No. 844,521. PATENTED FEB. 19, 1907.

J. IVERSEN.

VALVE GEAR.

APPLICATION FILED JAN. 31, 1905.

2 SHEETS—SHEET 1.

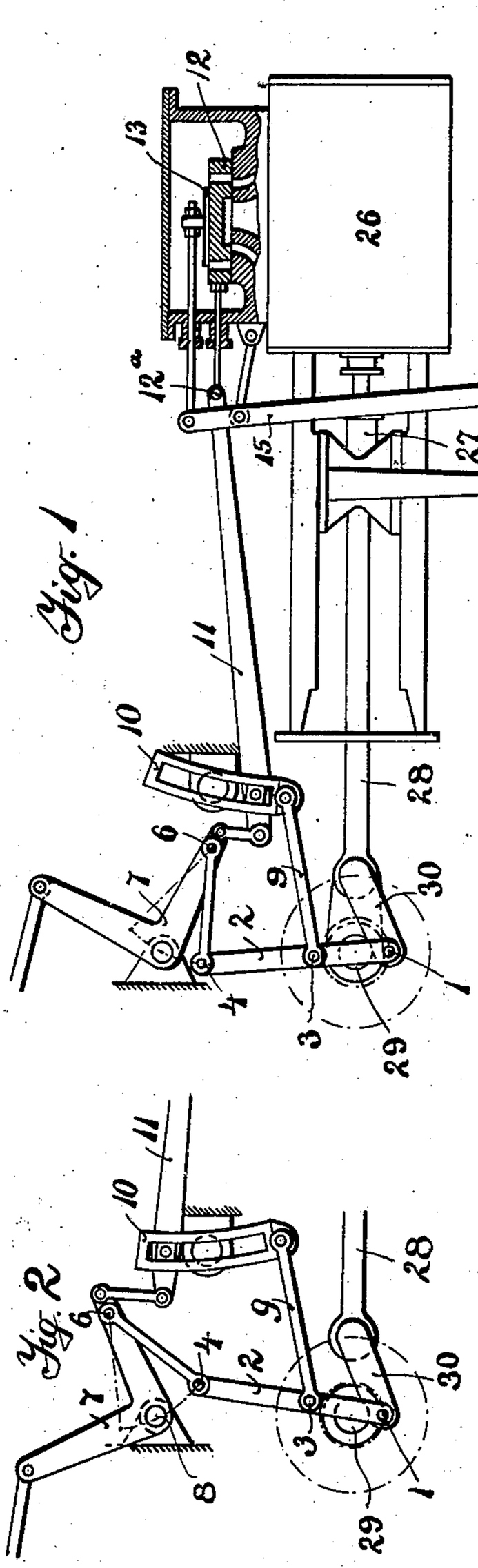


Fig. 1

Fig. 2

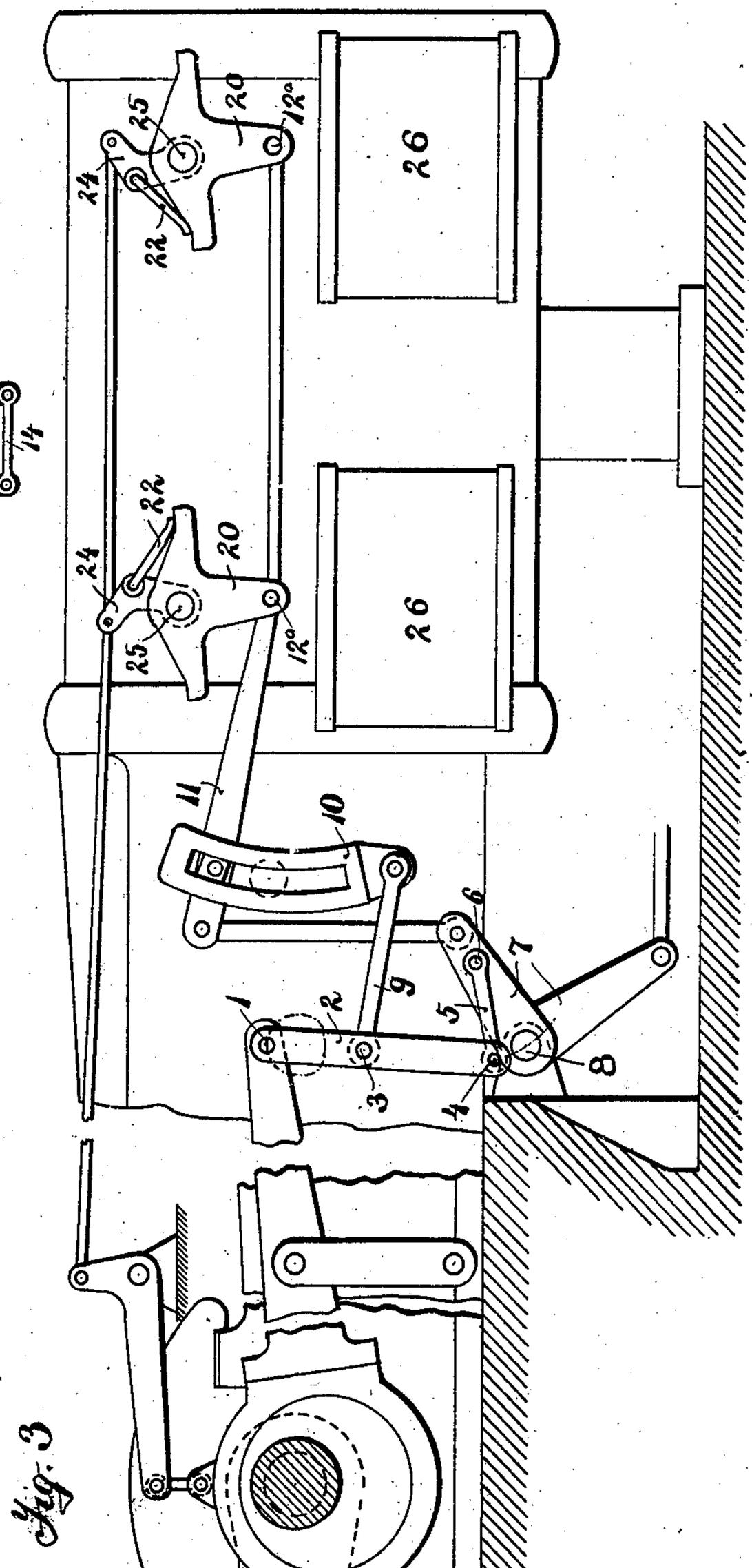


Fig. 3

Witnesses:
Walter Mann
Paul Filler

Inventor:
Jacob Iversen

No. 844,521. PATENTED FEB. 19, 1907.

J. IVERSEN.

VALVE GEAR.

APPLICATION FILED JAN. 31, 1905.

