

(No Model.)

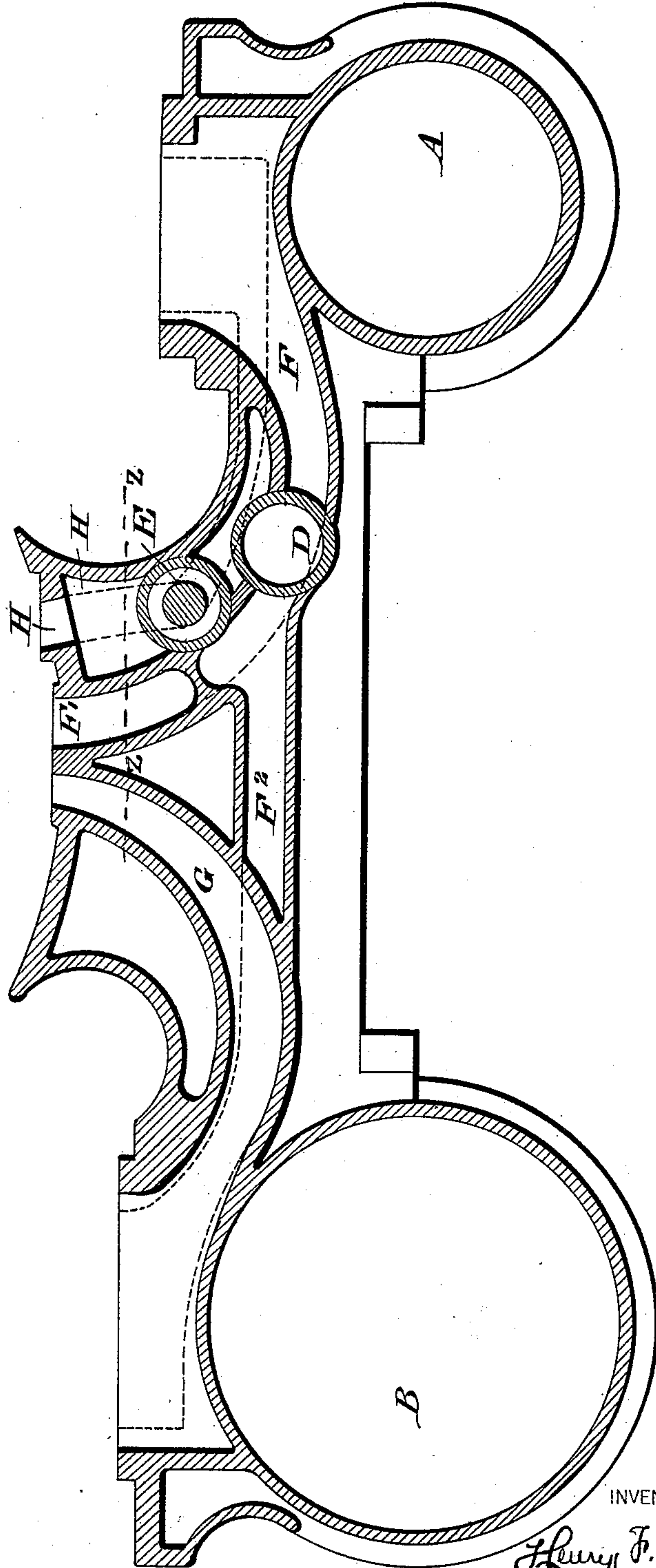
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H. F. COLVIN.
STEAM ENGINE.

No. 428,892.

Patented May 27, 1890.

Fig. 1.



WITNESSES:

P. H. Ingle
L. Douville

INVENTOR:

BY

Henry F. Colvin
John A. Diersheim
ATTORNEY.

