

(No Model.)

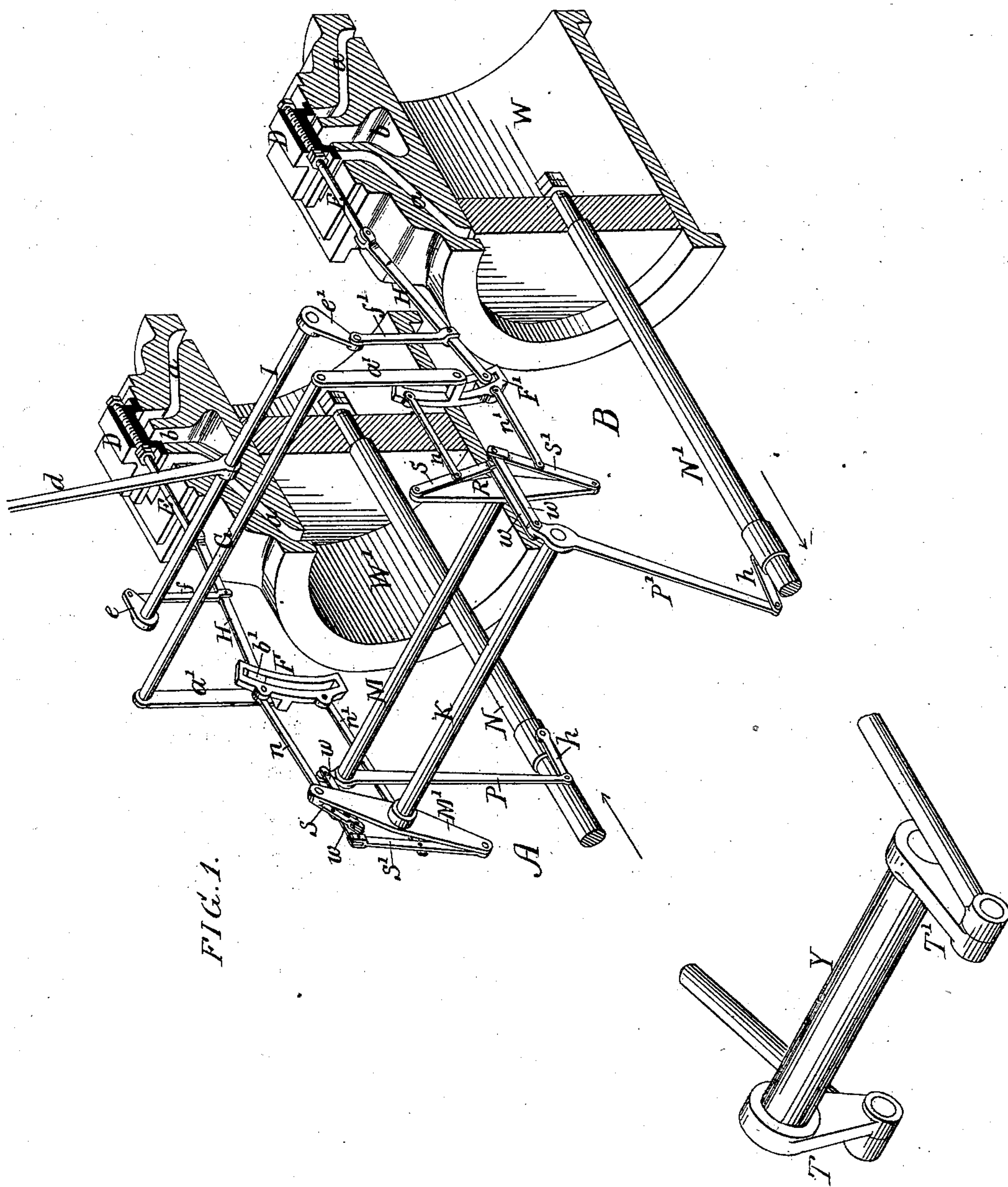
2 Sheets—Sheet 1.

F. V. MATTON.

VALVE GEAR.

No. 285,286.

Patented Sept. 18, 1883.



WITNESSES:

James I. Tobins
Harry L. Ashenfelter.

INVENTOR:

Fredrick V. Matton
by his Attorneys
Howson & Co.

