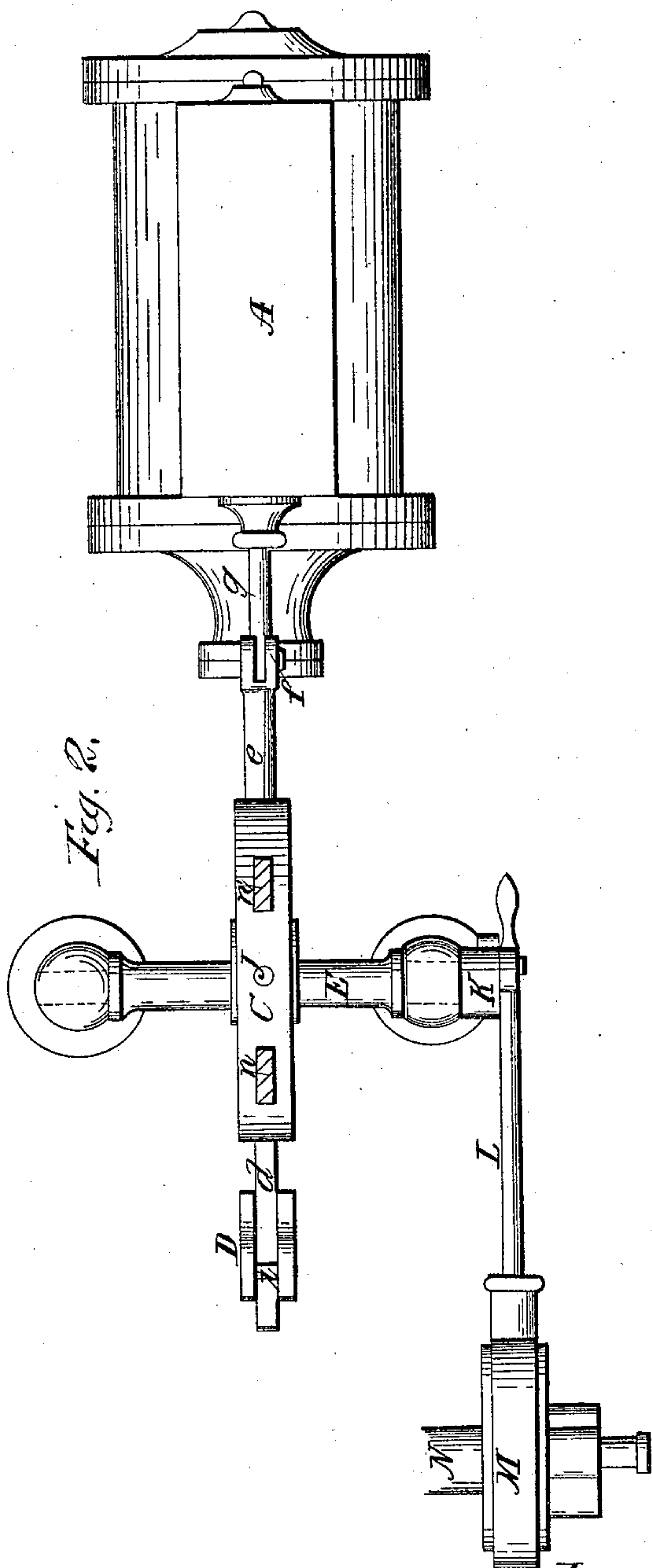
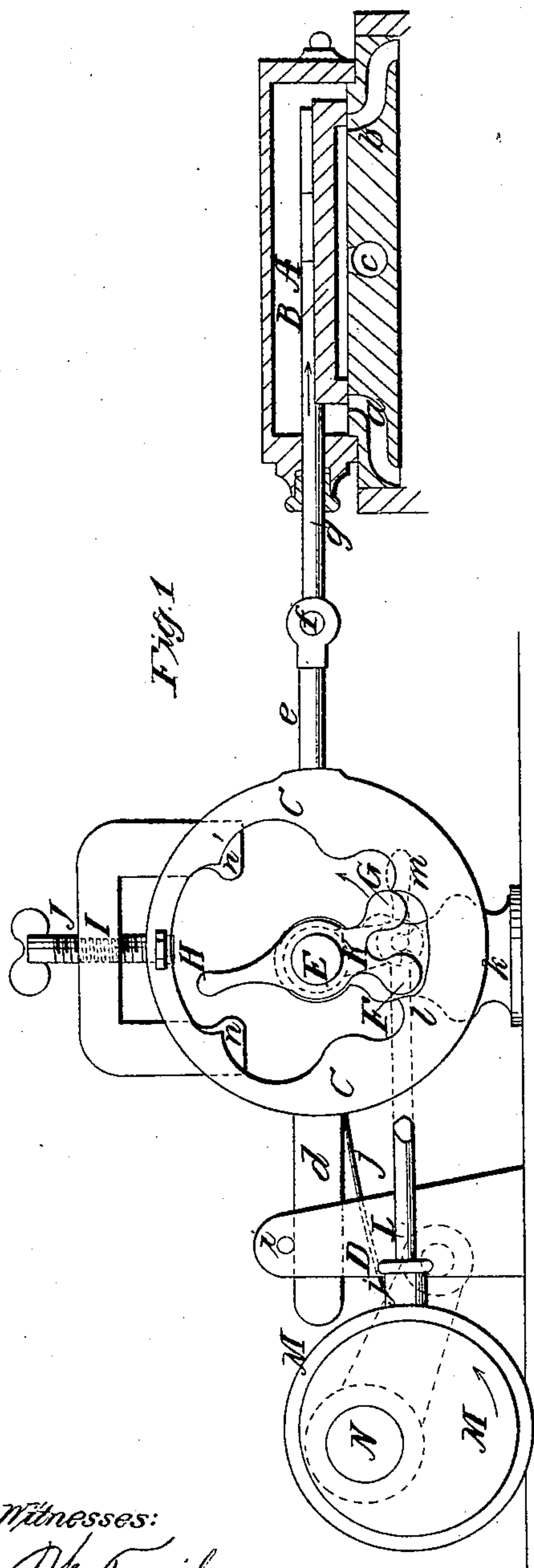


