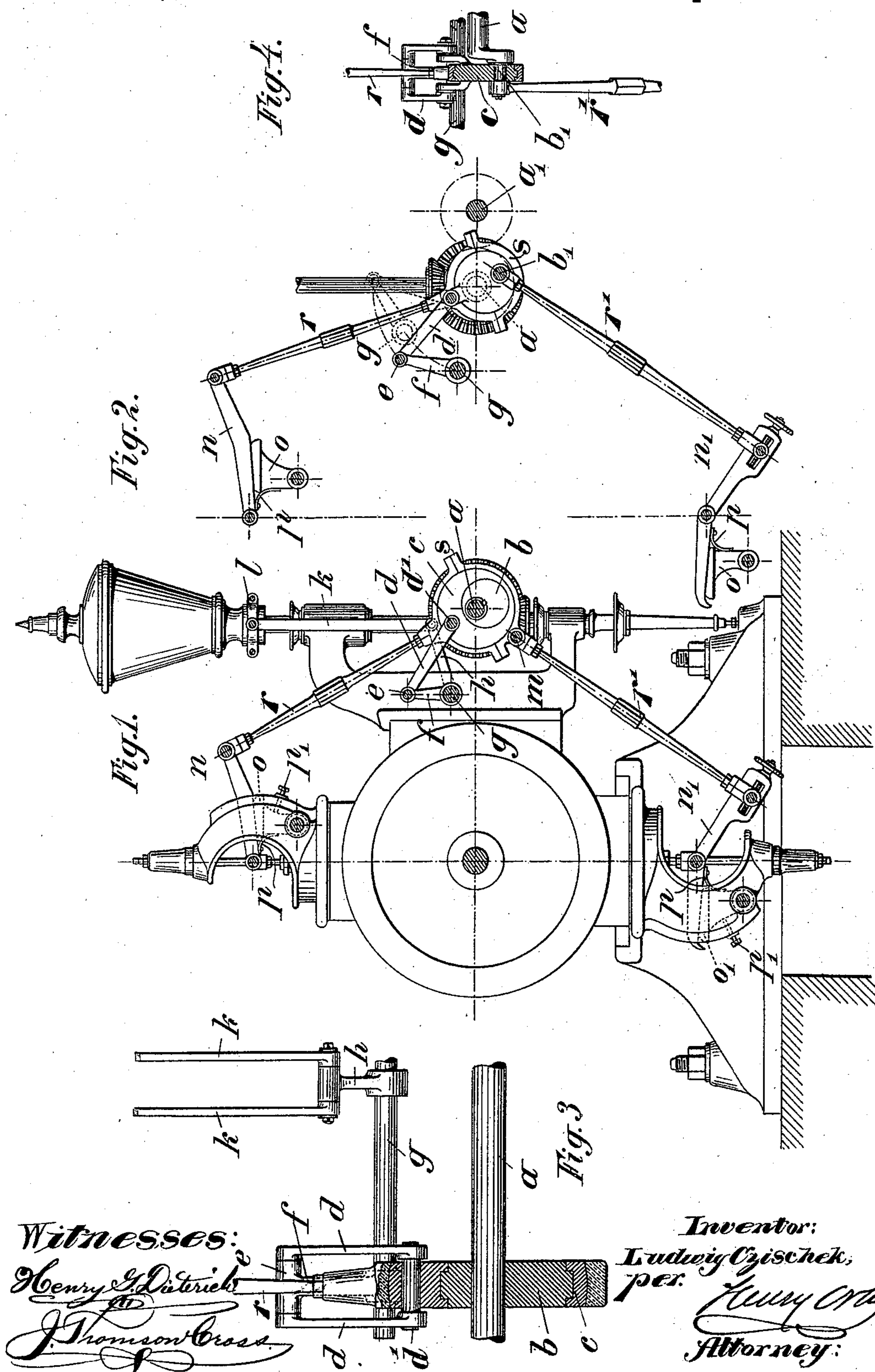


(No Model.)

L. CZISCHEK.
VALVE GEAR.

No. 435,994.

Patented Sept. 9, 1890.



Witnesses:
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UNITED STATES PATENT OFFICE.

LUDWIG CZISCHEK, OF VIENNA, AUSTRIA-HUNGARY.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 435,994, dated September 9, 1890.

Application filed June 4, 1890. Serial No. 354,286. (No model.) Patented in Austria-Hungary September 4, 1889, No. 10,055 and No. 40,218.

To all whom it may concern:

Be it known that I, LUDWIG CZISCHEK, a subject of the Emperor of Austria-Hungary, residing at Vienna, in the Province of Lower Austria, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Valve-Gears, (for which I have obtained patents in Austria-Hungary September 4, 1889, No. 10,055 and No. 40,218;) 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Referring to the drawings, Figure 1 is an elevation of my improved valve-gear, and Fig. 2 is a like view showing a slight modification. Figs. 3 and 4 are cross-sections of the eccentrics, shown in Figs. 1 and 2.

