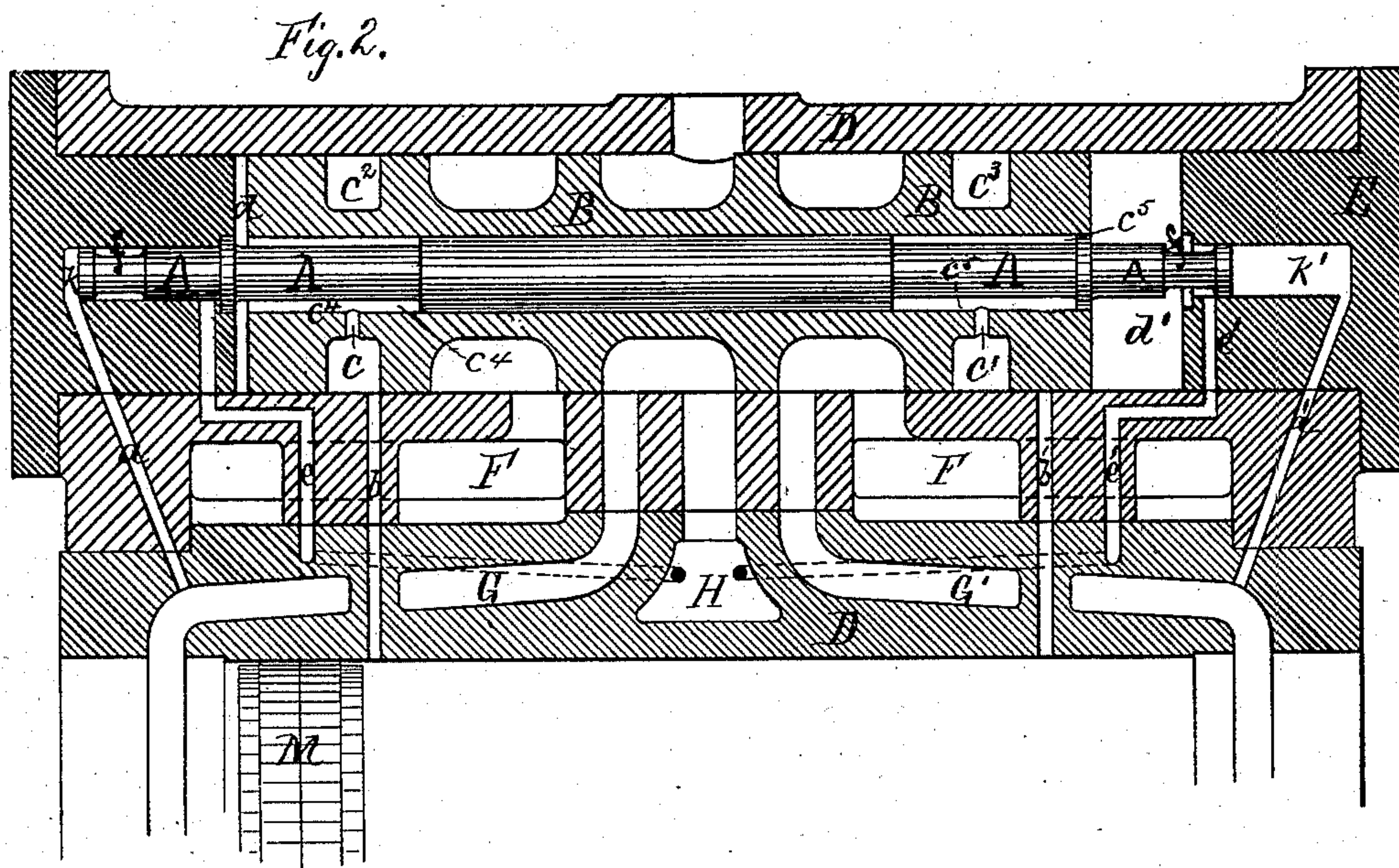
