

(No Model.)

W. BERRENBURG.

ROTARY VALVE.

No. 355,677.

Patented Jan. 11, 1887.

Fig. 1.

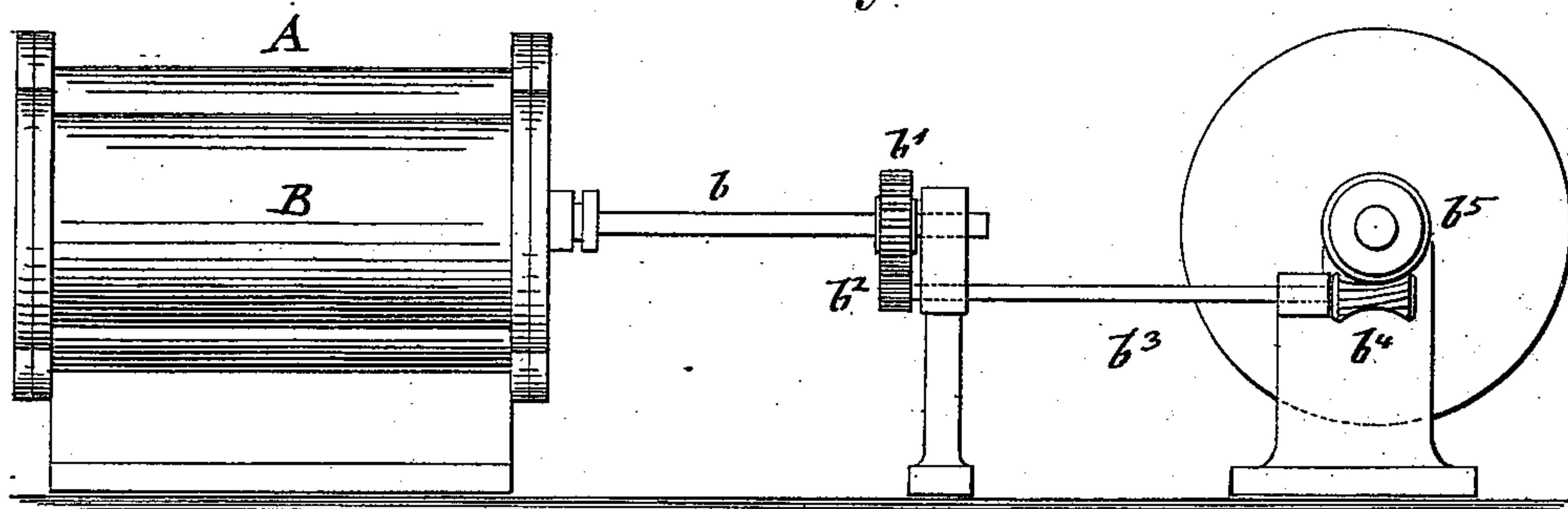


Fig. 2.

