N. W. WHEELER.

VALVE GEAR FOR STEAM ENGINES.

No. 52,475. Patented Feb. 6, 1866.

Fig 2.

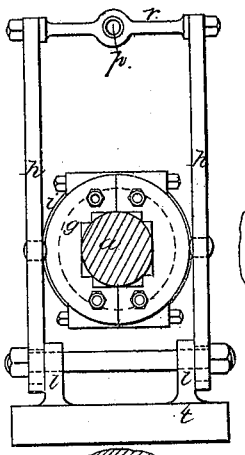


Fig 1.

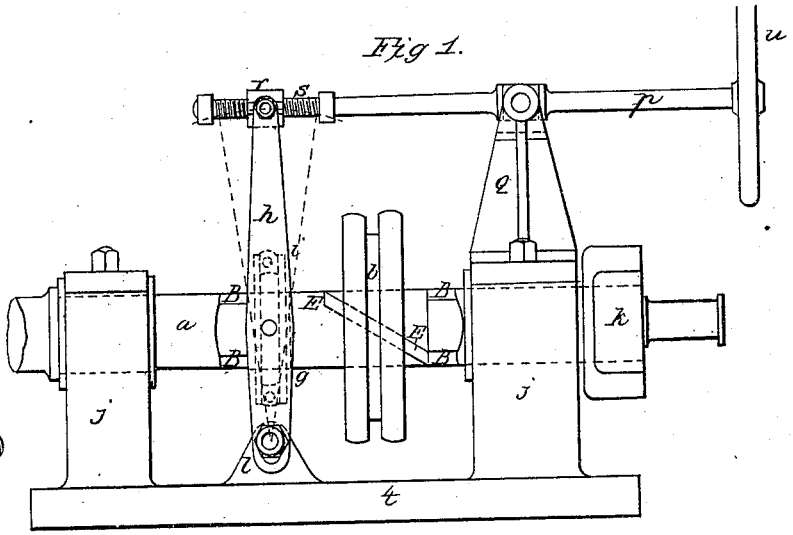


Fig 3.

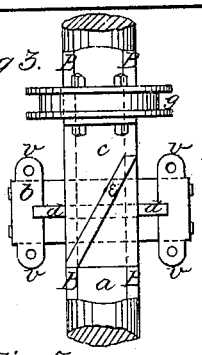


Fig 4.

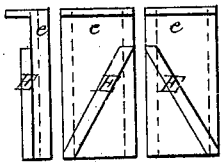


Fig 5.

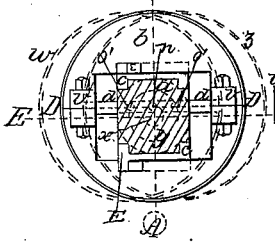


Fig 6.

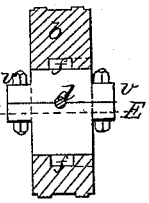
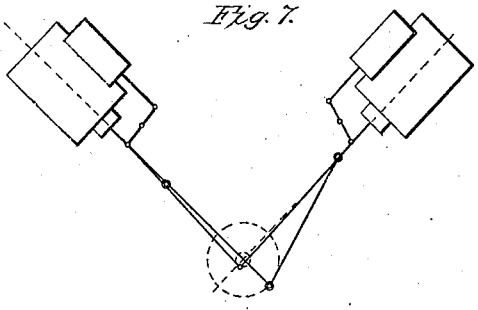


Fig 7.



Witnesses.

John Van Arnringe

J R Rand

Inventor.

Norman W Wheeler

UNITED STATES PATENT OFFICE.

NORMAN W. WHEELER, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN VALVE-GEARS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **52,475**, dated February 6, 1866.

To all whom it may concern:

Be it known that I, NORMAN W. WHEELER, of the city of Brooklyn, E. D., county of Kings, and State of New York, have invented a new and useful Improvement in Valve-Gears for Steam-Engines; and I hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of these specifications, and the letters of reference marked thereon, which letters indicate the same parts in the different views.

Figure 1 represents an elevation, and Fig. 2 an end view, of a part of the main shaft and such other parts of a steam-engine as are necessary to illustrate my invention. Figs. 3, 4, 5, and 6 represent detailed parts; and Fig. 7 is a diagram of a double engine.

