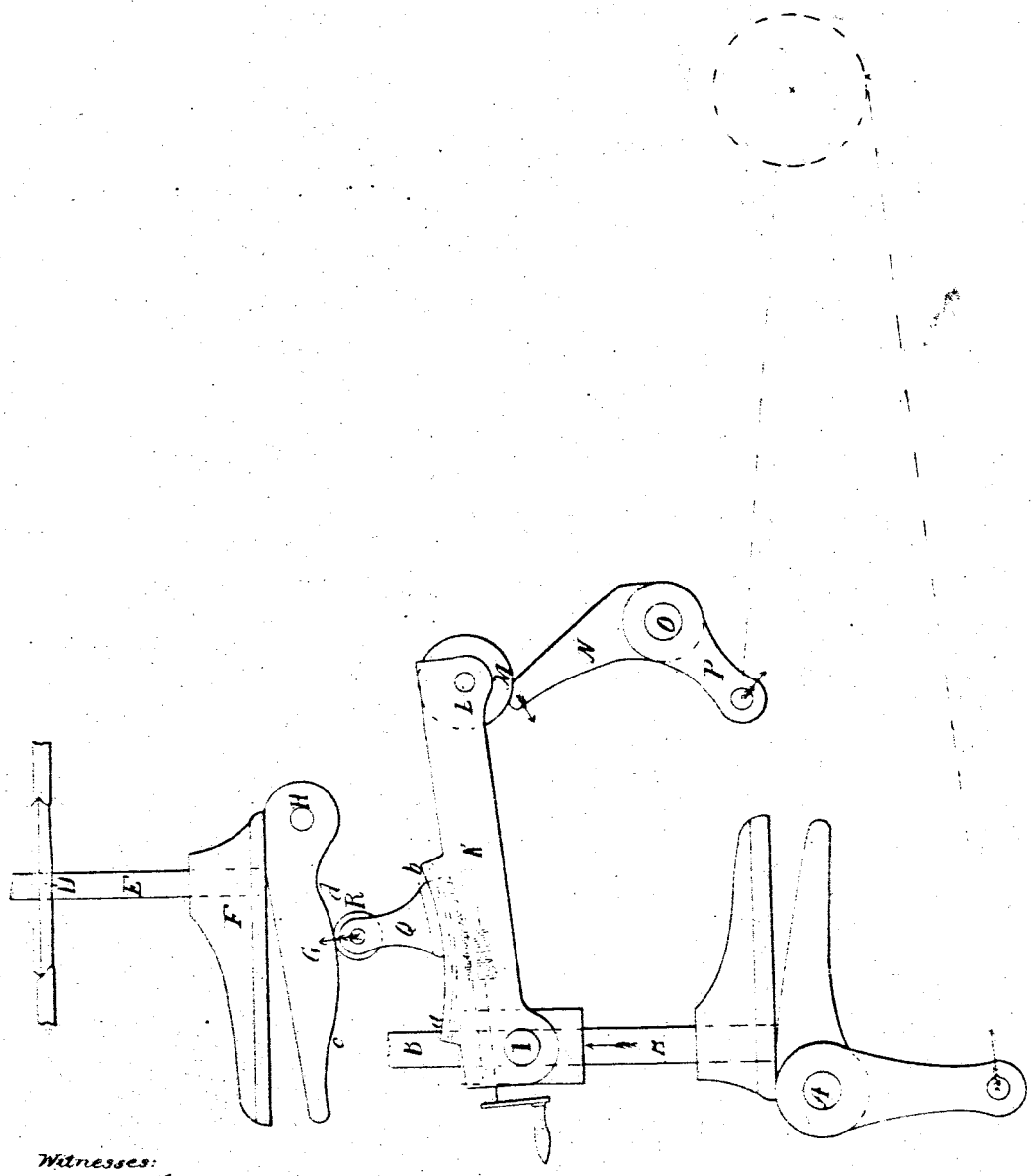
H. Allen,

Steam Cut-Off.

