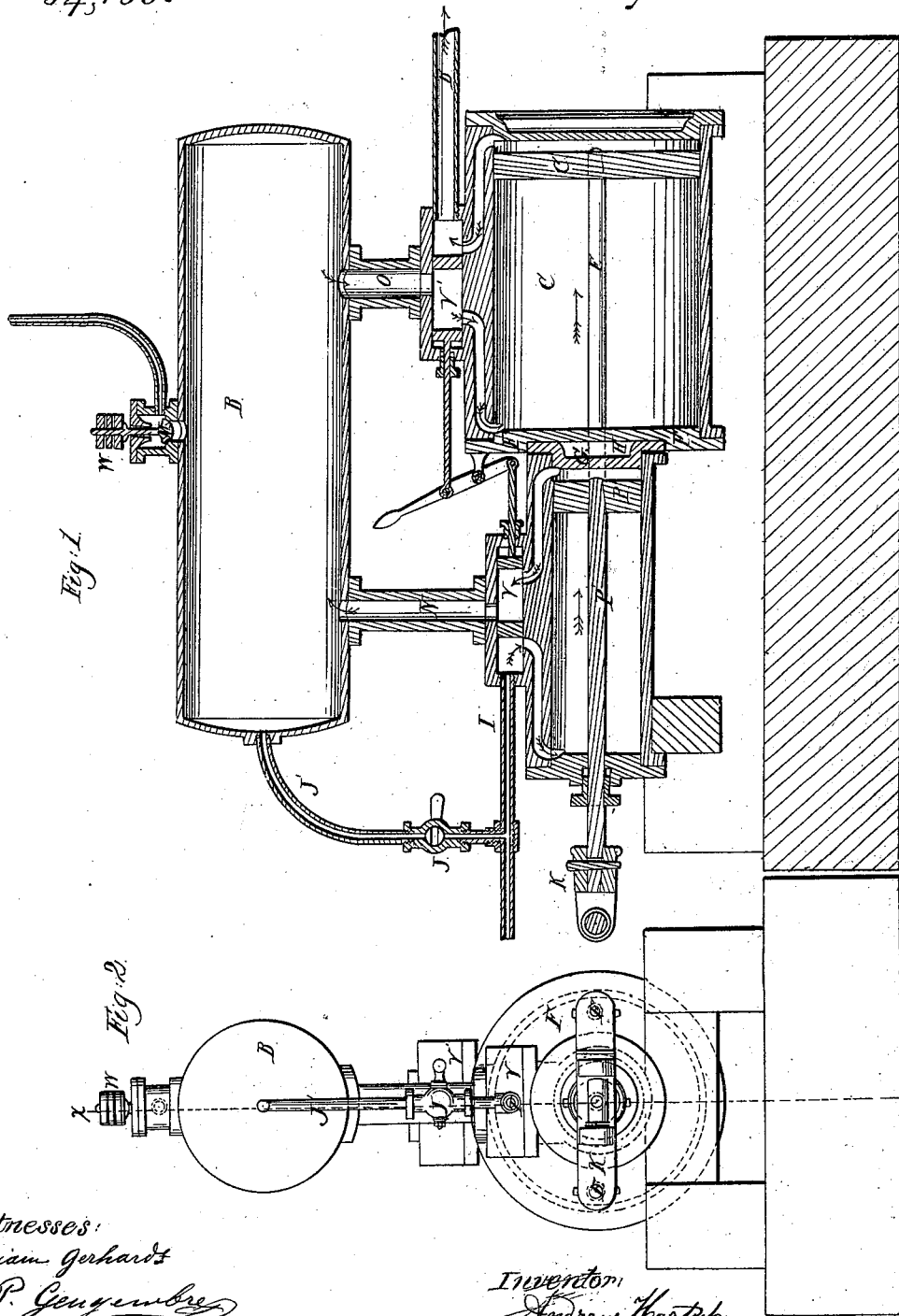


*A. Hartupée,*  
*Compound Steam Engine.*  
*N<sup>o</sup> 54,150.      Patented Apr. 24, 1866.*



# UNITED STATES PATENT OFFICE.

ANDREW HARTUPEE, OF PITTSBURG, PENNSYLVANIA.

## IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 54,150, dated April 24, 1866.

*To all whom it may concern:*

Be it known that I, ANDREW HARTUPEE, of the city of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and Improved Steam-Engine; and I do hereby declare that the following is a full and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional view of the engine through the line  $x x'$  of Fig. 2, and Fig. 2 is an end view of the same.

Similar letters of reference indicate like parts in both figures.

The object of this invention is a steam-engine which works on the same principle as the one for which I have obtained Letters Patent dated December 27, 1864, and numbered 45,603, but having several improvements, which I will further specify.

A is a small cylinder, working at very high pressure, with its valve or valves V of any construction, and its piston P and piston-rod  $p'$ .

B is the moderator or receiver, in which the steam is expanded and its pressure moderated, as claimed in my patent of December 27, 1864.

C is a large cylinder, also with its valve or valves  $V'$  of any desired construction, and its pipe D leading to a condenser of any construction. (Not shown in the drawings.)

The piston Q of the cylinder C has two piston-rods, E E', set far enough apart to pass out through the head F of the cylinder C in suitable stuffing-boxes, and extend on each side of the small cylinder A until they reach the yoke or cross-piece K, to which they are keyed or otherwise fastened; and, as the piston-rod  $p'$  of the cylinder A is also keyed or fastened to the center of the same yoke K, the two pistons P and Q are connected together, and when acted on by steam-pressure, will both move in the same direction. The pistons Q and P are so regulated in their relation to the valves V and  $V'$  that the steam will always act on the corresponding side of said pistons, so as to make them act in harmony one with the other.

The head F of the large cylinder C is so

shaped as to receive the head G, of the small cylinder A and the head G, or both the heads G and F are so shaped that when they are bolted together there will be left between them a vacant space, H, filled with air to act as a non-conductor of heat and prevent the condensation of the steam in the small and large cylinders.

I is the steam-pipe coming from a boiler of any construction, but working at very high pressure.

J is a valve or cock which connects the steam-pipe I with the moderator B, through the pipe  $J'$ . This valve or cock J is used for the purpose of bleeding the boilers—that is, to blow off any excess of steam in the boilers when the engine is stopped or working off less steam than is generated in the boilers. It is also used, when desirable, to fill the moderator with steam and bring up that steam to the desired pressure for working in the large cylinder until it is brought up to that pressure by the accumulation of steam exhausting from the cylinder A.

M is a valve which is loaded with weights or acted upon by springs and working as a safety-valve, so as to prevent any undue accumulation of steam in the moderator B.

The valves V and  $V'$  have nothing novel in their construction, and any valve or valves or cocks will answer in their place, provided they are so combined as to admit steam on the same end of the respective cylinder A and C at the same time, and make the pistons P and Q travel in the same direction.

The working of the engine is substantially the same as the one I have patented and already referred to. The high-pressure steam is admitted by the pipe I to the small cylinder A, and it exhausts by the pipe N into the moderator B. The large cylinder C is supplied with steam from the moderator B through the pipe O, and exhausts by the pipe D into the condenser, as in ordinary low-pressure engines, the small arrows indicating the direction of the steam and of the pistons.

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

1. The arrangement of the two cylinders A and C, having three piston-rods, E, E, and

$p'$ , fastened to a common yoke or cross-piece, K, when combined with the receiver or moderator B.

2. The combination of the valve or cock J, pipe I, and pipe J' with the receiver or moderator B, as described, and for the purpose specified.

3. The arrangement of the two cylinder-

heads F and G, as specified, so as to leave between them the space H, in the manner and for the purpose specified.

ANDREW HARTUPEE. [L. S.]

Witnesses:

H. P. GENGEMBRE,  
I. DONALDSON.