The invention has for its object to simplify the construction of valve-gear, increase the efficiency, and facilitate the adjustment as well as the reversal thereof.

To these ends the invention consists in structural features and combinations of parts, as will now be more fully described, reference being had to the accompanying drawings, in which like letters indicate like parts.

The valve operating or reversing shaft *a* carries an eccentric *b* that is rigidly secured thereto, and upon which eccentric *b* is loosely mounted an eccentric *c*, encompassed by its strap *s*. The eccentric *c* is connected to a shaft *g* through the medium of the guide rods or links *d*, pivoted on opposite sides of the said eccentric to a pin *d'*, and through the medium of a lever or radial arm *e*, to which the other end of the links *d* is pivoted. The shaft *g* is connected with the governor-sleeve *l* by means of the straps or connecting-rods *k* and the lever or radial arm *h*, while the inlet-valve is operated by a lever *n*, connected by rod *r* to the eccentric-strap *s*. It will be readily seen that the axis of the eccentric *c* will describe a somewhat elliptic curve under the influence or action of the eccentric *b* on the one hand, and the guide rods or links *d*, the

position of which curve relatively to the axial line of the valve-connecting rod *r*, will vary according as the eccentric *c* is more or less displaced upon the eccentric *b* by the governor through the gear described, so that the volume of steam admitted to the cylinder may be varied within sufficient limits between 0 and maximum. The exhaust-valve may be controlled by a special eccentric or directly from the eccentric-strap *s* by connecting the rod *r'* of the valve-operating lever *n'* to said strap at a properly-chosen point. Both valve-levers *n* and *n'* bear against pendulous or oscillating abutments *o* and *o'*, respectively, that in their normal position bear against the adjustable abutment-screws *p'* by gravity on the one hand and under the influence of weak springs *p* secured to the valve-levers. The same results may be obtained by providing the eccentric-shaft *a* with a crank *b'*, passing loosely through the eccentric *c*, the eccentric *b* being dispensed with, as shown in Figs. 2 and 4, the shaft *a* in this case being driven indirectly by means of suitable gearing, one of the gear-wheels being shown in dotted lines at *a'*.

In order to reverse the motion of the engine it will simply be necessary to throw the shaft *g* over, so that the guide rods or links *d* will lie on the opposite side of the connecting-rod *r*, as shown in dotted lines in Fig. 2.

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

1. In a valve-gear, the combination, with the eccentric that controls the movements of the valve and the revoluble shaft that controls the movements of the eccentric, of an auxiliary eccentric or crank on said revoluble shaft adapted to transmit the movements of said shaft to the valve-operating eccentric, the governor of the engine, and a connection between the governor and the valve-operating eccentric adapted to vary the position of the last-named eccentric relatively to that of the eccentric or crank on the shaft and there-through the amplitude of the oscillations of the valve-operating eccentric, substantially as set forth.

2. In a valve-gear, the combination, with

the eccentric that controls the movements of the valve and the revoluble shaft that controls the movements of the eccentric, of an auxiliary eccentric or crank on said revoluble shaft adapted to transmit the motion thereof to the valve-operating eccentric, the governor of the engine, and a connection between the governor-sleeve and the eccentric that controls the valve, consisting of the straps or links *k*, connected with said sleeve, the links *d*, and the shaft *g*, having radial arms *f* and *h* pivotally connected with said links *k* and *d*, respectively, substantially as and for the purposes specified.

3. In a valve-gear, the combination, with the valve-operating lever, the eccentric *c* for controlling the movements of said lever, the eccentric-strap, and a connection between said strap and lever, of the shaft *a*, an eccentric or crank on said shaft operating within the eccentric *c*, the governor-sleeve *l*, the straps or links *k*, connected with said sleeve, the links *d*, and the shaft *g*, provided with radial arms *f* and *h*, pivotally connected with the links *k* and *d*, respectively, substantially as and for the purposes specified.

4. The combination, with the valve-lever *n*,

its spring *p*, and the adjustable abutment-screw *p'*, of the pivoted-lever bearing *o*, substantially as and for the purposes specified.

5. The combination, with the revoluble shaft *a*, eccentrics *b* and *c*, of the valve-lever *n'*, and the rod *r'*, connected with said lever and with the strap of the eccentric *c*, respectively, substantially as and for the purposes specified.

6. In a valve-gear, an eccentric adapted to control both the admission and exhaust valves, of a revoluble shaft, an eccentric or crank thereon adapted to control the movements of the valve-operating eccentric, the governor of the engine, and a connection between the same and the valve-operating eccentric adapted to vary the position of the last-named eccentric relatively to that of the eccentric or crank on the revoluble shaft and therethrough the amplitude of the oscillations of the valve-operating eccentric, substantially as set forth.

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

LUDWIG CZISCHEK.

Witnesses:

CARL BOISETS,
NETTIE S. HARRIS.