H. HAERING.

VALVE-MOTION FOR STEAM-ENGINES.

No. 191,583. Patented June 5, 1877.

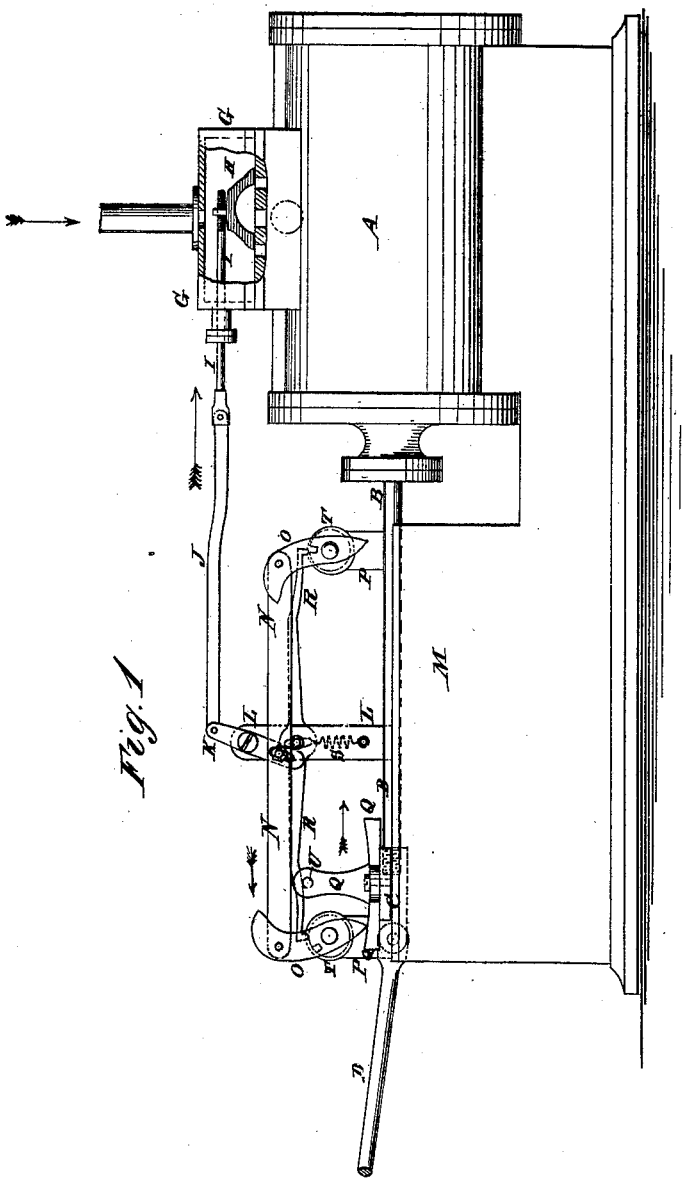


Fig. 1

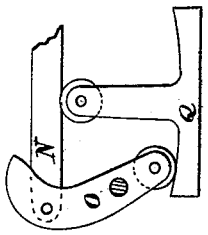
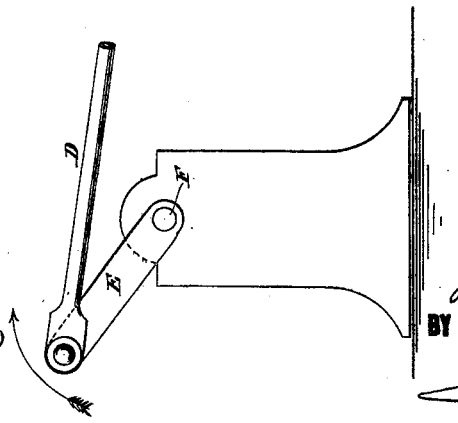


Fig. 2



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UNITED STATES PATENT OFFICE.

HENRY HAERING, OF NEW YORK, N. Y.

IMPROVEMENT IN VALVE-MOTIONS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **191,583**, dated June 5, 1877; application filed February 10, 1877.

