3 Sheets—Sheet 1

H. WOODMAN.

Shuttle-Motion for Loom.

No. 209,439. **Patented Oct. 29, 1878.**

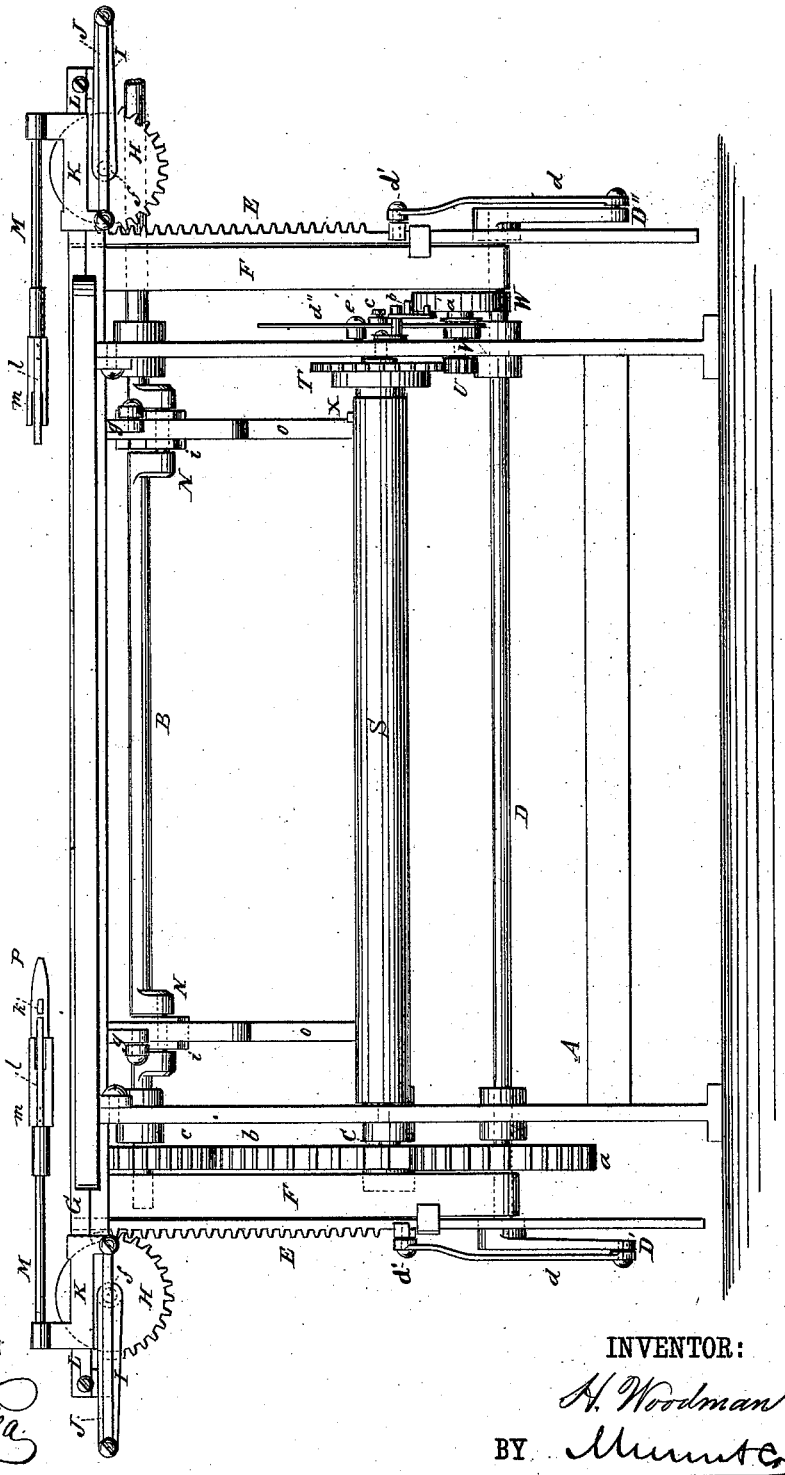

Fig. 1.

WITNESSES:

Chas. Nida

C. Sedgwick

INVENTOR:

H. Woodman

BY Munn & Co.

ATTORNEYS.

3 Sheets—Sheet 2.

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Fig: 2.

