

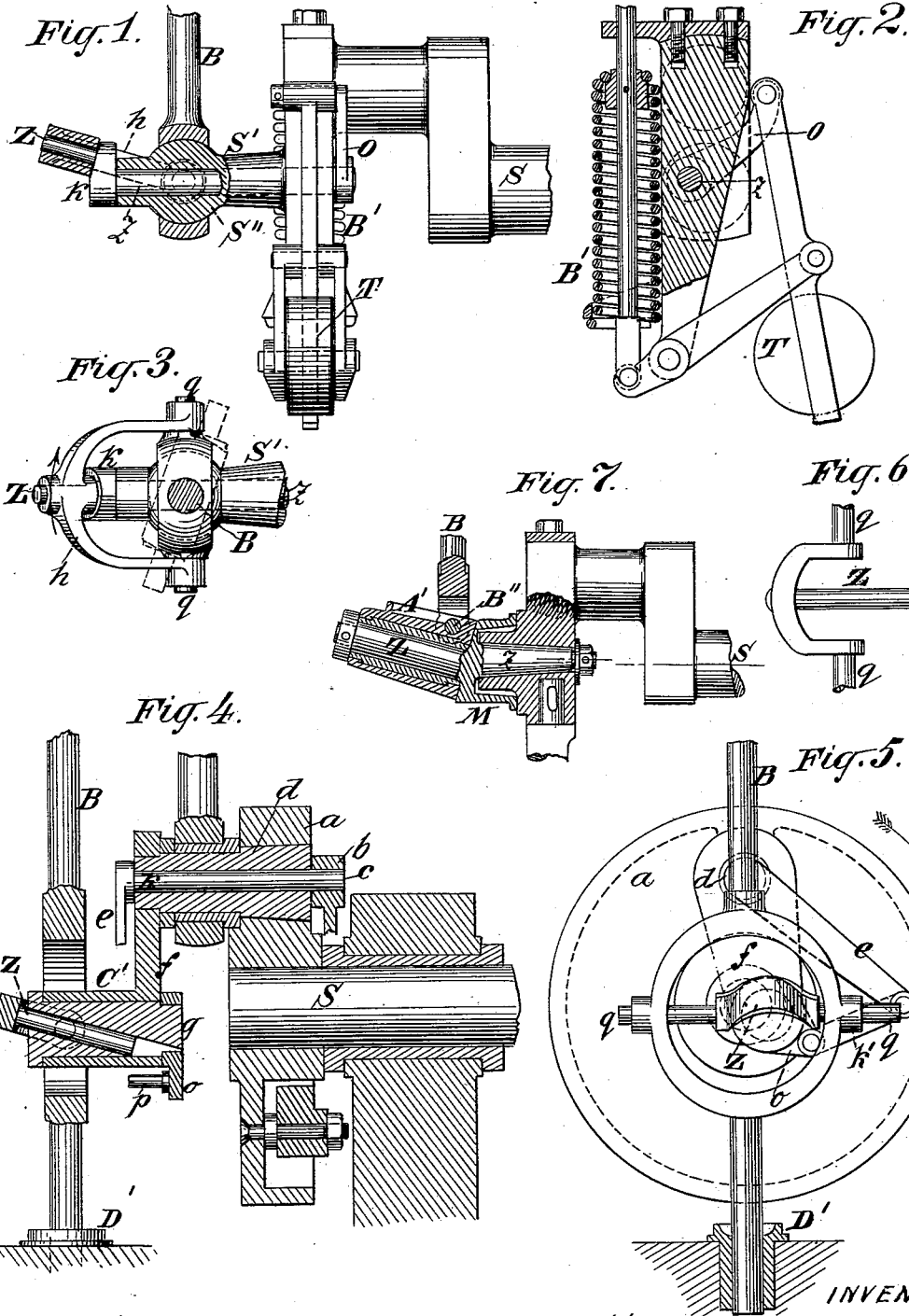
(No Model.)

H. MOEHRING & A. PFLÜGER.

VALVE GEAR.

No. 383,408.

Patented May 22, 1888.



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UNITED STATES PATENT OFFICE.

HERMANN MOEHRING AND ALBERT PFLÜGER, OF FRANKFORT-ON-THE-MAIN, PRUSSIA, GERMANY.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 383,408, dated May 22, 1888.

Application filed February 13, 1888. Serial No. 263,787. (No model.) Patented in England April 7, 1886, No. 4,859; in France April 7, 1886, No. 175,333; in Germany April 8, 1886, No. 40,827, and December 14, 1886, No. 41,921; in Belgium April 7, 1886, No. 72,682; in Italy June 30, 1886, No. 19,777, and June 30, 1887, No. 21,552, and in Austria-Hungary September 13, 1886, No. 14,984 and No. 41,064.

