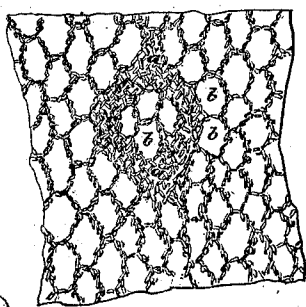
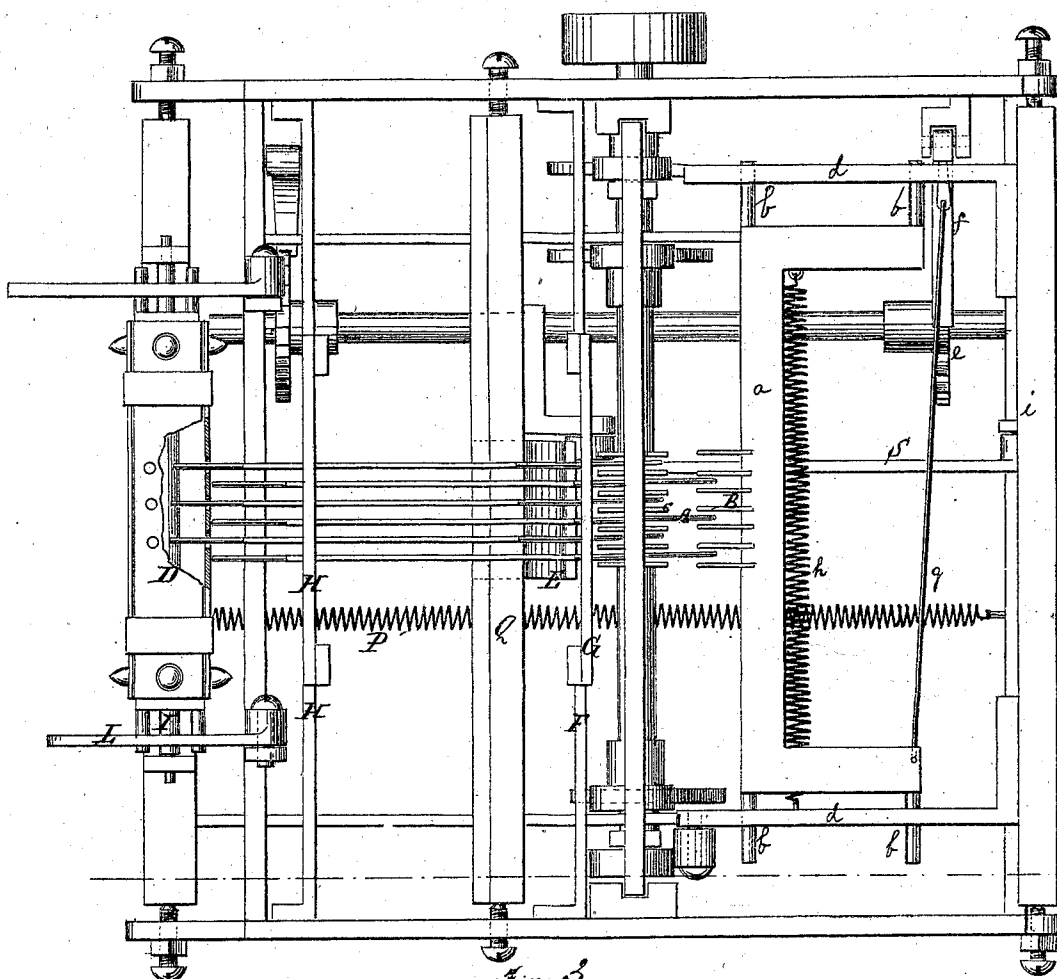


H. Williamson's Lace Machine.

No. 120,474.

Patented Oct. 31, 1871.

Fig: 1.



