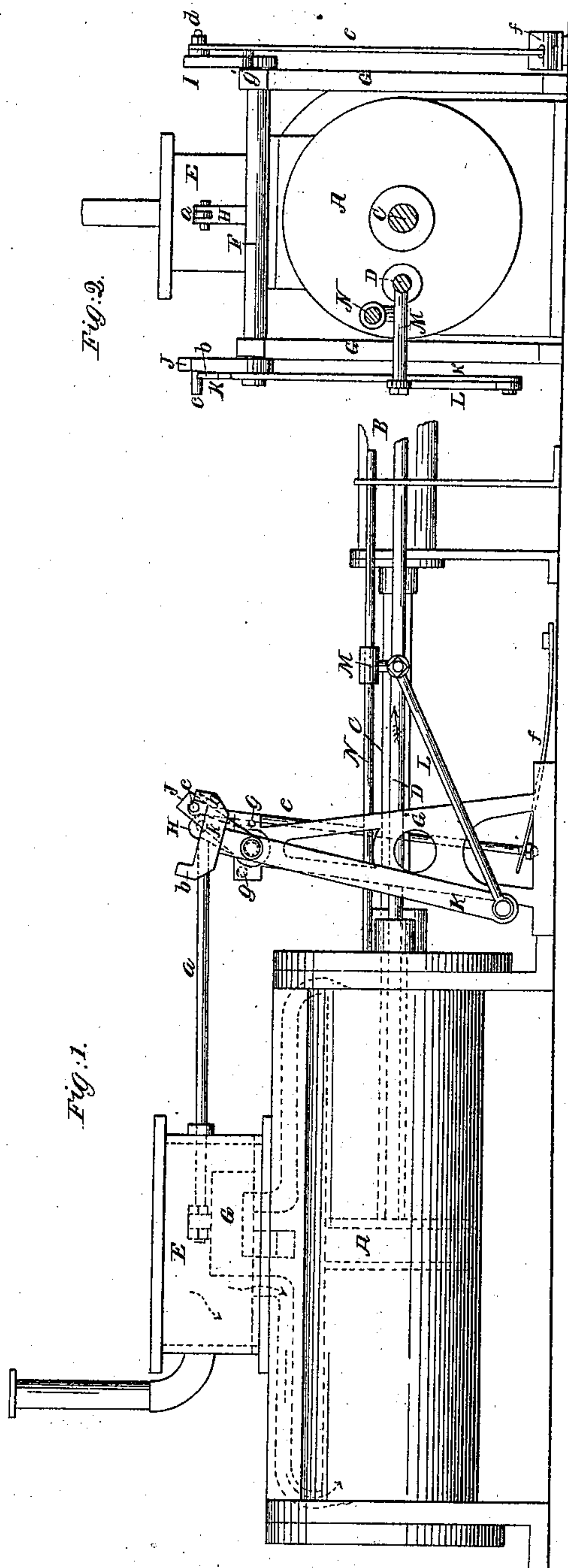


J. R. Jacob,

Steam-Engine Valve-Gear.

N^o 30,923.

Patented Dec. 18, 1860.



Witnesses:
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UNITED STATES PATENT OFFICE.

J. ROBIN JACOB, OF ELIZABETHTOWN, KENTUCKY.

VALVE-GEAR FOR STEAM-ENGINES.

Specification of Letters Patent No. 30,923, dated December 18, 1860.

To all whom it may concern:

Be it known that I, J. ROBIN JACOB, of Elizabethtown, in the county of Hardin and State of Kentucky, have invented a new and
5 Improved Slide-Valve Gear for Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this
10 specification, in which—

Figure 1 is a side view of a horizontal direct-action pumping engine with my improved valve gear. The pump is for the most part omitted. Fig. 2 is a view of the
15 cylinder and valve gear as seen looking toward one end of the cylinder.

Similar letters of reference indicate corresponding parts in both figures.

My invention is more especially designed
20 for direct-action engines, such as are used for pumping and other purposes for which a rotary motion is unnecessary. It may however be applied to an engine with a rotary shaft.