To all whom it may concern:

Be it known that we, HERMANN MOEHRING, a citizen of the United States, domiciled at Frankfort-on-the-Main, in the Kingdom of Prussia, Empire of Germany, but now temporarily residing at the city, county, and State of New York, and ALBERT PFLÜGER, a subject of the Emperor of Germany, residing at Frankfort-on-the-Main, in the Kingdom of Prussia, Empire of Germany, have invented certain new and useful Improvements in Mechanical Movements; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, and which has been patented in the following countries: In England April 7, 1886, No. 4,859; in Germany April 8, 1886, No. 40,827 and addition thereto December 14, 1886, No. 41,921; in France April 7, 1886, No. 175,333, and addition thereto March 31, 1887; in Austria-Hungary September 13, 1886, No. 14,984 and No. 41,064; in Italy June 30, 1886, No. 19,777, and addition No. 21,552, June 30, 1887, and in Belgium, No. 72,682, April 7, 1886, and addition thereto March 31, 1887.

This invention comprises certain new and useful combinations of parts whereby is provided a mechanical movement suitable for various purposes—as, for example, the working of that variety of means for steam-engines and similar motors in which the valve has a longitudinal movement to open and close the ports, and also a lateral movement to determine the point of cut-off—our said invention being also useful in many other classes of mechanism requiring in their operation a combined simultaneous lateral and longitudinal movement.

Figure 1 is a side view and partial-sectional view of an apparatus made according to our said invention. Fig. 2 is a sectional view taken in a plane at right angles to Fig. 1. Fig. 3 is a detail view, as seen from the top, of certain parts included in Figs. 1 and 2. Fig. 4 is a vertical transverse sectional view representing a modification of our said inven-

tion. Fig. 5 is a face view as seen from the left hand of Fig. 4, and Fig. 6 is a detail view of certain parts included in Figs. 4 and 5. Fig. 7 is a sectional view representing a further modification of our said invention.

Referring first to Figs. 1, 2, and 3, S is the main shaft, having attached to its crank-pin a return-crank carrying an arm or wrist, S', with a spherical boss, S". The center line of the arm or wrist S' and boss S" is eccentric to the line of the main shaft S—in other words, eccentric to the axis of motion of the wrist. The eye of the eccentric-rod B is pivotally connected with the spherical boss S". The arm S' is bored out to receive the shaft z, and the latter has attached to one of its ends the lever O, while the other is furnished with the crank k and the inclined crank-pin Z. The eye of the eccentric-rod B is provided with two pins or pivots, q q, on which the yoke h (the end of which is bored out to receive the crank-pin Z) is mounted and can turn. The lever O is attached by a proper link or connection with the mechanism of any suitable speed-governor or other suitable device. In Fig. 2 such a governor is shown, T being a weight which, by centrifugal force, when the main shaft rotates too rapidly, overcomes the resistance of the spiral spring B', and thus moves the arm O in one direction, while if the speed of the shaft is less than is desired the spring overcomes the centrifugal force of the weight and moves the arm O in the opposite direction.

The operation is as follows: In consequence of the eccentricity of the arm S' and spherical boss S" the eccentric-rod B receives the desired longitudinal motion, while the crank k, with its inclined crank-pin Z, communicates, by means of the yoke h, the desired transverse, lateral, or oscillating motion to the eccentric-rod B. The amount of this transverse motion is due to the amount of inclination of the inclined crank-pin Z, while the position of the inclination or position of the crank k determines the period, sooner or later, when the transverse motion takes place relative to the longitudinal motion. It is manifest that the

lever O, being turned in one direction or the other by the action of the speed-governor or by other means, turns the shaft z , to which it is attached, and consequently changes the position of the crank k and the position of the inclination of the crank-pin Z, causing a corresponding change in the relative periods of the two motions.

Referring now to the modifications shown in Figs. 4, 5, and 6, a is a crank-wheel on the shaft S. d is the crank-pin; f , a return-crank, with a tubular or hollow wrist, C', at its extremity, which, like the wrist shown in Figs. 1, 2, and 3, is eccentric to its axis of motion. In this tubular wrist the pin g can turn freely. This pin carries the inclined pin Z, and also at its other end a crank, o , with its crank-pin p . Levers or links are shown at b , e , and k' . c is a small shaft going through the center of the crank-pin d and connecting the levers b and e . Attached to the inclined pin Z is a yoke with turned ends q q , on which the eccentric-rod B (which is developed ring-shaped) is mounted or swung, as shown in Fig. 5. The eccentric-rod B passes through a guide, D', at its lower extremity.

