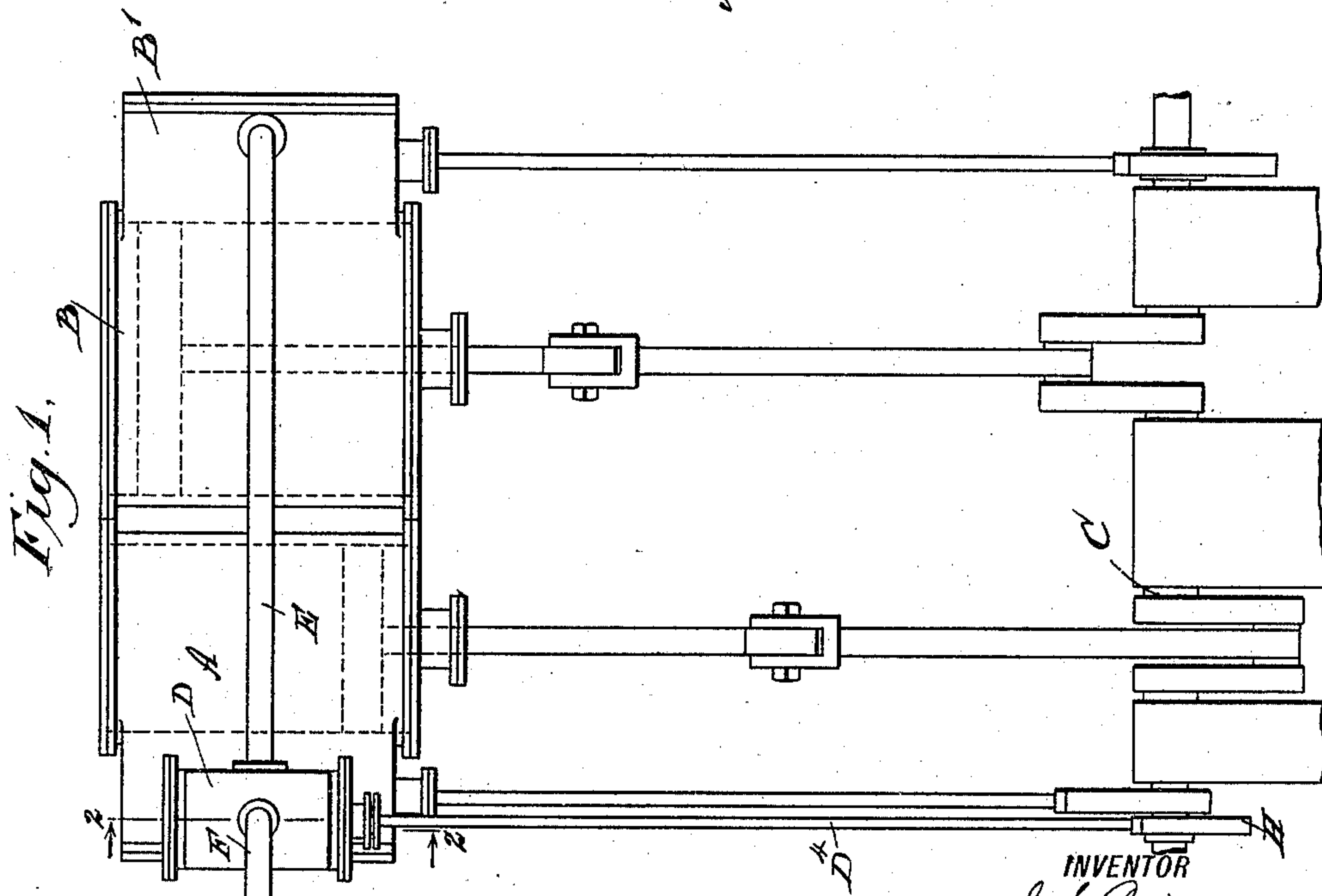
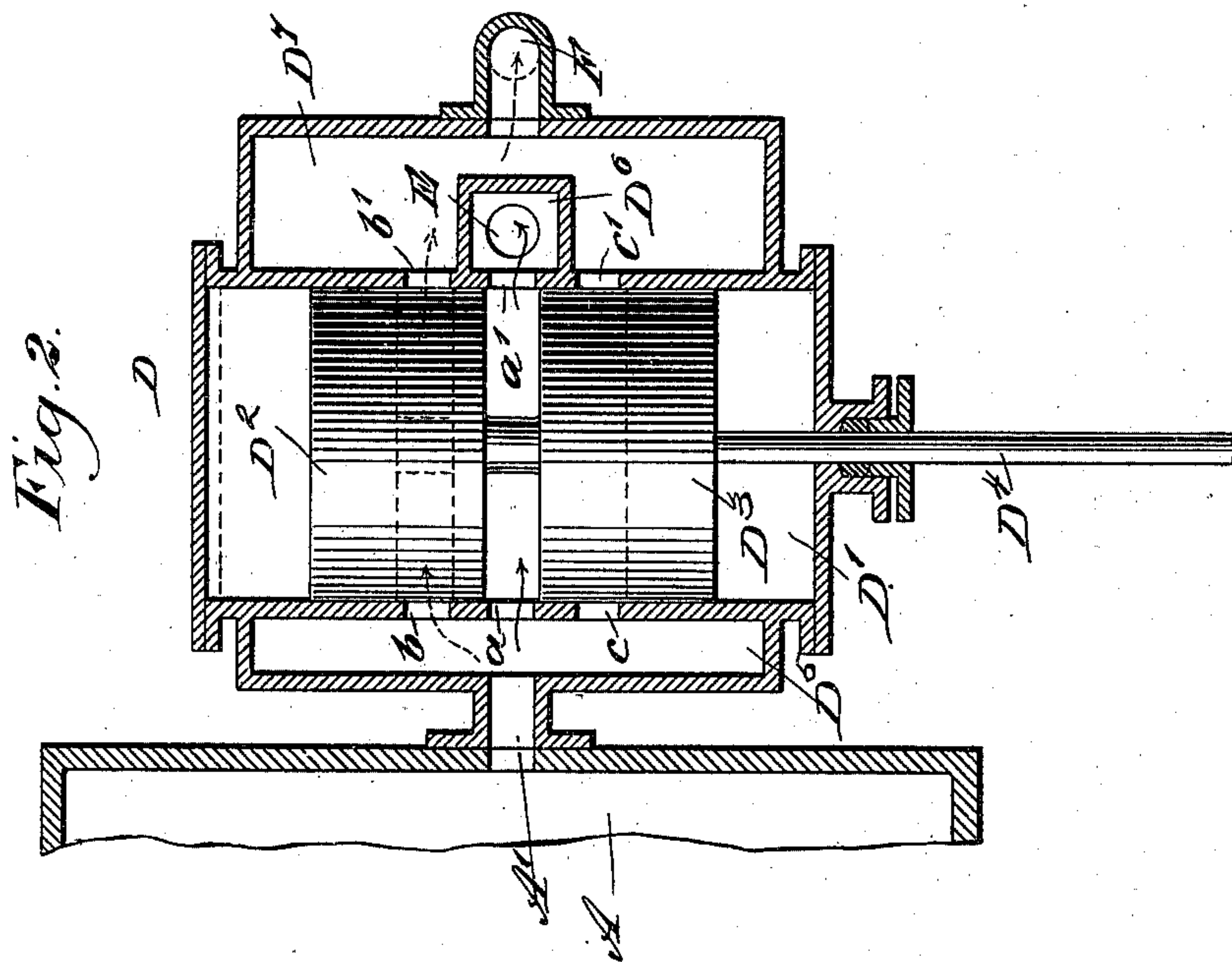


