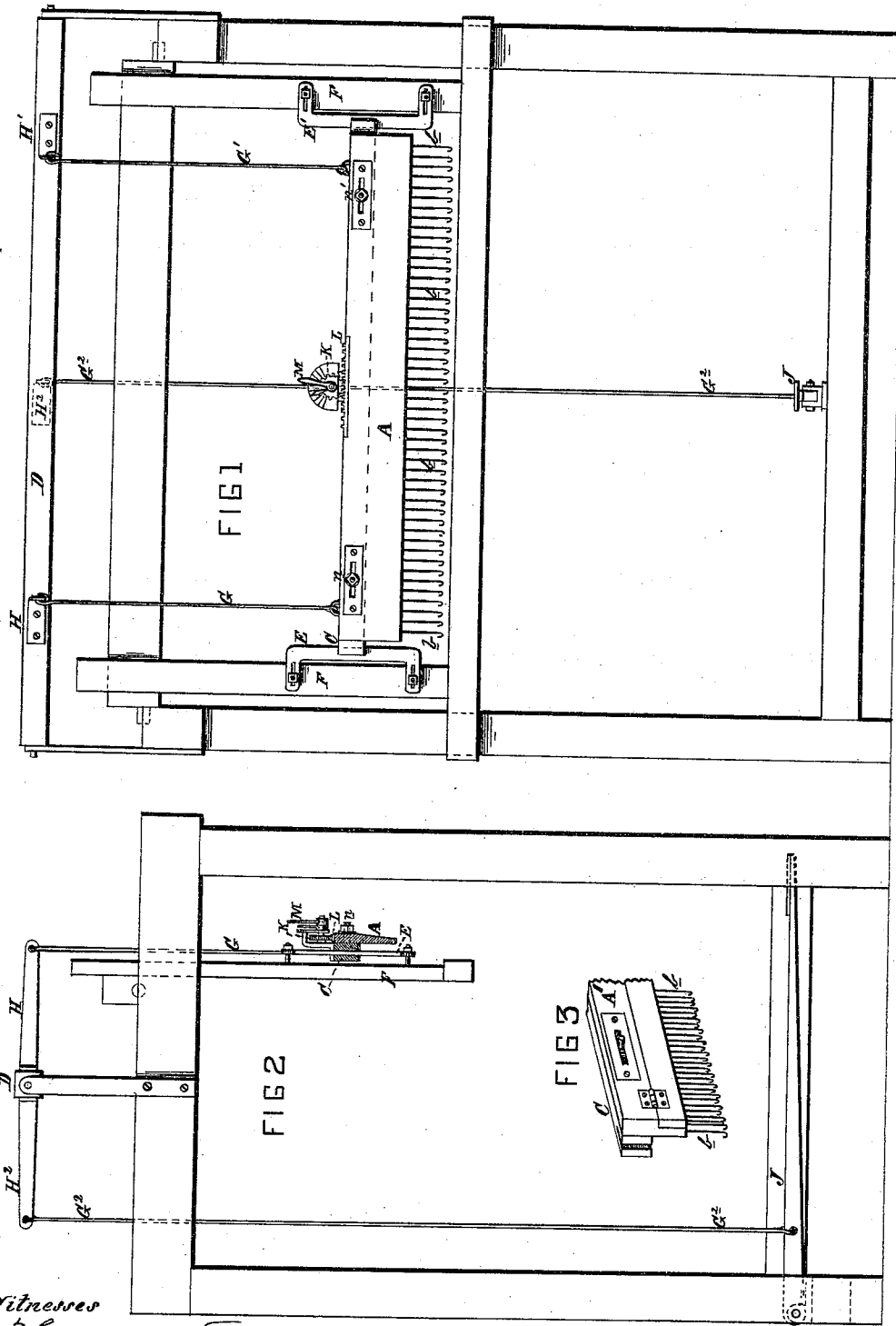


A. H. MILLER.
LOOM.

No. 179,334.

Patented June 27, 1876.