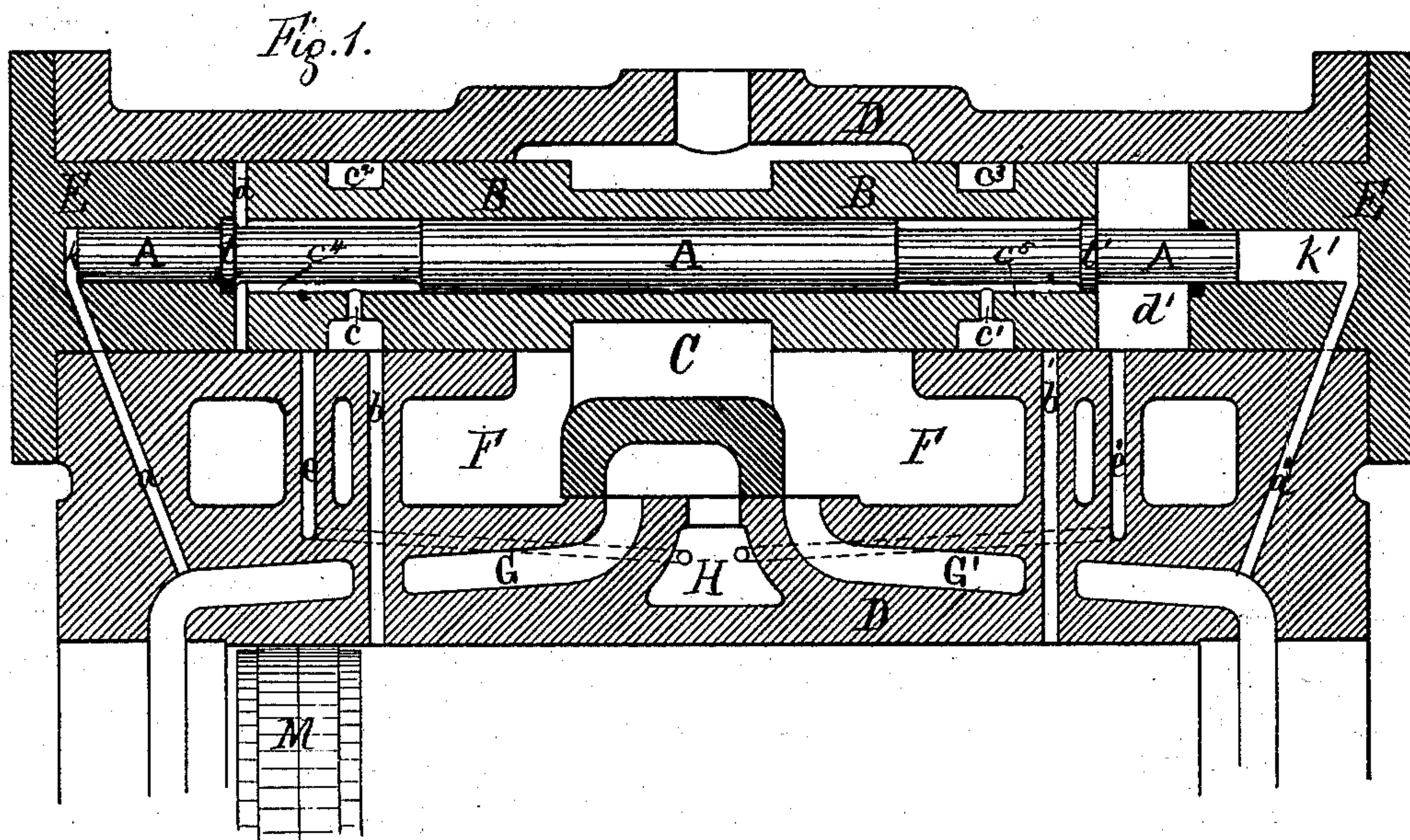


