2 Sheets—Sheet 1.

L. A. UPSON.

MACHINES FOR LACING TOGETHER JACQUARD CARDS.

No. 176,153. Patented April 18, 1876.

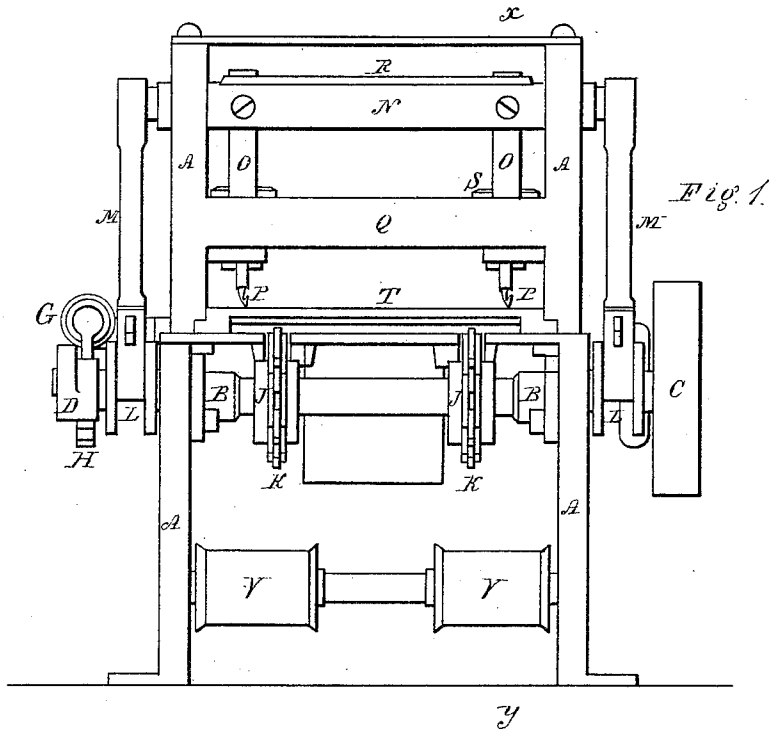

Fig. 1.

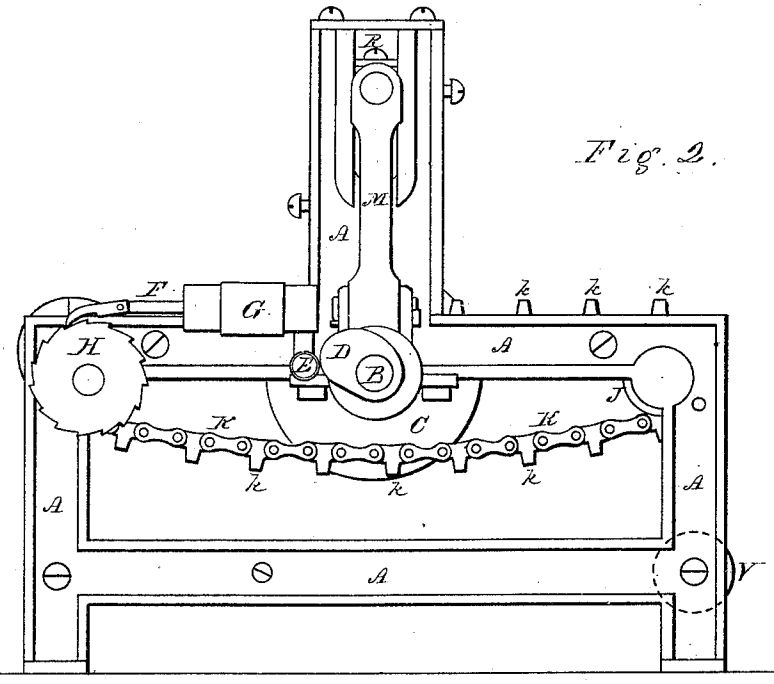

Fig. 2.

Witnesses.

Kendall R. Curtis

Albert D. Watkinson

Inventor.