*P. Louis,*  
*Steam-Engine Valve-Gear.*  
*N<sup>o</sup> 29,844. Patented Aug. 28, 1860.*



*Witnesses:*  
*Wm. Smith*  
*J. W. Coombs*

*Inventor:*  
*Peter Louis*



# UNITED STATES PATENT OFFICE.

PETER LOUIS, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF, AND HARAM WAUDEL, OF CASTLETON, NEW YORK.

## VALVE-GEAR FOR STEAM-ENGINES.

Specification of Letters Patent No. 29,844, dated August 28, 1860.

*To all whom it may concern:*

Be it known that I, PETER LOUIS, of the city, county, and State of New York, have invented a new and Improved 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 drawing, forming part of this specification, in which—

Figure 1 is a side view illustrating the application of my invention to a horizontal engine and showing the steam chest and valve in section. Fig. 2 is a plan of the same exhibiting the variable cut-off apparatus in section.

Similar letters of reference indicate corresponding parts in both figures.

My invention consists principally in the combination with a yoke connected with the valve or valves employed for the induction and cutting off the steam and with a rocker deriving motion from the main shaft of the engine and operating within and upon the said yoke to open the valve or valves at the proper time for the induction of steam, of two adjustable tappet pieces fitted to the yoke as hereinafter described for the purpose of being operated upon by an arm of the rocker to effect the closing of the valve or valves and consequent cutting off of the steam at such points in the stroke of the piston as may be desirable.

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

A, represents the steam chest of the engine.

*a, b*, are the steam ports communicating with opposite ends of the cylinder, and *c*, is the exhaust port.

B, is a slide valve working over the three ports. This valve should be of the double lap kind in order that it may, after cutting off the steam from one steam port *a*, or *b*, continue to keep the other one open to the exhaust port *c*.

C, is the yoke having rigidly attached to it two rods *d*, and *e*, of which the latter is connected by a pin joint *f*, with the stem *g*, of the valve and the former is arranged to work in a guide D, under a fixed pin *i*, against which it is held by a spring *j*, in the lower part of the guide except at the times hereinafter explained.

E, is a rock shaft working in suitable

fixed bearings *h, h*, and passing through the yoke C. This rockshaft has securely attached to it an arm K, which is connected by a rod L, with an eccentric M, on the main shaft N, of the engine and it has also secured firmly upon it a three armed rocker F, G, H, which works within the yoke. Two arms F, G, of this rocker operate upon two inward projections *l, m*, in the lower part of the yoke, to give the valve the necessary movements for the induction of steam to the two ports *a*, and *b*, alternately, and the third arm H, operates upon the two adjustable tappet pieces *n, n'*, which project through slots provided for them in the upper part of the yoke. These tappet pieces are attached rigidly to or formed upon the ends of a bar I, which is attached to the yoke by means of a screw J, so applied that by turning the said screw the said bar may be lowered or raised and the tappets caused to project farther or not so far into the yoke. The said tappets have the faces which are acted upon by the arm H, of the rocker of rounded form, and the end of the said arm as well as the ends of the other arms of the rocker are rounded.