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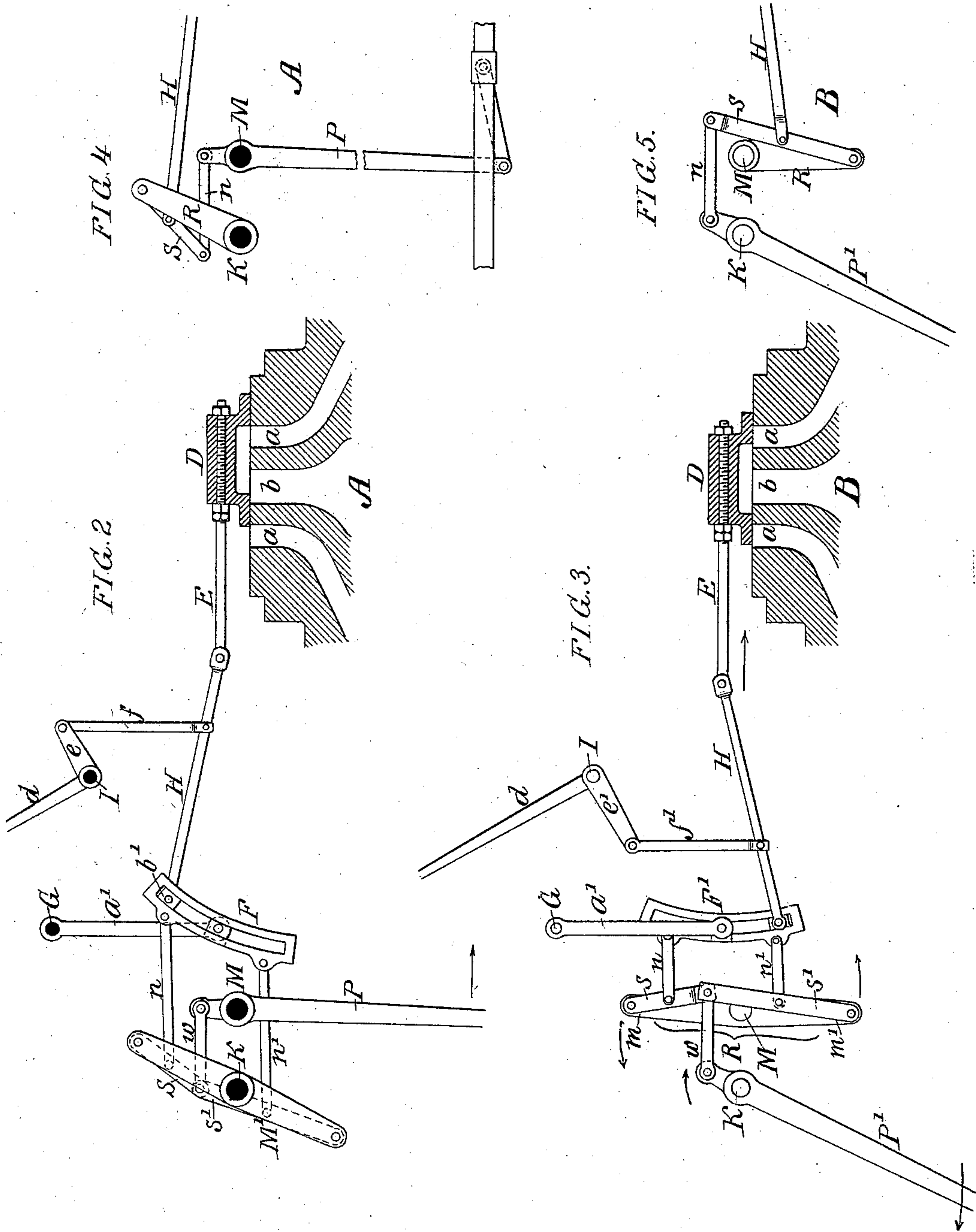
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UNITED STATES PATENT OFFICE.

FREDRIK V. MATTON, OF PHILADELPHIA, PENNSYLVANIA.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 285,286, dated September 18, 1883.

Application filed April 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, FREDRIK V. MATTON, a subject of the King of Sweden, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Valve-Gear, of which the

following is a specification.

My invention relates to double-cylinder engines—such as are applied to locomotives or steam vessels, pumps, &c.—and the main object of my invention is to dispense with the usual eccentrics, my invention consisting in causing the piston-rod of one engine to impart the desired throw to the valve of the other engine, which, however, so controls the movement thus derived from its adjoining engine as to modify that movement for the purpose of obtaining the desired lead of its valve, as fully explained hereinafter.

In the accompanying drawings, Figure 1, Sheet 1, is a sectional perspective diagram, showing the two cylinders and valves of a double-cylinder engine with my improved valve-motion; Figs. 2 and 3, Sheet 2, side views, representing the valve-motions of the two cylinders and the relation which the said motions bear to each other; and Figs. 4 and 5, views illustrating my improved motion as applied to a double-cylinder non-reversible engine.

