

JOSEPH A. WILDMAN.

Improvement in Constructing Links for Valve Gear
for Steam Engines.

No. 125,154.

Patented April 2, 1872.

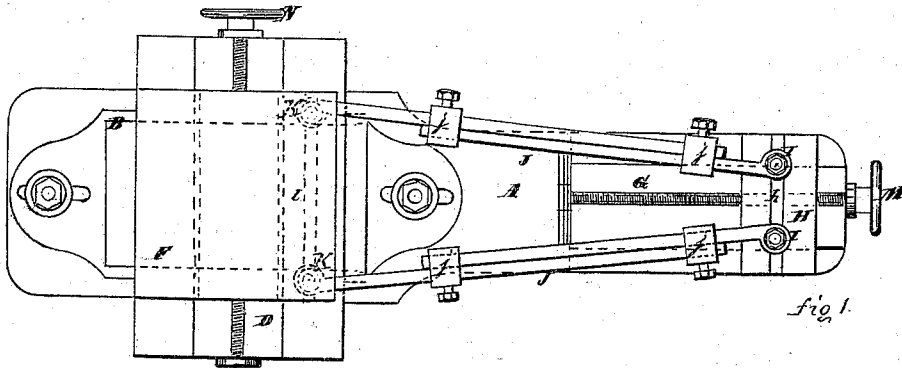


fig. 1.

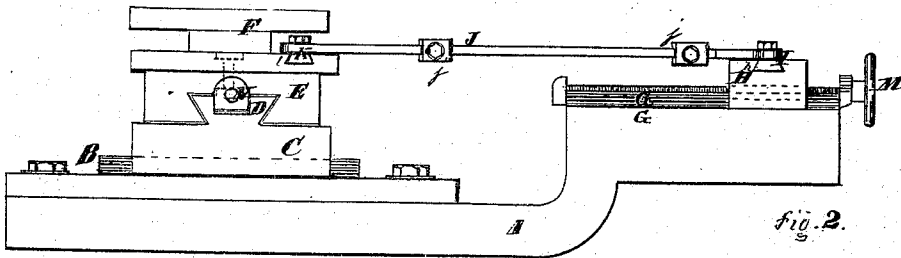


fig. 2.

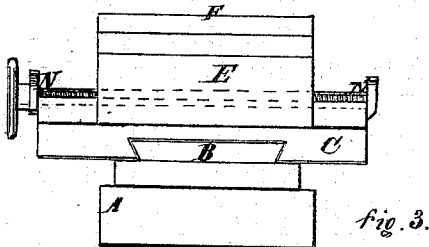


fig. 3.

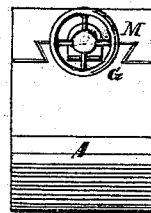


fig. 4.

Witnesses:

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IMPROVEMENT IN CONSTRUCTING LINKS FOR VALVE-GEAR FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 125,154, dated April 2, 1872.

Specification describing certain Improvements in the Method of Constructing Links for the Valve-Gear of Steam-Engines, invented by JOSEPH A. WILDMAN, of Chicago, in the county of Cook and State of Illinois.

Nature of the Invention.

The aim of this invention is to provide a method of determining the proper form to be given to the slotted link commonly employed in the valve-reversing and operating gear of steam-engines; the object being to so shape the slot of the link that when it is moved by the reversing lever from one position to another, when the engine is upon a dead-center, the valve-slide will not be moved or its position changed thereby, so that the same amount of "lead" will always be given, whatever may be the position of the link.

The great objection to the ordinary link-motion heretofore has been the fact that, during the change of the link from one position to another by the graduated reversing lever, to enlarge or diminish the play of the valve-slide or to reverse the motion, the curve of the slot has been such as to act as a cam to move the stud of the rocker-arm either forward or back, and thus enlarge or lessen the "lead" of the valve in different positions of the link. In such a case the due proportion of "lead" may be given at two positions of the link, as, for instance, when the stud or slide of the rocker-arm stands at either end of the slot, but may not be right at any other point; so that when the throw of the eccentrics is decreased by bringing the stud nearer the middle of the slot the "lead" will be increased or diminished, as the case may be; if increased, the opposing steam, instead of acting as a cushion, as it is designed, will be a resistance to overcome; and, if unduly diminished, the mechanism will soon wear itself out by the concussion.