2 SHEETS—SHEET 2.

Fig. 5

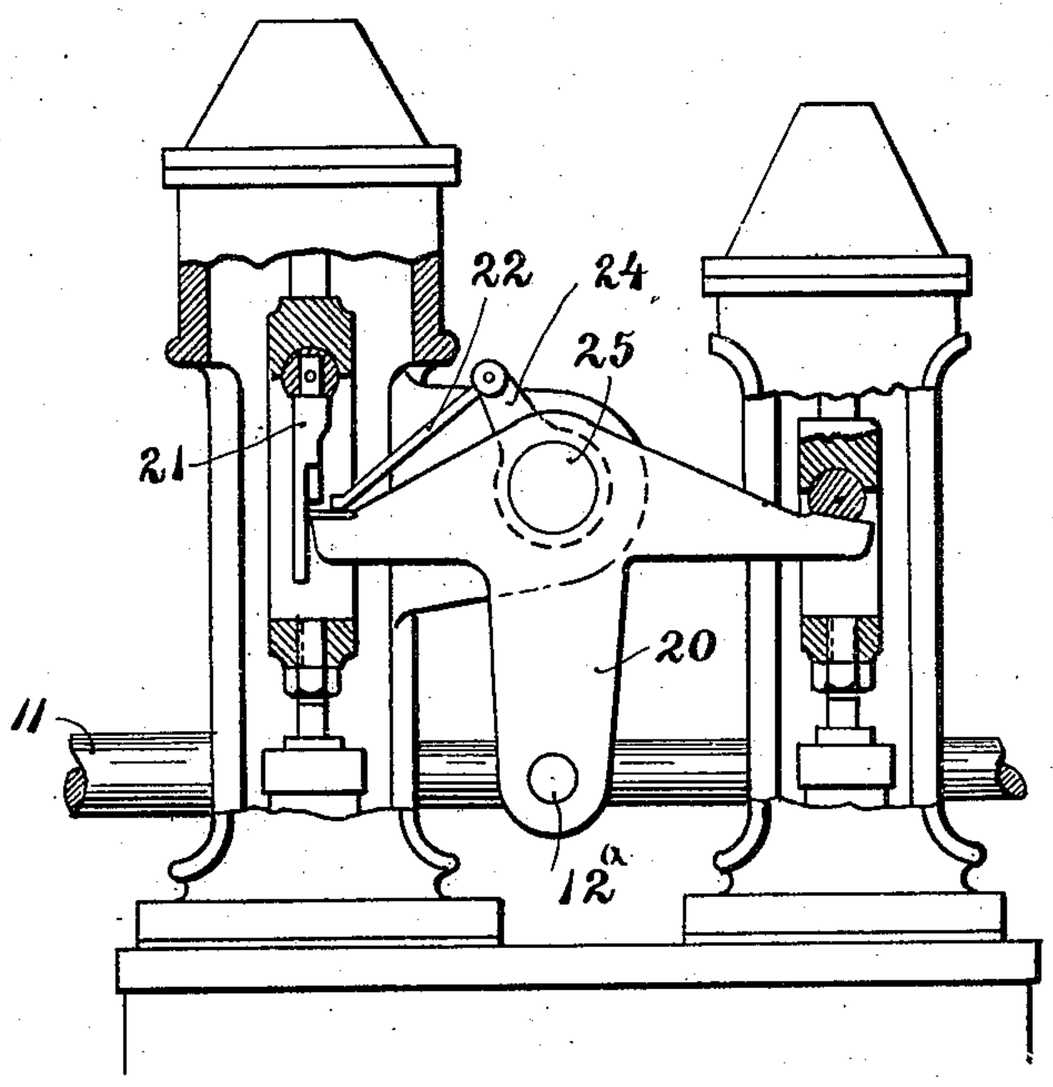
