No. 636,127. Patented Oct. 31, 1899.

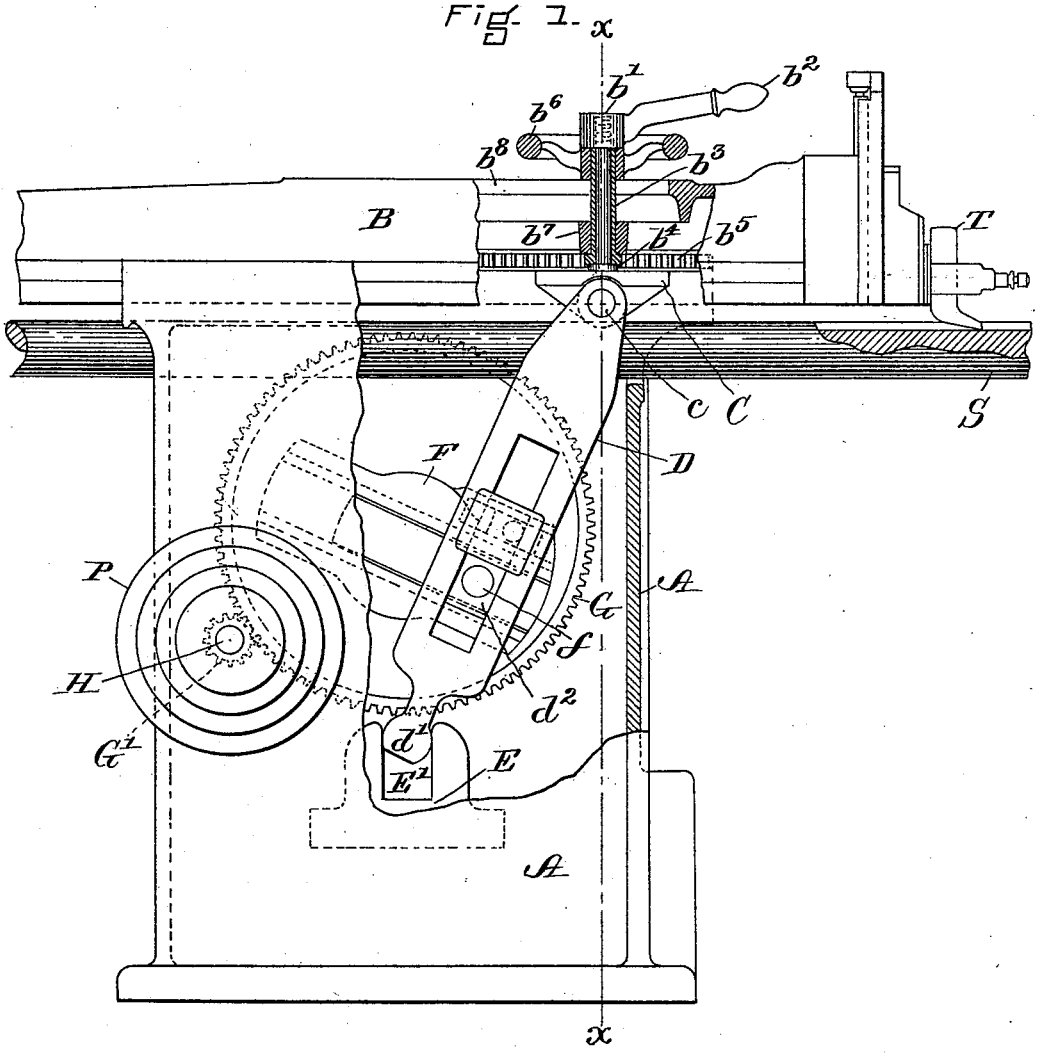
M. FLATHER.

DRIVING MECHANISM FOR SHAPERS AND PLANERS.

(Application filed May 13, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



WITNESSES.

A. D. Grover.

Fred E. Dorr.

INVENTOR.