To all whom it may concern:

Be it known that I, HENRY HAERING, of the city, county, and State of New York, have invented a new and useful Improvement in Valve-Motion for Steam-Engines, of which the following is a specification:

Figure 1 is a side view of my improved valve-motion shown as applied to a steam-engine. Fig. 2 is a view showing a modification of some of the parts for transferring motion from the piston-rod to the valve-stem.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved device for operating the slide-valve of a steam-engine from the piston-rod of said engine in such a way that the valve will be moved slightly to partially uncover the inlet and exhaust ports as the piston completes its stroke, and its motion will be continued in the same direction as the piston begins to move upon the return stroke, until the ports are fully opened, and will then stand still, with the ports fully open, until the piston has nearly completed its return stroke, and which shall be simple in construction and reliable in operation.

The invention consists in the combination of the three-armed bar, the two levers, the connecting-bar and the connecting-lever, with the piston-rod and the valve-stem of a steam-engine; and in the combination of the lock-bar, the spring, the two cylinders, and the pin with the two levers and the three-armed bar, as hereinafter fully described.

A represents the cylinder of a steam-engine. B is the piston-rod. C is the cross-head. D is the connecting-rod, and E is the crank that gives motion to the shaft F. G is the steam-chest. H is a slide-valve, and I is the valve-stem.

To the outer end of the valve-stem I is pivoted a connecting-rod, J, the other end of which is pivoted to the upper end of a short lever, K.

The short lever K is pivoted at its middle part to the upper end of a standard, L, attached to the slide or bed M of the engine. The lower end of the lever K is slotted longitudinally to receive the bolt by which it is pivoted to the bar N, or to one of the levers O.

The bar N is made about equal in length to the length of the stroke of the piston, and to its ends are pivoted two levers, O, near their upper ends. The levers O are pivoted, near their lower ends, to short standards P, attached to the slide M.

The inner sides of the upper parts of the levers O are concaved, as shown in the figure, and their lower ends are made sharp. They are made so especially to show more clearly their describing an eccentric curve in the planes Q Q, while I prefer to use rounded ends with rollers, as shown in Fig. 2.

To the cross-head C of the piston-rod B, or to any other part of said piston-rod, is attached a three-armed bar, Q, the central arm of which is vertical, and has its upper end enlarged and rounded off, to strike against the concaved sides of the upper parts of the lever O, and operate them, and may be provided with a frictional roller, if desired.

The upper surfaces of the side arms of the three-armed bar Q are inclined upward from the central arm to their ends. This upward inclination may be made upon the arc of an ellipse, and this form I prefer; or it may be upon the arc of a circle, or it may be a straight incline.

With this construction, as the piston approaches the end of its stroke the upper end of the upright arm of the bar Q strikes the concaved side of the upper part of one of the levers O, operating it, and moving the valve H to close the ports and admit steam in front of the piston. As the piston begins its return stroke the inclined upper surface of one of the side arms of the three-armed bar Q comes in contact with the lower end of the said lever O, and continues its motion in the same direction, fully opening the said inlet-port, which remains fully open until the piston has again nearly completed its stroke.

R is a bar, the center of which has a short transverse slot formed in it to receive the bolt by which it is pivoted to the standard L.

Upon the ends of the bar R are formed hooks or points to enter holes in the cylinders T attached to the levers O, at their pivots, to lock the bar N in place, where it is left when the levers O are released from the side arms of the bar Q.

The bar R is held down by a small coiled spring, S, one end of which is attached to the middle part of the said bar R. Its other end is attached to the lower part of the standard L.

To the upper part of the upright arm of the three-armed bar Q is attached a pin, U, in such a position that it may come in contact with and raise the bar R from the cylinder T, as the said arm of the bar Q is about to come in contact with the lever O, to shift the valve. The hooks of the bar R rest and slide upon the cylinders T until the levers O come into proper position, when the hook upon the end of the bar R farthest from the bar Q drops into the hole in the cylinder T, where it remains until again raised by the pin U of the said bar Q.

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

1. The combination of the three-armed bar Q, the levers O, the bar N, and the lever K, with the piston-rod B, and with the valve-stem I of a steam-engine, substantially as herein shown and described.

2. The combination of the lock-bar R, the spring S, the cylinders T, and the pin U, with the levers O, and the three-armed bar Q, substantially as herein shown and described.

HENRY HAERING.

Witnesses:
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