Lyman A. Upson

by Thos. G. Ellis, Attorney

2 Sheets—Sheet 2.

L. A. UPSON.

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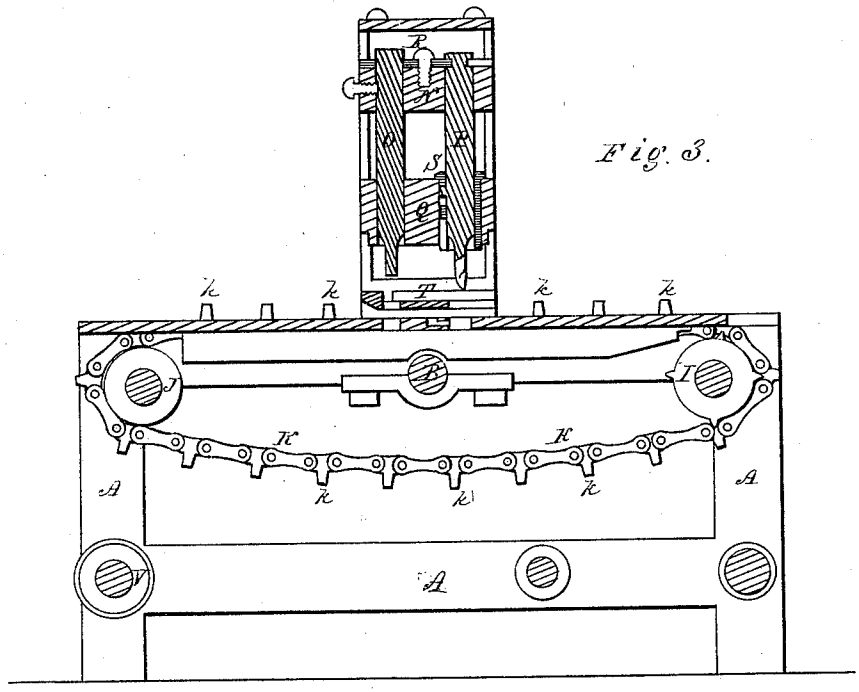

Fig. 3.

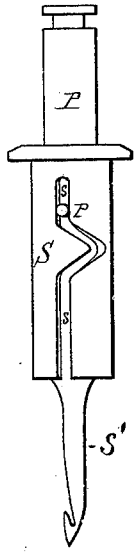

Fig. 4

Witnesses.

Wendell R. Curtis
Albert Waterhouse

Inventor.

Lyman A. Upson
by Theo. G. Ellis, attorney

UNITED STATES PATENT OFFICE.

LYMAN A. UPSON, OF ENFIELD, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR LACING TOGETHER JACQUARD-CARDS.

Specification forming part of Letters Patent No. **176,153**, dated April 18, 1876; application filed August 13, 1875.

To all whom it may concern:

Be it known that I, LYMAN A. UPSON, of Enfield, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Lacing together Jacquard-Cards; and I do hereby declare that the following is a full, clear, and exact description thereof, whereby a person skilled in the art can make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Like letters in the figures indicate the same parts.

The object of my invention is to provide a machine for lacing or securing together in a chain the punched pattern-cards used in weaving figured fabrics in the jacquard-loom. This operation has heretofore been done by hand.

My invention consists in the construction and arrangement of the said machine and the mechanical details thereof.

In the accompanying drawings on two sheets, Figure 1 is an end view of my improved machine. Fig. 2 is a side view of the same. Fig. 3 is a longitudinal vertical section through the needle and punch on the line *x y*, Fig. 1. Fig. 4 is an enlarged view of the needle-bar and the thimble through which it passes, showing the cam which rotates the needle-bar.