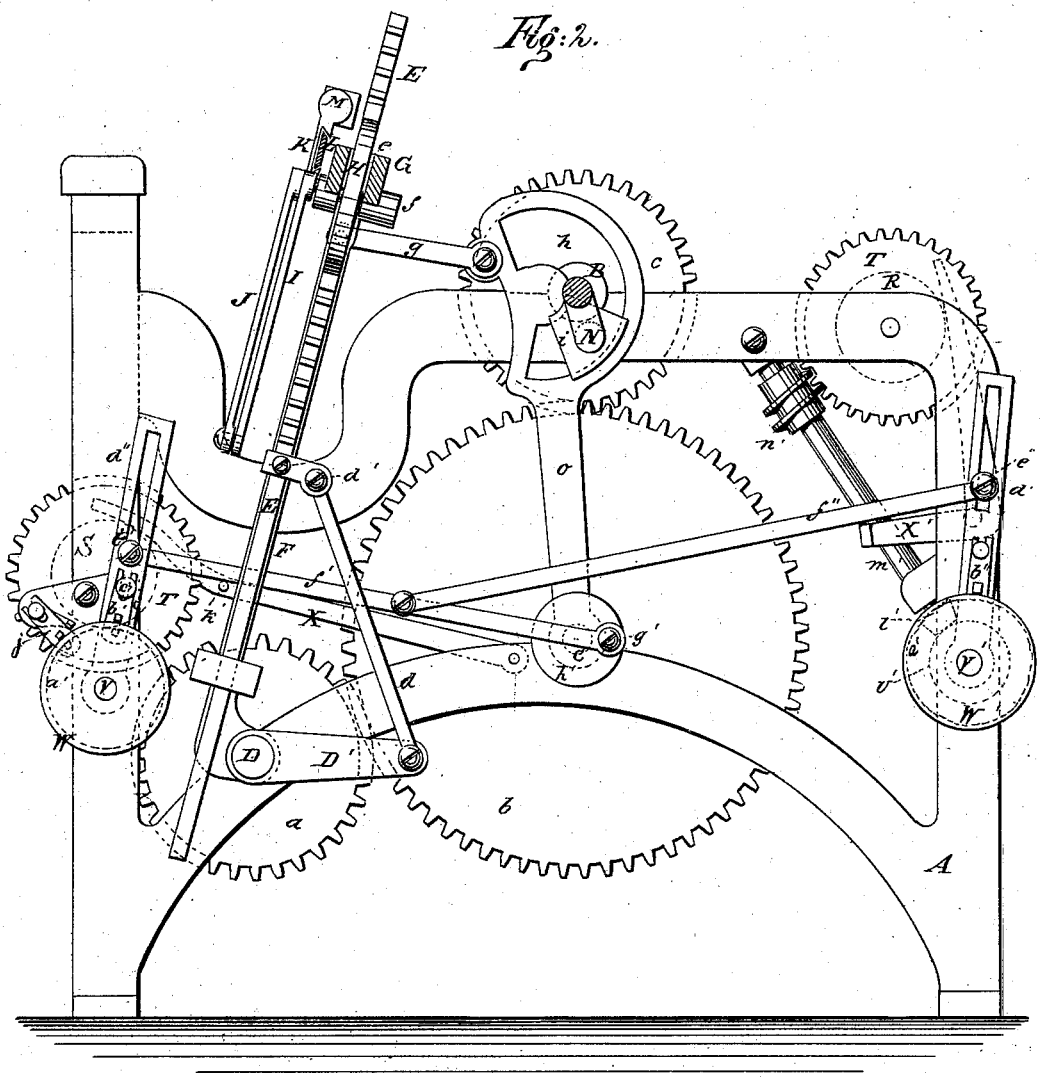

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Fig. 3.