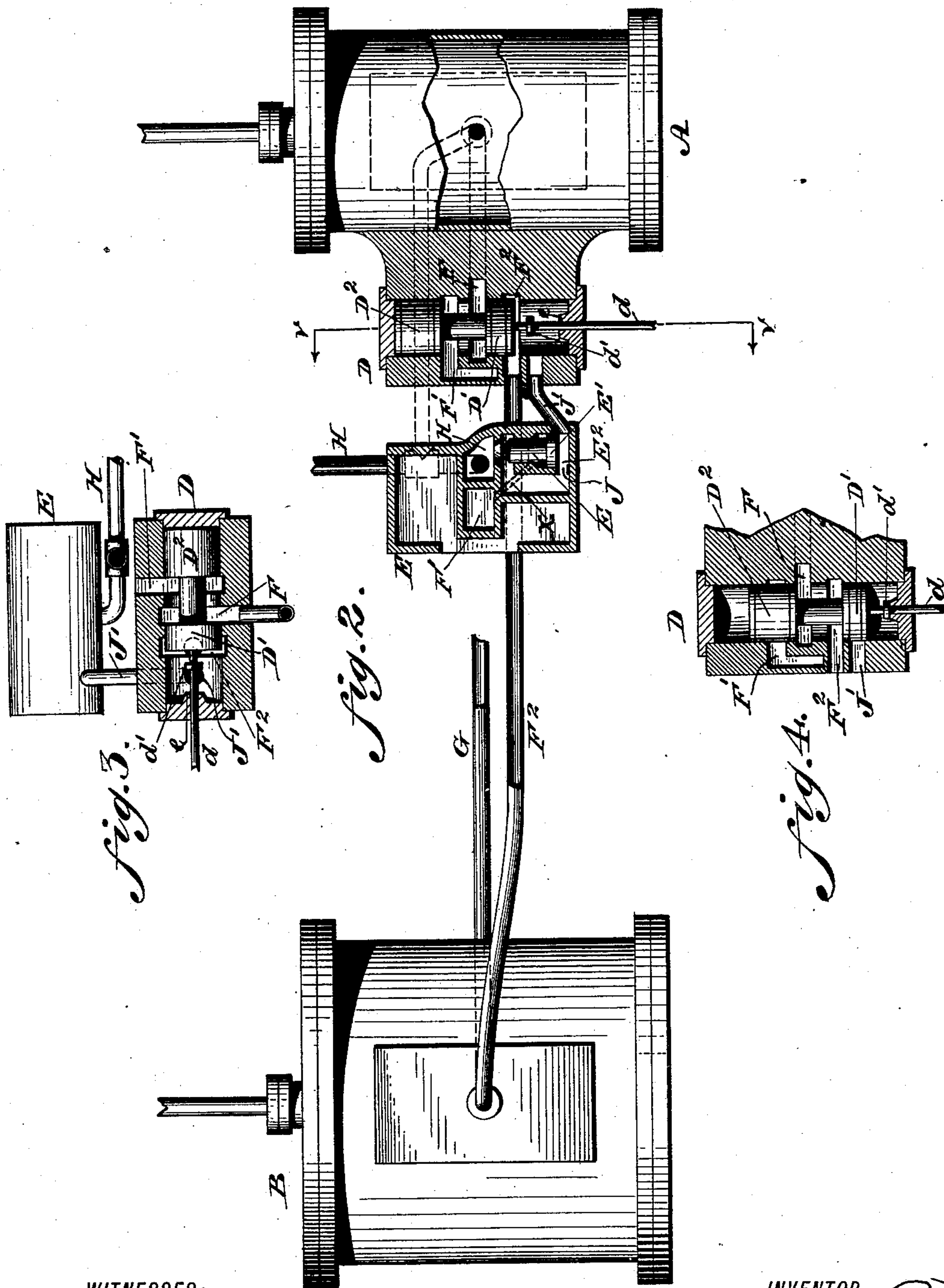
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WITNESSES:
L. Douville,
P. F. Chagles.

INVENTOR
H. F. Colvin
BY
J. A. Frederickson
ATTORNEY.

UNITED STATES PATENT OFFICE.

HENRY F. COLVIN, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 428,892, dated May 27, 1890.

Application filed September 20, 1889. Serial No. 324,504. (No model.)

To all whom it may concern:

Be it known that I, HENRY F. COLVIN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Steam-Engines, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to steam-engines, the improvement being designed for single or double expansion or compound engines; and it consists of two or more cylinders of different sizes arranged on the engine, the smaller cylinder or cylinders being for steam direct from the boiler and the larger cylinder or cylinders for exhaust-steam from the smaller ones, the said cylinders being arranged in such manner that live steam from the same source of supply can be used in both sets of cylinders when required, or live steam can be used in the high-pressure cylinder and its exhaust in the low-pressure cylinder, the controlling-valve connecting the communicating passages for the supply of the exhaust-steam to the low-pressure cylinder, all of which is accomplished by the means or equivalent thereof as will be hereinafter fully set forth.

Figure 1, on an enlarged scale, represents a section of cylinders, valves, and passages of a steam-engine embodying my invention. Fig. 2, on an enlarged scale, represents a horizontal section on line *z z*, Fig. 1. Fig. 3 represents a vertical section on line *v v*, Fig. 2. Fig. 4 represents a sectional view of the controlling-valve and adjacent parts on the same plane as in Fig. 2, the valve being in a different position from that shown in said Fig. 2.