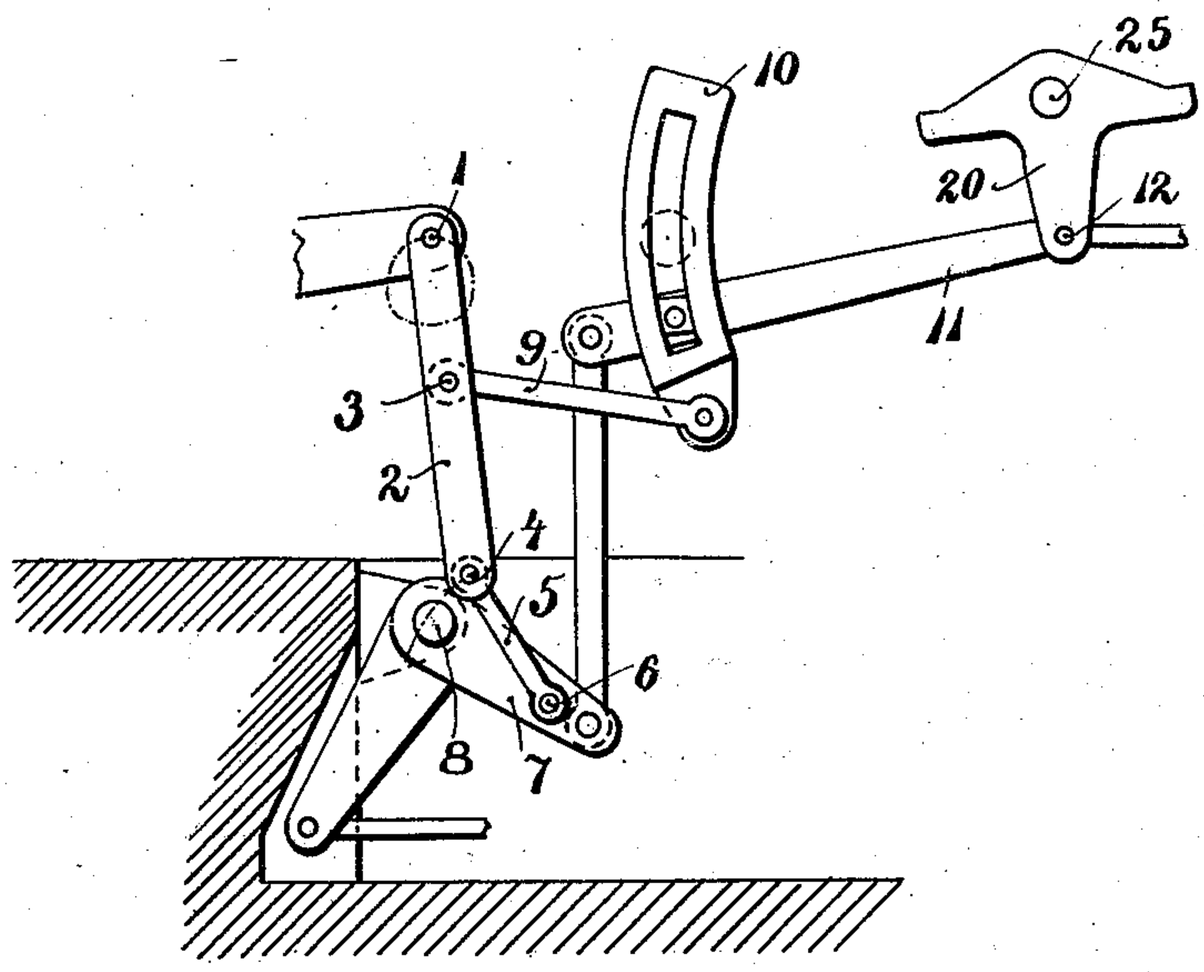


