

(No Model.)

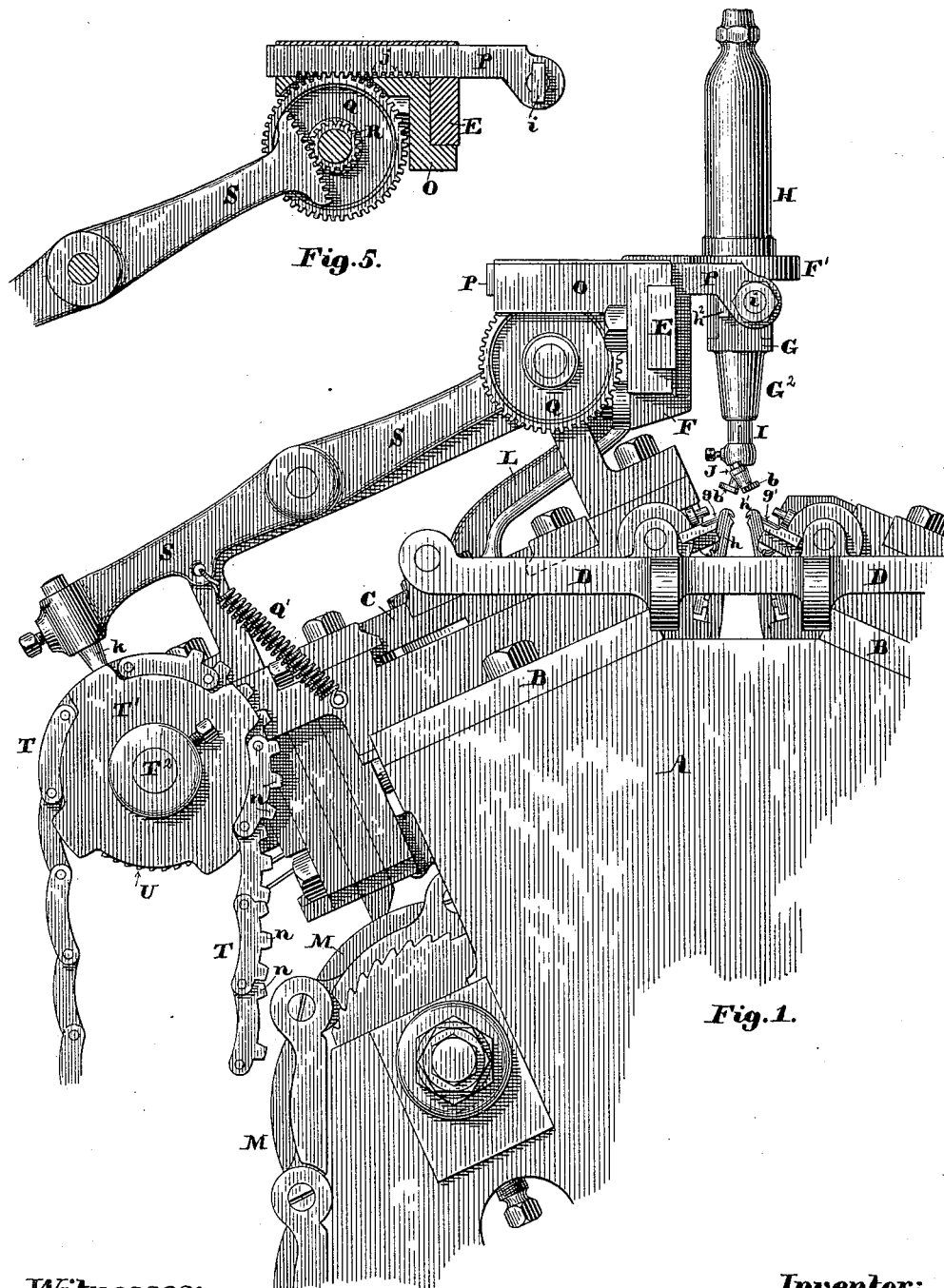
4 Sheets—Sheet 1.

W. ESTY.

YARN GUIDING MECHANISM FOR STRAIGHT KNITTING MACHINES.

