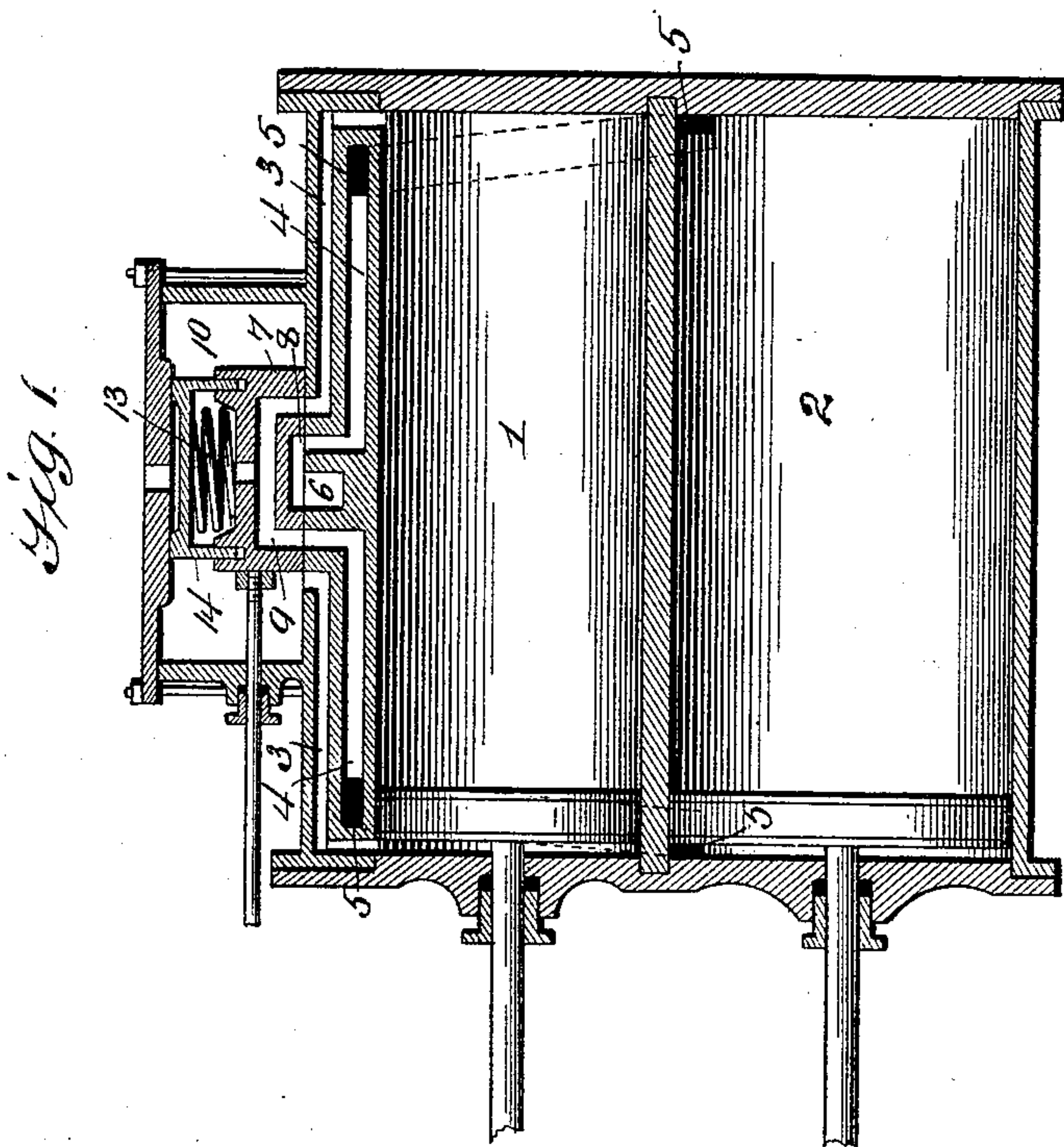
