

No. 694,702.

Patented Mar. 4, 1902.

S. M. VAUCLAIN.  
COMPOUND ENGINE AND VALVE THEREFOR.

(Application filed Nov. 2, 1900.)

(No Model.)

2 Sheets—Sheet 1.

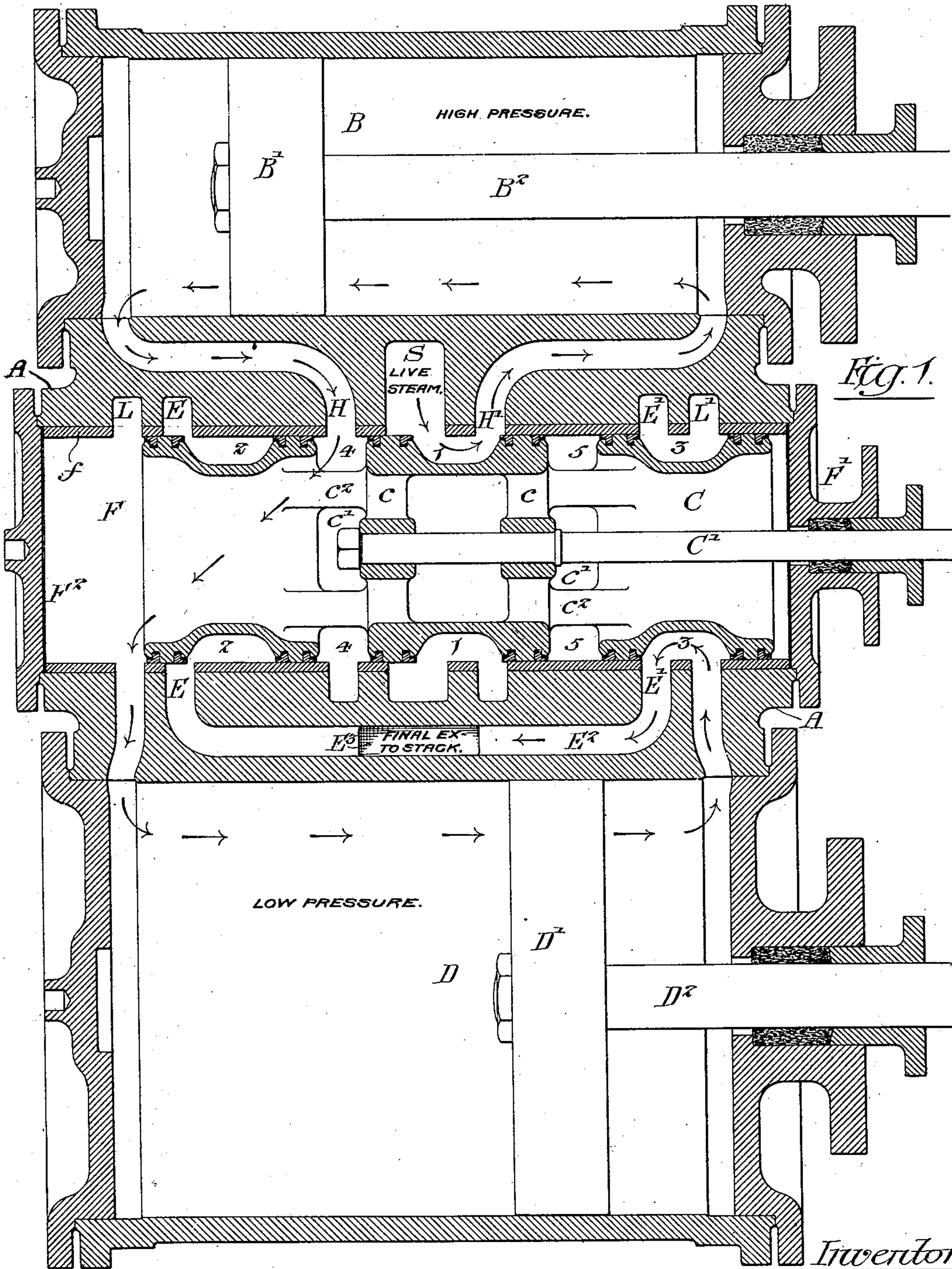


Fig. 1.

Witnesses:-

Hamilton S. Turner

Louis M. F. Whitehead.

Inventor:  
Samuel M. Vauclain

by his Attorneys:-

Howell & Howell

No. 694,702.