Witnesses:

Witnesses:
Chas. Nida
L. S. Mabee

Inventor:

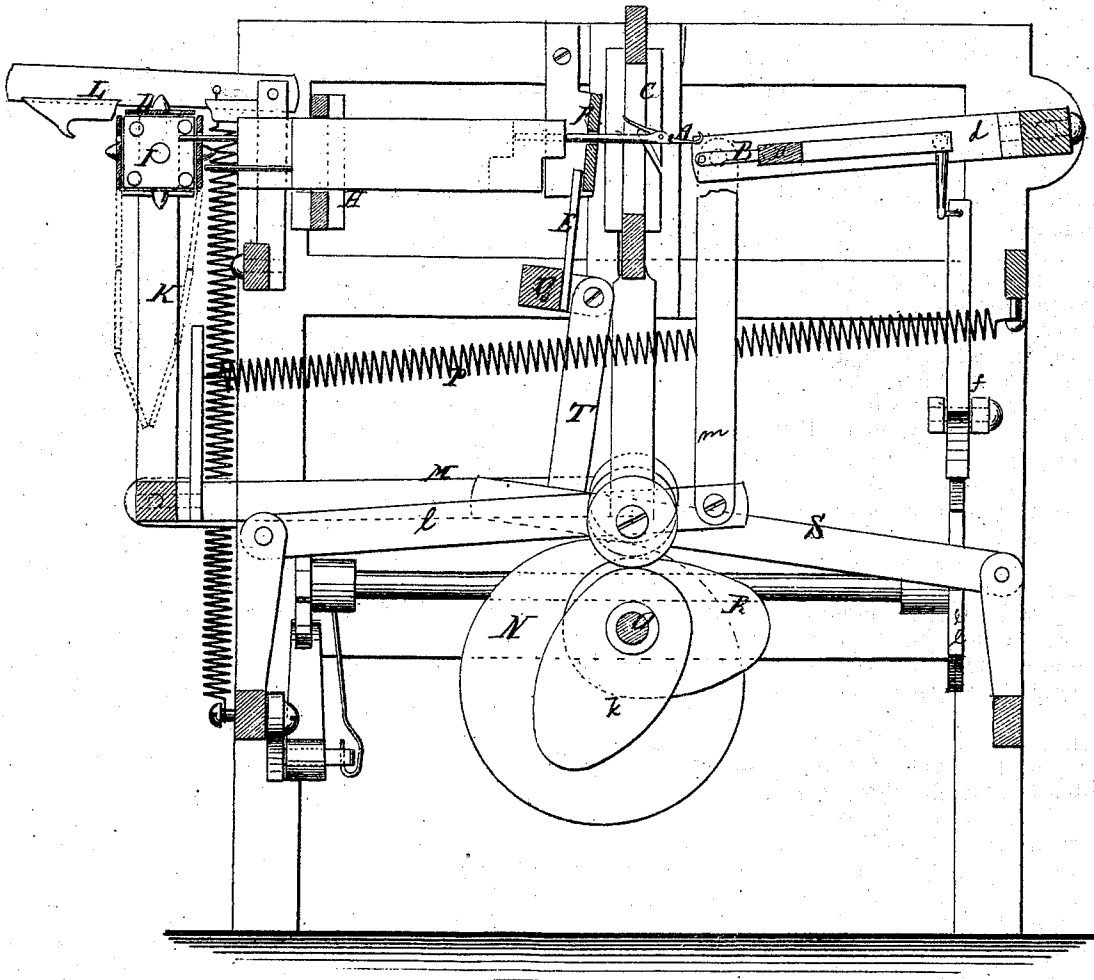
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H. Williamson's Lace Machine.

No. 120,474.

Patented Oct. 31, 1871.

Fig. 2.



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UNITED STATES PATENT OFFICE.

HENRY WILLIAMSON, OF WILLIAMSBURG, NEW YORK.

IMPROVEMENT IN LACE-KNITTING MACHINES.

Specification forming part of Letters Patent No. 120,474, dated October 31, 1871.

To all whom it may concern:

Be it known that I, HENRY WILLIAMSON, of Williamsburg, in the county of Kings and State of New York, have invented a new and Improved Lace-Machine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming a part of this specification.

This invention relates to improvements in machines for knitting or crocheting lace; and it consists in an arrangement of the hooks or needles so as to be capable of working independently of each other, and operated by Jacquard-patterns, cards, or cylinders, with the thread-guides all mounted on one bar. The object is to provide machines wherein the patterns can be varied to a great extent.

Figure 1 is a plan view of a machine arranged according to my improvements. Fig. 2 is a sectional elevation of the same taken on the line *x x* of Fig. 1; and Fig. 3 is a plan view of a piece of crocheted lace, showing the character of the goods which I propose to make with my improved machine.

