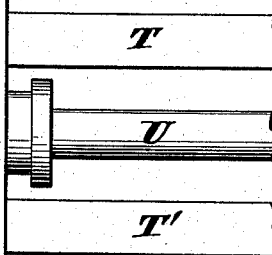
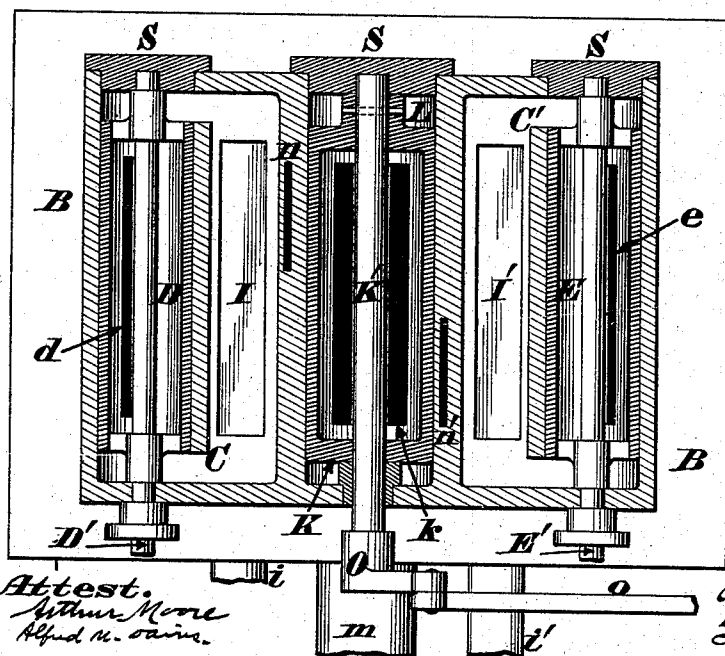
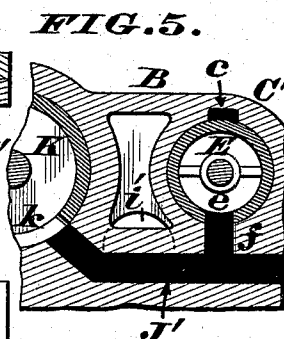
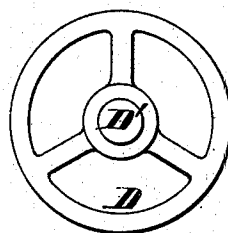
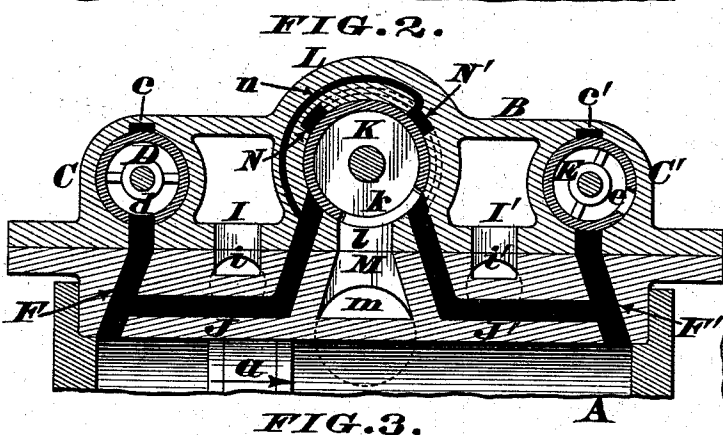
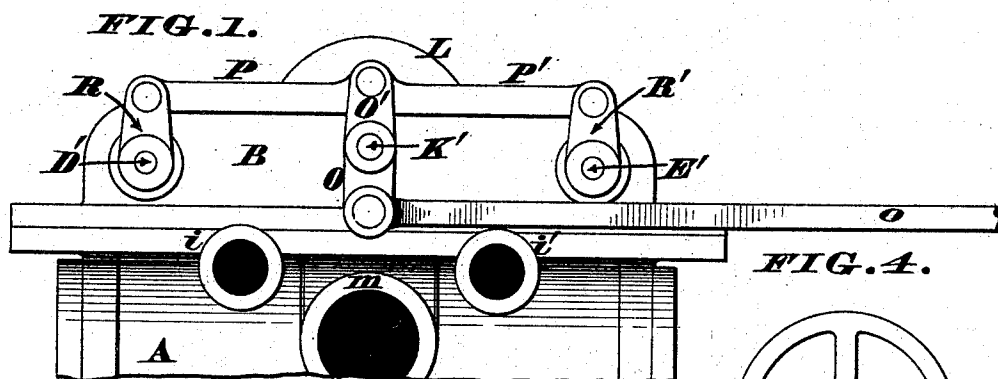


(No Model.)

A. F. DEVEREUX.
VALVE FOR STEAM ENGINES.

No. 528,123.

Patented Oct. 23, 1894.



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UNITED STATES PATENT OFFICE.

ARTHUR F. DEVEREUX, OF CINCINNATI, OHIO.

VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 528,123, dated October 23, 1894.

Application filed October 2, 1893, Serial No. 486,964. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR F. DEVEREUX, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Valves for Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the annexed drawings, which form part of this specification.

My invention comprises a novel construction of steam-chest and valves for controlling the admission of steam into the cylinder of an engine, and permitting the "escape" to occur at the proper moment.

