(No Model.)

H. C. MOOERS.

VALVE GEAR.

No. 346,492. Patented Aug. 3, 1886.

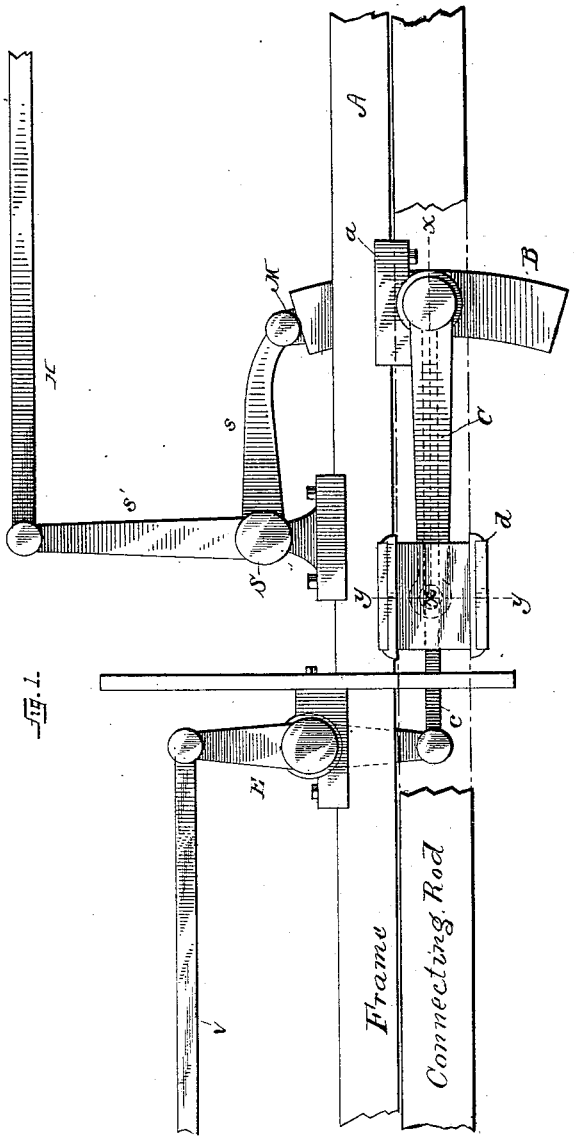

Fig. 1.

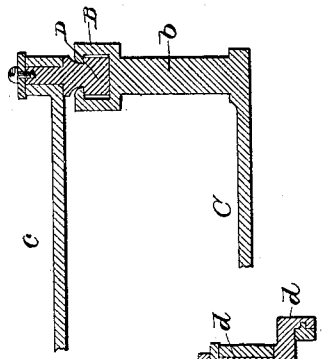

Fig. 2.

Fig. 3.

WITNESSES

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VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 346,492, dated August 3, 1886.

Application filed October 9, 1885. Serial No. 179,410. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. MOOERS, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Valve-Gears; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to valve-gear.

Heretofore links which were mounted on a fixed pivot were ordinarly oscillated by means of an eccentric.

The object of my invention is to dispense with the use of an eccentric and operate the link directly from the main rod, and to improve and simplify the construction of the link, whereby the amount of friction and strain upon the parts is reduced and the operation is rendered more nearly perfect.

The invention is embodied in a link having an oscillating arm fixed thereto at or about at its middle point, the said arm being adapted to be connected with the main or connecting rod of the engine, as will be hereinafter particularly set forth.

In the accompanying drawings, in which similar letters indicate corresponding parts in the different figures, Figure 1 is a view, in side elevation, of a valve gear embodying my improvement. Fig. 2 is a section on line *x x* of Fig. 1; and Fig. 3 is a section on line *y y* of Fig. 1.

The letter A indicates the main frame of the engine, and B the link, which is provided at or about its middle point with a shaft or journal, *b*, projecting at right angles therefrom. The link is secured pivotally to the main frame by placing the shaft or journal *b* in the journal-box *a* on the frame, the said journal or shaft *b* being free to turn there. From the end of the journal *b* projects an arm, *c*, which is pivoted or adapted to be attached to the main or connecting rod of the engine in such manner or by the intervention of such means that vertical curvilinear motion will be imparted to it. In this instance the means consists of a block, *d*, secured pivotally to the arm *c* by the stud-shaft *b*, passing through the eye or socket *c'* in the end of the arm, the end of said stud-shaft being fitted with a washer and nut suitable for retaining the block upon the arm. The face of the box *d* is grooved, and said groove may be fitted with metal gibs in its sides, as shown. When the parts are in proper position, the box *d* is so located that the main rod (indicated by broken lines) will pass through the groove. The groove in the box is of such shape and size as to fit nicely upon said main rod.

D is a link-block, which may be provided with metal gibs, and is adapted to be moved in the groove in the link the entire length thereof. This block D is secured to the end of an adjusting-rod, C, attached to one end of a lever, E, fulcrumed in the frame. The other end of the lever E has attached to it the valve-rod V. S is the tumbling or reverse shaft, also journaled on the frame, and provided with arms *s* and *s'*, as shown, the arm *s* having at its end a hanger, M, to which is attached the block D.

A rod, H, leading to within convenient reach of the engineer, as by being connected with the usual reverse-lever below the rack, is rigidly attached to the end of the arm *s'*.

The main or connecting rod of the engine, when in action, produces a perpendicular motion at a point central with the box *d*. This perpendicular motion of the rod therefore imparts a like motion to the box *b* and arm *c*, which results in an oscillating movement of the link.

The link-block may be moved by the engineer from one end of the link to the other without disturbing the position of the lever or hanger E or the valve of the engine.

When the link-block D is in line with shaft or journal *b*, or at the center of the link, oscillating movement of the link will produce no effect at the valve, since the link will simply oscillate on the block as a pivot.

When the link-block occupies a position above the center of the link, the valve will operate to produce a go-ahead motion of the engine, and when below the center a back-up motion.

It will be understood that the position of the link-block can be determined by the engi-

neer, who can operate said block by means of the rod H, to lengthen or shorten the stroke or throw of the valve-rod on either side of the center in the usual manner, as may be desired.

It is evident from the foregoing that by my invention I produce a simple, durable, and correct valve-gear, reduce the cost of construction, and lessen the amount of friction and strain on the parts. My invention furthermore permits an increased length of fire-box, and consequently an increased amount of grate-surface.

It is obvious that instead of the box *d*, I may simply provide a pin to engage a slot or its equivalent in the main rod of the engine, and produce the same motion above described.

The principal feature of my invention, in addition to vertical adjustment of the block, intsead of the link, is the simplicity of connection, and construction in which the link is oscillated by direct connection with the main-rod of the engine.

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

1. The improved link for valve-gear, consisting of the link portion B, having fixed thereto the shaft provided with means for connecting it to the main or connecting rod of an engine, substantially as described.

2. The combination, in a valve-gear, of the link portion having integral therewith the shaft or journal, and a rod provided with means for connecting it to the main or connecting rod of an engine, the said link portion being provided with a longitudinal groove or slot in which a rod communicating with the valves rests, and in which it may be adjusted to vary the throw.

3. The combination, in a valve gear, of the link portion having integral therewith the shaft or journal and a rod provided with a box, or the like, for attaching it to the main or driving shaft of the engine, the said link being slotted or grooved longitudinally, and a rod communicating with the valves, and having its end resting in and capable of sliding in the said groove.

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

HENRY C. MOOERS.

Witnesses:

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