Referring to Figs. 1 and 2, W represents a portion of the cylinder of one engine, and W' a portion of the cylinder of the other engine. With the view to simplifying the description, I will refer throughout the specification to the two engines as the A and B engines.

Each cylinder has the usual steam-ports, *a a*, and exhaust-port *b*, and there is an ordinary valve, D, for each cylinder. The two valves are operated from the piston-rods by mechanism which I will proceed to describe, it being understood, however, that I do not desire to restrict myself to the precise devices shown.

A segment, F, similar to that of an ordinary link-motion, is suspended to a shaft, G, by a link, *a'*, and a rod, H, is connected at one end to a block, *b'*, adapted to slide in the segment, the other end being connected to the valve-spindle E, these parts being the same in both motions appertaining to the A and B engines.

To a rock-shaft, I, common to both engines, is secured the reversing-lever *d*, and an arm,

e, on this shaft is connected by a link, *f*, to the rod H of the A engine, Fig. 2, a similar arm, *e'*, on the same shaft I, being connected by a link, *f'*, to the rod H of the B engine, Fig. 3.

There are two shafts, K and M, common to both engines, and to the shaft M is secured a lever, P, the long arm of which is connected by a small link, *h*, to the piston-rod N of the A engine, the long arm of a lever, P', secured to the shaft K, being similarly connected to the piston-rod N' of the B engine. This arrangement of valves and levers will be best observed by reference to the perspective view, Fig. 1.

To the shaft M is secured a lever, R, to one arm, *m*, of which is pivoted a short arm, S, a longer arm, S', being pivoted to the arm *m'* of the same lever, and both of the arms S S' are connected to the segment F' of the B engine, the short arm to the segment near the upper end of the same and the long arm to the segment near its lower end. In like manner the shaft K has a lever, M', one arm of which is connected by a short arm, S, and link *n* to the upper part of the segment F of the A engine, the other arm of the said lever M' being connected by a longer arm and a link to the lower portion of the said segment of the A engine.

The desirability of mounting the two shafts K and M in line with each other necessitates the employment of long and short arms S S'; but by observing the points of connection of the several parts with each other it will be seen that this difference in the length of the arms does not produce any difference in the extent of movement of the upper and lower portions of the segment.

The arms S S', appertaining to the B engine, are connected by links *w w* to the short arm of the lever P', one of these links being connected to the short arm S and the other to the long arm S', as the ends of the two arms move in different arcs of circles. In like manner the short arm of the lever P is connected to the long and short arms of the lever M of the A engine.

It will be understood that the cranks T T' are secured to the crank-shaft Y, nearly at right angles to each other, as in ordinary double-cylinder engines.

Each valve D has a compound or differential

movement, or rather two movements intimately associated. One is the extended reciprocating movement which determines the throw of the valve, and the other the lesser movement which determines the lead. I will define one as the "throw movement" and the other as the "lead movement." The throw movement of the valve D of the B engine is derived from the piston-rod of the A engine through the medium of the lever P, shaft M, lever R, arms S S', links n n' , segment F', and rod H, the throw movement of the A engine being derived from the piston-rod of the B engine through the medium of similar mechanism.

The lead movement of the valve of the B engine is derived from the piston-rod of the same engine, owing to the connection of the short arm of the lever P' to the segment F' through the medium of the links w , arms S S', and links n n' . If the valve of one engine is reciprocated directly and solely by the piston-rod of the other engine—and this has been done in steam-pumps—there will be no lead; but by the mechanism described each engine so modifies or controls the main movement of its own valve that the desired lead is obtained.

When my invention has to be applied to a non-reversible double-cylinder engine, the valve-motion may be modified, as shown in

Figs. 4 and 5, where, as the segments are dispensed with, the throw movement of the valve of the B engine is derived from the piston of the A engine through the medium of the arms R and S, this movement being modified to produce the lead by placing the said arm S under the control of the piston of the B engine through the medium of the lever P', link n , and said arm S, the throw motion of the valve of the A engine, as derived from the piston of the B engine, being controlled in a similar manner, and through the medium of similar mechanism, by the piston-rod of its own engine.

I claim as my invention—

The combination, in a double-cylinder engine, of the cylinders, valves, and piston-rods with mechanism whereby the main movement or throw of the valve of each cylinder is derived from the piston-rod of the other cylinder and the lead of each valve controlled by its own piston-rod, substantially in the manner described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDRIK V. MATTON.

Witnesses:

HARRY L. ASHENFELTER,
HENRY HOWSON, Jr.