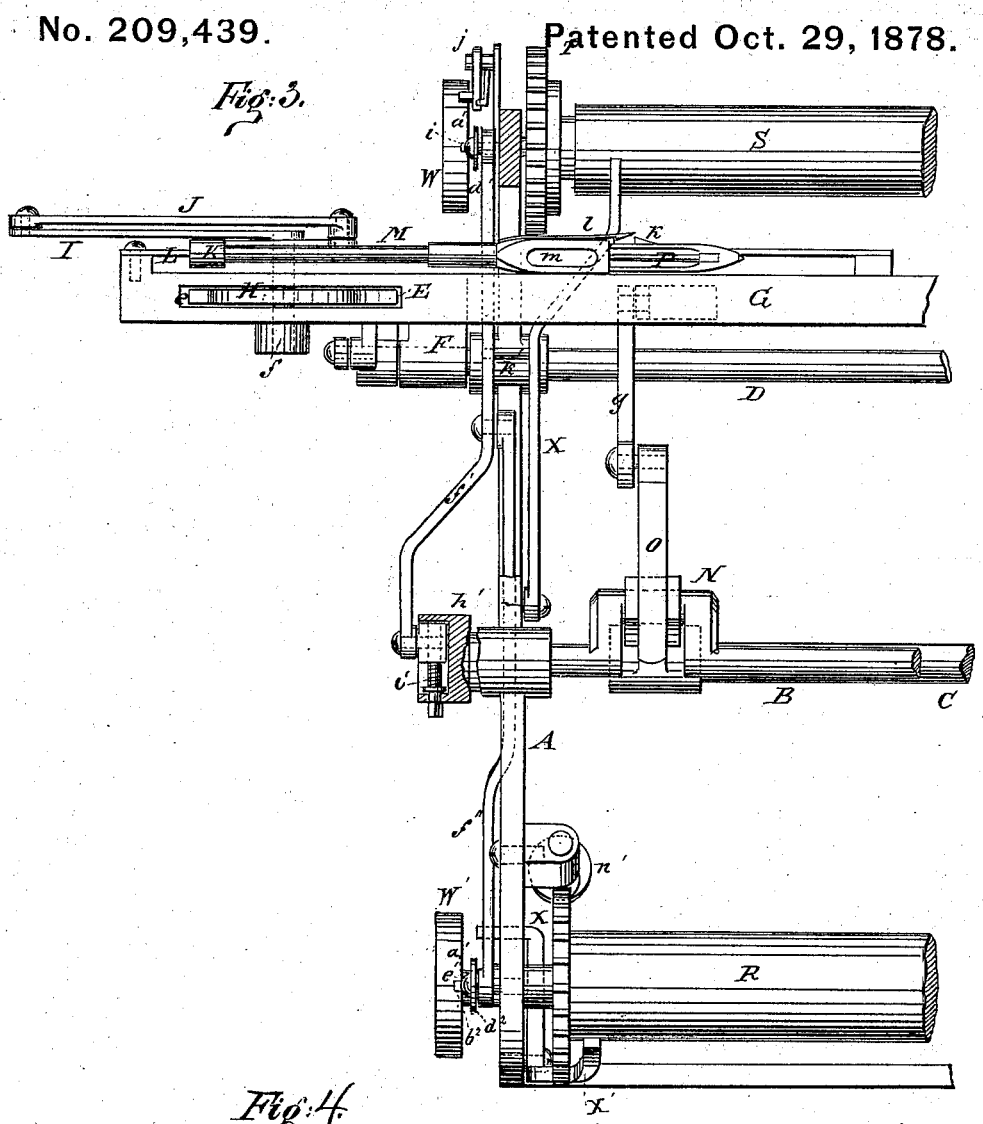


Fig. 4.

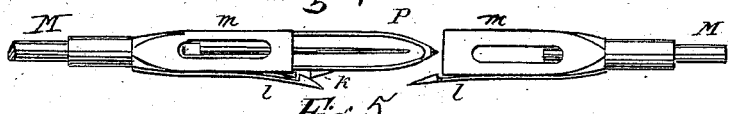
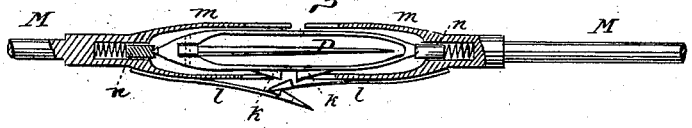


Fig. 5.



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C. Sedgwick

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BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

HORACE WOODMAN, OF SACO, MAINE.

IMPROVEMENT IN SHUTTLE-MOTIONS FOR LOOMS.

Specification forming part of Letters Patent No. **209,439**, dated October 29, 1878; application filed April 12, 1878.

To all whom it may concern:

Be it known that I, HORACE WOODMAN, of Saco, in the county of York and State of Maine, have invented a new and Improved Positive Shuttle-Motion for Looms, of which the following is a specification:

Figure 1 is a front elevation of my improved loom. Fig. 2 is an end elevation. Fig. 3 is a sectional plan view. Figs. 4 and 5 are detail views, showing the manner of shifting the shuttle from one shuttle-carrying arm to another.

Similar letters of reference indicate corresponding parts.

My invention relates to that class of looms wherein all of the parts of the loom are driven by mechanism that imparts to them positive motions.

Referring to the drawings, A is the main frame of the loom, B the crank-shaft, C the cam-shaft, and D the lathe-shaft, all being well known parts in common use.