Fig. 4



Witnesses:
Walter Mann
Paul Filler

Inventor
Jacob Iversen

UNITED STATES PATENT OFFICE.

JACOB IVERSEN, OF TEGEL, NEAR BERLIN, GERMANY.

VALVE-GEAR.

No. 844,521. Specification of Letters Patent. Patented Feb. 19, 1907.

Application filed January 31, 1905. Serial No. 243,592.

To all whom it may concern:

Be it known that I, JACOB IVERSEN, a subject of the German Emperor, and resident of Tegel, near Berlin, Germany, have invented certain new and useful Improvements in Valve-Gear, of which the following is a specification.

This invention relates to valve-gear. The object of the same is to attain a more favorable consumption of the steam or compressed air than is done with the systems of reversing-gear now in use by a more advantageous distribution of the steam and more particularly in the case of lower admissions. This is effected, first, by working or actuating the distributing devices under a correspondingly large angle of lead, so that the first introduction and escape of steam or air and the compression are correspondingly large; second, by making the strokes of the distributing devices sufficiently large, so that no throttling takes place.

An especial advantage of this valve-gear is that in consequence of the large strokes with small fillings the dimensions of the distributing devices and as a result also the power required for the valve-gear are very small.

With the valve-gear most in use (Hensinger, Allan, Stephenson, Gooch, Klug, and so on) the actuating device can always be replaced by a single eccentric—the so-called "center" eccentric—whose stroke and angle of lead vary according to the link-motion. The proportion between the angle of stroke and the angle of lead is represented on the whole by the so-called "vertex curve," whose form is either a parabola or a straight line. In order to attain with the said valve-gear low admissions, the stroke of the relative eccentric must be small and the angle of lead large. The consequences of this are from an economical point of view very disadvantageous, for, first, the consumption of steam or compressed air is greatly increased in the case of low admissions, which are more particularly to be considered, as the first admission and the first escape of steam or air and the compression are too great and there takes place a strong throttling on account of the small channel-openings; second, the channels, the size of which depends on the greatest stroke, and consequently also the distributing devices, have to be unusually large. The often-recommended use of a special actuating device for regulating the feeding in order to be able to control the preliminary admission of steam or air is therefore fully justified. None of the above-mentioned reversing devices are suited for this, the required dimensions being of no use practically.