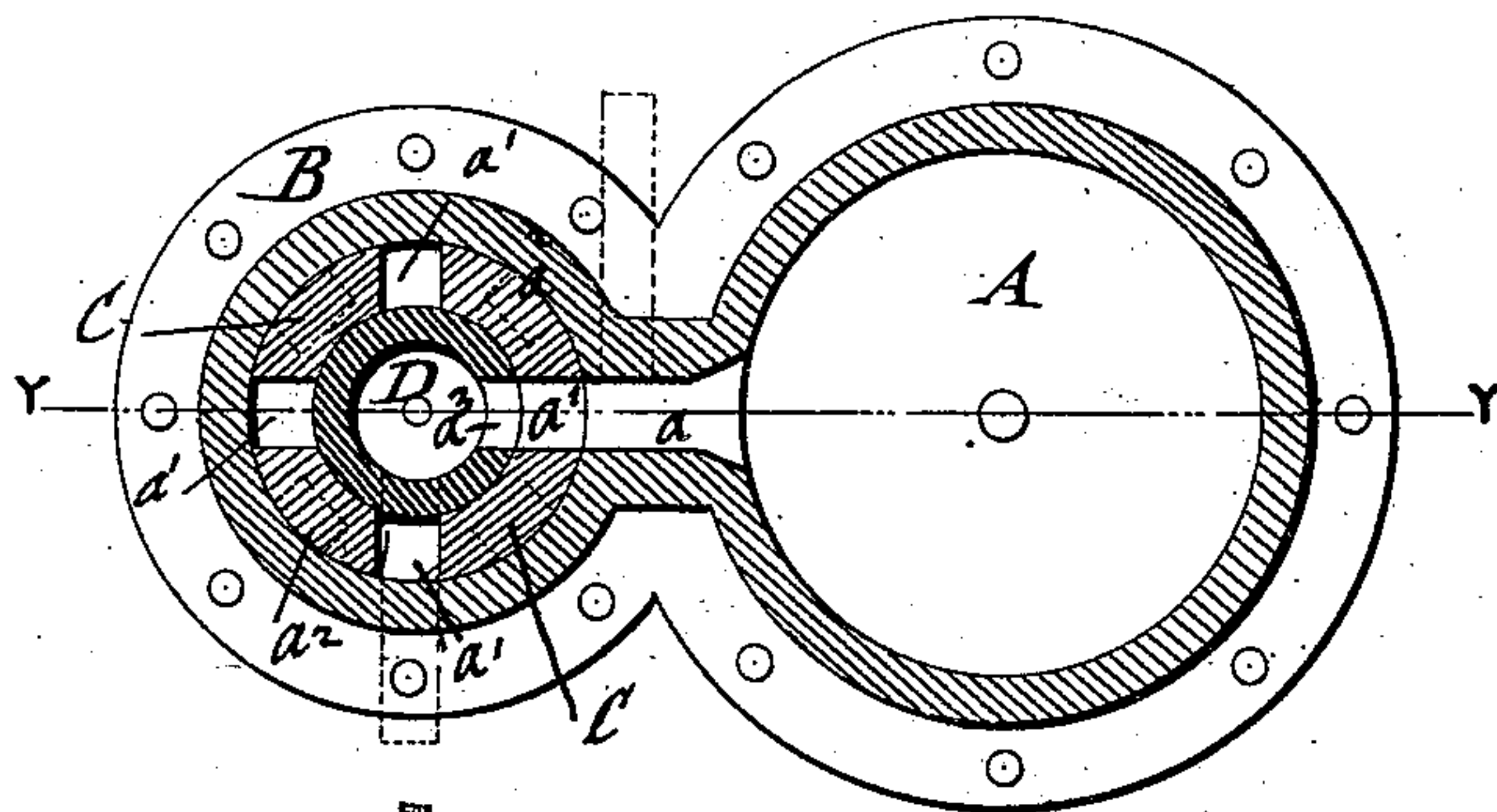


Fig. 3.

