S. H. WHEELER.

VALVE-GEAR FOR STEAM-ENGINES.

No. 187,947. Patented Feb. 27. 1877.

Fig 1

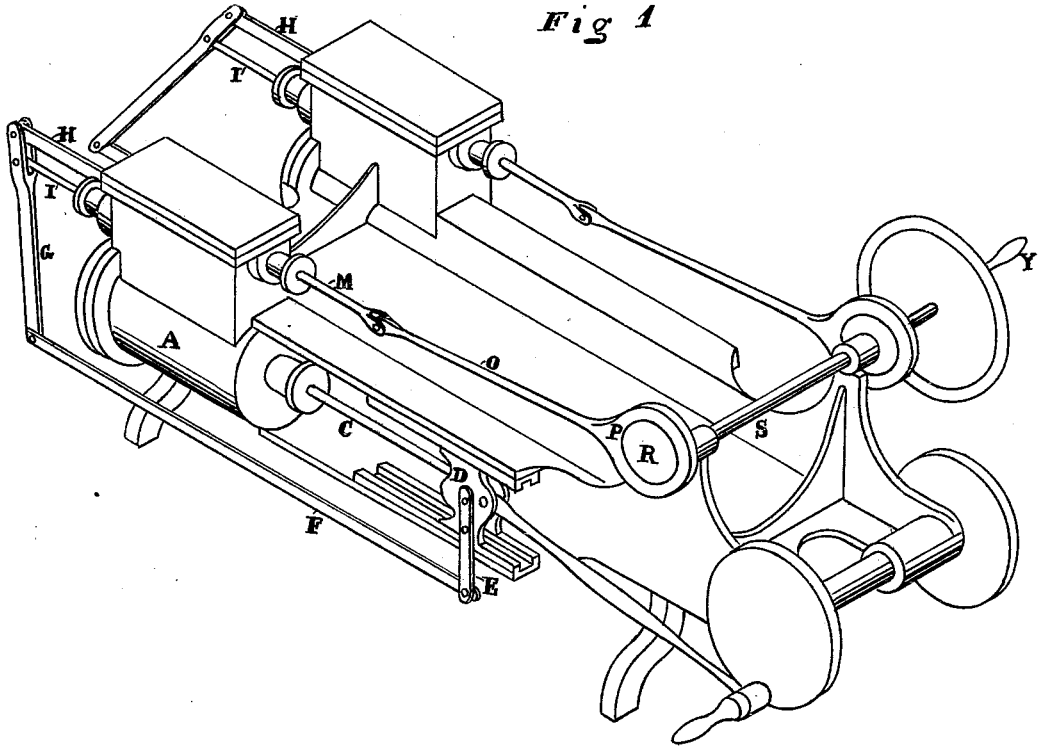
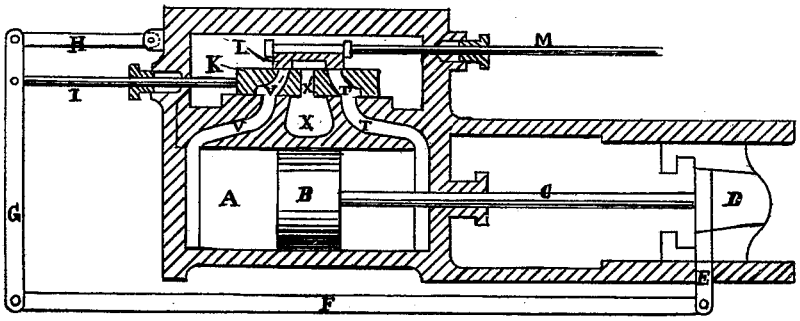


Fig 2



Witnesses

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UNITED STATES PATENT OFFICE.

SAMUEL H. WHEELER, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN VALVE-GEAR FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **187,947**, dated February 27, 1877; application filed September 9, 1876.

To all whom it may concern:

Be it known that I, SAMUEL HOWARD WHEELER, of the city and county of San Francisco, State of California, have invented an Improved Valve-Motion for Steam and other Engines; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention without further invention or experiment, reference being had to the accompanying drawing.