It consists of a forked rocker worked upon but independently of an ordinary valve rock-
shaft, by a connection with the piston rod or other correspondently reciprocating portion
30 of the engine and operating upon an ordinary valve rockshaft in combination with a spring acting upon another arm thereof substantially as hereinafter described to cause the valve to be first moved gradually to a
35 position to close the steam-port at either end of the cylinder as the piston approaches the other end and then to be moved suddenly sufficiently farther to give a full opening to the steam port at the last mentioned
40 end to admit steam to move the piston in the opposite direction.

To enable others to make and use my invention I will proceed to describe its construction and operation.

45 A, is the steam cylinder and B, a portion of the pump cylinder arranged in line with it.

C, is the main piston-rod connecting the steam piston with the piston or plunger of the pump B. D, is another piston-rod for
50 working the feed pump secured like C, to the main steam piston and passing through a stuffing box in the head of the cylinder. This piston rod is represented as employed to work the valve gear, but the main piston
55 rod may be used in precisely the same manner for the same purpose.

E, is the valve chest of the cylinder A, containing the slide valve G, which may be of the kind well known as the "short three-
60 port D valve."

F, is the valve rockshaft arranged transversely to the axis of and at a short distance from the steam cylinder in bearings in fixed standards G*, G*. This rockshaft has secured to it besides the arm H, to which the
65 valve stem *a*, is connected, the two arms I, and J, arranged one at each end outside of the standards G*, G*.

K, is the forked rocker arranged to work upon and independently of the rockshaft F.
70 The lower end of this rocker is connected by a rod L, with a cross-head or arm M, secured rigidly to the piston rod D, and this cross-head or arm is fitted to work upon a fixed guide rod N, parallel with the piston rod.
75 The forked upper part of the said rocker receives between its prongs *b*, *b'*, the stud *c*, which projects from the arm J, of the rockshaft. The position of the arm I, on the rockshaft coincides exactly with that of the
80 arm J, and both of these arms occupy vertical positions, when the valve G, is at the middle of its stroke where it closes both steam ports. The arm I, carries a stud *d*, which is connected by a rod *e*, with a spring
85 *f*, secured to the bed-plate of the engine. This spring and rod are so arranged that as soon as the stud *d*, passes in either direction beyond a position directly over the axis of the rock-shaft F, the spring tends to pull down
90 the arm I, suddenly, as far as permitted by one of two stop pins *g*, *g'*, which are secured in one of the standards G*, G*, said pins being so arranged as only to permit the valve
95 G, to move far enough to give full opening to each of the steam ports in turn.

The operation of the valve gear is as follows: By the oscillating motion which the rocker K, derives through the connecting,
rod L, from the piston rod D, the prongs *b*,
100 *b'*, of the fork of the said rocker are alternately brought into action on the stud *c*, to move the valve in one and the other direction alternately during the successive strokes of the piston in opposite directions, and each
105 prong in its turn is thereby made to move the rock-shaft and valve from the position in which the valve leaves one steam port wide open to a little beyond the vertical position of the arm I, when the spring coming into action on the stud *d*, causes the
110 rock-shaft to move very suddenly to the

position to open the other port and so cause the action of the steam on the piston to be reversed. Figure 1, represents the valve gear in the condition which it has assumed 5 when the piston has made about half of its stroke to the right, the left hand steam port being still wide open. The prong b' , of the forked rocker is just coming into operation on the stud c to commence moving the valve 10 slowly to the left, to shut off the steam from the left hand end of the cylinder. By the time the valve has closed the port the stud d , will have arrived over the axis of the rockshaft and the slightest movement of the 15 piston produced by the expansion of the steam in the cylinder will carry the stud d , to a position in which the spring f , will act upon it and suddenly pull it down and so cause the valve to move as far as the stop 20 g , permits which is far enough to open the right hand port of the cylinder. The movement of the piston is then instantly reversed and so is the movement of the rocker K,

whose prong b , when the piston is again at about half stroke comes into operation on 25 the stud c , after which a precisely similar operation of the valve to that just described, only in a reverse direction, is produced by the combined operation of the rocker and spring. 30

This valve gear may be used with all kinds of slide valves whether of the straight or rolling kind.

What I claim as my invention and desire to secure by Letters Patent, is— 35

The combination of the forked independent rocker K, working on the valve rockshaft, the two arms I, J, with their studs c , d , rigidly attached to the said rockshaft and the spring f , the whole applied in relation 40 to each other and operating substantially as herein set forth.

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Witnesses:

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