No. 386,117.

Patented July 17, 1888.



Witnesses:
Walter E. Lombard.
William H. Barry.

Inventor:
William Esty,
by N. C. Lombard,
Attorney.

(No Model.)

4 Sheets—Sheet 2.

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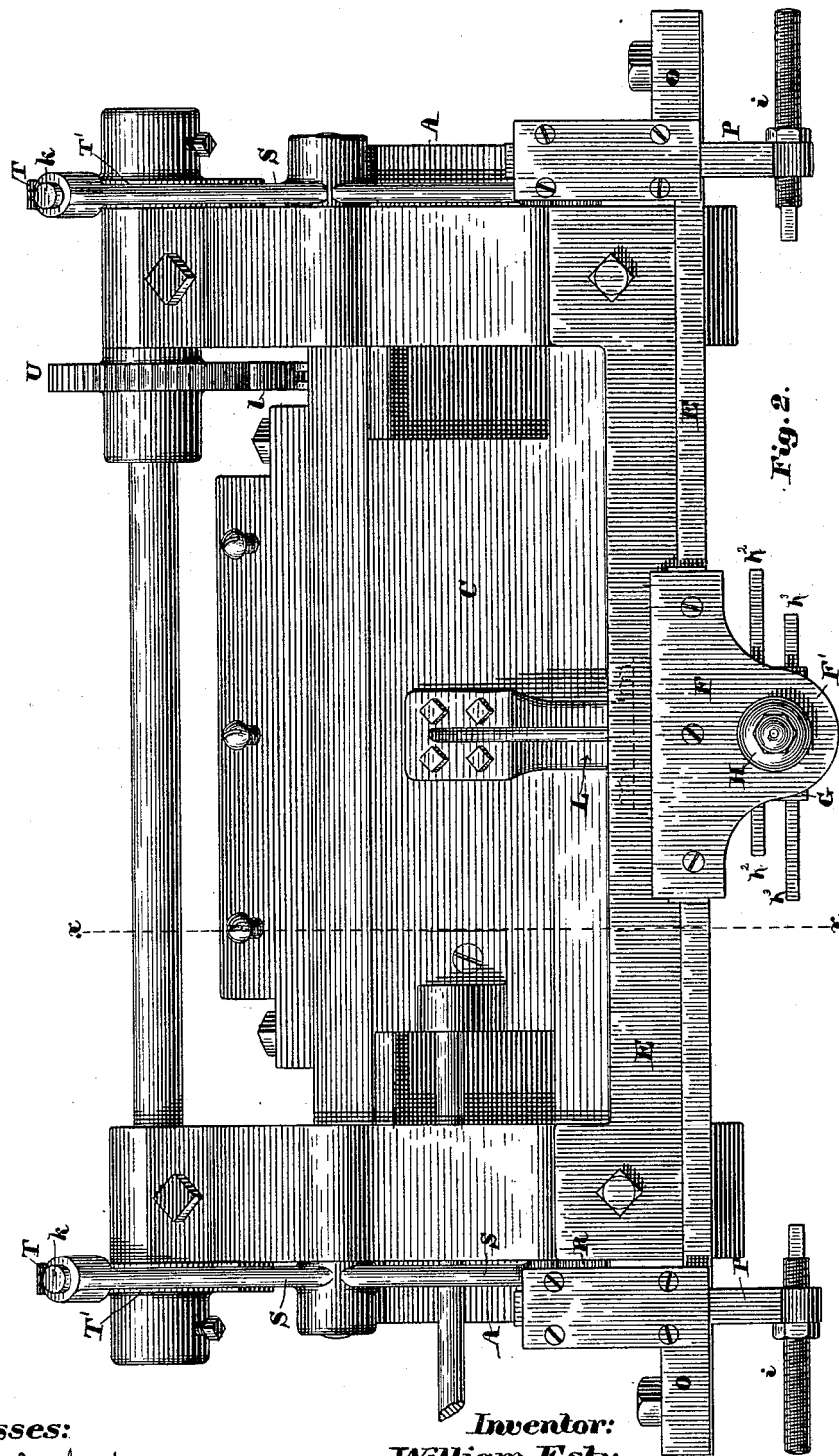


Fig. 2.

