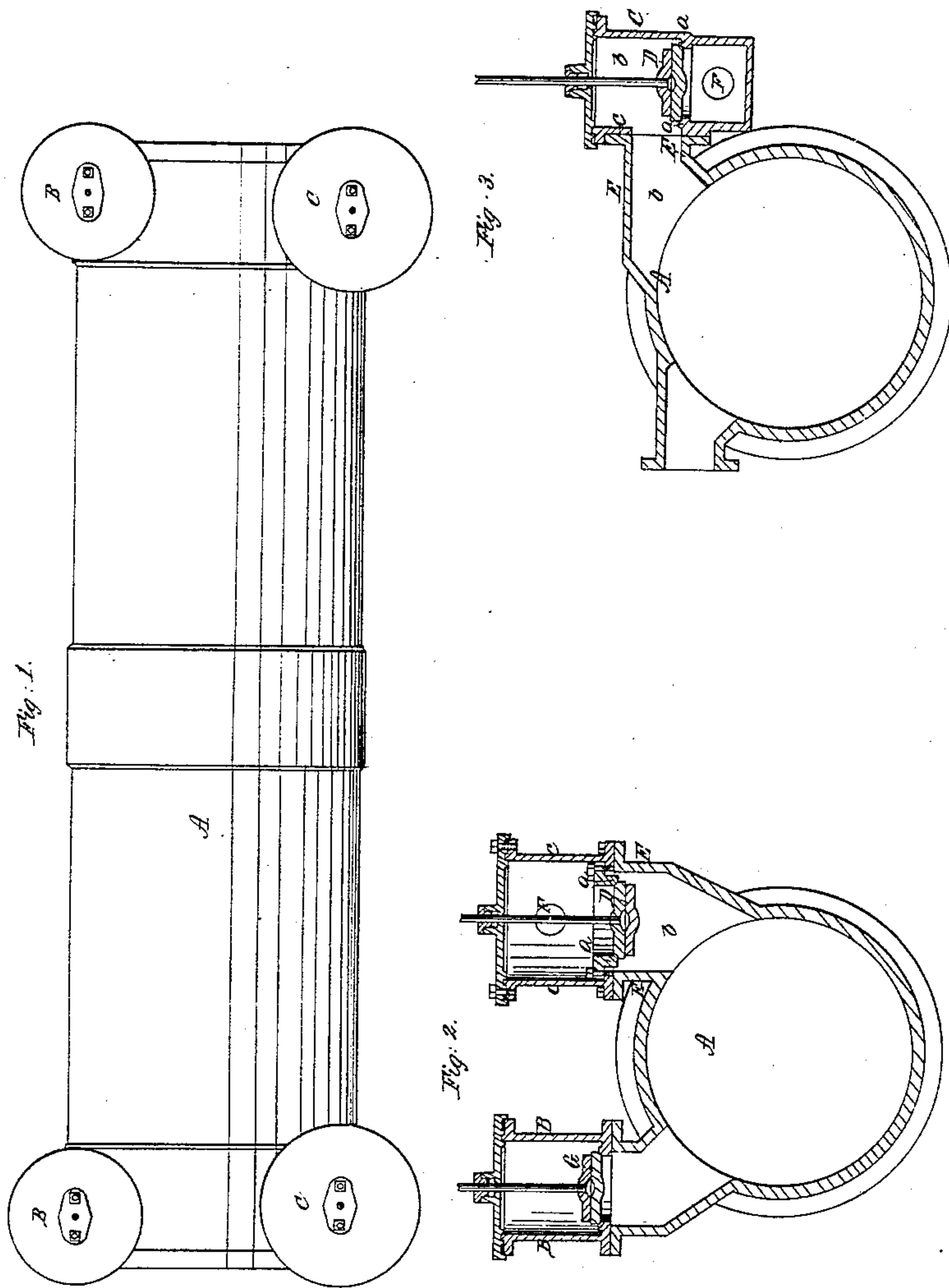


*G. B. McDonald,*  
*Steam Puppet Valve.*

*N<sup>o</sup> 39,100.*

*Patented June 30, 1863.*



*Witnesses*  
*J. W. Crook*  
*G. W. Reed*

*Inventor*  
*G. B. McDonald*  
*per Munn & Co*  
*attorneys*

# UNITED STATES PATENT OFFICE.

GREEN B. McDONALD, OF LOUISVILLE, KENTUCKY, ASSIGNOR TO HIMSELF  
AND DENNIS LONG, OF SAME PLACE.

## IMPROVED ARRANGEMENT OF VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 39,100, dated June 30, 1863.

*To all whom it may concern:*

Be it known that I, GREEN B. McDONALD, of Louisville, in the county of Jefferson and State of Kentucky, have invented a new and useful Improvement in Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan of the cylinder of a steam-engine with my improvement. Fig. 2 is a transverse vertical section of the same through the ports and valves. Fig. 3 is a transverse section of a similar character to Fig. 2, showing an arrangement of ports and valves heretofore used, for the sake of comparison with my invention.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to engines with horizontal cylinders and puppet-valves. Its object is to reduce the dead-space in the eduction-valve, chambers and thereby reduce the waste of steam between the cylinder and the eduction-valves; and it consists in a certain arrangement of the valve-chambers, valves, nozzles, and exhaust-pipes for this purpose.

To enable others skilled in the art to apply my improvement to the steam-engine, I will proceed to describe it with reference to the drawings.

A is the cylinder, B B the induction-valve chambers, and G G the induction-valves. C

C are the eduction-valve chambers; D D, the eduction-valves.

In the old arrangement of the parts (shown in Fig. 3) the nozzle E, by which the eduction-valve chamber C is connected with the cylinder, is at one side of the said chamber and above the valve-seat *a*. The eduction-valve D is arranged to open upward, and the exhaust-pipe F is connected below the valve-seat, and the consequence is that the whole of the space *b b* within the nozzle and the valve-chamber is dead-space, requiring to be filled with fresh steam in every stroke of the engine.

In my arrangement (shown in Fig. 2) the nozzle E is connected with the bottom of the valve-chamber, below the valve seat *a*, and the valve D is arranged to open downward, and the exhaust-pipe F is connected with the chamber above the valve seat, and by this arrangement the dead-space *b* is only within the nozzle E, and consequently greatly reduced.

What I claim as my invention, and desire to secure by Letters Patent, is—

The arrangement relatively to each other of the valve-chamber C, nozzle E, valve-seat *a*, valve D, and exhaust-pipe F, substantially as herein described with reference to Fig. 2.

GREEN B. McDONALD.

Witnesses:

ROBERT HUGHES,  
A. W. WALLER.