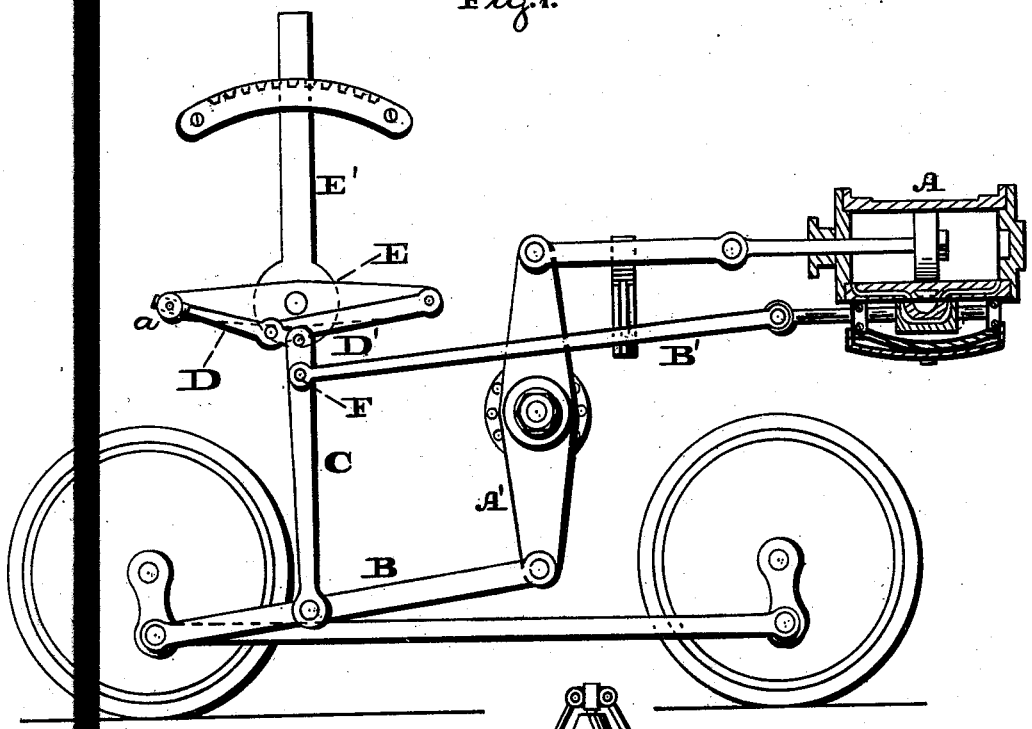
C. BROWN.

Valve-Gear for Engines.

No. 202,222. Patented April 9, 1878.

Fig. 1.



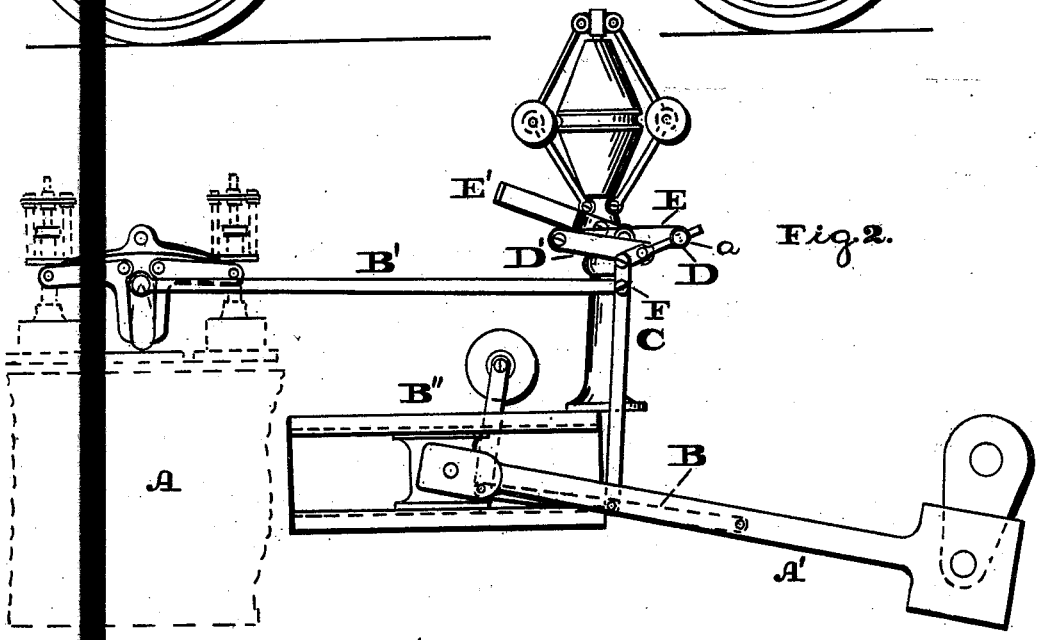


Fig. 2.

Witnesses:

Louis F. Brous,

A. P. Grant.

Inventor:

Chas. Brown,

by John A. Wiedersheim

Attorney.