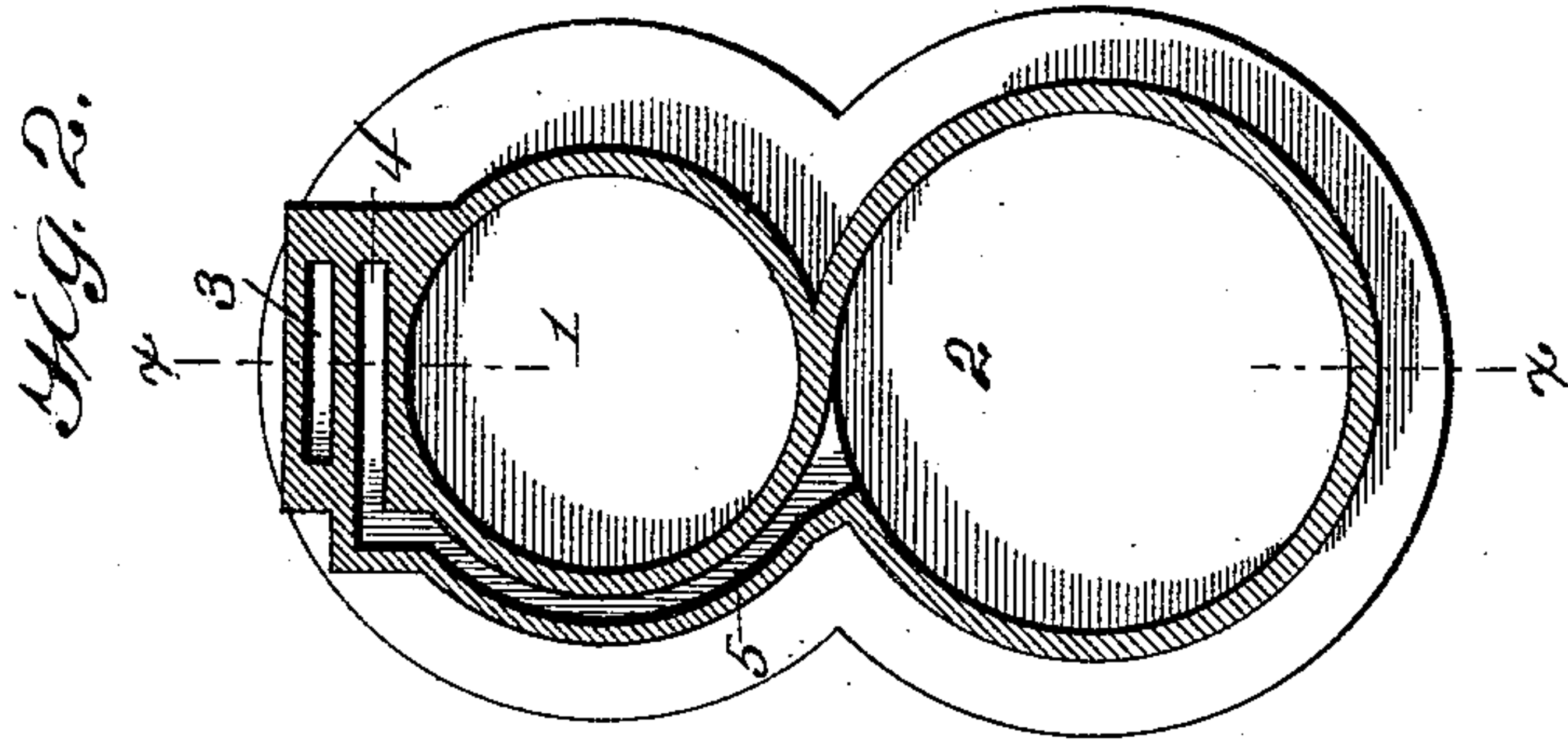


