

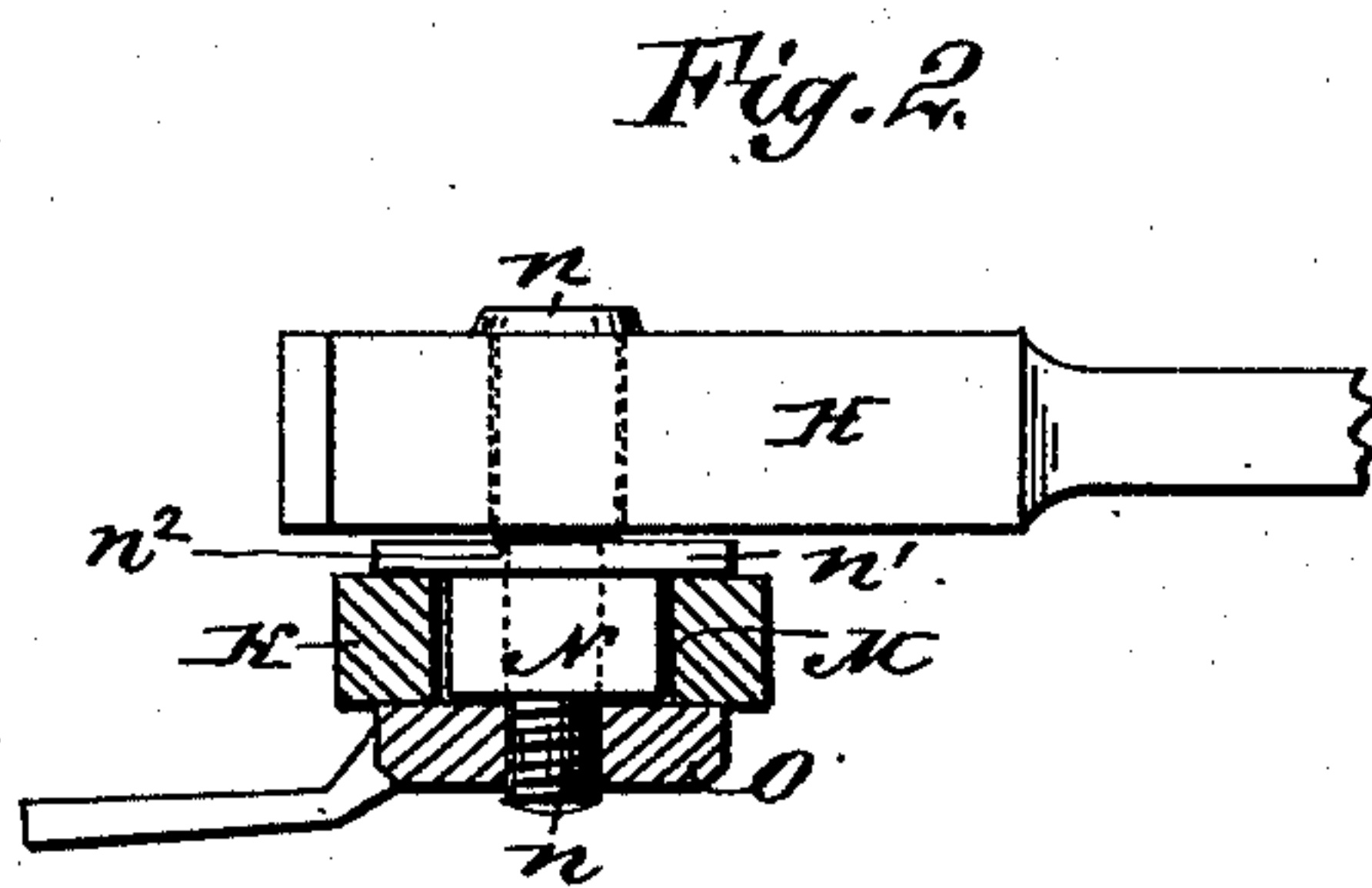