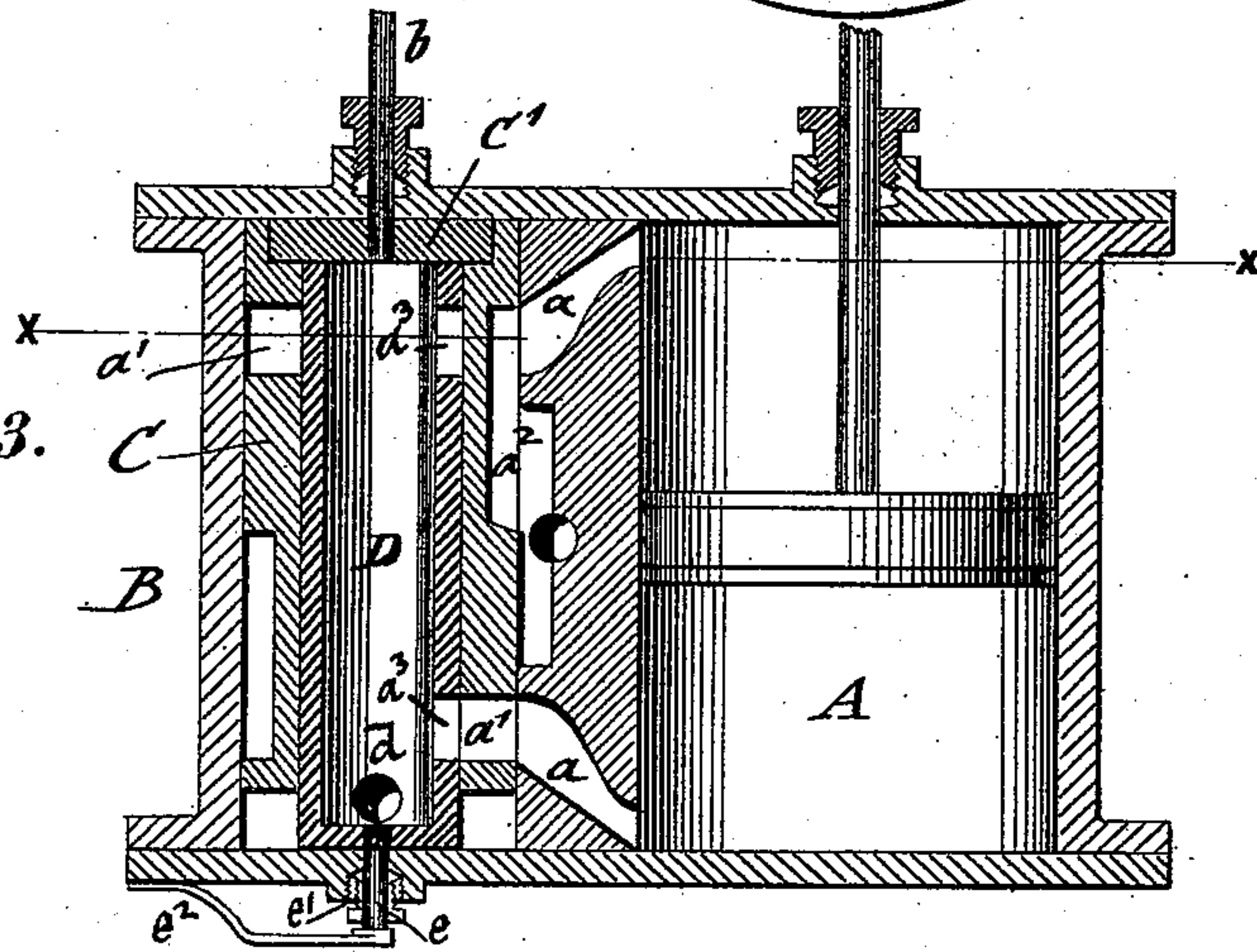
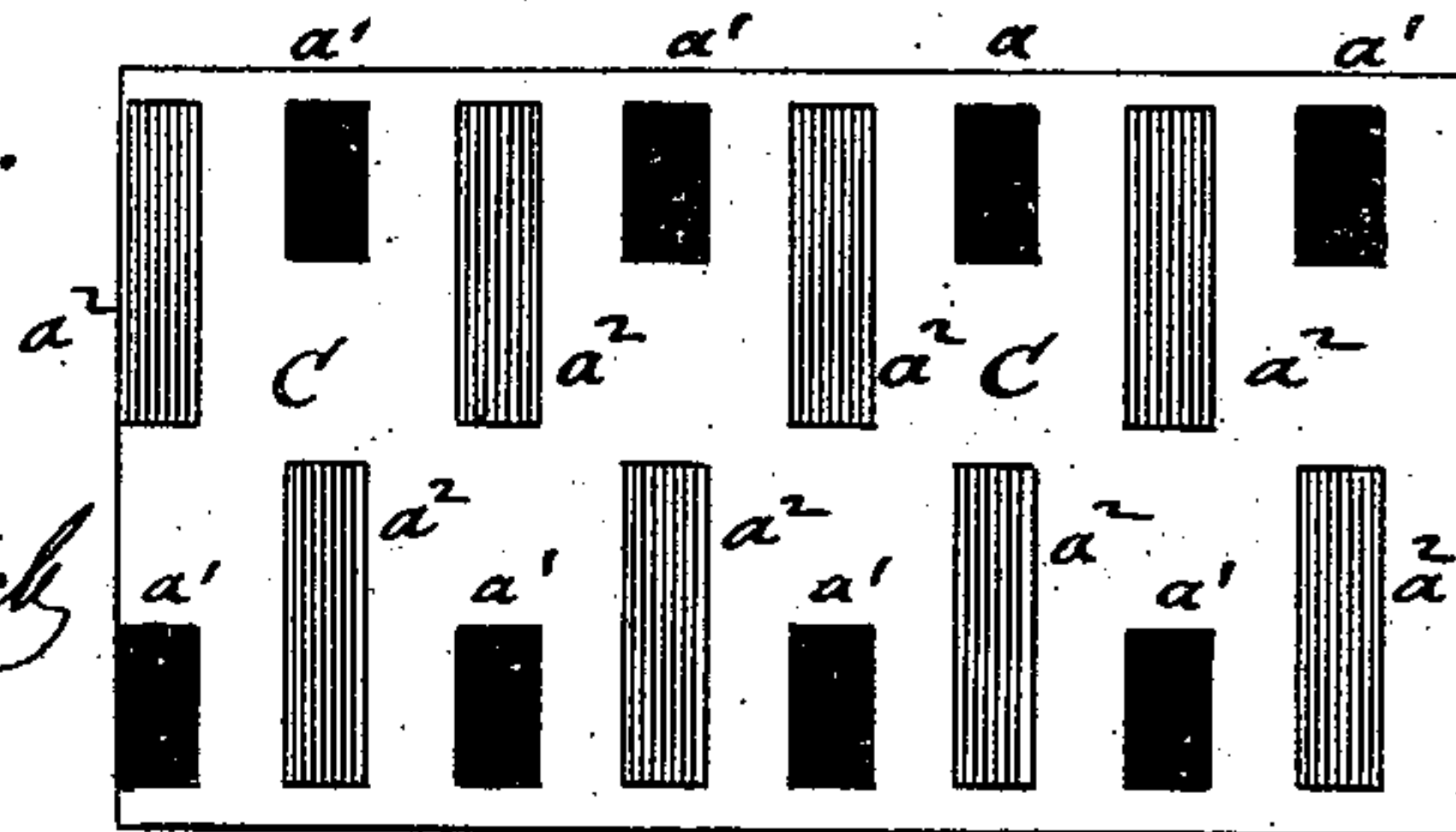


Fig. 4.