Witnesses

Harvey Taylor
James Phipps

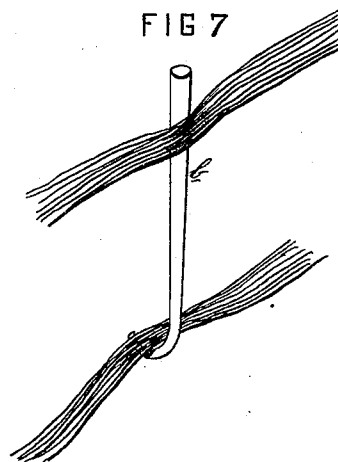
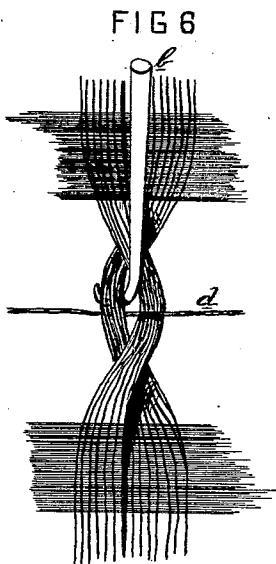
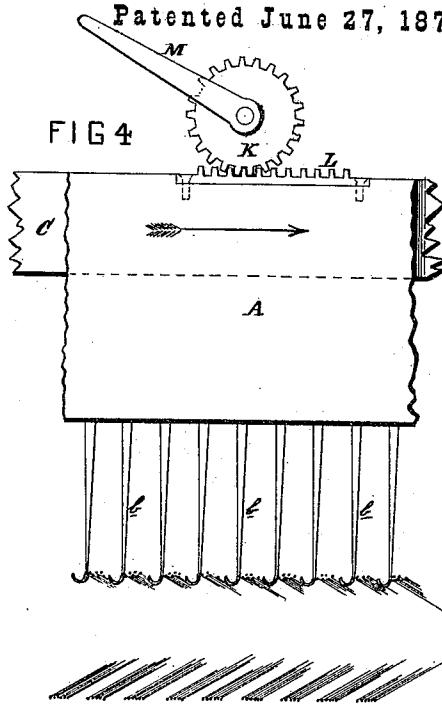
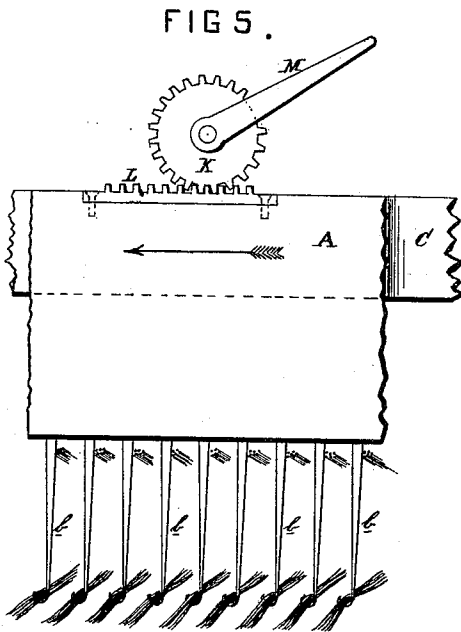
Inventor.

Augustus H. Miller
By his Attorney Isaac R. Oakford

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Harry Taylor
James Shippe

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UNITED STATES PATENT OFFICE.

AUGUSTUS H. MILLER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
ANNIE E. TAYLOR, HARRY TAYLOR, AND JAMES PHIPPS, OF SAME PLACE.

IMPROVEMENT IN LOOMS.

Specification forming part of Letters Patent No. **179,334**, dated June 27, 1876; application filed
March 23, 1876.

To all whom it may concern:

Be it known that I, AUGUSTUS H. MILLER, of the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Looms, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

My invention consists in attaching to the lay or batten of an ordinary weaving-loom a horizontal needle-bar, carrying a series of hooked needles, and arranged so as to be raised or lowered and shifted laterally at the will of the operator, the object of which is to render the loom capable of forming sections of net or looped work between strips or webs of woven work, thereby producing, on the one machine, a fabric which shall combine both woven work and net-work, or work resembling hand-knitting.