Mark Flather

By Richard P. Elliott

his Attorney

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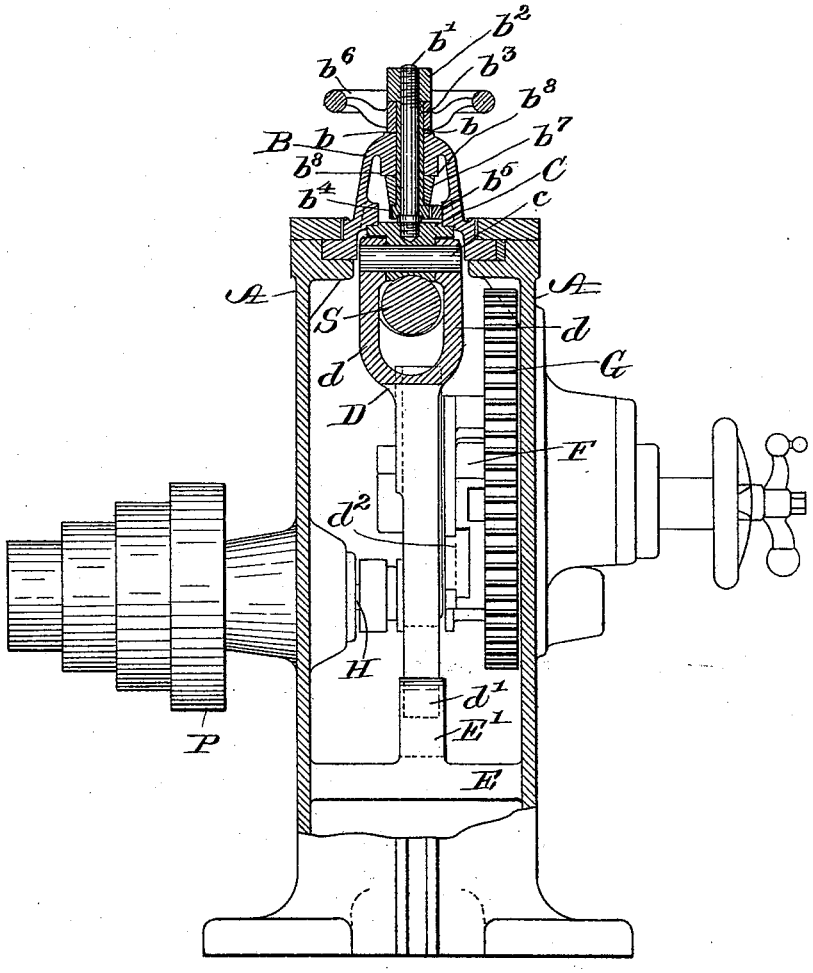
Fig. 2.



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UNITED STATES PATENT OFFICE.

MARK FLATHER, OF NASHUA, NEW HAMPSHIRE.

DRIVING MECHANISM FOR SHAPERS AND PLANERS.

SPECIFICATION forming part of Letters Patent No. 636,127, dated October 31, 1899.

Application filed May 13, 1899. Serial No. 716,779. (No model.)

To all whom it may concern:

Be it known that I, MARK FLATHER, a citizen of the United States, residing at Nashua, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Driving Mechanism for Shapers and Planers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation, partly in section, of my new driving mechanism fitted to a shaper. Fig. 2 is a section on line $x\ x$ of Fig. 1.

The objects of my invention are, first, to provide means for increasing the speed of the ram at the ends of its stroke, while the speed of the driving-shaft remains the same, and thereby producing a more uniform speed of the ram throughout the length of its stroke; secondly, to adapt the shaper to the machining of long pieces, as shafts, and, thirdly, to lessen the effect of the torsional stress on the ram and the consequent binding of the ram in its bearings.

My invention consists in the combinations hereinafter described and claimed.

In the drawings illustrating the principle of my invention and the best mode now known to me of applying that principle, A is the main frame of the machine, in ways in the top of which slides the ram B, carrying the cutting-tool T. As shown in Fig. 2, the ram B is hollow and open underneath and is formed with a central longitudinal slot b in its top. A bolt b' extends vertically through the slot b and screws at its lower end into a socket in the ram-adjusting block C. The upper end of the bolt b' is screw-threaded and engages in a screw-hole in the working end of the clamp b^2. The bolt b' is for a portion of its length surrounded by a bushing b^3, integral with the lower end of which is the pinion b^4. Pinion b^4 meshes with a rack b^5, secured to the interior of the ram B. A hand-wheel b^6 is loosely keyed to the upper end of the bushing b^3. A conical sleeve b^7 fits loosely on the bushing b^3 between the pinion b^4 and the bottom sides of the slot-walls $b^8\ b^8$. The ram-adjusting block C carries a pivot-pin c, the ends of which have a rotative fit in pin-holes in the bifurcations $d\ d$, which form the upper forked end of the pitman D. The lower end d' of the pitman D is epicycloidal-shaped and is fitted to move freely in the socket E', formed in the transverse beam E, the ends of which are fast in the main frame A. The pitman D is slotted at its middle portion to receive the slide-block d^2, which is pivotally connected to the crank-disk F. The crank-disk F is actuated by the spur-gear G and is eccentric therewith. The main shaft H is driven by the cone-pulley P and carries the pinion G', which meshes with spur-gear G. The construction of the main shaft H, spur-gear G, pinion G', and the crank-disk F is similar in all respects to that shown in my Patent No. 543,598, dated July 30, 1895, for a quick return motion.