The essence of my invention consists in an eccentric so constructed and applied to a main shaft that it may be shifted over in a right line from the position proper for running the engine one way to the position proper for running the engine the reverse way, or to any intermediate point, without changing the lead of the valve.

In the drawings, A represents the engine-shaft with that part of its length which carries the eccentric made square, with rabbets B B B B worked out of the corners; *c c*, cheek-pieces which are fitted to two sides of the shaft, with feathers to fit the rabbets B B B B, and bolted to the grooved clutch-disk *g* in such a way that by turning the reversing-wheel *w* the cheek-pieces *c c* will be moved end-long upon the shaft through the action of the screw *s*, nut *r*, levers *h h*, and clutch *g*. The cheek-pieces *c c* have formed upon them the diagonal feathers E E. The eccentric *b* is made usually in two parts, fitted to embrace the shaft and cheek-pieces, and with diagonal grooves *f f* to fit the feathers E E, the parts of the eccentric being bolted together by the ears *v v*, and having sufficient clearance for its proper motion upon the two sides of the shaft not occupied by the cheek-pieces, and a steady-pin, *d d*, fitted with its ends resting in the eccentric and sliding freely through a hole bored in proper position through the shaft *a*, preventing the eccentric from changing its position longitudinally, as shown. The before-described end-long movement of the cheek-pieces *c c* will, by reason of the diagonality of the feathers E E and grooves *f f*, shift the center of the eccentric *b* along the right line D D between the points *o* and *o'*, from which points as centers the dotted outlines *w* and *z* of the eccentric are struck.

Now, if the center line D D of the eccentric passed through the center of the shaft *a*, then D D would coincide with the line E E, and if the eccentric-rod were parallel with the axis of the cylinder, and, further, if a line drawn from the axis of the shaft *a* through the axis of the crank-pin A were at right angles to the line D D, the proper motion would be derived from the eccentric *b* to run the engine either way, according to the position at *o* or *o'* of the center of the eccentric, but in that case the steam-valves could have no lead. Hence the center of the eccentric is placed at such distance to one side of the axis of the shaft toward or from the crank-pin, as the case may be, as will give a constant quantity of throw equal to the lap or idle motion and the desired lead of the valve, which lap and lead motion will be constant for all positions of the eccentric upon the shaft, the lines D D and E E being parallel to each other.

The action of this valve-gear may be otherwise illustrated by comparing it with the ordinary link-motion, in which case the centers of the two eccentrics would be set at *o* and *o'*, respectively, and for reversing or cutting off the link would be shifted in such a way that the motion of the valve would be influenced more or less by the motion of *o* or *o'*, respectively, the equivalent of which is obtained, in the example before us, by shifting the eccentric itself along the line D D, with, however, the important difference that with the link-motion the lead is changed by the traversing of the eccentric-rods around through considerable angles when the point of cutting off is changed, whereas in the problem before us the lead is constant, as before described.

In devices which have heretofore been proposed, including a shifting or sliding eccentric, the path of the center of the eccentric, when shifted from one point to another, was curved, and not a right line, for what purpose it is difficult to divine, for that feature would

render the lead variable; and, moreover, the shifting of the eccentric was attained by means of a bell-crank motion from a longitudinally, moving clutch with no adequate means of holding the eccentric in position except the bell-crank connection. Now, in the example before us the friction of the eccentric-straps on the eccentric tends to force the cheek-pieces firmly against the shaft, and causes a gripe upon the shaft and upon the pin *d d* which, while the engine is moving, overpowers all tendency to lost motion and rattling, wherein it is radically different and superior, both in a geometrical and mechanical point of view, to the bell-crank and curved shifting-path device before alluded to.

Having described my invention, I will proceed to state what I claim as novel and desire to secure by Letters Patent, viz:

The combination of the eccentric *b*, cheek-pieces *c c*, pin *d d*, and clutch *g*, or their mechanical equivalents, constructed and combined with the main shaft, and together, substantially as and for the purpose described.

NORMAN W. WHEELER.

Witnesses:

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