No. 6,092. Patented Feb. 6, 1849.



Witnesses:

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UNITED STATES PATENT OFFICE.

HORATIO ALLEN, OF NEW YORK, N. Y.

ADJUSTABLE LEVER CUT-OFF WITH SECONDARY TOE.

Specification of Letters Patent No. 6,092, dated February 6, 1849.

To all whom it may concern:

Be it known that I, HORATIO ALLEN, of New York city, in the county and State of New York, have invented a new and useful Machine called "The Lever Cut-Off," of which the following is a full and exact description.

The combination whereby I obtain an adjustable cut-off for engines using puppet valves is represented in the Figs. 1, 2 and 3 of the drawings hereto attached.

A is the rock shaft, B the lifting rod, to which the exhaust valve lifter is attached as usually arranged and worked.

D is the steam valve, E the valve stem. F is a piece attached to the valve stem by means of which it rests on the toe G. This toe G has a fixed center at H on which it turns.

On the lifting rod B is fastened the center I. On this center I is supported and turns one end of the lever K, at the other end L is the roller M, which is supported on the extremity of the arm N. This arm N is attached to the shaft O, on the same shaft O is attached the arm P to which arm is given a reciprocating motion coincident with that of the piston and taken from the side lever or any other part having the same motion, suitably reduced, as that of the piston.

On the lever K is placed the movable piece Q (the surface *a b* on which it is movable being a curve) the roller R is attached to the piece Q, and on the roller R rests the toe G, the under surface of the toe is a curve *c d* corresponding to the curve *a b*, which forms the top of the lever K. The parts being arranged as represented and the engine being supposed at that part of its motion when the crank has just turned its center, the parts will have their motions in the directions indicated by arrows.

It will be seen that by the upward motion of the lifting rod, the end I of the lever K is raised, while by the downward motion of the arm N the other end of the lever K is lowered. But it will also be perceived that the upward motion of the end I is at its greatest velocity at the beginning of the stroke, while the arm N which lowers the end L has no motion at the immediate beginning of the stroke; by reason of these relative motions the lifting end will have the advantage, and the valve will therefore be raised at the early part of the stroke, but the motion of the lifting end is rapidly diminishing, while that of the lowering end is increasing, it therefore will soon happen that the lowering end will lower the valve more rapidly than it is raised at the other end, and thus the valve will be restored to its seat.

The point of stroke at which the valve will be restored to its seat, will depend on the proportion of parts and with suitable proportion of parts, on the position of the movable piece Q. If in the position represented in the drawing the valve is restored at half stroke, then by the moving the piece Q towards the lifting end the valve will be restored at a later point, and by moving it towards the lowering end, the valve will be closed at an earlier point.

The piece Q is made to move on a curved surface in order that the extent of the raising of the valve may be kept within proper limits. If it was moved in a straight line, the opening given to the valve would be too great when cutting off short of half stroke, and too little when cutting off beyond half stroke.

What I claim in this invention and combination is—

1. The use of a secondary toe G having a fixed center which toe is moved by a motion taken from the usual rock shaft, and is lowered by a motion coincident with that of the piston, and by means of which the valve can be raised and returned to its seat at any portion of the stroke without concussion.

2. The use of a double fulcrum lever K the ends of which are alternately sources of motion and fulcra, and by means of which in combination with motions which are nearly at right angles to each other, the valve will be raised at the commencement of the stroke and then restored to its seat at such part of the stroke as the adjustment provides for.

3. The use of the adjustable piece Q by means of which the proportion of cut off is changed.

4. The mode of working the steam valve by the combination of the secondary toe G, lever K, adjustable piece Q and arm N substantially as set forth in this specification.

In testimony whereof I the said HORATIO ALLEN hereto subscribe my name in the presence of the witnesses whose names are hereto subscribed, on the fourth day of November 1847.

HORATIO ALLEN.

Signed in our presence—
W. B. SPELMAN,
JONA R. WIGGIN.