

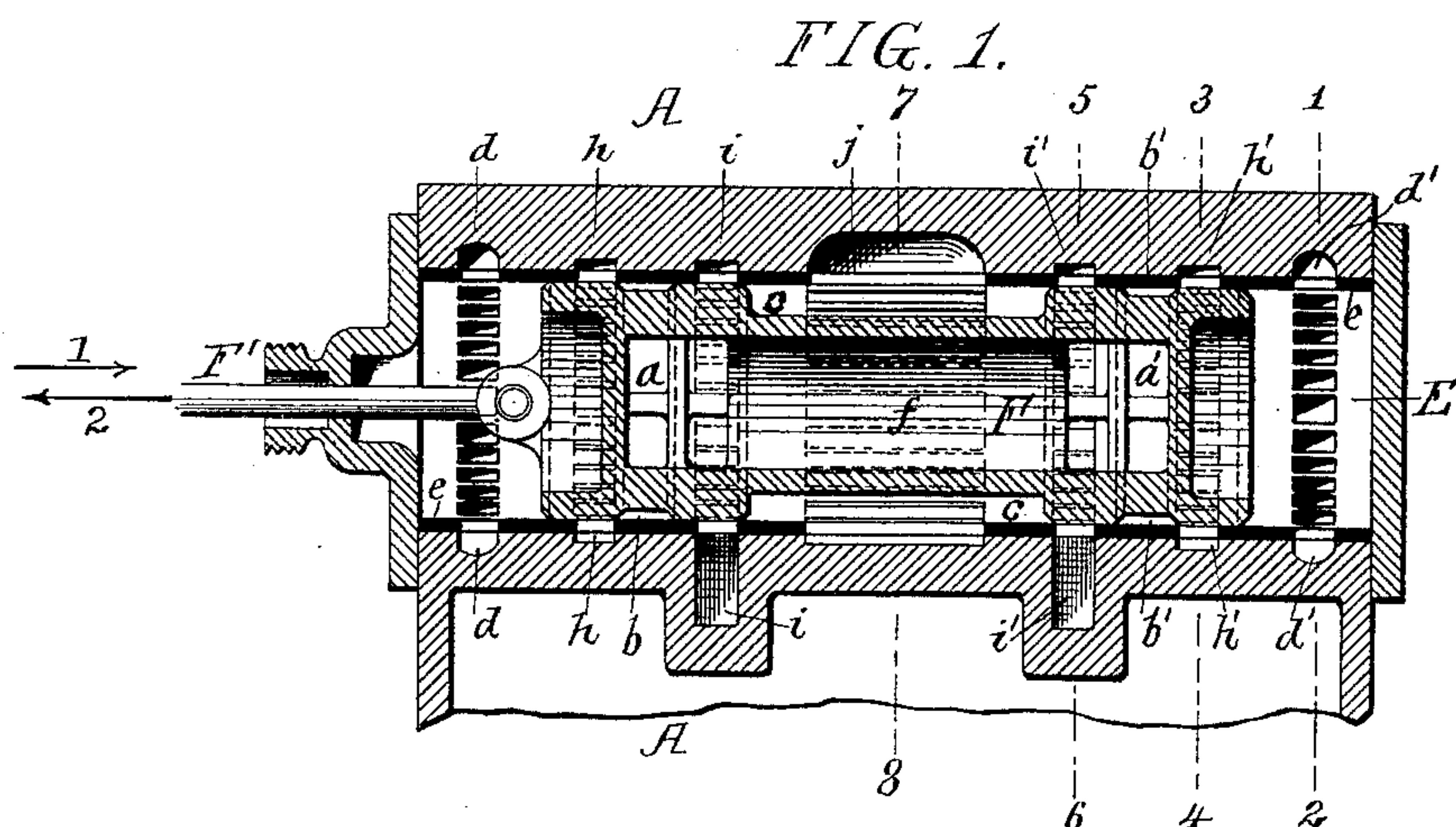