WITNESSES

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WILLIAM BERRENBURG, OF BOSTON, MASSACHUSETTS.

ROTARY VALVE.

SPECIFICATION forming part of Letters Patent No. 355,677, dated January 11, 1887.

Application filed March 24, 1886. Serial No. 196,316. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BERRENBURG, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Rotary Valves, of which the following is a specification.

This invention relates to an improved rotary valve with variable expansion.

In the accompanying drawings, Figure 1 represents a side elevation of a steam-cylinder with my improved rotary valve, showing its connection with the driving-shaft. Fig. 2 is a vertical transverse section of the steam-cylinder and valve on line $x x$, Fig. 3. Fig. 3 is a horizontal section on line $y y$, Fig. 2; and Fig. 4 is a diagram showing the rotary valve developed in a horizontal plane.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the steam-cylinder, which is provided at one side with a cylindrical steam-chest, B, said chest being connected by ports $a a$ with the opposite ends of the steam-cylinder A.

The steam-chest B is provided at its inside with a hollow cylindrical valve, C, which valve is closed at one end by a head, C' , and connected, by a spindle, b , transmitting gearing $b' b^2$, intermediate shaft, b^3 , and worm-gear $b^4 b^5$, to the driving-shaft of the steam-engine, whereby continuous rotary motion is imparted from said driving-shaft to the valve C. The valve C is provided at the circumference of both ends with alternating steam-ports $a' a'$ and exhaust-channels a^2 , each steam-port a' at one end being in line with an exhaust-channel, a^2 , at the other end, said exhaust-channels being longer than the steam-ports a' , as shown clearly in Fig. 4.

At the interior of the rotary valve C is arranged a hollow cylinder, D, that is closed at that end opposite to the closed end of the valve C, and provided near the closed end with a supply-port, d , for the live steam. The interior cylinder, D, can be axially adjusted in the valve C by means of a short spindle, e , that passes through a stuffing-box, e' , in the head of the steam-chest B, said spindle being provided with a pointer, e^2 , that is set along a graduated scale at the outside of the steam-chest. The interior cylinder, D, can thus be

turned on its axis and adjusted to different degrees of expansion. It is provided at both ends with ports a^3 , which register alternately with the ports a' at opposite ends of the valve B, so as to supply alternately steam to opposite ends of the cylinder A.

When the ports a^3 of the interior cylinder, D, register fully with the ports of the rotary valve C, the engine works with full power, while when the interior cylinder, D, is turned more or less on its axis, so that its ports register only partly with the ports of the valve, the engine is run with a smaller degree of expansion of the steam. When the port a^3 at one end of the cylinder D is in line with the steam-port a' at one end of the valve and the port a at one end of the main cylinder A, live steam is admitted to that end of the cylinder, so as to move the piston forward, while the exhaust-steam passes from the port a at the other end of the cylinder and along the exhaust-channel a^2 to the exhaust-port of the cylinder, as shown in Fig. 3.

By the continuous rotary motion of the valve, steam is supplied alternately to opposite ends of the cylinder, and as many forward and return strokes imparted to the piston of the cylinder for each full rotation of the valve as there are steam-ports arranged in the body of the same. By this arrangement the sets of steam-ports and exhaust-channels register with the ports of the steam-cylinder quickly by the rotary movements of the valve, so that the engine can be run at considerable speed with a comparatively slow motion of the valve.

My improved valve has the advantage of simplicity of construction, wears out but slowly, as there is no direct steam-pressure on the same, moves easily and without noise, and is readily kept in order.

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

The combination of a steam-cylinder having the usual ports at each end and an exterior exhaust-port between them, a cylindrical steam-chest, a rotary cylindrical valve within said chest, closed at one end and open at the other end, and having near each end a row of alternating steam-ports and exhaust-channels, the steam-port of one row being in line with the exhaust-channel of the other row, and said ex-

haust-channels being cut in the outer face of the valve from a point registering with the ports near each end of the steam-cylinder inwardly to a point registering with the exhaust-port, 5 means for imparting continuous rotary motion to the valve, and an axially-adjustable interior cylinder, open at one end and closed at the other end, the open end resting against the closed end of the rotary valve, and the closed end extending beyond the open end of the valve and 10 resting against the head of the steam-chest, said interior cylinder being provided with

ports near each end in line with each other, and registering with the ports of the steam-cylinder, and also provided with a port in its 15 extended closed end for the admission of live steam, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

WILLIAM BERRENBURG.

Witnesses:

PAUL GOEPEL,
SIDNEY MANN.