(No Model.)

P. MURRAY, Jr.  
Steam Actuated Valve.

No. 237,994.

Patented Feb. 22, 1881.



WITNESSES:-

*E. A. Horton*  
*Peter DeLacy*

*Peter Murray Jr., INVENTOR,*  
*by atty. J. Clayton.*



# UNITED STATES PATENT OFFICE.

PETER MURRAY, JR., OF NEWARK, NEW JERSEY.

## STEAM-ACTUATED VALVE.

SPECIFICATION forming part of Letters Patent No. 237,994, dated February 22, 1881.

Application filed May 15, 1880 (No model.)

*To all whom it may concern:*

Be it known that I, PETER MURRAY, Jr., of Newark, Essex county, in the State of New Jersey, have invented certain new and useful  
5 Improvements in Steam-Actuated Valves, of which the following is a specification.

My invention consists, chiefly, in the arrangement or combination of two piston-valves, one within the other, working automatically by  
10 steam-pressure, an outside (or in connection therewith a main) steam-valve for supplying steam to a cylinder, substantially as hereinafter specified and claimed.

In the accompanying drawings, Figure 1  
15 represents a vertical longitudinal section of valves and chest embodying some of my improvements, having the main cylinder-valve separate from the piston-valve, but moved by fitting in collar formed at center of outer piston-valve made for that purpose; also, one  
20 method of connecting the ends of outer valve with the exhaust. Fig. 2 represents a vertical longitudinal section embodying other improvements, and having the main valve forming a part of the outer piston-valve with a  
25 different method of applying the exhaust to the end of the outer piston by means of an annular space on the inner valve or rod, keeping the exhaust under the control of the inner  
30 valve, and keeping open later in the movement of the outer valve.

Similar letters of reference designate corresponding parts in both figures.

A represents the inner piston-valve or rod;  
35 B, the outer piston-valve, forming part of main valve in Fig. 2.

C represents the main valve separate from outer piston-valve in Fig. 1.

D represents the steam-chest in Fig. 1, forming a part of cylinder. In Fig. 2 D shows the  
40 steam-chest separate from the cylinder, so that the whole may be removed for repair without disturbing the cylinder.

E represents the heads for chest, forming  
45 guides for the inner valve.

F shows the steam-space; G and G', the ports to the cylinder; H, the exhaust-port; M, the piston of the main cylinder.

a a' are the small ports for the inner valve or  
50 rod; b b', small ports for the larger outer valve, connecting directly with the engine-cyl-

inder; c c', ports through the outer valve, B, and connecting the annular channels c<sup>2</sup> c<sup>3</sup> on the outer valve and the annular channels c<sup>4</sup> c<sup>5</sup> on the inner valve.

d d' represent the clearance for the outer  
55 valve.

e e' represent the exhaust ports or passages for the outer valve, B, connecting direct with the main exhaust-port H.  
60

In the operation of my invention, when the outer valve, B, (or the valve C in connection,) is in the position of full throw, as shown in Fig. 1, steam is admitted to port G' and small  
65 port a', moving the inner valve or stem, A, to full throw, as shown in both figures, and the main piston moves along the cylinder until it passes the port b, through which steam enters to c and d, forcing the outer valve, B, toward  
70 d', where there is a vacuum formed through exhaust-port e' to exhaust H and to the condenser (or to the atmosphere with a high-pressure engine) until the main valve C admits  
75 steam to port G, and through a to end of inner valve or rod, A, while the exhaust is opened to port G' and small port a', causing the inner valve or rod, A, immediately to move  
80 to a reverse position, occupying space k' instead of k. This also closes the steam-port to the outer valve, C, and only leaves expansion-pressure and headway and full vacuum through  
85 b' and e, to carry the valve to a full throw, making an easy and noiseless motion. This opens the full pressure on the piston M, and it moves toward the other end of the cylinder, when, again, the valve reverses, and the piston is ready for the return movement.

In the operation of the valve, as in Fig. 2, the movements and connections remain the same, except that the exhaust-hole e e' connects with an annular space on the inner valve  
90 or rod, A. As the expanded steam from the cylinder is admitted at c to the outer valve, B, it moves to open steam to main cylinder through port G, when pressure passes through hole a to inner valve or rod, A, moving it toward k'.  
95 While this movement is taking place the outer valve, B, moves full over, and is cushioned against the steam left in space d' by the closing of exhaust a f. The piston M in the cylinder has now moved over and opens the port  
100 b', admitting expanded steam, through b' and

$c'$ , to end of outer valve, and repeats the movements in reverse direction.

In Fig. 2 the steam is admitted to the piston through space F.

5 What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, substantially as described, of a cylinder having ports G, G', and H, the inner valve or rod, A, and ports  $a a'$ ,  
10 communicating with the cylinder, the outer valve, B, and its ports  $c c'$ , and channels  $c^2 c^3$  and  $c^4 c^5$ , a slide-valve, C, the cylinder-ports  $b$  and  $b'$ , and exhaust-ports  $e$  and  $e'$ , all arranged in relation to each other as shown and speci-  
15 fied.

2. The steam chest and cylinder, the steam-ports  $a a'$  and  $b b'$  to connect them, the outer valve, B, and its annular steam-channels  $c^2 c^3$ , and ports  $c c'$ , and the inner valve or rod, A, with its channels  $c^4 c^5$ , and having collars  $t t'$ , to regulate the throw of the same, in combination with the main valve C, substantially as and for the purpose described.

PETER MURRAY, JR.

In presence of—

ABRAHAM MANNERS,  
J. C. CLAYTON.