And the invention consists of a method of determining the proper shape of the link which shall obviate this difficulty, which method is as follows, viz.: By means of two rods, pivoted at the ends, at points coinciding to the centers of the eccentrics, and pivoted at the other ends to a tablet at points coinciding to the points of attachment of the eccentric-rods to the link. Now, if the tablet is swung back and forth upon the pivoted rods, a stationary point

will describe upon the tablet a line which will be the proper curve for the slot of the link of the particular dimensions for which the centers and lengths have been set. And the invention further consists in a special mechanism of rods and tablet for the accomplishment of this purpose, whereof the several parts are made adjustable to suit any particular length of rod or throw of eccentrics, and which may be applied to any common slotting-machine, by means of which the link, being placed upon the tablet, will be cut of the desired form.

To enable those skilled in the art to make and use my invention, I will proceed to describe the same with particularity, making use in so doing of the accompanying drawing, in which—

Figure 1 is a top or plan view of an adjustable mechanism, constructed in accordance with my invention, for producing the proper curve. Fig. 2 is a side elevation of the same. Fig. 3 is an end elevation of the same taken from the left hand, and Fig. 4 is an end elevation of the other end.

Like letters of reference employed in the several figures indicate like parts.

General Description.

A is a frame-work, at one end of which is placed the longitudinal dovetail slide B, upon which traverses the sliding carriage C, which in turn is fitted with the dovetail slide D at right angles to the slide B, and traversed by the sliding carriage E, upon which is pivoted a tablet, F. It will be seen that by this construction and arrangement of the parts named the tablet F may be moved in any direction in the horizontal plane in which it lies. At the other end of the frame A, upon the raised portion thereof, is the longitudinal dovetail slide G, traversed by the carriage H, which is slotted transversely by the slot *h*, within which, upon slides, are placed the pivots *I I*, pivoting the rods *J J*, the other ends of which are pivoted to the tablet F by the pivots *K K* sliding in the transverse groove *l*. The rods *J* are made double and fitted to slide or extend by means of loops *j j* fitted with set-screws. The carriage H is arranged to be operated or set forward and back by means of the screw M, and the carriage E is arranged to be moved transversely by the screw N or an equivalent

feed device. The operation of these several parts will be presently explained.

In constructing a link according to this invention it is first necessary to ascertain the exact distance between the true centers of the two eccentrics carried upon the driving-shaft. This distance, as is well known, is governed by the added length of the "lap" and "lead" of the valve-slide. The sum of the length of "lap" and "lead" being given, to find the position of the true centers of the eccentrics is a simple problem, and may be worked in many ways. I prefer, however, to use the following formula, viz.: Describe a circle, the diameter of which shall be equal to the throw of the eccentrics; upon a radius of this circle lay off from the center a distance equal to the sum of the "lap and lead." A line cutting this radius at right angles at the distance from the center equal to the sum of the "lap and lead" will intersect the circle at points which will be the true centers of the eccentrics; and, as a matter of course, the distance between these points will be the distance between the centers in a straight line. With the data thus obtained I set the pivots I I to coincide in distance apart to the said centers of the eccentrics, and set the pivots K K to coincide in distance apart with the lugs upon the links to which the rods are attached. The rods J J are now adjusted to the right length and the parts all secured. The link is now laid upon the tablet F, and secured thereto in a position so that the lugs will coincide with the pivots K,

and clamped securely in position. The entire mechanism is now placed upon a slotting-machine so that the cutting-tool will descend upon a point of the line to be cut, and the work is fed up to the cutter regularly by operating the screw N. The result is that the line described by the cutter, and the shape given thereby to the link, is precisely the curve required to allow the link to swing upon the eccentrics, when the engine is upon a dead-center, without moving the stand of the rocker-arm.

Claims.

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

1. The method, substantially as hereinbefore specified, of determining the proper shape to be given to the slotted link of steam-engine valve and reversing-gear by means of the rods J J, pivoted at stationary points I I coinciding to the centers of the eccentrics, and pivoted to the tablet F at points coinciding to the points of attachment of the eccentric-rods to the link.

2. The combination of the tablet F mounted upon and pivoted to the universal slide B C D E, the adjustable rods J J, adjustable pivots I K, and adjustable carriage H, substantially as and for the purpose specified.

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Witnesses:

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