The shaft D, instead of being stationary and merely a supporter for the sword-arms, is provided with a spur-wheel, *a*, by which it takes motion from a spur-wheel, *b*, on the cam-shaft C, and the wheel *b* takes its motion from a spur-wheel, *c*, on the crank-shaft B. The wheels *a c* are of the same diameter, so that the crank-shaft B and the shaft D revolve at the same speed, causing the shuttle-driving mechanism and the lathe-operating device to move in unison. Cranks D′ D″ are secured to opposite ends of the shaft D, and both project in the same direction. These cranks are connected by means of rods *d* with the rack-bars E, which are made, by means of the cranks D′ D″, to slide up and down in guides secured to the sword-arms F of the lathe.

In each end of the lathe-beam there are mortises *e*, in which are placed the toothed pinions H, which are secured to short shafts *f*, journaled in boxes secured to the lathe-beam G, and are engaged by the teeth of the rack-bars E, so that the movement of the rack-bars produces an oscillating movement in the toothed pinions H, moving them through a half-revolution. Upon the forward end of the shaft *f* cranks I are secured, which are connected by rods J with slides K, placed on ways L, which are secured to the forward or breast-beam side of the lathe-beam G, one at each end of the beam. These slides carry the shuttle-arms M, which project toward the center of the loom.

In this class of looms it is necessary to have two dwells, one in the movement of the shuttle and one in the movement of the lathe. The dwell in the shuttle-movement is, in this case, secured by the relative position and proportion of the cranks and connecting-rods employed to throw the shuttle. The connecting-rods *d* J of the cranks D′, D″, and I are but little longer than the cranks, being relatively about ten to seven. When the cranks D′ D″ are traveling through the lower portion of the circle, and as the rack-bars E are drawn downward and the connecting-rods *d* approach a line drawn through the center of the shaft D and the wrist-pin *d′*, upon which the upper end of the connecting-rod *d* is received, the motion of the rack-bars E becomes gradually slower until the bars stop at the lower end of their stroke, after which their motion gradually increases until the maximum speed is attained. The maximum of speed occurs when the crank has moved half of the distance that it travels from the lowermost to the uppermost points. As the rack-bars near the lower end of their stroke the cranks I swing outward and upward toward the line of the centers of the shafts *f*, and when the rack-bars E come to rest at the lower end of the stroke the cranks I and connecting-rods J are in the same horizontal line.

When the rack-bars E reach the upper end of their stroke the cranks I and connecting-rods J are again in horizontal line with the cranks projecting toward the center of the loom. When the cranks are in the position last described the shuttle-rods M are at the extreme inner end of their stroke.

The shuttle P is of the usual description, except that it has on one side, and near the center, two inclined planes, *k*, facing in opposite directions, and forming two catches. The latter are engaged by springs *l* on holders *m*, that are carried by the rods M. The similar holders on both rods M consist of a socket of sufficient size to receive one-half of the shuttle, and containing a spring-follower, *n*, the latter being concaved to receive the point of the

shuttle as it is thrust into the sockets, and protect it from injury by the constant blows received in making its picks. As the shuttle is thrust from one of the holders into the other, the catch *l* of the empty holder passes under the nib of the catch on the holder that contains the shuttle, and disengages the said catch from the shuttle, and at the same time the catch of the receiving-holder engages and holds the shuttle, the shuttle-holders being then separated and drawn out of the shed.

By my improved construction I obviate a difficulty experienced in looms in which the shuttle is driven by picker-staffs. In such looms the shuttle cannot be driven from one side to another without a shock.

In my improved loom the shuttle is driven directly by cranks without the intervention of staffs or levers, which are liable to spring and render the movement of the shuttle uneven and uncertain, and when the shuttle-carriers are at either end of their stroke the actuating-cranks are on their centers, so that no springing or backlash or recoil can occur other than that arising from ordinary wear.

It will be observed that the working parts of the shuttle-shifting mechanism consist simply of the two latch-springs and the two inclined planes on the shuttle, and that in locking and unlocking the shuttle both springs are employed. The springs are long enough to cover both inclines when the shuttle is in either holder, and in delivering the shuttle from one holder to the other the end of the spring on the receiving-holder passes under the end of the spring that holds the shuttle, and between the said end and the inclined plane on the shuttle, while the farther movement of the arms M forces the latch-spring out of the catch, and the combined action of the two latch-springs forces the spring of the receiving-shuttle holder into engagement with the incline on the shuttle.

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

The combination of shaft D, having cranks D′ D″, the rods *d*, racks E, pinions H, the cranks I, rods J, slides K, and shuttle-arms M, carrying holders *m*, provided with spring-latches, as and for the purpose described.

HORACE WOODMAN.

Witnesses:
JAMES H. GRIDLEY,
SOLON C. KEMON.