

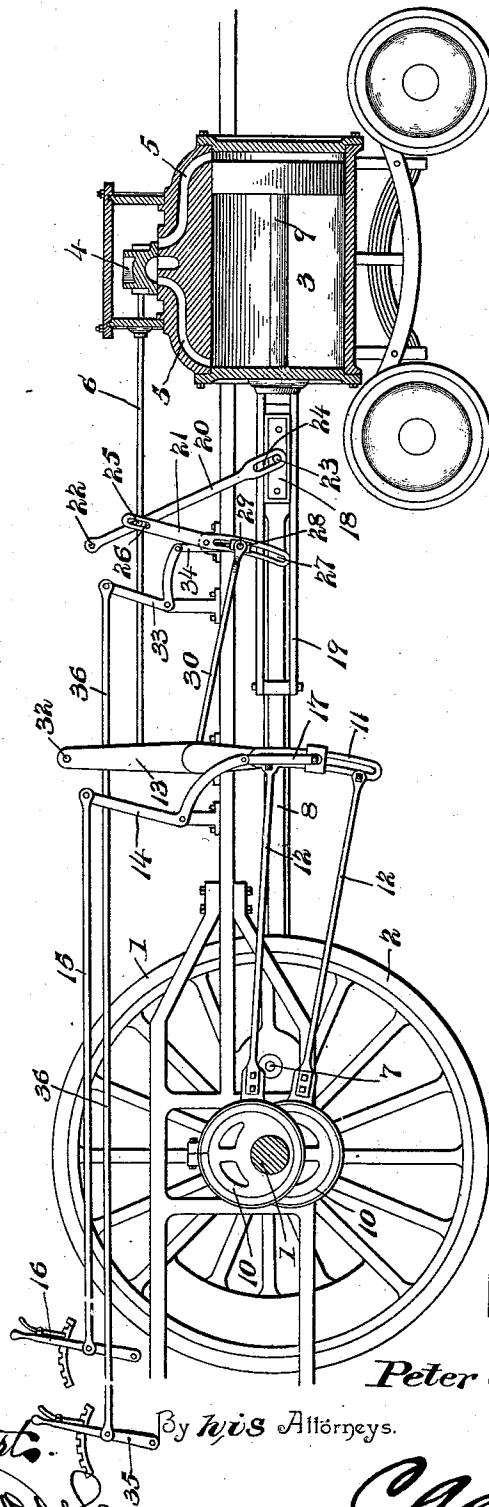
(No Model.)

2 Sheets—Sheet 1.

P. J. SHELBY.
VALVE MOTION.

No. 531,654.

Patented Jan. 1, 1895.



Inventor

Peter J. Shelby

Witnesses

E. H. Stewart
[Signature]

By his Attorneys.

C. A. Snow & Co.

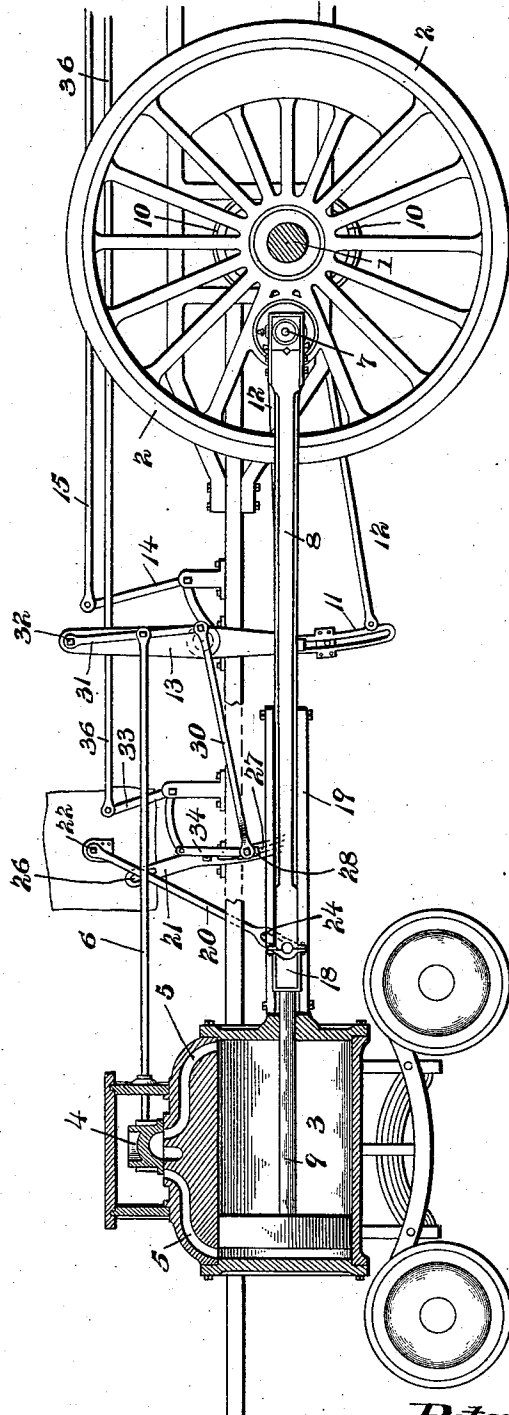
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By *his* Attorneys. *Peter J. Shelb*

Cañon Viejo.

UNITED STATES PATENT OFFICE.

PETER J. SHELBY, OF FORT WORTH, TEXAS.

VALVE-MOTION.

SPECIFICATION forming part of Letters Patent No. 531,654, dated January 1, 1895.