The chest, which is usually the same length as the engine-cylinder, is composed of three separate, independent sections, having no communication with each other, the central division of said chest being a closed chamber containing an oscillating exhaust-valve provided with a port that regulates the escape of steam through the outlet-passages. The other divisions of the chest include open-ended casings containing hollow, oscillating inlet-valves that regulate the admission of steam through the induction passages, and these divisions have separate branch-pipes leading to the main supply-pipe. Furthermore, all the valves are worked simultaneously by outside connections coupled to the valve-spindles, said connections being operated either by an eccentric rod or other motor, and the valves being balanced, so as to be shifted with the least possible expenditure of power, as hereinafter more fully described.

In the annexed drawings, Figure 1 is a side elevation of the upper part of a steam-cylinder provided with my improved valve-mechanism. Fig. 2 is a vertical section of said cylinder taken in the plane of its piston rod. Fig. 3 is a horizontal section of the steam-chest and valves taken in the plane of the valve-spindles. Fig. 4 is an enlarged end-elevation of an inlet-valve. Fig. 5 is a vertical section of a modification of my invention.

A represents the upper part of a steam cylinder, *a* is a portion of the piston thereof, and B is the steam-chest, said chest having near its ends casings or shells C, C', within which latter are journaled the oscillating inlet-valves D, E, consisting of hollow, open-ended

cylinders provided with spindles D', E', and having, respectively longitudinal ports *d*, *e*. These ports *d*, *e*, control inlet-passages F, F', of the cylinder A.

c, *c'*, are longitudinal grooves made in the shells C, C', at points diametrically opposite the inlet passages F, F', which grooves are, practically, of the same area as said passages, and receive steam at their ends direct from the chest B.

I, I', are supply-ports in the bottom of the chest to allow steam to enter from the branch-pipes *i*, *i'*, and then flow into the end divisions of said chest. Branches *i*, *i'*, may connect with a main steam-pipe having a throttle-valve or similar controlling-device.

J, J', are exhaust passages communicating with the inlets F, F', the upper ends of said passages being alternately opened and closed by an oscillating exhaust-valve K. This valve is hollow, but closed at its ends and sides, except where a port *k* is made, and is mounted upon a spindle K', journaled in a special chamber L at the center of the steam chest. Chamber L has no communication with the other divisions of said chest, but has an opening *l*, leading into the exhaust port M, from which latter the escape pipe *m* proceeds. Again, this chamber L has a pair of longitudinal grooves N, N', opposite the upper ends of passages J, J', steam being admitted to these grooves by ducts *n*, *n'*, whose mouths open into said passages. (See Fig. 2.) Spindle K', of the exhaust valve K has an external crank O, whose free end is coupled to an eccentric rod *o*, or to a "link motion" for the purpose of regulating the play of the valves. Furthermore, said spindle has another crank O', from which a pair of connecting rods P, P', lead to other cranks R, R', secured to the spindles D', E'.

S, S, S, are bonnets or caps on the side of the steam chest, the removal of which covers affords access to the engine valves.

T, T', and U, in Fig. 3, represent portions of the guides and piston rod of the engine.

From the above description it is evident that any motion imparted by the rod *o* to crank O, causes a simultaneous oscillating of the three valves D, E, K, within their respective housings, and when said valves are in the positions seen in Fig. 2, steam first en-

ters through the branch-pipe *i*, ascends the port I, and thus has free access to the left end of chest B, thereby enveloping the casing C and filling the valve D. The steam then
 5 flows through the slot *d* of said valve into the cylinder-passage F, thereby driving the piston *a* in the direction of the arrow, the waste steam from said cylinder being now dis-
 10 charged through the channels F', J', and ports *k*, *l*, M, into the escape pipe *m*; but when the piston completes its stroke, the positions of the valves are exactly reversed, the waste steam being then expelled through the other channels F and J. As steam is freely ad-
 15 mitted to the grooves *c*, *c'*, at their ends, and as the areas of said grooves are equal to the areas of the inlet-ports F, F', it is evident the valves D, E, are relieved of all pressure, and, on this account, they can be operated
 20 without detracting from the power of the engine.

In the modification of my invention, seen in Fig. 5, the inlet-valve E is near the ex-
 25 haust-valve K, and the slot or port *e*, of the former communicates with a channel *f* leading into the discharge passage J'. It will thus be seen that the position of valves D, E, is immaterial, provided they control the ad-
 30 mission of steam to the inlet passages of an engine cylinder.

I claim as my invention—

1. In a steam-engine, the combination of

cylinder A, having inlet-passages F, F', ex-
 haust-channels J, J', and escape port M *m*—
 the chest B, having inlets I, I', chamber L, 35
 provided with grooves N, N', ducts *n*, *n'*, that
 connect these grooves with the channels J, J',
 casings C, C', having grooves *c*, *c'*, and a pas-
 sage leading to the escape port M *m*—the re-
 ciprocating-rotary inlet-valves D, E, fitted 40
 within these casings, and having, each, a sin-
 gle longitudinal slot *d*, *e*—the reciprocating-
 rotary outlet-valve K, fitted within the cham-
 ber L, and having a single longitudinal-slot
k—spindles D', E', K', for operating said 45
 valves D, E, K,—and outside connections that
 actuate said spindles, all as herein described.

2. In a steam-engine, the combination of
 chamber L, longitudinal counterbalancing-
 chambers N, N', exhaust passages J, J', ex- 50
 haust port M, and a reciprocating-rotary out-
 let-valve K, having a port *k* that alternately
 opens communication between said passages
 J, J', and port M, the chambers N, N', being
 diametrically opposite the discharging ends 55
 of said passages and receiving steam from
 the same through the channels *n*, *n'*, as herein
 described.

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

ARTHUR F. DEVEREUX.

Witnesses:

JAMES H. LAYMAN,
 ARTHUR MOORE.