# W. B. WILLARD.

## SHUTTLE-DRIVING MECHANISM FOR NARROW-WARE LOOMS.

No. 191,392. Patented May 29, 1877.

*Fig: 1.*

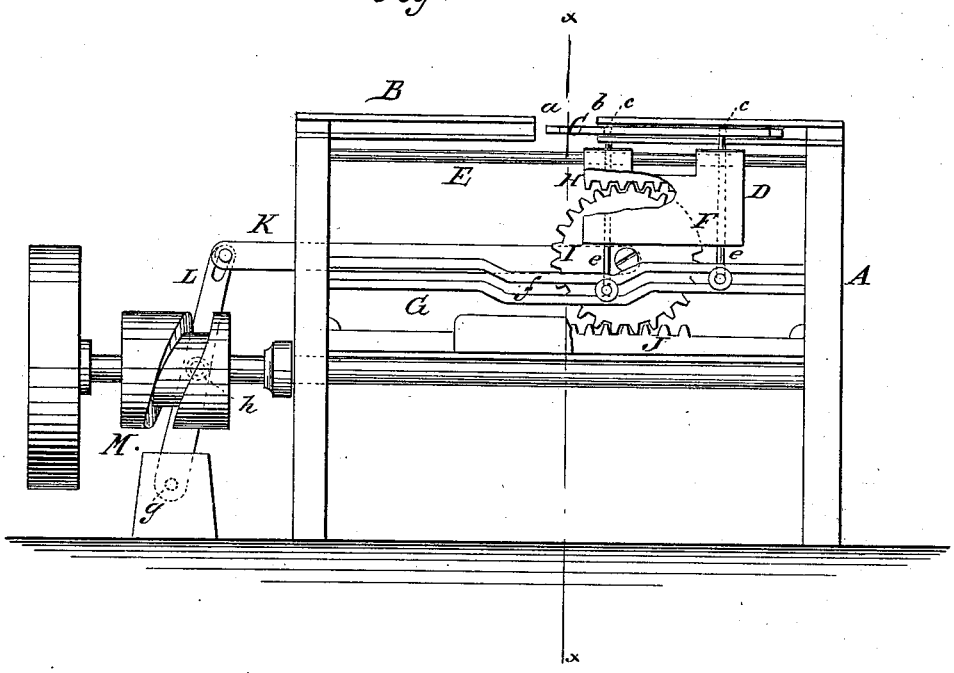
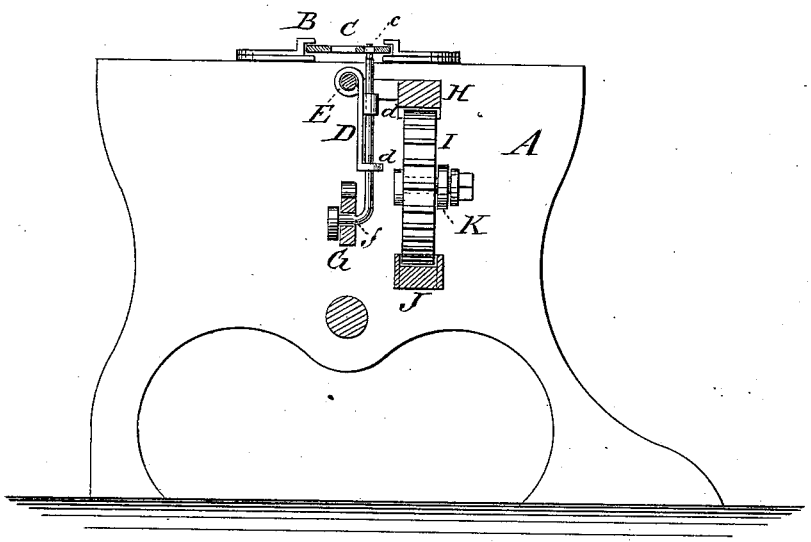



*Fig: 2.*

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WILLIAM B. WILLARD, OF NEW YORK, N. Y.