The operation is as follows: As the center line of the pin g is eccentric to the center line of the main shaft S, it is manifest that we give thereby the desired longitudinal motion to the eccentric-rod B, while the inclination of the pin Z gives the desired transverse, lateral, or oscillating motion to the said eccentric-rod B. The position of the inclination of the pin Z determines, as already explained, the period, sooner or later, when this transverse, lateral, or oscillating motion takes place relative to the longitudinal motion. It is manifest that by turning the pin g around we alter the position of the inclination of the inclined pin Z, and, as the pin g is provided with the crank o and pin p , and the latter is connected by the link k' , lever e , and shaft c with the lever b , it can be turned in either direction, as may be desired, by moving the latter one way or the other. It is further manifest that by connecting the lever b with a speed-governor contained in the crank-wheel, or otherwise suitably placed, the governor will determine the position of inclination of the inclined pin Z, and consequently the period, sooner or later, at which the transverse, lateral, or oscillating motion of the eccentric-rod B takes place relative to its longitudinal motion. Any suitable mechanism, means, or device may be used instead of the speed-governor, levers, &c., to change the position of the pin Z.

In the modification represented in Fig. 7 the rod B is attached to the sleeve A' by a suitable joint or connection, B', thereby dispensing with the yoke represented in Fig. 3. The sleeve A' can turn on the inclined pin Z, which latter is carried by its axle z , which is placed in a suitable bearing in the return-crank and capable of the requisite oscillating or turning movement therein. This axle z has an outer

shell, M, or equivalent device, to which may be connected any suitable means for turning the axle z , and consequently the inclined pin Z, in the one direction or the other to determine the period during the longitudinal movement of the rod B at which the lateral or oscillating movement thereof shall occur. When desired, the actuating mechanism or device may be otherwise connected with the pin Z—as, for example, to the rear extremity of its axle z .

As the axis of rotary motion of the pin Z and its axle z is eccentric to that of the shaft S, by which the return-crank is carried, it follows that they constitute a wrist arranged eccentric to its axis of rotary motion, which gives the longitudinal movement to the rod B, while the lateral or transverse oscillating movement thereof is derived from the inclination of the pin Z.

What we claim as our invention is—

1. In a mechanical movement, the combination of a wrist arranged eccentric to its axis of motion, a rod connected with said wrist to receive a longitudinal to-and-fro movement therefrom, and an eccentric-pin arranged at an angle to said wrist to give a transverse, lateral, or oscillating movement to the said rod during the longitudinal to-and-fro movement thereof, substantially as and for the purpose herein set forth.

2. In a mechanical movement, the combination of a wrist arranged eccentric to its axis of motion, a rod connected with said wrist to receive a longitudinal to-and-fro movement therefrom, an eccentric-pin arranged at an angle to said wrist to give a transverse, lateral, or oscillating movement to said rod during the longitudinal to-and-fro movement thereof, and a device for changing the position of the eccentric-pin, substantially as and for the purpose herein set forth.

3. In a mechanical movement, the combination of a wrist arranged eccentric to its axis of motion, a rod connected with said wrist to receive a longitudinal to-and-fro movement therefrom, an eccentric-pin arranged at an angle to said wrist to give a transverse, lateral, or oscillating movement to the said rod during the longitudinal to-and-fro movement thereof, and a crank or arm connected with said eccentric-pin to actuate or change the position of the same, substantially as and for the purpose herein set forth.

4. In a mechanical movement, the combination of a wrist arranged eccentric to its axis of motion, a rod connected with said wrist to receive a longitudinal to-and-fro movement therefrom, an eccentric-pin arranged at an angle to said wrist to give a transverse, lateral, or oscillating movement to the said rod during the longitudinal to-and-fro movement thereof, and a speed-governor to control the movement of said eccentric-pin, substantially as and for the purpose herein set forth.

5. In a mechanical movement, the combi-

5 nation of a wrist arranged eccentric to its
axis of motion, a rod connected with said
wrist to receive a longitudinal to-and-fro move-
ment therefrom, an eccentric-pin arranged at
an angle to said wrist to give a transverse,
lateral, or oscillating movement to said rod
during the longitudinal to-and-fro movement
thereof, a crank or arm connected with said
eccentric-pin to actuate or change the posi-
10 tion of the same, and a speed-governor to con-
trol the movement of said eccentric-pin, sub-

stantially as and for the purpose herein set
forth.

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Correction in Letters Patent No. 383,408.

It is hereby certified that in Letters Patent No. 383,408, granted May 22, 1888, upon the application of Hermann Moehring and Albert Pflüger, of Frankfort-on-the-Main, Prussia, Germany, the title of the invention was erroneously written and printed "Valve-Gear," whereas said title should have been written and printed *Mechanical Movements*; and that said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 29th day of May, A. D. 1888.

[SEAL.]

Countersigned:

BENTON J. HALL,
Commissioner of Patents.

H. L. MULDROW,
First Assistant Secretary of the Interior.