A represents the needles, which are of the ordinary kind, but which I propose to arrange independently of each other, to enable me to work them according to any pattern which I choose to make, by means of a pattern-cylinder with pattern-cards D, or any of the well-known equivalents thereof. The needles are arranged in the notched-bar F, behind the sinkers C, for being supported at the front ends, on the top of which bar is a cap, G, for confining the needles in the notches. Near the rear ends they are supported between the notched-bars H, one above and the other below them, but they may be arranged in any approved way. They are moved forward for taking the yarn by the pattern-cards, worked by the rotating card-carrier I, which is mounted in the vibrating supports K, and shifted by a pawl, L, against which it is forced by a lever, M, and cam N, the latter being on the cam-shaft O, and it is moved forward by the spring P; the whole being arranged as such devices commonly are for the purpose. The needles are moved backward by a pusher, E, attached to the vibrating shaft Q, which is oscillated by the cam R, lever S, and connecting-bar T. B represents the thread-guides, which are mounted in the bar *a* supported by the rods *b*, and in the oscillating arms *d*, so that it

may slide forward and backward endwise, being moved in one direction by the tappet-wheel *e*, lever *f*, and connecting-rod *g*, and in the other by the spring *h*. The arms *d* are mounted on the oscillating shaft *i*, and are lifted by the cam *k*, lever *l*, and the connecting-rod *m*. When the needles come forward these guides are raised up between them, and each one moved across its needle by the tappet-wheel, and then let fall by the cam *k* to engage the yarn upon the hooks; and after falling down again between the needles the spring returns them to the place of beginning. The needles having the yarn then move back from the stitches and cast them off in the usual way.

Now, this arrangement and operation of the guides are the same as in other crocheting machines, except that, in this case, the lateral movement of the guides is limited to crossing one or at most two needles, and all the guides used are mounted on one bar, *a*, while in the common arrangement the guides are divided among a number of bars, and the bars have a greater range of lateral movement, and are worked by a Jacquard mechanism to form the pattern. Commonly, for making figured goods, there are from three to twelve of these bars, one above another, each having an equal number of guides arranged in the order of the said bars—that is, beginning at one end, one bar (say the top one) will have the first guide, the second bar from the top the second guide, and so on, repeating for every sixth or twelfth guide according to whether there be six or twelve of the bars; or they are sometimes arranged by twos or threes in each bar, but in the same order, and the said bars (as before stated) are worked laterally by a Jacquard to carry the thread across the hooks, according to the pattern to be made, one bar being moved laterally at each forward movement of the needle while the others are allowed to rise and fall between the same needles without supplying thread to them.

This arrangement is necessary to work out the patterns when the needles are all connected together, as in all the machines of this character heretofore made; and it has two important objections, which I seek by my improvement to avoid, viz.: first, it necessitates the use of a large number of guide-bars and the supports and adjuncts thereof, which are objectionable and expensive; and second, with all the guide-bars that can be

used, practically, it is impossible to knit wide patterns; for there must necessarily be a repetition of the patterns as often as the order of the guides is repeated on the bars; with one bar only plain goods can be made. These objections are completely overcome by shifting the Jacquard to the needles arranged to work independently of each other, in connection with only one guide-bar, operating as described, and carrying all the guides, by which the single pattern may be as wide as the fabric knitted, with no repetition, as will be clearly understood, for the number of needles receiving the yarn at each movement, and the order of their receiving it, will be governed entirely by the pattern-cards or cylinders. With my arrangement, when all the needles are worked together the lace formed will be closely knitted, as shown by the part *a* of Fig. 3; but some of the needles not being pushed by the pat-

tern-cards the gaps or openings *b* will be made, which gaps or openings will be terminated when the needles previously left back are moved forward again. The order of these openings will be according to the pattern, as will be understood.

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

The lace-knitting machine herein described, having its thread-guides all arranged on a single guide-bar, working uniformly with each movement of the needles, and the needles worked independently of each other by Jacquard patterns for forming the pattern of the goods, all substantially as specified.

HENRY WILLIAMSON.

Witnesses:

GEO. W. MABEE,
T. B. MOSHER.

(89)