The operation of the valve gear is as follows: The revolution of the eccentric produces an oscillating movement of the rock shaft E, within the yoke C, and causes the arms F, G, to act upon the projections *l, m*, to move the yoke to make the valve open the ports *a, b*, to the steam at the proper time and the arm H, to act upon the tappet pieces *n, n'*, to move the yoke to make the valve close the ports to the steam at the proper time the closing movement and cutting off of the steam taking place later or earlier in the stroke according as the tappet pieces project farther or not so far into the yoke. To illustrate this movement more fully I will first suppose the crank rotating in the direction indicated in Fig. 1, and to have arrived nearly on the center. The rocker operated by the eccentric (which is set with a lead) is moving in the direction of the arrow shown within the yoke in Fig. 1, and the arm G, is acting upon the projection *m*, of the yoke and so moving the valve in the direction of the arrow marked on its stem in Fig. 1, off the port *a*, which is being opened to the steam while *b*, is being opened to the exhaust. By the time the port *a*, is fully opened to the steam the arm G, will pass



over the angular edge of the projection *m*, and cease to act upon the valve only depressing the yoke slightly as it passes over the said angle. The valve then remains  
 5 with the port *a*, open to the steam, and *b*, open to the exhaust till the arm H, by the continued movement of the rocker in the same direction comes into operation on the  
 10 tappet piece *n*, and moves the yoke far enough in the opposite direction to that in which it had been previously moved by the arm G, to bring the valve over the port *a*, and so to cut off the steam but not far  
 15 enough to open *b*, to the steam or even to close it to the exhaust. As the crank approaches the opposite center to that near which it is shown in Fig. 1, the direction of the movement of the rocker having changed, the arm F, comes into operation on the pro-  
 20 jection *l*, of the yoke to move it still farther in the direction in which it had been moved by the action of the arm H, on the tappet piece *n*, and the said arm, by this action on the yoke, opens the port *b*, to the steam and  
 25 *a*, to the exhaust just as the crank passes the center. The arm F, after having opened the ports as above specified, passes over the projection *l*, and the yoke and valve remain stationary till the arm H, while the rocker  
 30 still moves in the same direction, comes into operation on the tappet piece *n'*, and moves the yoke and valve back in the direction first described and indicated by the arrow shown upon the stem in Fig. 1, far enough  
 35 to close the port *b*, and so cut off the steam but not far enough to open *a*, to the steam or to close it to the exhaust. As the crank again approaches the center near which it is represented in Fig. 1, the direction of move-  
 40 ment of the rocker having again changed the arm G, comes into operation again as at first described and in this way the operation proceeds. The arms F, and G, after

having produced their movements of the valve pass over the angles of the projections 45 *l*, *m*; and it is to permit this that the spring *j*, is applied under the rod *d*, of the yoke, said spring lifting the yoke again after it has been depressed by the arms passing over the projections in either direction. 50

The tappet bar I, carrying the tappet pieces *n*, *n'*, may if it be desired to employ a governor in connection with the cut off to regulate the engine, be connected with the governor in such a way as to be raised up to 55 cause the tappet pieces to project not so far into the yoke by any tendency to increased speed and vice versa. It will be understood that when the tappets are nearer to the center of the yoke—their adjustment 60 not being radial to the center of the yoke—the arm H, will have to move farther before striking them, and vice versa.

It will be understood by engineers that by a suitable system of connections between the 65 yoke and the valves this valve gear may be employed in connection with other kinds of valves as well as in connection with the slide valve.

What I claim as my invention, and desire 70 to secure by Letters Patent, is—

1. The arrangement of the two connected adjustable tappet pieces I, I, *n*, *n'*, in connection with the valve yoke C, and rocker F, G, H, substantially as and for the pur- 75 pose herein described.

2. In combination with the above described arrangement of tappet pieces the spring *j*, applied in connection with the yoke and the rocker substantially as and 80 for the purpose specified.

PETER LOUIS.

Witnesses:

W. TUSCH,  
J. W. COOMBY.