

APPLICATION FILED JAN. 11, 1912.

Patented Apr. 2, 1912.

2 SHEETS-SHEET 1.

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VALVE GEAR.

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1,022,232.

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2 SHEETS-SHEET 2.

Fig. 3.

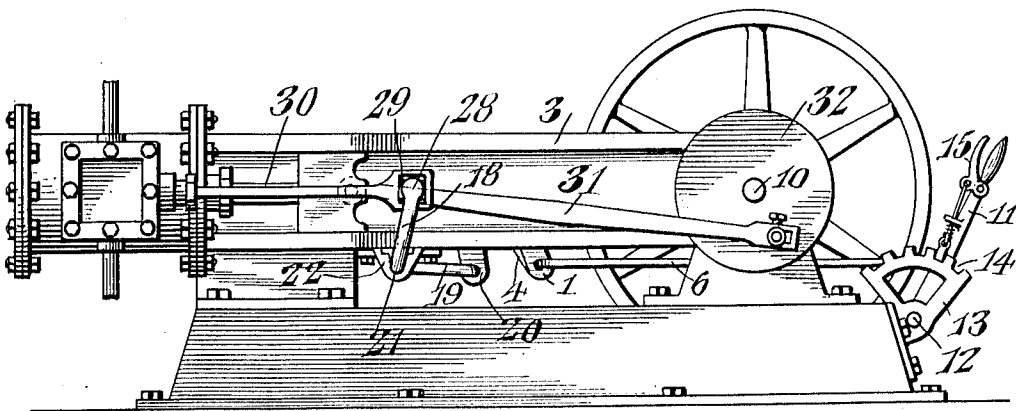
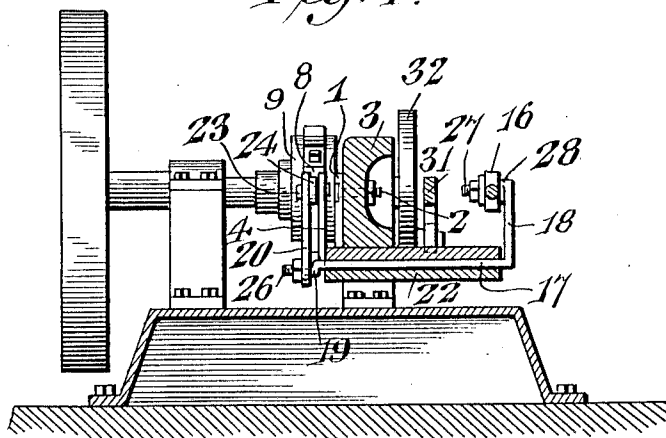


Fig. 4.



WITNESSES

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VALVE-GEAR.

1,022,232.

Specification of Letters Patent.

Patented Apr. 2, 1912.

Application filed January 11, 1912. Serial No. 670,694.

To all whom it may concern:

Be it known that I, JOHN H. GENTRY, a citizen of the United States, residing at Greentown, in the county of Howard and State of Indiana, have invented a new and useful Valve-Gear, of which the following is a specification.

The invention relates to improvements in valve gears for engines.

The object of the present invention is to improve the construction of the valve gear, shown and described in an application filed by me Nov. 10, 1910, Serial No. 591,739, and to provide simple and efficient means for accelerating the valve motion and for increasing the travel of the valve to provide for lap, and also to produce a quick opening and closing of the ports without affecting the variable cut-off.

With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended; it being understood that various changes in the form, proportion, size and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—Figure 1 is a plan view of a valve gear, constructed in accordance with this invention, and shown applied to a stationary engine. Fig. 2 is a side elevation of the same. Fig. 3 is an elevation of the opposite sides of the engine from that shown in Fig. 2. Fig. 4 is a transverse sectional view on the line 4—4 of Fig. 2.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

In the accompanying drawings in which is illustrated the preferred embodiment of the invention, the valve gear comprises in its construction an inverted reverse link 1, pivoted at the upper end 2 to the frame 3 of an engine or other suitable support, and pivotally connected at its lower end with an inverted radius link 4 by a pin 5, or other suitable pivot, which also connects the inner end of a reach rod 6 to the reverse link. The

upper end of the radius link is pivoted by a pin 7 to an eccentric rod 8 of an eccentric 9, which is mounted on the crank shaft 10. The reverse link extends below the plane of the reciprocatory member or eccentric rod 8, and the latter imparts motion through its reciprocation to the radius link, which through the oscillation of the reverse link is adapted to be swung to either side of a perpendicular position to reverse the steam engine. The reverse link is also adapted to be secured at an intermediate position to cut off the steam, and it may also be hooked up at any point between a central position and the limit of its adjustment in either direction to provide a variable cut-off. This adjustment is effected through an upright reverse lever 11, pivoted at its lower end 12 to a stand 13, having a notched or toothed segment 14, which is engaged by a spring actuated dog or detent 15, carried by the reverse lever and operated by a latch lever. The reversing mechanism and the adjustment thereof is accomplished with great ease owing to the particular arrangement of the radius and reverse links with relation to the eccentric rod.