A A is the fixed frame of the machine. B is the main shaft, which gives motion to the machine. This is rotated by the pulley C. D is a cam on the end of the shaft B, for giving a horizontal reciprocating motion to the bar F. A spring within the box G keeps the small roller E against the cam, and draws back the bar F after it is pushed forward by the motion of the cam D. H is a ratchet-wheel, which is operated by a pawl on the bar F, and moves one notch at each forward movement of F. Upon the same shaft as H are two spur-wheels, I I, receiving their motion from H, and at the farther end of the machine are two rollers, J J. Over these wheels I and J pass two continuous chains, K K. These chains pass over a flat table on the bed of the machine, and are provided with the spurs or projections *k k*, &c., for holding the cards to be laced together. The cards are provided with holes fitting onto the spurs, and as the chain is carried forward by each movement of the bar F the cards advance across the table by successive small movements. At each side of the machine, upon the shaft B, are cranks L L and connecting-rods M M, which give a reciprocating vertical motion to the cross-bar N, which moves in guides in the frame A. To this cross-bar are attached two punches, O O, and two needle-bars, P P, which move up and down with it. The punches are firmly set in the bar N, and move in slides through the bar Q. They are placed over corresponding dies in the table under them, and are for the purpose of punching the holes in the cards through which they are laced together. The needle-bars P turn freely in the cross-bar N, and are held into it by means of the key-plate R, which enters into grooves in their upper ends. They pass through thimbles S in the bar Q, which are provided with a cam-slot, *s*, in which the pin *p*, attached to the needle-bar, slides. This slot makes about a quarter-turn diagonally around the thimble, and returns near the middle of the stroke, the rest being vertical, as shown in Fig. 4. The pin *p*, in following this slot, gives the needle-bar a rotating motion as it rises and falls with the cross-head N.

The needle used is of a peculiar form. It is a crochet-hook, with the point on one side, and to the front under the barb. (See Figs. 3 and 4.). It is made of this form to properly release the thread in the peculiar manner of forming the stitch used in this machine.

T is a guard-plate over the bed of machine, through which the needles and the punches operate. V V are bobbins for holding thread.

The operation of my invention is as follows: The prepared cards are laid in their proper positions upon the spurs *k k*, &c., of the carrying-chains, and are moved forward across the table by the action of the cam D at each revolution of the shaft B. This motion is intermittent, and takes place when the needles and punches are above the cards. At each turn of the cranks L the bar N descends, the punches O make holes in the ends of the cards, and the needle moves down through a hole previously formed, and hooks over the thread, which is held upon bobbins under the table. As the bar N rises the punches are withdrawn, and the needle is drawn upward, bringing a

loop of the thread through the hole and the previous loop, which has remained around the needle. The chains then move one notch of the ratchet H, and the bar N again descends. The needle passes down through the loop it has brought up, and takes another stitch. In ascending and descending the needle turns its barb to the rear by means of the cam-slot *s* in the thimble S just as it is passing through the line of stitching. By this operation it avoids hooking the previous loop, and allows it to throw off and remain upon the new loop drawn up.

The inclined side and rear of the hook is to place the point in such a position that it will enter the new loop and cause it to pass over the shank of the needle as it is turned to one side and commences to descend, and to assist in catching the thread below to form another loop.

The stitch formed is a crochet-stitch, and runs across the ends of the cards continuously, thereby attaching them together in one chain, in which form they are used in the looms.

What I claim as my invention is—

1. The combination, with the eccentric pointed hook-needle, of operating mechanism, substantially as described, whereby a vertical reciprocating and rotary motion is imparted to the said needle, in the manner and for the purpose set forth.

2. The combination of the vertically-moving bar N with the rotating needle-bars and the fixed punches, substantially as herein described.

3. The combination of the intermittently-progressing carrying mechanism with the punch O and rotating hooked needle P, for lacing together loom-cards, substantially as herein described.

4. The combination of the shaft B, the cam D, the rod F, the wheels H I, the connecting-rods M, and the bar N, for giving simultaneous and proper motions to the carrying-chain, the punches, and the needles, substantially in the manner described.

5. An eccentric pointed hook-needle, having its back and side inclined from its point toward its tang, whereby the point is formed on the same side of its axis as its hook.

LYMAN A. UPSON.

Witnesses:

THEO. G. ELLIS,

WENDELL R. CURTIS.