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

Referring to the drawings, A designates a high-pressure cylinder, and B a low-pressure cylinder.

D designates an intermediate or controlling valve for the purposes of changing the engine from high to low pressure, and vice versa.

E designates a reducing-valve, which permits the necessary amount of steam to pass to the low-pressure cylinder B, so that its power will be the same as the high-pressure A when working both with steam direct from

the boiler. The exhaust-passage F from the high-pressure cylinder A leads to the chamber of the controlling-valve D, and an exhaust-passage F' leads from said chamber to the atmosphere, and connecting the said chamber of the valve D with the low-pressure cylinder B is a passage F². The passage H leads from a boiler to the steam-chest of the cylinder A and through the chamber of the reducing-valve E and passage J' into the chamber of the valve D.

G designates a passage for the exhaust-steam of the low-pressure cylinder, and may be connected, if desired, with the passage F'.

The small passage X, Fig. 2, allows any leakage of steam around the packing of the valve or piston E to escape to the atmosphere through the passage F'.

As shown in Fig. 2, the head E' of piston or valve E moves in a chamber E², which has a port or passage J communicating with the passage H. The steam entering the passage H from the boiler acts against the smaller portion of valve E, which opens said passage H, so that the steam passes around the same and through the port J into the passage J', pressing against the larger end of the said valve E. The smaller end of the reducing-valve E will be lifted from its seat to allow sufficient steam to pass to the rear thereof and into the passages J' as will exert a total pressure against the larger end of the valve equal to the total pressure exerted against the smaller end thereof, so that the valve will remain balanced or at rest so long as the pressure on the smaller end remains unchanged.

The controlling valve or piston D is constructed with double heads D' and D², the head D' having a stem *d* connected thereto, to which is attached a lever situated in the cab of the engine or in proximity to the engineer. The stem *d* of said valve or piston D is formed with a stop-collar *d'*, adapted to bear against a projection on the head *e* of said valve-chamber, and thereby limit the movement thereof. This latter construction informs the engineer that the valve is open to its full extent, said parts being so arranged that the head D² will either shut off or open

communication between the passages F and F', and the head D' open or close the communication between the passages F and F² and the passages J and F².

5 As the valve or piston D is shown positioned in Figs. 3, 4, and 5, it is arranged to cause the engine to work with steam direct from the boiler in both cylinders—that is, the high-pressure cylinder A will receive steam through
10 the passage II direct into the chest, and cylinder B will receive steam from the boiler through passage II, reducing-valve E, passage J', the chamber of valve D, and passage F², and the exhaust from the cylinder A will pass
15 through passages F and F' to the atmosphere, the cylinder B exhausting through passage G. This arrangement of the controlling-valve D is had when the engine is starting or when the work cannot be done with the cylinder A
20 alone.

When the engine is under headway, the valve D is drawn back, as in Fig. 6, to close communication between passages F and F' and open passages F and F² to each other
25 and close the communication of passages J' with F², when the exhaust-steam from cylinder A will flow through the passages F and F² into the steam-chest of the cylinder B, the live steam from the passage J' being shut off from
30 entering the passage F² by the head D' of the said valve D.

It will be seen that the valve E effects a uniformity of pressure by its automatic reduction, as has been fully set forth.

35 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A steam-engine having high and low pressure cylinders, a live-steam passage lead-

ing direct to the high-pressure cylinder, and a 40 passage with reducing-valve leading from the live-steam passage to the low-pressure cylinder, and a controlling-valve having an exhaust-passage leading from the high-pressure cylinder to its chamber, and an exhaust- 45 passage leading from said chamber, the said live-steam passage to the low-pressure cylinder leading into said controlling-valve chamber, said parts being combined substantially
50 as described.

2. A steam-engine having a high-pressure cylinder and a low-pressure cylinder, a supply-passage having the reducing-valve, the exhaust-passage F, leading from the high-pressure cylinder, the passage F², leading to the 55 low-pressure cylinder, the passage F', leading to the atmosphere, the reciprocating valve D, with heads D' and D², adapted to alternately open and close the communication of the passage F with the passages F' and F², and the 60 passages J' with the passage F², and the exhaust-passage G for the low-pressure cylinder, said parts being combined substantially as described.

3. A steam-engine having the passage II 65 leading from the boiler to the steam-chest thereof, the valve-chamber E², with reducing-valve E therein, and the passage J', communicating with the chamber E² and passage F², and a controlling-valve D, adapted to open or 70 close the communication of the said passages J' and F², said parts being combined substantially as described.

HENRY F. COLVIN.

Witnesses:

JOHN A. WIEDERSHEIM,
L. JENNINGS.