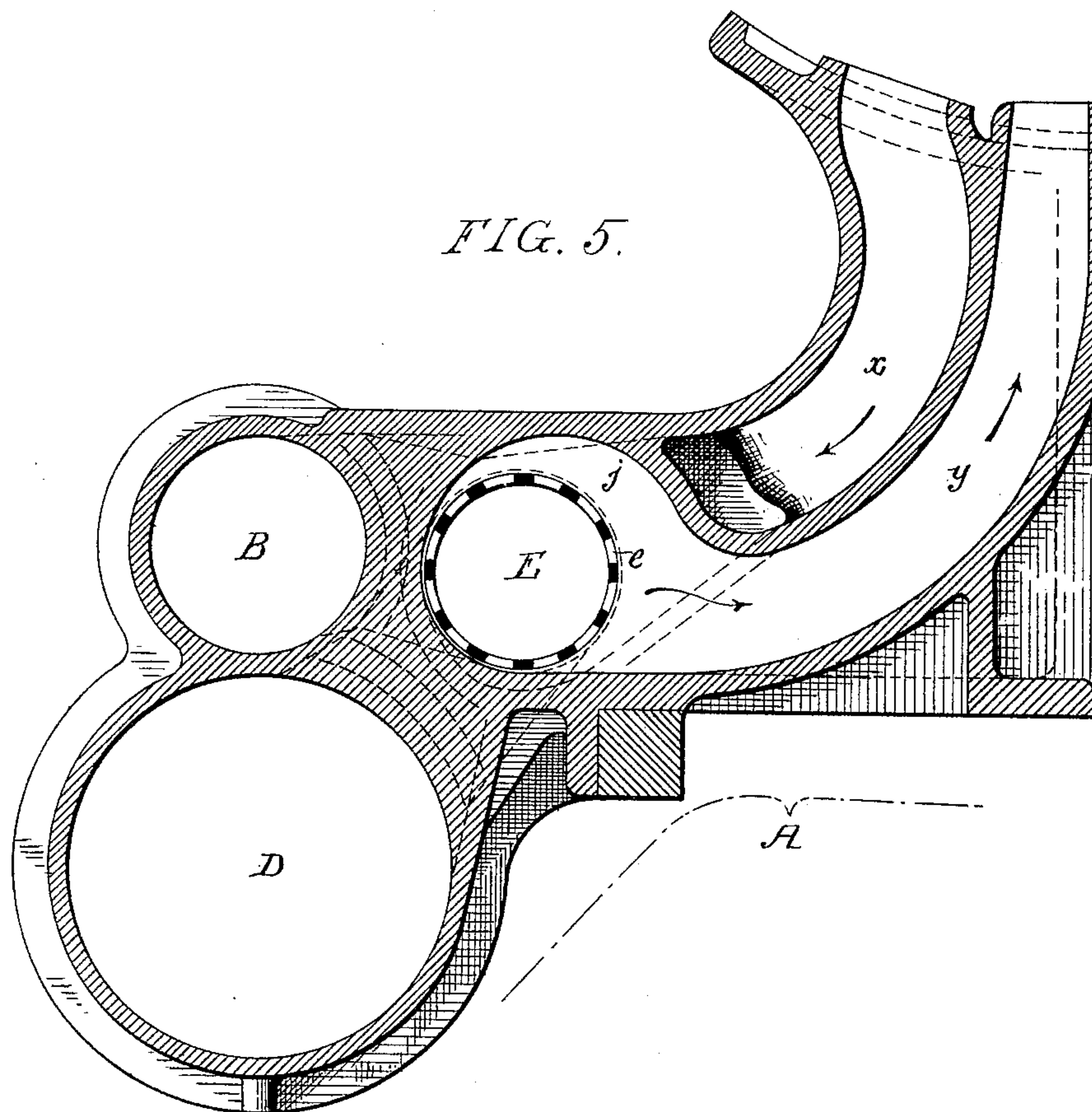
(No Model.)