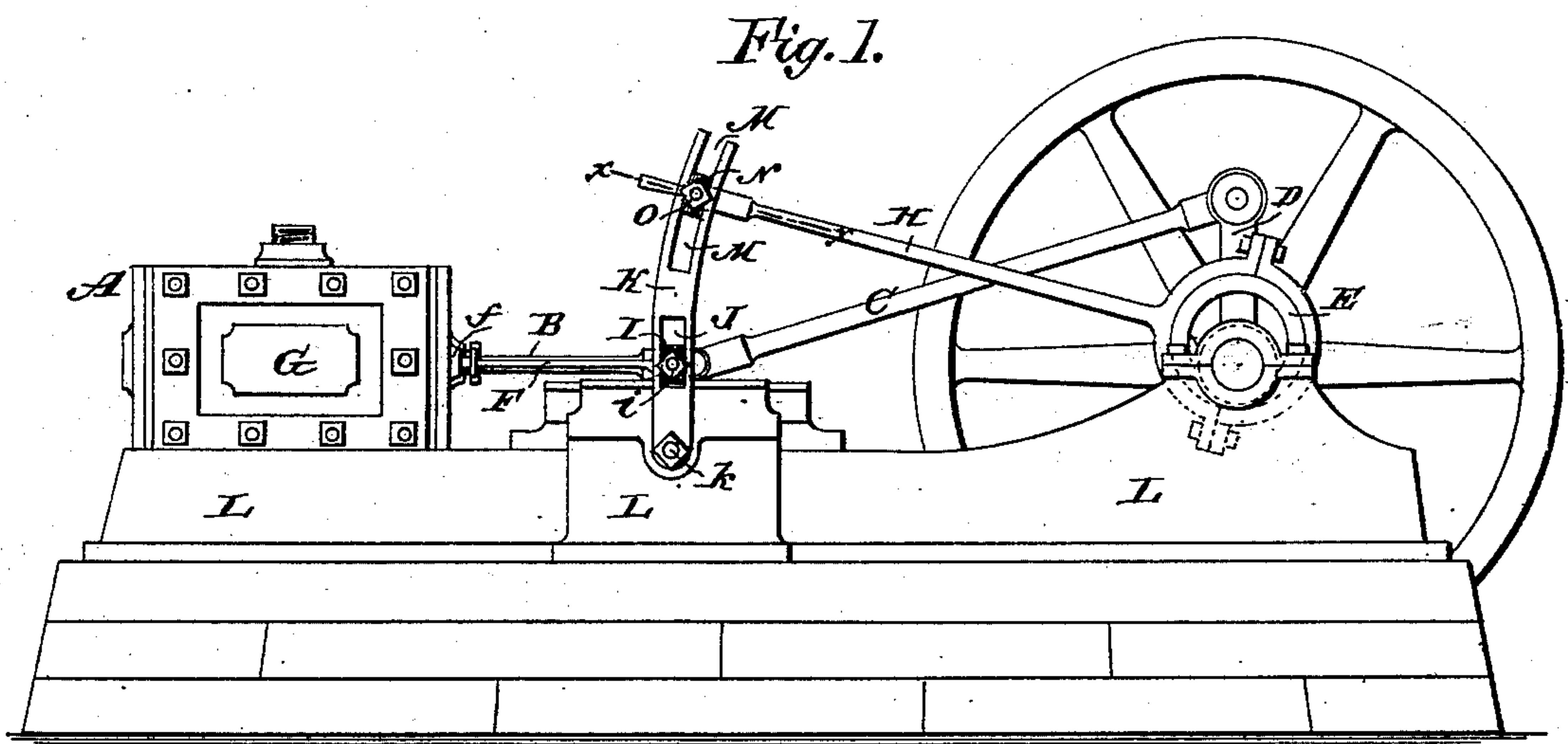
(No Model.)

