S. H. WHEELER.

VALVE-MOTION FOR STEAM-ENGINES.

No. 180,401. Patented July 25, 1876.

Fig 1.

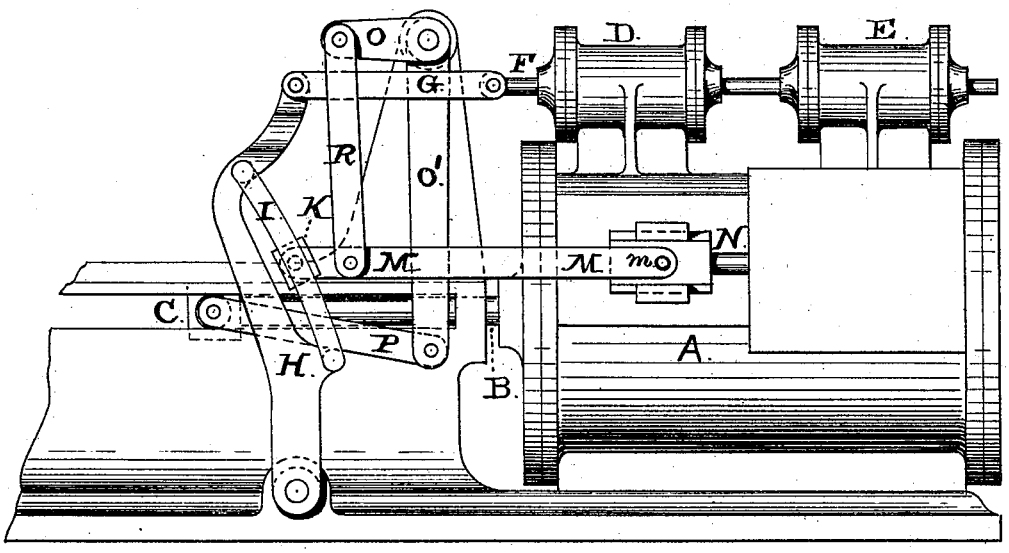
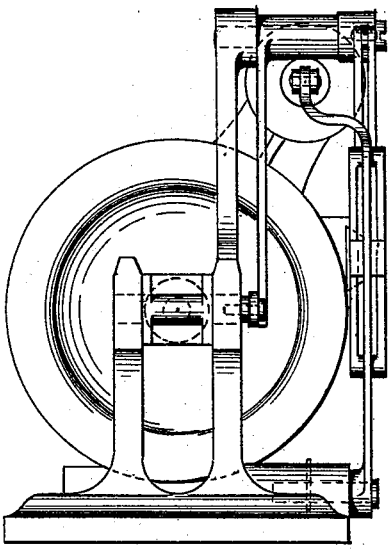


Fig 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

SAMUEL H. WHEELER, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN VALVE-MOTIONS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **180,401**, dated July 25, 1876; application filed June 14, 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, of which the following is a specification:

The object of my invention is to give such a motion to the valves of reciprocating engines, whether slide-valves or puppet-valves, as that the motion of the main piston of the engine shall depend upon the motion of the piston or the crank-shaft of a supplemental engine. This I accomplish by connecting the piston of the supplemental engine, and also the piston of the main engine, through a system of links and levers, to the valve-rod of the slide-valve, or, in case the engine has puppet-valves, to the pin of the main rock-shaft, in such a manner as that, while the movement of the supplemental piston shall tend to give an opening for the supply of steam to the main piston, the movement impressed upon the main piston by this supply shall tend to cut off the supply by bringing the valve back to its mid-position, or down to its seat. My invention therein consists in the means hereinafter described for accomplishing the above-stated object.

In the accompanying drawing is shown a direct-acting slide-valve engine with my improved valve-motion. A is the main steam-cylinder. B is its piston-rod. C is its cross-head. D is the steam-cylinder of the supplemental engine, having its valve operated by any well-known device through a connection with the main cross-head or piston, or through a second supplemental engine, that has its valve operated by a connection with the main cross-head or piston. E is a cataract-cylinder of the supplemental engine, by which the time occupied in making a single stroke is regulated. F is the piston-rod of the supplemental engine. G is a link connecting F to a vibrating lever, H. On the lever H is fixed a link or guide, I, which has a curvature and inclination determined by the dimensions and extent of motion of the various parts of the mechanism. K is a block sliding on the link or guide I, and connected by a pin to one end of the radius-bar M. The other end of the radius-bar M is connected by a pin to the valve-rod N of the main cylinder at the point *m*. O and O′ are the two arms of a bell-crank lever. The arm O′ is connected by the link P to the cross-head C. The arm O is connected by the link R to the radius-bar M, at a point near its connection to the sliding block K, so that the motion of the bell-crank lever will cause the block K to slide on the links or guide I.

The object sought to be obtained by this combination is to cause the resultant motion imparted to the pin in the sliding block K to be in the arc of a circle described from the point of connection *m* with a radius of the length of the radius-bar M, the point of connection *m* being, during perfect action of the engine, practically stationary on one side or the other of its mid-position, while the main piston makes its stroke.

The action of the mechanism is as follows: Motion being given to the rod P, a corresponding movement will be given to the lever H, and also to the main valve-rod N. This will supply steam behind the main piston and cause it to advance, thus vibrating the lever O O′, and sliding the block K up or down on the link or guide I, as the case may be, and bringing the point *m* back toward its mid-position. Thus the amount of opening of the main valve for the distribution of steam to the main piston will always be automatically adjusted to the speed that is determined by the supplemental engine D.

It is obvious that the same results obtain when the link or guide I receives its motion from the piston of the main engine, and the sliding block K receives its motion along the link I from the supplemental engine.

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

1. The combination of the following parts: the radius-bar M, attached at one end to the valve-stem of the main engine-valve, the link or guide I, moved by connection with the piston-rod of a supplementary engine, for giving a horizontal motion to the said radius-bar, and the link R, operated from the main pis-

ton-rod, for imparting a vertical motion to the said radius-bar, substantially as described and shown.

2. The combination, with the main piston-rod B and the piston-rod F of a supplementary engine, of the radius-bar M, lever H, link or guide I, link G, bell-crank arms O O′, link R, and link P, all constructed and arranged to operate substantially as described and shown.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 1st day of June, 1876.

SAMUEL HOWARD WHEELER. [L S]

Witnesses:
C. W. M. SMITH,
PHILIP MAHLER.