2 Sheets—Sheet 1.

S. M. VAUCLAIN.  
VALVE FOR COMPOUND ENGINES.

No. 406,012.

Patented June 25, 1889.



Witnesses:  
John Wilson Chr.,  
William D. Corner.

Inventor:  
Samuel M. VaucLain  
by his Attorneys  
Hewson & Hewson

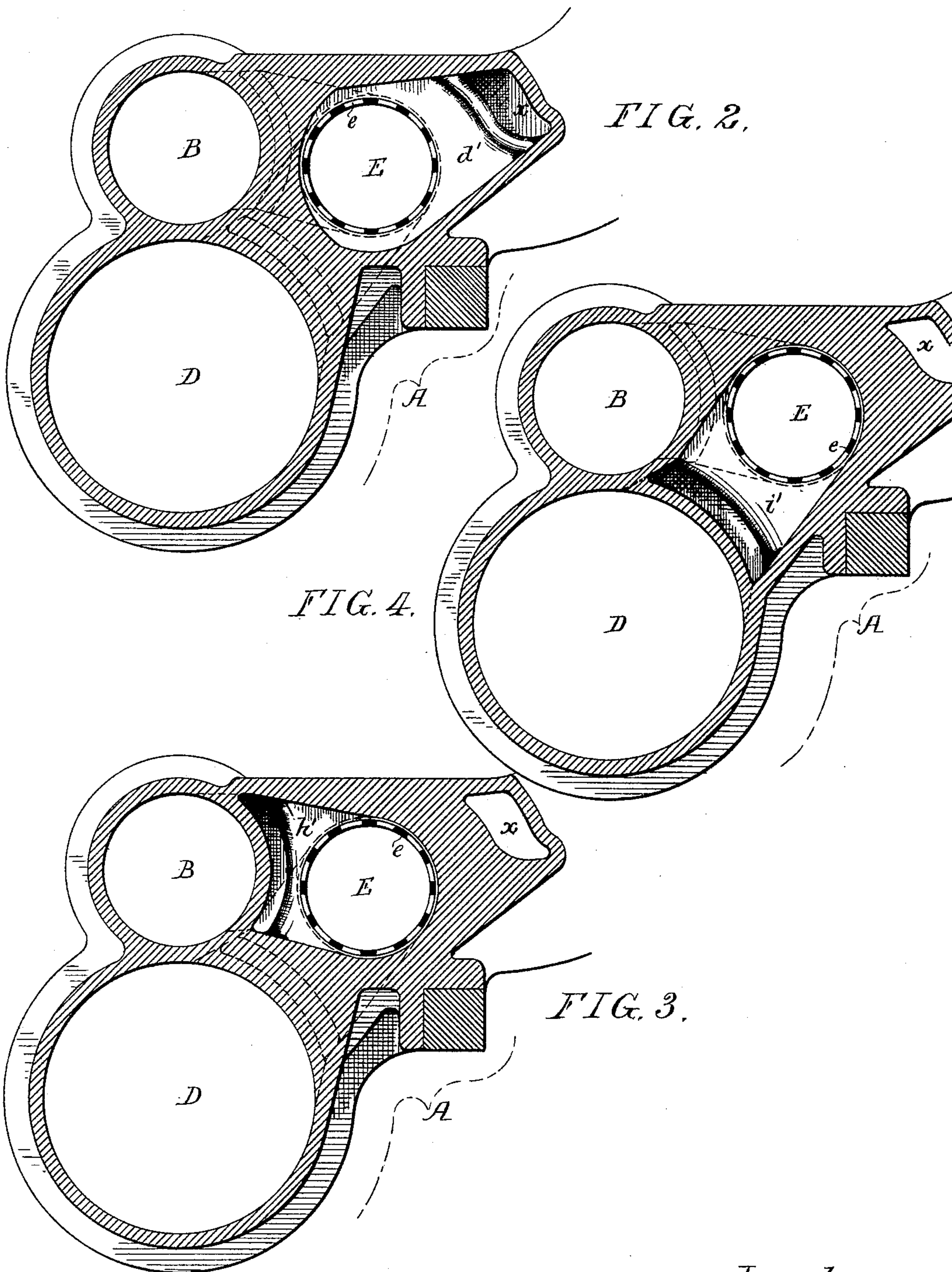
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2 Sheets—Sheet 2.

S. M. VAUCLAIN.  
VALVE FOR COMPOUND ENGINES.

No. 406,012.

Patented June 25, 1889.



Witnesses:  
John Wilson Orr,  
William D. Bonner.

Inventor:  
Samuel M. VaucLain  
by his Attorneys  
Howson & Howson



# UNITED STATES PATENT OFFICE.

SAMUEL M. VAUCLAIN, OF PHILADELPHIA, PENNSYLVANIA.

## VALVE FOR COMPOUND ENGINES.

SPECIFICATION forming part of Letters Patent No. 406,012, dated June 25, 1889.

Application filed March 22, 1889. Serial No. 304,322. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL M. VAUCLAIN, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Valves for Compound Engines, of which the following is a specification.