The object of my invention is to give such a distribution of steam or other fluid in reciprocating engines as that the motion of the main piston of the engine shall correspond both in extent and time of movement with the motion impressed upon the distribution-valve of the engine, the distribution-valve being operated by any means independent of the main engine, as, for instance, by manual force, or by an auxiliary or supplemental engine. This I accomplish by placing a movable seat under the distribution-valve and connecting it to the main piston in such a manner as that, when the motion of the distribution-valve upon this seat gives steam behind the main piston, the motion thus impressed upon the piston will be communicated to the movable seat and will cause it so to move under the distribution-valve as to cut off the steam-supply. By this means the motions of the main piston are made to correspond with those of the distribution-valve, the piston moving while the valve is in motion and coming to rest when the valve is arrested.

This valve motion, while it has for its object the regulation of the motion of the main piston of the engine to correspond with the motion of the piston of a supplemental engine or the hand of an operator, as in the Letters Patent af the United States issued to me July 25, 1876, and numbered 180,401, and in those issued to H. Davey, September 7, 1875, numbered 167,509, has this difference from them that in this invention the distribution-valve always makes its full stroke forward and backward during continuous working of the engine, while by the combination described in those patents the valve is constrained by the motion of the main piston to remain very near to its middle position.

In this invention, on account of the combination of parts that I use in it, the motion of the main piston corresponds both in extent and time with the motion impressed upon the main valve. In the accompanying drawing is illustrated the application of my invention to a pair of rotative engines designed to be used on a foundry-crane. In this instance motion is given to the distribution-valves through the medium of a shaft and eccentric operated by a crank-handle. The crank-handle being turned by the attendant, the engine-shaft will receive a corresponding motion and will continue its motion, stop or reverse, just as the hand of the attendant may be moved.

This arrangement I consider to be particularly well adapted to this and similar purposes, as, for instance, steering-gear for ships, since the motion of the engine is under complete control. In applying my invention to a single direct-acting pumping-engine I would give motion to the distribution-valve by means of a cataract-engine, the piston-rod of which could be attached directly to the valve-rod, which would thus receive a regular and continuous reciprocating motion.

In the accompanying drawing, before referred to, A is the steam-cylinder; B, the piston; C, the piston-rod; D, the cross-head; E, an arm attached to the cross-head and connected by a pin to one end of a link, F, the other end of which is jointed to one end of the lever G. The lever G has its fulcrum at the joint of its connection to the link H, which is attached to the steam-chest. The rod I of the movable valve-seat K is jointed to the lever G at a suitable point between H and F. The movable seat K has passages T′, X′, and V′ corresponding to the thoroughfares T and V and the exhaust X in the main cylinder. These passages and thoroughfares are so proportioned to one another that each will always be in communication with its correspondent and no other. L is the distribution-valve sliding in the movable seat. The face of the valve and the passages in the movable seat are proportioned to each other in this case the same as though the seats were fixed, and without either inside or outside lap. M is the valve-

rod guided in the guider N, and jointed to the eccentric rod O, the strap of which embraces the eccentric R, fastened on the shaft S. Means of turning the shaft S is provided by the crank-handle Y.

The operation is as follows: Supposing that the engine is to be operated by steam, and that communication has been made with the steam-boiler by the arrangement of the mechanism, the engine will have placed itself so that both valves will cover the passages V′ and T′. Now, if the crank-handle is turned, motion will be given to both valves, and steam will be supplied behind the two pistons to cause the main crank-shaft to turn in the same direction as the eccentric shaft has been turned. This motion of the main pistons will be communicated through C, D, E, F, G, and I to the movable valve-seats, to cause them to move in the same direction as the distribution-valves L have been moved, thus tending to cut off the supply of steam that has been given by the valves L. Now, if the valves L are stopped in their course, the piston B will continue to move until the movable seats K have completely cut off the steam by closing the passages T′ and V′. They will then stop and remain stationary until motion is again given to the crank-handle Y, and through its connection to the distribution-valves L. If the motion of the crank-handle Y is made continuous, the motion of the piston B will also be continuous, and will correspond exactly with the reciprocations imparted to the valves L, since the seats K, by their connections with the pistons B, will follow the valves L with openings of the passages T′ or V′ that will be automatically adjusted to the speed at which the valves L are reciprocated by the motion imparted to them by the revolution of the crank-handle Y.

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

The combination, in a reciprocating engine, of a movable valve-seat, K, actuated through a fixed connection of intermediate mechanism by the main piston B, and a distribution-valve L, moved by a means independent of the main engine, whereby the time of the stroke in either direction is controlled by the operator, substantially as described, and for the purpose set forth.

In witness whereof I have hereunto set my hand and seal.

SAMUEL H. WHEELER. [L. S.]

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