The essential features of the here-described system are, first, that a fixed connecting-link is used; second, that the parts regulating the first admission, the first escape, and the compression are actuated under a moderately large angle of lead; third, that the admissions decrease as the stroke of the connecting-link increases, and, fourth, that the channel-openings increase as the admission decreases.

Figure 1 shows a side view of the construction of my valve-gear as applied for engines with double slide-valves. Fig. 2 shows a detail view of Fig. 1, showing the position of the lever 7 and the parts actuated thereby in a position for reversing the motion of the engine. Fig. 3 shows a side view of the construction of my valve-gear as applied for engines with double-seat valves. Fig. 4 shows a detail view of Fig. 3, showing the position of the lever 7 and the parts actuated thereby in a position for the reversing motion of the engine. Fig. 5 is an enlarged detail view of the valve-seats.

26 are the cylinders of the engine. 27 is the piston-rod. 28 is the connecting-rod. 29 is the crank-shaft. 12 is the slide-valve, and 13 the expansion slide-valve.

The arm 30 is firmly connected with one end to the connecting-rod 28, while the other end is linked, by means of a pivot 1, to a rod 2, which is identical in Figs. 1 and 2 with the eccentric-rod. The other end of the eccentric-rod 2 is pivotally connected by a pivot 4 to a guide-rod 5, which itself is pivotally connected by a pivot 6 to one arm of a lever 7, keyed on the reversing-shaft 8. The other arm of said lever 7 is connected to a guide-rod. The movement of the one end of the rod 2 is transferred to the slide-valve rod 11 and the slide-valve 12 by means of a rod 9, pivotally connected with one end to the rod 2 in the point 3 and with its other end also pivotally connected to a connecting-link 10, having a fixed center. The expansion slide-valve 12 receives a lead movement of ninety degrees, or about ninety degrees, and this may be effected from the cross-bar by means of a guide-rod 14 and a lever 17, which latter is connected to the guide-rod of the expansive slide-valve. On reversing the engine the re-

versing-shaft 8 is shifted in the usual manner, so that the parts come into the position illustrated by Fig. 2.

From the drawings it can be seen that the bottom slide-valve is in the dead-point shifted out of the central position, so that the engine in spite of using only one eccentric and one fixed connecting-link works with a lead. It can further be seen that this lead of the bottom slide-valve increases as the stroke of the reversing-shaft increases and is "0" in the center. As the expansion slide-valve in the position of the piston shown moves in a direction which is the opposite to that of the bottom slide-valve, the admissions must become lower when the stroke of the bottom slide-valve and of the reversing-shaft increases. Instead of the guide-rod 5 there may of course also be used for guiding the point 4 a connecting-link of a corresponding shape and connected to the reversing-shaft.

Fig. 5 illustrates an engine in which a double-seat valve is provided. The driving means are the same as already shown in Fig. 1. The slide-valve rod 11, actuating the valves, is pivotally connected at 12^a to one arm of the three-armed swinging lever 20, pivotally mounted on the shaft 25. Each inlet-valve can be uncoupled by means of the catch 21, pivotally provided in the spindle. The uncoupling is effected by means of a small forcing-lever 22, which is pivotally connected to the lever 24 by means of the pivot 23. This arm sits loosely on the shaft 25 and receives likewise an oscillating movement, but from a point with a lead of ninety degrees or about ninety degrees, so that also in this construction the admission becomes lower as the stroke of the reversing-shaft increases.

The position shown in Fig. 4 shows the position of the parts when the motion of the engine is reversed.

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

In valve-gears for engines the combination of a rod 2, means to force the one end 1 of said rod to describe a closed curve, means to guide the other end 4 in an oscillating movement, means to change the position of this oscillating movement, a rod 9 pivotally connected and pivotally connecting said rod 2 with a connecting-link 10, a connecting-link 10 oscillating around a stationary center, means to transfer the motion of said connecing-link to the distributing device, and means to cut off the admission of the steam all substantally as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JACOB IVERSEN.

Witnesses:

WOLDEMAR HAUPT,

HENRY HASPER.