

Patented Nov. 4, 1873.

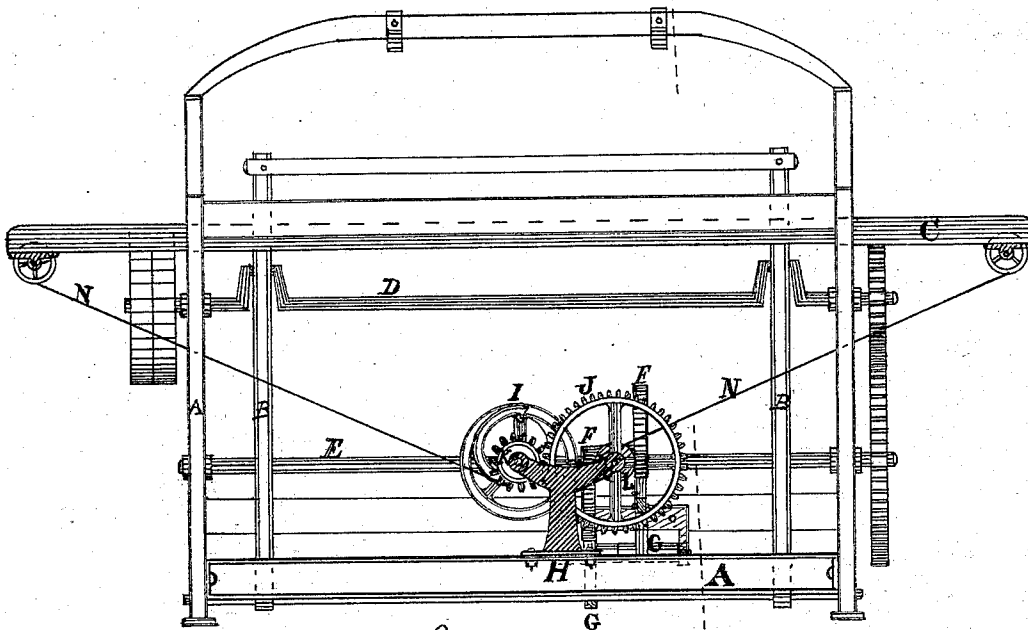


Fig 7.

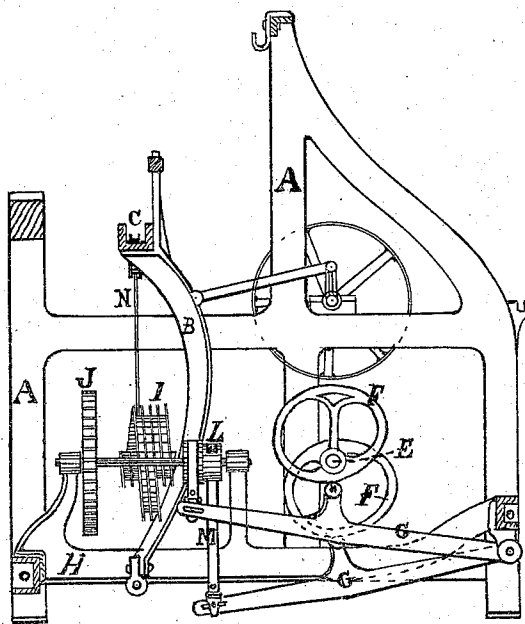


Fig 2.

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IMPROVEMENT IN SHUTTLE-ACTUATING MECHANISMS FOR LOOMS.

Specification forming part of Letters Patent No. **144,218**, dated November 4, 1873; application filed April 9, 1872.

To all whom it may concern:

Be it known that I, JOHN R. NORFOLK, of Salem, in the county of Essex and State of Massachusetts, have invented certain Improvements in Looms, of which the following is a specification:

My invention relates to looms in which the shuttle is operated positively, and may be regarded as an improvement with reference to the subject-matter of the patent granted to me on the 8th day of February, 1870, the purpose of the two inventions being the same; and it consists in a mechanism for operating the shuttle, consisting of cams and levers, in combination with a spirally and helically grooved wheel or wheels, arranged and operating in such relation to each other that the movement of the shuttle is alternately accelerated and retarded.

In the drawing, Figure 1 is a front elevation. Fig. 2 is a sectional elevation through the line *a b* of Fig. 1, showing a loom embodying my invention.

Similar letters of reference indicate like parts in both figures.

A represents the frame of the loom; B, the swords; C, the grooved lay in which the shuttle-carriage runs; D, the crank-shaft; E, the cam-shaft; F, cams for operating shuttle-carriage; G, levers operated by cams F; H, stand, upon which wheel I, gears J K, and pulley L are placed; M, straps connecting levers G with pulley L; N, bands connecting grooved wheel with shuttle-carriage.

The cams F are constructed of the form substantially as represented in the drawing; and they are so placed on the shaft that when the shuttle is at the end of the lay they do not impart motion to the levers G.

After the lay has commenced its backward movement the cams actuate the levers G, the motion being gradually increased until the shuttle reaches the middle of the shed, when the motion is retarded until the shuttle reaches the end of the lay. The time which the shuttle lies still for changing the harness is determined by the length of that part of the periphery of the cam which forms a true circle from the center.

The cams F are placed on the harness cam-shaft; but they may be placed on any suitable shaft.

The levers G are attached to the pulley L by the straps M, one on each side of the pulley, so that, as one lever is depressed by the cam, the corresponding strap is being unwound, while the other is being wound round the pulley L.

In order that the straps may be kept parallel with the pulley L, they should be attached to the levers G by a movable joint.

The pulley L is attached to the shaft, to which is also attached the driving-gear J, the whole being mounted in bearings on the stands H. The driving-gear J is geared into the pinion K, which is attached to the shaft, upon which is placed the spirally and helically grooved wheel I, which is also mounted in bearings on the stand H.

The bands N, which actuate the shuttle-carriage, are wound upon and attached to the fusee-wheel I. The wheel I should be made as light as possible in order to decrease its momentum. The spiral grooves upon its periphery correspond to the width of the band; and it should have two sets of grooves, one for each band; or two wheels may be used. These spiral grooves are also helical, and may extend once or more around the wheel, so as to make the increase and decrease of movement as gradual as may be desired. The grooves are made spiral for the purpose of preventing the band from winding upon itself.

In some looms two spiral wheels may be used, one at each end of the loom.

I claim as my invention—

The spirally and helically grooved wheel I, connected, by cords or straps, with the shuttle-moving device, in combination with the cams F, levers G, and pulley L, the whole constructed, arranged, and operating substantially as described.

JOHN R. NORFOLK.

Witnesses:

JOHN A. BASSETT,
I. R. NICHOLS.