UNITED STATES PATENT OFFICE.

CHARLES BROWN, OF WINTERTHUR, SWITZERLAND.

IMPROVEMENT IN VALVE-GEARS FOR ENGINES.

Specification forming part of Letters Patent No. **202,222**, dated April 9, 1878; application filed August 24, 1877.

To a[ll] whom it may concern:

Be[it] known that I, CHARLES BROWN, of Win[ter]thur, in the canton of Zurich and Repub[lic] of Switzerland, have invented a new and [use]ful Improvement in Valve-Motion, whic[h] improvement is fully set forth in the follo[w]ing specification and accompanying draw[in]gs, in which the figures are side elevations [o]f the valve-motion embodying my invent[io]n.

Si[m]ilar letters of reference indicate corresp[on]ding parts in the two figures.

My [in]vention consists of valve-motion applica[b]le to stationary and locomotive engines, in w[hi]ch the mechanism controlling the working [o]f the upper end of the pendulum-lever can b[e] placed in an inclined position on either side [o]f the middle position, so as to impart a suita[b]le motion to the slide-valve for the forward [o]r backward movement of the engine or rever[s]ing motion.

An[y] position intermediate of the two extrem[es] will give a greater or less amount of admi[s]sion or expansion, as required either for back[w]ard or forward gear.

Re[f]erring to the drawings, A represents the cylin[d]er of a locomotive-engine, and B an oscillat[in]g rod connected at one end to the crank or wr[i]st-pin of one of the driving-wheels and at th[e] other end to the working-beam A′ attache[d] to the piston-rod.

C r[e]presents the pendulum-lever, which is pivot[ed] at its lower end to the rod B. The lift of [t]his pendulum-lever is determined by the a[d]justment of an adjustable lever-bar, E, the in[te]rmediate connection between the two levers [b]eing effected by means of the lever-rods [D] D′. The latter of these rods, D′, is pivot[ed] at one end to the lever E, and at its other [e]nd it is pivoted to the rod D. This rod D is [n]ot pivoted to lever E in the same way as the r[od] D′, but is adapted to work through an eye, *a*, which is swiveled to the lever E. As shown, the pendulum-lever C is pivoted to the rod D, whereby it will be guided and controlled [i]n its movement.

To [t]he oscillating lever E is connected the revers[in]g lever E′, for shifting the position of the le[v]er E, said lever E′ engaging with the well-k[no]wn notched sector or screw-reversing gear.

To the lever C, at the point F, which is just below the place of connection with lever-rods D D′ of the lever E, there is pivoted a rod, B′, which is connected to the stem of the slide-valve or other operating mechanism of the valve.

In Fig. 2 the valve-motion is shown as applied to a stationary engine. In this case the pendulum-lever C is attached at its lower end to an oscillating rod, B, (shown in dotted lines,) one end of said rod being pivoted to the crank-arm or working-beam A′ of the engine, and the other to a swinging arm, B″, suitably mounted. The rod B′, which is pivoted to the pendulum-lever C, is connected to a tappet which operates the elbow-lever of the valves; but the operation is similar to that stated above.

It will be seen that by my invention the position of the lever E regulates the magnitude or extent of the lift of the point F, which has to travel through a more or less elliptical orbit, and it thus controls the movement of the valve.

It will also be seen that this gear or motion is acting in the capacity of expansion and link gear. As an expansion-gear it offers, compared with ordinary arrangements, the advantage that it renders possible to create more degrees of expansion and a more accurate distribution of steam. As a link-gear its construction is advantageous, because the handling of the link-gear lever is quite easy, requiring less strength and effort of the operator than the ordinary connecting-gear accompanied by the counter-guide, and it is easy to obviate the detrimental influence of short guiding-rods on the precise distribution of steam, by raising and lowering the upper extremity of the pendulum-rod through a slight adjustment of the joints of the oscillating lever E. This lever E may be placed in an inclined position on either side of the middle position, so as to impart a suitable motion to the valve for the reversing motion.

It is evident that any position of the two extremes will give a greater or less amount of admission or expansion, as required either for backward or forward gear.

Where the pendulum-lever is worked from a coupling-rod, the motion communicated to

the valve is slightly incorrect—that is to say, the admission is not perfectly equal on both sides of the piston; but in applying my valve-gear to engines where the motion of the piston is transmitted to the driving-wheels by means of a working-beam, one end of the crank-connecting rod is compelled to move in a circular arc by being attached to one end of the working-beam.

Now, as the pendulum-lever is attached to the connecting-rod at a suitable point between the crank-pin and working-beam, the error due to the curve described by the lower end of said pendulum-lever may be so far overcome that the distribution of steam in the cylinder is nearly mathematically correct for any notch of the sector.

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

In combination with a valve and its connecting-rod, the pendulum-lever C, receiving a positive movement, the rods D D′, and the adjustable lever E, all connected, as shown, whereby the movement of the engine may be changed, substantially as described.

The above specification signed by me.

CHARLES BROWN.

In presence of—
FERDINAND VEITH,
T. T. SCHÄPPI.