(No Model.)

C. SCHLARED.  
COMPOUND STEAM ENGINE.

No. 543,057.

Patented July 23, 1895.



WITNESSES

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# UNITED STATES PATENT OFFICE.

CHARLES SCHLARED, OF COLUMBUS, OHIO.

## COMPOUND STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 543,057, dated July 23, 1895.

Application filed September 25, 1893. Serial No. 486,408. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES SCHLARED, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Compound Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates particularly to the kind of compound engine of which the patent granted to W. Baxter, Jr., July 21, 1874, No. 153,300, is an example—that is, those in which the piston in both the high and low pressure cylinders move simultaneously in the same direction.

My invention consists of a construction and arrangement of ports, passages, and valve that simplify and cheapen the manufacture of such engines and lessen the expense of running them by preventing as far as possible loss of heat from the steam in its passage from one cylinder to the other, as hereinafter set forth.

In the accompanying drawings, Figure 1 is a vertical sectional view of the cylinders and valve, taken on a plane designated by the line *xx* of Fig. 2; and Fig. 2 is a transverse vertical sectional view.

1 and 2 designate the small and large or high and low pressure cylinders, respectively, which are independent of each other and are arranged one above the other. Each of the cylinders is furnished with the usual piston, the rods of which may be connected to one cross-head.

In the upper part of the cylinder 1 are the steam-passages 3 3 and 4 4, arranged horizontally in parallel planes one above the other throughout their entire length. The passages 3 extend from their ports near the middle of the valve-seat to the extreme ends of the cylinder 1, and the passages 4 extend from their ports near the middle of the valve-seat to passages 5, that pass around the ends of cylinder 1 in nearly vertical planes, communicating with the extreme ends of the cylinder 2. This location and arrangement of the passages 3 and 4 in parallel planes and in close proximity to each other, as shown, in-

sure the retention of heat in the exhaust-steam of the cylinder 1, thereby increasing the power and economizing in the expense of running the engine.

6 designates the exhaust-port located in the valve-seat and communicating in the usual way with the atmosphere.

The slide-valve 7 in the steam-chest 10 has in its lower face a recess 8, and extending through said valve is a passage 9, the ends of which terminate in the lower face of the valve and on opposite sides of the said recess 8.

The passages 3 3 and 4 4 and the recess 8 and passage 9 are so formed and arranged that when a port of passage 3 on one side of the exhaust-port 6 communicates with one end of the passage 9 the other end of said passage 9 communicates with the port of a passage 4 on the opposite side of said exhaust-port and the other port of passage 4 will communicate with the exhaust-port 6 through the recess 8. When a port of one of the passages 3 is open or in communication with the steam-chest the port of the other is closed to such communication.

The valve 7 may be held on its seat by a spring 13 inclosed in a box 14, the lower edges of which fit in grooves formed in and extending around the upper side of the valve, as shown.

To make clear the operation of my engine let it be supposed that the port of the left-hand passage 3 is open, so that live steam may enter the same, and that the piston is at the end of its stroke at the left-hand side, as shown in Fig. 1. Live steam entering said port 3 will force the piston in the cylinder 1 toward the right, and when it reaches the end of its stroke in this direction the slide-valve (by obvious connection for the purpose) will have been thrown so as to establish, through passage 9, communication between the port of the left-hand passage 3 and the port of the right-hand passage 4, and on the return stroke the steam in the upper cylinder will pass through the right-hand passage 5 into the lower cylinder, where it will act against the piston in said cylinder, and thus the two pistons will be forced to the left at the same time, and when the piston of the lower cylinder 2 moves to the left the dead steam on



its left-hand side will exhaust into the atmosphere through passage 5, passage 4, recess 8, and exhaust-port 6. In other words, while live steam from the boiler is acting on the piston in cylinder 1 exhaust-steam from said cylinder is acting on the corresponding side of the piston in cylinder 2, and exhaust-steam in the latter will escape into the atmosphere.

By the employment of the two cylinders and locating their passages and ports and the valve in the particular way shown I not only effect a saving in the cost of the manufacture of the engine and the room to be occupied by it, but I also effect a considerable economy in the consumption of fuel.

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

In a compound engine, the small cylinder 1 and the large cylinder 2 independent of each other and arranged one above the other, a valve seat in the cylinder 1, the two passages 5 5 extending from the ends of cylinder 2 in nearly vertical planes upward and around

the ends of the cylinder 1, the two passages 3 3 and the two passages 4 4 arranged horizontally in parallel planes one above the other in the upper part of the cylinder 1, each of the passages 3 3 extending from a port near the middle of the valve seat to the extreme ends of the cylinder 1 and each of the passages 4 4 extending from a port near the middle of the valve seat to the upper ends of the passages 5 5, exhaust port 6, a valve 7 having a single passage 9 for connecting the ports 3 3 and 4 4 and a recess 8 for connecting the ports of passages 4 4, the ports of the passages 3 3 and 4 4, port 6, recess 8, and passage 9 being arranged so that they are intersected by a plane passing through the axes of both cylinders, as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES SCHLARED.

Witnesses:

LEWIS L. RANKIN,  
GEORGE M. FINCKEL.