The object of my invention is to provide a compound engine with a single valve common to both the high and low pressure cylinders, the valve having been especially designed for use in connection with compound locomotive-engines, but being applicable to stationary or marine engines as well.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of the valve and valve-chest. Fig. 2 is a transverse section on the line 1 2, Fig. 1, showing not only the valve, but also the high and low pressure cylinders in section. Fig. 3 is a similar section on the line 3 4, Fig. 1. Fig. 4 is a similar section on the line 5 6, Fig. 1; and Fig. 5 is a similar section on the line 7 8, Fig. 1.

A is a casting containing the high and low pressure cylinders B and D and the valve-chest E. The casting, as shown, forms part of a locomotive-engine,  $x$  being the steam-inlet passage, and  $y$  the exhaust-passage; but it will be understood that other forms of castings may be used, as the different character of the engine or other circumstances may suggest.

In the valve-chest E is a bushing  $e$ , slotted or perforated at the inlet and outlet ports, as shown, to permit the steam to enter and exhaust from the valve-chest.

F is a hollow piston-valve having a high-pressure exhaust-passage  $f$  extending between openings  $a a'$  in said valve, said openings communicating with external grooves  $b b'$  in the periphery of the valve. The valve is also grooved externally at the center  $c$ , the grooves forming passages for the steam, as described hereinafter. The steam-supply ports  $d d'$  communicate with the steam-passage  $x$ , Fig. 2, these ports being situated at the extremes of the valve-chest, as shown in Fig. 1.

Ports  $h h'$  communicate with the opposite ends of the high-pressure cylinder, as shown in Fig. 3; and serve alternately as induction and eduction ports for said high-pressure cyl-

inder,  $i i'$  being the corresponding ports for the low-pressure cylinder, as shown in Figs. 1 and 4, and  $j$  is the final exhaust-port communicating with the exhaust-passage  $y$ , as shown in Figs. 1 and 5.

A valve-rod  $F'$  is connected to the valve F, and passes through a stuffing-box in the head of the valve-chamber, as shown in Fig. 1, for connection to any suitable valve-gear. When the valve is moved in the direction of the arrow 1, Fig. 1, so as to uncover the port  $h$ , the port  $h'$  is in communication with the groove  $b'$ , the port  $i'$  with the groove  $c$ , and the port  $i$  with the groove  $b$  of the valve; hence steam passes from the supply-port  $d$  through the port  $h$  to the rear end of the high-pressure cylinder, while steam is exhausted from the front end of the said cylinder through the port  $h'$ , through the groove  $b'$ , port  $a'$ , passage  $f$ , port  $a$ , and groove  $b$  of the valve, and through the port  $i$  to the rear end of the low-pressure cylinder D, the steam exhausting from the front end of the low-pressure cylinder through the port  $i'$ , groove  $c$ , and port  $j$  to the exhaust-passage  $y$ .

When the valve is moved in the direction of the arrow 2, high-pressure steam from the supply-port  $d'$  passes through the port  $h'$  to the front end of the high-pressure cylinder, steam passing from the rear end of the same through the port  $h$ , valve, and port  $i'$  to the front end of the low-pressure cylinder, and steam escaping from the latter through the port  $i$ , groove  $c$ , and port  $j$  to the exhaust.

By the above-described means I am enabled with a single valve to control the admission of steam into the high and low pressure cylinders, and by making the valve hollow or with a passage through it I am enabled to restrict the size of the valve and chest and provide comparatively straight and short passages for the steam.

I claim as my invention—

1. The combination, in a valve structure for compound engines, of the valve-chest having supply-ports, high-pressure induction and eduction ports, low-pressure induction and eduction ports, and final exhaust-port, with a hollow valve having an internal passage providing communication between the high-pressure ports and the opposite low-pressure

ports, and a passage between the latter and the exhaust-port, substantially as described.

2. The combination, in a compound engine, of the high and low pressure cylinders situated side by side, the valve-chest common to both cylinders and situated at the side thereof, said chest having supply-ports at the ends, a final exhaust-port at the center, high-pressure induction and eduction ports adjoining the steam-supply ports, and low-pressure induction and eduction ports adjoining the final exhaust-port, with a hollow valve having an

internal passage connecting opposite high and low pressure ports, and a passage connecting the latter ports and the exhaust-port, substantially as described. 15

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL M. VAUCLAIN.

Witnesses:

WM. RHODES,  
FRANK H. MASSEY.