T. J. WALDEN.

LINK MOTION FOR ENGINE VALVES.

No. 307,245.

Patented Oct. 28, 1884.



WITNESSES:

*Wm. Beyer*  
*Wm. Sedgwick*

INVENTOR:

*T. J. Walden*  
BY *Munn & Co.*  
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# UNITED STATES PATENT OFFICE.

THOMAS J. WALDEN, OF LEBANON, INDIANA, ASSIGNOR TO HIMSELF AND  
PETER MORRIS, OF SAME PLACE.

## LINK-MOTION FOR ENGINE-VALVES.

SPECIFICATION forming part of Letters Patent No. 307,245, dated October 28, 1884.

Application filed May 22, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS J. WALDEN, of Lebanon, in the county of Boone and State of Indiana, have invented a new and Improved  
5 Link-Motion for Engine-Valves, of which the following is a full, clear, and exact description.

The object of my invention is to provide a simple and efficient valve-motion for slide-  
10 valve engines, by means of which the steam-supply may be cut off or varied at will, according to the load on the engine.

The invention consists in the construction and arrangement of parts, as will be herein-  
15 after described, and specifically set forth in the claim.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate cor-  
20 responding parts in both the figures.

Figure 1 is a side elevation of an ordinary slide-valve engine with my improvement applied; and Fig. 2 is an enlarged sectional plan view taken on the line  $x x$ , Fig. 1.

25 The letter A indicates the steam-cylinder; B, the piston-rod; C, the connecting-rod; D, the crank-shaft of an ordinary slide-valve engine.

E is the eccentric, fitted, as usual, on the  
30 crank-shaft D; and F is the valve-rod, which passes through a stuffing-box,  $f$ , on the steam-chest G and works the valve (not shown) over the ports of the cylinder A to admit and exhaust the steam. The engine-valve may  
35 have any suitable construction.

Instead of connecting the rod H of the strap of the eccentric E directly to the valve-rod F, so that the valve shall be moved directly by the movement of the eccentric, I connect the  
40 outer end of the valve-rod to a block, I, which is suitably held by a nut,  $i$ , so as to slide in a slot, J, ranging about vertically through a link, K, which is pivoted below, at  $k$ , to the engine-bed L, and so as to be rocked in the  
45 plane of motion of the engine-valve to move the valve over the cylinder-ports, and as the valve is moved the block I slides in the link-slot J, so as not to throw the valve-rod F out of line and cause undue wear on its stuffing-box  
50 or disturb the even travel of the valve.

Above the slot J the link K has a slot, M, curved in the sweep of a circle described by the block N, which enters the slot, and has a

shoulder,  $n'$ , coming against one face of the link, so that when the nut O is screwed upon  
55 the bolt  $n$  at the opposite side of the link the block N will be clamped firmly to the link, and the shoulder  $n^2$  of the bolt will be drawn against the block, and the head of the bolt  $n$  will hold the end of the connecting-rod H to  
60 the block and leave the rod free to rock on the bolt as the rod is moved back and forth by the eccentric. It is evident that if the block N is moved upward in the slot M the travel of the valve will be lessened or short-  
65 ened, and if the block is moved downward the travel of the valve will be increased or lengthened, thereby cutting off the steam-supply earlier or later in the stroke of the  
70 piston.

The link-connection with the eccentric and valve-rods constitute a cut-off variable at will by simply adjusting the block N in the link-  
75 slot M as the work demanded of the engine shall require, thereby preventing the waste of steam caused by the uniform travel of the valve when it is connected directly to the eccentric.

My improvement also facilitates the starting of the engine without turning over the  
80 fly-wheel by hand, as the block N may be loosened and may drop to the bottom of the slot M, and the steam then be turned on, when the engine will start slowly, whereupon the block N may be raised and fastened by the  
85 nut O at the desired height, and without stopping the engine.

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

The combination, with the engine-valve rod F and eccentric-rod H, of the link K, pivoted at its lower end to the engine-bed, said valve-rod being connected to the link by a  
95 block, I, slot J, and nut  $i$ , and the eccentric-rod connecting with the link by a block, N, having a shoulder,  $n'$ , between rod H and link K, slot M in the link K, bolt  $n$ , having a shoulder,  $n^2$ , and passing through rod H and block N, and nut O, substantially as shown  
100 and described.

THOMAS J. WALDEN.

Witnesses:

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THOS. H. MARTIN.