Application filed March 9, 1894. Serial No. 503,039. (No model.)

To all whom it may concern:

Be it known that I, PETER J. SHELBY, a citizen of the United States, residing at Fort Worth, in the county of Tarrant and State of Texas, have invented a new and useful Valve-Motion, of which the following is a specification.

My invention relates to a variable cut-off valve-motion, and has for its object to provide simple and efficient and at the same time readily adjustable means for varying the points at which the ports communicating with the cylinder of a locomotive or other engine are opened and closed, in accordance with the load, the desired speed, &c.

Further objects and advantages of the invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings: Figure 1 is a side view of a valve-motion embodying my improvements. Fig. 2 is a view of the opposite side.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a drive-shaft; 2, a drive or fly wheel carried by said shaft; 3, a cylinder; 4, a valve controlling the passage of steam through the ports 5; 6, the valve-stem; 7, a crank-pin; 8, a connecting-rod journaled at one end upon said crank-pin and connected at the other end to the piston-rod 9; 10, twin eccentrics which are keyed upon the drive-shaft; 11, a slotted link the terminals of which are connected, by means of the pitmen 12, to the straps of said eccentrics, and 13 a rocking lever, the lower arm of which supports the slotted link and the upper arm of which is connected to the valve-stem; all of the ordinary construction.

The eccentrics, instead of being adjustable upon the drive-shaft to vary the cut-off by the disposition of their major axes at different angles or in different relative positions, are arranged with their major axes at right-angles or perpendicular to a line connecting the axes of the drive-shaft and the crank-pin, whereby the eccentrics are at their greatest throw as the crank pin approaches the dead-centers.

A bell-crank lever 14, one arm of which is connected by a rod 15 to an operating or hand-lever 16, is connected by means of a link 17 to

the slotted link 11, whereby the pivotal point of connection between said slotted-link and the lower arm of the rocker 13 may be adjusted as desired to vary the relative movements of the eccentrics and the rocker.

A cross-head 18, which is mounted for reciprocation in guides 19 and is operated by the connecting-rod, or by other means from the crank-pin, is loosely connected to the lower end of a swinging arm 20, which is preferably pivoted at its upper end to a stationary part of the framework of the engine, and this arm is connected, at an intermediate point, to one arm of an auxiliary rocking-lever 21. The fixed pivotal point of the swinging-arm 20 is shown at 22, and the connection of the arm with the cross-head is by means of a pin 23 on the latter fitting in a longitudinal slot 24 in the former. A sliding or loose connection is also provided between the swinging-arm 20 and the upper arm of the auxiliary rocking-lever, formed by a pin 25 on the former fitting in a slot 26 in the latter.

The lower arm of the auxiliary rocking-lever is slotted as shown at 27 for the adjustment of a block 28 carrying a pivot 29 for the attachment of the rod 30 which extends to and is connected with the lower end of a link-arm 31 pivoted to the upper extremity of the main rocker, as shown at 32. This link arm forms the connection between the valve-stem and the rocker, and is pivotally connected, at an intermediate point to the extremity of the former. The block 28 forms the connection between the rod 30 and the lower arm of the auxiliary rocker, and as the latter is preferably pivoted to a fixed part of the framework of the engine it will be understood that by varying the position of the block in the slot the throw of the link-arm 31, and hence of the valve-stem, may be varied independently of the main rocker and connections. The adjustment of the pivotal connection of the rod 30 with the auxiliary rocker is accomplished by means of an auxiliary bell-crank lever 33, connected by a link 34 to the block, an operating lever or handle 35, and a connecting-rod 36.

From the above description the operation of the improved valve-motion will be readily understood by those skilled in the art to which the invention appertains.

The adjustment of the pivotal point of con-

nection between the slotted-link, which is operated by the eccentrics, and the lower arm of the main rocker enables the operator to control to a certain extent the throw and the period of vibration of the valve with relation to the movement of the piston, but the accuracy of the adjustment is increased by means of the auxiliary devices including the swinging-arm, auxiliary rocker, and swinging-link. Furthermore, inasmuch as said auxiliary devices are actuated by the crank, while the main-rocker is actuated by eccentrics arranged perpendicular to or at ninety degrees from the crank-pin, and diametrically opposite each other, any desired abruptness of opening and closing the ports may be attained, and such opening and closing may be accomplished at any desired point of travel of the piston. It will be understood that this construction is susceptible of numerous modifications to suit different conditions under which it is employed, and it is obvious that changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention, I claim—

1. In a valve-motion, the combination with an eccentrically-operated rocker, of a syn-

chronously vibrated cross-head, a link-arm carried by the rocker and connected to the valve-stem, an auxiliary rocker connected to the free end of the link-arm, and connections between the cross-head and the auxiliary rocker, substantially as specified. 35

2. In a valve-motion, the combination with an eccentrically-operated rocker, of a synchronously vibrated cross-head, a link-arm carried by the rocker and connected to the valve-stem, an auxiliary rocker connected to said link-arm, and a swinging-arm actuated by the cross-head and loosely connected to said auxiliary rocker, substantially as specified. 45

3. In a valve-motion, the combination with an oscillatory rocker, of a link-arm carried by the rocker and connected to the valve-stem, an auxiliary rocker and means for oscillating the same synchronously with the main rocker, a link connection between the auxiliary rocker and the link-arm, and means for adjusting the point of attachment of said connection and auxiliary rocker, substantially as specified. 55

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

PETER J. SHELBY.

Witnesses:

ANDREW H. JACKSON,

NEWTON RHEA BOWLIN.