## IMPROVEMENT IN SHUTTLE-DRIVING MECHANISMS FOR NARROW-WARE LOOMS.

Specification forming part of Letters Patent No. 191,392, dated May 29, 1877; application filed October 7, 1876.

*To all whom it may concern:*

Be it known that I, WILLIAM B. WILLARD, of the city, county, and State of New York, have invented a new and Improved Shuttle-Driving Mechanism for Narrow-Ware Looms, of which the following is a specification:

Figure 1 is a rear elevation of a machine embodying my improvements, with parts removed to show the construction more clearly. Fig. 2 is a transverse section on line *x x* in Fig. 1.

Similar letters of reference indicate corresponding parts.

My invention relates to looms for weaving narrow ware; and it consists in the arrangement of a spur-wheel traveling on a fixed rack, and actuating a movable rack attached to the shuttle-carrier. Motion is given to the spur-wheel by a cam on the main shaft of the machine, which acts through a slotted lever and a connecting-rod.

The object of the invention is to provide mechanism for throwing the shuttle in narrow-ware looms.

Referring to the drawing, A is the ordinary frame of a loom, and B is a shuttle-race, which is divided at its center, leaving the space *a b*, which is of sufficient width to admit of the passage and shedding of the warp. C is a shuttle that slides in the race B, and is of such length as to overlap the opening *a b*, so that it may pass smoothly from one section of the shuttle-race to the other. The shuttle is pierced at *c c*, to receive the fingers of the shuttle-carrier.

D is the shuttle-carrier, which slides on the bar E. It consists of a piece of sheet metal, F, which is turned over at its upper edge to receive the bar E, and is provided with the guides *d d* for the fingers *e e*. The said fingers are capable of engaging with the holes *c c* in the shuttle, and project below the piece F, and are bent at right angles, and provided with grooved friction-rollers, which engage with a cam-slot, *f*, in the bar G, which slot is of such form that it will draw the fingers *e*, one at a time, downward out of the shuttle, and retain them below the warp during the passage of the portion of the shuttle with which they engage, through the threads of the warp, and replace them after that part of the shuttle passes the warp.

A rack, H, is attached to the shuttle-carrier, and engages with the spur-wheel I, that travels on a fixed rack, J, that is arranged in the frame A, parallel to the movable rack H, that is attached to the shuttle-carrier.

The spur-wheel I is journaled on a stud at the end of a sliding rod, K, which is guided by a mortise in the end of the frame A. Motion is imparted to the bar K by a lever, L, which is pivoted at *g*, and provided with a roller, *h*, which engages with the cam M on the main shaft of the machine. A connection is made between the lever L and bar K by means of a roller or stud projecting from the side of the said bar into a slot in the upper end of the lever.

By revolving the cam M an oscillating motion is imparted to the slotted lever L, which causes the rod K to reciprocate, carrying the spur-wheel I back and forth over the fixed rack J, which, by its meshing with the said wheel, causes it to make a partial revolution at every stroke of the rod K.

Motion is imparted to the rack H by the wheel I, which is double that of the rod K. The rack H, being attached to the shuttle carrier, moves it, and, consequently, the shuttle, in the shuttle-race.

One of the fingers *e*, as it approaches the warp, is drawn out of the shuttle by the action of the cam-slot *f*, while the other finger carries the shuttle forward until the withdrawn finger and the aperture in the shuttle, with which it engages, have passed the warp, when the finger is caused, by the cam-slot *f*, to again engage the shuttle, and the finger that follows it is withdrawn by the cam-slot *f*, to allow the heel of the shuttle to pass out of the warp. This operation is repeated at every stroke, carrying the shuttle positively and with precision.

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

The combination of the cam M, lever L, rod K, wheel I, racks J and H, and shuttle-carrier D, substantially as herein shown and described.

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Witnesses:

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