(No Model.)

J. S. BRIGGS.
COMPOUND CONDENSING ENGINE.

No. 598,357.

Patented Feb. 1, 1898.



WITNESSES:

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JOHN SANDERS BRIGGS, OF POLAND, MAINE.

COMPOUND CONDENSING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 598,357, dated February 1, 1898.

Application filed February 17, 1897. Serial No. 623,766. (No model.)

To all whom it may concern:

Be it known that I, JOHN SANDERS BRIGGS, of Poland, in the county of Androscoggin and State of Maine, have invented a new and Improved Compound Condensing-Engine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved compound condensing-engine arranged to prevent back pressure in a high-pressure cylinder and to supply the low-pressure cylinder as well as the condenser with exhaust-steam from the high-pressure cylinder.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both figures.

Figure 1 is a side elevation of the improvement; and Fig. 2 is an enlarged transverse section of the valve, the section being on the line 2 2 of Fig. 1.

The engine, as shown in Fig. 1, is provided with the high-pressure cylinder A and the low-pressure cylinder B, both having their pistons connected in the usual manner with the main driving-shaft C of the engine. In the exhaust A' of the high-pressure cylinder A is arranged a valve D, adapted to connect the said exhaust A' successively with the supply-pipe E for the steam-chest B' of the low-pressure cylinder B and with the pipe F, leading to the condenser G, of any approved construction. The valve D is actuated by the eccentric H, or other suitable means, from the main driving-shaft C, and the valve is preferably of the construction shown in detail in Fig. 2. The valve D is provided with a cylinder D', containing the cylindrical valves D² and D³, placed a suitable distance apart and secured on the same valve-stem D⁴, connected with the eccentric H, so as to be actuated by the same. The valve-cylinder D' is provided with the two oppositely-arranged ports a and a', of which the port a opens into a chamber D⁵, directly connected with the exhaust A', and the other port a' opens into a chamber D⁶, connected with the pipe E, previously

mentioned. The ports b and c open from the cylinder D into the chamber D⁵, and the ports b' and c', located directly opposite the ports b and c, open into a chamber D⁷, connected with the pipe F, leading to the condenser G, previously mentioned. The valves D² and D³ are so arranged that when the ports a a' are open, as shown in Fig. 2, the ports b b' and c c' are closed, and when one set of ports b b' or c c' is open the set of ports a a' is closed.