To adjust the ram B, the clamp b^2 is loosened by unscrewing it and the hand-wheel b^6 is turned. The pinion b^4 is in engagement with the rack b^5, and when the hand-wheel b^6 is turned the ram is moved in the desired direction, and thereby to the desired position. The clamp b^2 is then tightened and the last few turns of the clamp b^2 draw the bolt b' up and clamp the adjusting device to the ram B between the sleeve b^7 and the hand-wheel b^6. As the ram B makes its stroke the upper end of the pitman travels in a right line, while the lower end d' slides up and down in the socket E' and approaches or recedes from the load center f. As the ram B completes its forward stroke the distance between the lower end d' and the load center f is decreased, while the distance from the pivot-pin c and the load center f is increased. This relative change in the distances between the load center f and the ends of the pitman D causes the upper end of the pitman to travel at a faster rate during a given angular movement of the crank-disk F than it otherwise would do at this part of the stroke. By increasing the rate of travel of the ram B at the ends of the stroke the whole stroke is made at a more uniform speed and a larger amount of work can be done in a given time with the same angular speed of crank-disk F, the speed of which is maintained uniform. Another advantage gained by having the upper end of pitman D move in a right line while its lower

end is movable is found in the facility with which long pieces, such as the shaft S, may be machined. In the old form of driving mechanism, where the pitman D was pivoted at its lower end to a fixed pivot, the forks at the upper end had to be made so long in order to allow for the vertical movement of the upper end of the pitman D as practically to prohibit the forked construction of the upper end. By making the lower end *d'* of the pitman *D* movable the forked construction of the upper end is made practicable.

An advantage of the forked construction now first made practicable lies in the support given the ram B to resist torsional stress and consequent binding in the ways. This torsional stress is brought upon the ram when the point of the cutting-tool enters the work at a distance from the longitudinal axis of the ram B.

What I claim is—

1. In a shaping-machine, the combination of a ram; a pitman, one end of which is hinged to said ram and the other end of which is free to slide during the movement of the ram, said slidable end being the fulcrum about which the pitman pivots during the movement of the ram; a support for said slidable end, over which said slidable end moves during the movement of the ram; and a driving mechanism for imparting to said pitman an oscillating motion about said slidable pivotal end.

2. In a shaping-machine, the combination of a ram; a pitman, one end of which is hinged to a slide-block secured to said ram and the other end of which is free to slide during the movement of the ram, said slidable end being the fulcrum about which the pitman pivots during the movement of the ram; said slide-block secured to said ram; a support for said slidable end, over which said slidable end moves during the movement of the ram; a slide-block fitted in a slot in said pitman; a crank-disk connected to said slide-block; and means to rotate said crank-disk.

3. In a shaping-machine, the combination of a ram; a pitman one end of which is bifurcated for the passage of the work and which is hinged to said ram, and the other end of which pitman is free to slide during the movement of the ram, said slidable end being the fulcrum about which the pitman pivots during the movement of the ram; a support for said slidable end, over which said slidable end moves during the movement of the ram; and a driving mechanism for imparting to said pitman an oscillating motion to said slidable pivotal end.

4. In a shaping-machine, the combination of a ram; a slide-block secured to said ram; means to adjust said ram on said slide-block; a pitman, one end of which is hinged to said slide-block and the other end of which is free to slide during the movement of the ram, said slidable end being the fulcrum about which the pitman pivots during the movement of the ram; a support for said slidable end, over which said slidable end moves during the movement of the ram; and a driving mechanism for imparting to said pitman an oscillating motion to said slidable pivotal end.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 12th day of January, A. D. 1899.

MARK FLATHER.

Witnesses:
RICHARD P. ELLIOTT,
JAMES HAMILTON.