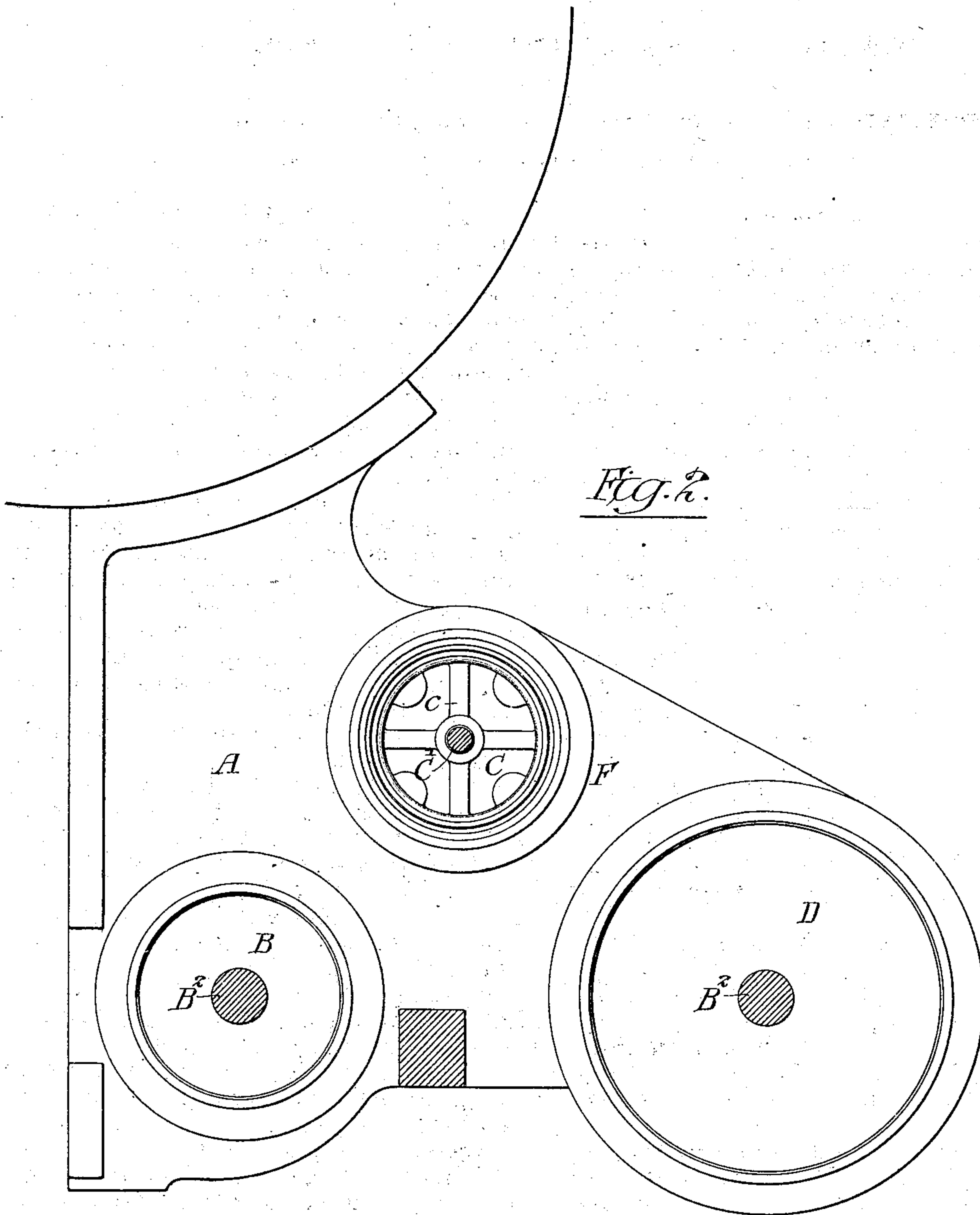
Patented Mar. 4, 1902.

S. M. VAUCLAIN.  
COMPOUND ENGINE AND VALVE THEREFOR.

(Application filed Nov. 2, 1900.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses:

Hamilton D. Turner  
Louis M. Whitehead

Inventor:

Samuel M. Vaucrain.  
by His Attorneys.  
Howell & Howen



# UNITED STATES PATENT OFFICE.

SAMUEL M. VAUCLAIN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
THE FIRM OF BURNHAM, WILLIAMS & COMPANY, OF PHILADELPHIA,  
PENNSYLVANIA.

## COMPOUND ENGINE AND VALVE THEREFOR.

SPECIFICATION forming part of Letters Patent No. 694,702, dated March 4, 1902.

Application filed November 2, 1900. Serial No. 35,230. (No model.)