Now when the piston in the high-pressure cylinder A begins its working stroke the valves D² D³ are in the position shown in Fig. 2, so that the exhaust in front of the piston of the high-pressure cylinder can pass by way of the exhaust A', chamber D⁵, port a, cylinder D', port a', and chamber D⁶ to the supply-pipe E, carrying the steam to the steam-chest B' of the low-pressure cylinder B, to act on the piston therein in the usual manner. When the high-pressure cylinder-piston has advanced a suitable distance, then either of the valves D² D³ closes the set of ports a a' and opens the corresponding set of ports b b' or c c'. The remainder of the exhaust-steam from the high-pressure cylinder A now passes from the chamber D⁵ by the open set of ports b b' or c c' into the chamber D⁷ and from the latter by the pipe F to the condenser G. On the return stroke of the piston in the high-pressure cylinder A the above-described operation is repeated—that is, part of the exhaust in front of the piston first passes into the low-pressure cylinder B and the remainder into the condenser G, so that the piston in the high-pressure cylinder is during its entire travel completely relieved of any back pressure whatever.

I do not limit myself to the particular construction of the valve shown and described, as it is evident that other suitably-constructed valves may be employed for accomplishing the same result.

It is understood that if three or more cylinders are used each intermediate cylinder is provided with the valve arrangement described to prevent back pressure in the said cylinders.

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

1. A compound condensing-engine provided

with a valve comprising a cylinder having ports in its sides arranged midway between its ends and connected respectively with the exhaust and the low-pressure cylinder, the said cylinder being further provided with ports arranged between the first-mentioned ports and the ends of the cylinder and connected respectively with the exhaust and the condenser, and a piston-valve arranged to reciprocate in said cylinder and provided with a transverse passage arranged midway between its ends, whereby when the said piston-valve is on the center of its stroke the exhaust will be connected with the low-pressure cylinder and when moved toward either end of its stroke the exhaust will be connected with the condenser, substantially as described.

2. A compound condensing-engine comprising high and low pressure cylinders, a condenser and a valve comprising a cylinder having ports on one side connecting with the exhaust of the high-pressure cylinder, and ports on the opposite side connecting respectively with the low-pressure cylinder and the condenser, and a valve arranged to reciprocate in said cylinder and having a transversely-extending passage arranged to connect the exhaust from the high-pressure cylinder successively with the low-pressure cylinder and the condenser, substantially as shown and described.

3. A compound condensing-engine provided with a valve comprising a cylinder having oppositely-arranged ports, the ports on one side being connected with the exhaust of the high-pressure cylinder and the ports on the opposite side being connected respectively with the low-pressure cylinder and the condenser and cylindrical valves contained in said cylinder and spaced apart, the space between the said valves being arranged to connect the ports receiving the exhaust successively with the ports leading to the low-pressure cylinder and the condenser, substantially as shown and described.

4. A compound condensing-engine provided with a valve comprising a cylinder having two ports arranged respectively at opposite sides

of the cylinder and midway between its ends, one of said ports being connected with the exhaust for the high-pressure cylinder and the other with the low-pressure cylinder, ports arranged opposite each other in the said cylinder and located between the first-mentioned ports and the ends of the cylinder, the said ports on one side of the cylinder being connected with the exhaust for the high-pressure cylinder and those on the opposite side with the condenser, and a cylindrical valve adapted to reciprocate in said cylinder and having a transverse opening adapted when the said valve is on the center of its stroke to connect the exhaust of the high-pressure cylinder with the low-pressure cylinder end when the said valve moves toward either end of the cylinder to connect the said exhaust with the condenser, substantially as shown and described.

5. A compound condensing-engine comprising high and low pressure cylinders, a condenser and a valve comprising a cylinder, and cylindrical valves contained in said cylinder and spaced apart, the said valves being secured on the same valve-stem, the said cylinder being provided with two oppositely-arranged ports one of which opens into a chamber directly connected with the exhaust of the high-pressure cylinder, the other port opening into a chamber connected with a pipe leading to the steam-chest of the low-pressure cylinder, the said cylinder being further provided with ports located above and below the first-mentioned ports at opposite sides of the cylinder, the said ports at one side opening into the chamber connected with the exhaust of the high-pressure cylinder, and the ports at the opposite side of the cylinder opening into a chamber connected with a pipe leading to the condenser, the space between the cylindrical valves being arranged to connect the exhaust of the high-pressure cylinder successively with the low-pressure cylinder and the condenser, as and for the purpose set forth.

JOHN SANDERS BRIGGS.

Witnesses:

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