Figure 1 is a front elevation of a portion of a loom, showing my invention applied to the lay or batten. Fig. 2 is an end view of the same. Fig. 3 is a view of a portion of the needle-bar, showing a modification of my invention. Fig. 4 is a front view of a portion of the needle-bar, (enlarged,) showing it in an elevated position, with the hooks shifted, to clear the upper set of warp-threads. Fig. 5 is a view of the bar, depressed, showing the hooks shifted under and in the act of raising the lower set of warp-threads. Fig. 6 is a plan view, enlarged, showing the manner of decussating the warp-threads to form the net-work. Fig. 7 is a side view, enlarged, of one of the hooked needles, showing it depressed, and the relative positions of the upper and lower set of warp-threads.

On referring to Figs. 1 and 2 of the drawing, it will be seen that my invention consists of a needle-bar, A, in the lower edge of which is inserted a series of hooked needles, *b b b*, &c., arranged at regular intervals. The bar A is arranged for lateral movement upon a horizontal bar, C, which is suspended from arms *H H*¹, secured to a rocking beam, D, overhead, and has its ends guided by plates *E* and *E'*, which are secured to the sword *FF* of the lay or batten. The bar C is attached by cords or wires *G* and *G'* to levers *H* and *H*¹,

which are secured on the front side of the rocking beam D and a lever, *H*², which is secured on the opposite side of the beam, is attached, by means of a cord or wire, *G*², to a treadle, J. The depression of the treadle J draws the lever *H*² downward, and, at the same time, raises the levers *H* and *H*¹, by which means the operator is enabled to raise the needle-bar after the lower set of warp-threads are gathered upon the hooks.

The needle-bar A is shifted laterally, by means of a pinion, K, placed on a pivot mounted in bearings secured to the center of the bar C and gearing with a rack, L, on the upper edge of the needle-bar, motion being communicated through a hand-lever, M. The pins *n* and *n'*, passing through suitable slots in the needle-bar, and furnished with screw-nuts at their outer ends, permit a free parallel movement of the needle-bar upon the bar C.

The operation of my invention is as follows: When a strip or few inches of cloth are woven, the weaving operation is suspended for a while and the needle-bar A shifted to the right by the operator, as shown in Fig. 4, and then depressed. This operation causes the hooked needles to pass between and divide the upper and lower set of warp-threads into groups of six threads each. The needle-bar is then shifted in the opposite direction, as shown in Fig. 5, sufficiently to cause the hooks to pass under and gather up the lower set of warp-threads. The needle-bar is now raised, through the treadle attachment above described, elevating the lower half of the warp-threads in groups and crossing the upper set in a decussated manner, and also forming a shed through which a silk or other filling, *d*, is thrown, to tie the sets together. The needle-bar A is afterward shifted to the right, to clear the hooks from the loops. It will be observed, on referring to Fig. 7, that each group in the upper set of warp-threads is pressed upon to form a loop, so that the lower group will cross at an acute angle, as above mentioned.

In my description of the operation of the invention, I have described the upper and lower set of warp-threads as divided into groups of six threads each, although a greater

or less number may be employed. An additional number of bars, furnished with hooked needles, and hinged or attached to the needle-bar A, as shown at A' in Fig. 3, may also be employed. In using extra rows of needles, arranged on separate bars, the distance between the needles may be reduced without interfering with the operation of the hooks, by which means finer or larger meshes may be made in the net-work.

What I claim as my invention is—

The needle-bar A, hooked needles *b b b*, &c., bar C, pins *n* and *n'*, rack L, pinion K, lever M, guides E and E', cords or wires G, G¹, and G², levers H, H¹, and H², rocking beam D, and treadle J, in combination with the lay or batten of a loom, substantially as and for the purpose shown and described.

AUGUSTUS H. MILLER.

Witnesses:

ISAAC R. OAKFORD,

ALEXANDER H. MORGAN.