Motion is communicated from the radius link to the valve rod 16 by means of a bell crank, journaled below the horizontal plane of the eccentric rod and substantially in the plane of the lower ends of the reverse and radius links, and consisting of a transverse rock shaft or pivot 17, an upwardly extending rocker arm 18 and an approximately horizontal rocker arm 19, arranged to swing upwardly and downwardly from a horizontal position and connected with the outer end of the eccentric rod 8 by a link 20. The rocker arms 18 and 19 are located at opposite sides of the frame of the engine, and the transverse pivot or rock shaft extends beneath the engine frame and is journaled in a suitable bearing opening 21 of a bracket 22, suitably secured beneath the frame of the engine, as clearly illustrated in Figs. 2 and 3 of the drawings. The upper end of the link 20 is connected by a pivot 23 with the extension 24 of the eccentric rod 8, and the extension 24 is provided with a plurality of perforations 25 to receive the pin or pivot 23 to provide an adjustment for the up-

per end of the upright link 20. The extension of the eccentric rod beyond the point of the pivotal connection with the upper end of the radius link 4 accelerates the motion transmitted to the valve and increases the travel of the latter to provide for the lap of the valve. The increased motion and the acceleration thereof enables lap of the valve to be employed and at the same time provides for quick port opening and closing.

Although the pin and perforations are shown in the drawings for adjusting the effective length of the extension of the eccentric rod, any other suitable means may, of course, be employed for this purpose. The lower end of the link 20 is connected by a suitable pivot 26 to the horizontal rocker arm 19, and the upper end of the rocker arm 18 is provided with a suitable pivot 27, which is connected with the valve rod 16. The valve rod is preferably equipped with a head 28, having a suitable opening receiving a slidable bearing 29 to permit the necessary play of the parts incident to the oscillation of the rocker arm 18, but any other suitable means may be employed for effecting this result, such as the link connection between the rocker arm and the valve rod. The piston rod 30 is connected by a main rod 31 with a suitable crank element 32 of the shaft 10. The valve may be either inside or outside admission and the valve gear, which may be applied to various types of engines, produces a quick opening and closing of the valve and permits the latter to remain wide open a maximum length of time.

The eccentric rod 8 by being extended beyond the pivoted upper end of the radius link exerts a powerful leverage on the valve in actuating the same when the engine is in motion. The reverse and radius links operate as a toggle joint or lever in reversing the engine, making the latter very easy to reverse, which is exceedingly desirable. Also the radius link 4 and the connecting link 20 form a toggle joint or lever in connection with the eccentric rod when the engine is in motion. The leverage secured by extending the eccentric rod past the radius link is in addition to the action of the toggle joint or lever and coöperates with the same in sliding the valve. With this arrangement the steam engine is relieved of much of the load incident to reciprocating the valve, which in most instances requires considerable power, and by reducing the amount of power expended in operating the valve, the power of the engine is increased. Also by relieving the eccentric of a heavy load usually imposed on it, it is possible to employ a larger eccentric and thereby increase the throw of the same and the rapidity of the operation of the valve.

What is claimed is:—

1. In a valve gear, the combination with a valve rod, and a horizontal reciprocatory eccentric rod, of an inverted reverse link pivoted at its upper end and extending below the plane of the eccentric rod, an inverted radius link pivotally connected at its lower end to the lower end of the reverse link and at its upper end with the said eccentric rod and located below the plane of the same, said eccentric rod being provided with an extension projecting beyond the radius link, a rocker arm, an upright link connecting the rocker arm with the extension of the eccentric rod, and means for transmitting motion from the rocker arm to the valve rod.

2. In a valve gear, the combination with a valve rod, and a horizontal reciprocatory eccentric rod, of an inverted reverse link pivoted at its upper end and extending below the plane of the eccentric rod, an inverted radius link pivotally connected at its lower end to the lower end of the reverse link and at its upper end with the said eccentric rod and located below the plane of the same, said eccentric rod being provided with an extension projecting beyond the radius link, a bell crank having one of its arms connected with the valve rod, and an upright link connected at one end to the other arm of the bell crank and having its other end adjustably connected to the extension of the eccentric rod.

3. In a valve gear, the combination with a valve rod, and a horizontal reciprocatory eccentric rod disposed longitudinally of the engine, of an inverted reverse link located at one side of the frame of the engine and pivoted at its upper end and extending below the eccentric rod, an inverted radius link located below the plane of the eccentric rod and pivoted at its lower end to the reverse link and connected at its upper end to the eccentric rod, the latter being provided with an extension projecting beyond the radius link, a bell crank extending beneath the frame of the engine and provided at one side of the same with an upwardly extending rocker arm connected with the valve rod, said bell crank having a horizontal rocker arm located at the opposite side of the engine frame and extending to a point below the extension of the eccentric rod, and an upright link connecting the horizontal rocker arm with the extension of the eccentric rod.

4. In a valve gear, the combination with a valve rod, and a reciprocatory eccentric rod, of a reverse link pivoted in approximately the plane of the eccentric rod and arranged substantially at right angles to the same, a radius link pivotally connected at one end to the reverse link and at its other end to the eccentric rod at a point intermediate of the ends of the same, the eccentric rod being ex-

tended past the radius link, a connecting
link pivotally connected to the extension of
the eccentric rod and extending from the
same side of the same as the reverse and
5 radius links, and means for transmitting
motion from the connecting link to the valve
rod.

In testimony, that I claim the foregoing
as my own, I have hereto affixed my signa-
ture in the presence of two witnesses.

JOHN HENRY GENTRY.

Witnesses:

H. E. ASH,

B. F. GENTRY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