*To all whom it may concern:*

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

The object of my invention is to provide a compound engine with a valve-chest and valve common to both cylinders and so designed that the valve will be balanced, the steam will be admitted to the center of the chest, and steam from one end of the high-pressure cylinder will exhaust directly into that end of the low-pressure cylinder, the exhaust for the low-pressure cylinder being conveyed to a central discharge-passages.

In the accompanying drawings, Figure 1 is a longitudinal sectional view through the high and low pressure cylinders and through the valve-chest and valve, and Fig. 2 is a transverse sectional view.

A is a casting, in the present instance containing the high-pressure cylinder B, the low-pressure cylinder D, and the valve-chest F. This casting forms part of a locomotive-engine, although my invention is applicable to any compound engine.

Fig. 2 shows one-half of the saddle of a locomotive-engine, in which the high and low pressure cylinders are mounted on each side of the locomotive.

B' is the piston of the high-pressure cylinder, having a rod B<sup>2</sup>, which passes through the usual stuffing-box in the head of the cylinder.

D' is the piston of the low-pressure cylinder, having a rod D<sup>2</sup>, which passes through the usual stuffing-box in the end of the cylinder D.

The valve-chest F in the present instance is mounted, as shown in Fig. 2, above the cylinders, although it will be understood that it may be mounted in any position according to the design of the engine. The valve-chest F has a bushing f and heads F' F<sup>2</sup>.

C is the valve, having a valve-stem C', which passes through a stuffing-box in the head F'. The valve C is open at both ends and hollow throughout its length, having

spiders c c on each side of the center, to which the valve-rod C' is secured. The valve is divided into three sections by passages which form communication between the center of the valve and the ports 4 and 5. The central section has an annular passage 1, and the side sections have annular passages 2 and 3, respectively. Between the several passages are suitable packing-rings, which prevent leakage of the steam from one passage to the other.

S is a port connected to the source of steam-supply and is the central port of the series.

H H' are the two ports leading from the valve-chest to the high-pressure cylinder B.

L L' are ports at each end of the valve-chest leading to the low-pressure cylinder, and E E' are the exhaust-ports leading from the valve-chest through a passage E<sup>2</sup> to the final exhaust-passage E<sup>3</sup>.

The valve and the ports are so arranged that steam will be admitted to one end of the high-pressure cylinder and steam will exhaust from the opposite end of the high-pressure cylinder to that end of the low-pressure cylinder through the hollow valve, as indicated by the arrows, Fig. 1, and steam at the opposite end of the low-pressure cylinder will exhaust through one of the annular passages in the end sections of the valve through one of the exhaust-passages E<sup>2</sup> to the final exhaust E<sup>3</sup>. Thus by the arrangement above described and shown in the drawings I am enabled to connect the live-steam port S directly with either end of the high-pressure cylinder and to form an almost direct connection between one end of the high-pressure cylinder and the low-pressure cylinder through the hollow valve. The valve being hollow throughout enables me to use the valve-chest as an expansion-chamber between the high and low pressure cylinders and have very little clearance in the low-pressure cylinder. Furthermore, the valve is perfectly balanced.

The steam-inlet is at the center of the valve, and the exhaust is led to a point where it can be readily directed to the stack.

The cylinders and valve structure of this application are used in connection with the engine-gear clearly shown and described in a



companion application filed by me even date herewith.

I claim as my invention—

1. The combination of high and low pressure cylinders, with a valve-chest having a central port connected to a series of steam-supply, ports on each side of the central port communicating with the high-pressure cylinder, ports at each end of the chest communicating with the low-pressure cylinder, ports adjacent to the low-pressure-cylinder ports, communicating with an exhaust-passage, a valve consisting of three annular sections provided with passages in their external surfaces, said sections being rigidly connected to the valve-rod, having passages through them and annular openings between them, said openings being in communication with each other and with both ends of the valve-chest through the passages in the interior in the said sections of the valves, substantially as described.

2. The combination of high and low pressure cylinders having a valve-chest, a central port in said chest connected to a source of steam-supply, ports on each side of the cen-

tral port communicating with the high-pressure cylinder, ports at each end of the chest communicating with the low-pressure cylinder, ports adjacent to the low-pressure-cylinder ports, communicating with an exhaust, a valve consisting of a cylindrical section, having fixed to it a valve-rod, said section having an annular depression in its external surface a similar cylindrical section on each side of and similar to the first section held to the same and supported independently of the valve-rod by longitudinal ribs, said sections also having annular depressions in their external surfaces, all of the said sections being hollow and thereby allowing free passage of fluid from end to end of the valve and also to the interior of said sections from the space between the same, substantially as described.

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

SAMUEL M. VAUCLAIN.

Witnesses:

WILLIAM DE KRAFFT,  
JAS. H. M. HAYES.