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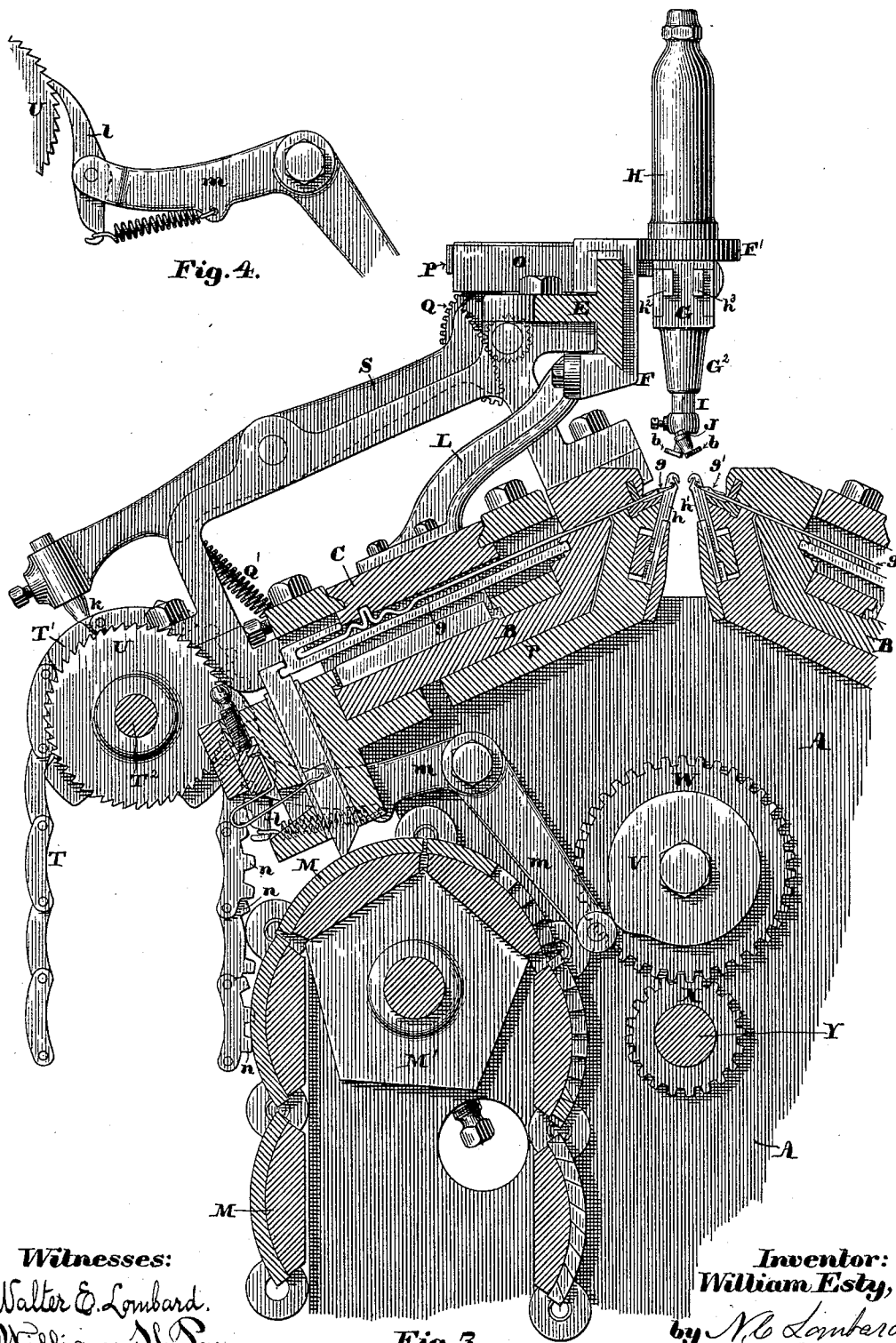
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Fig. 3.

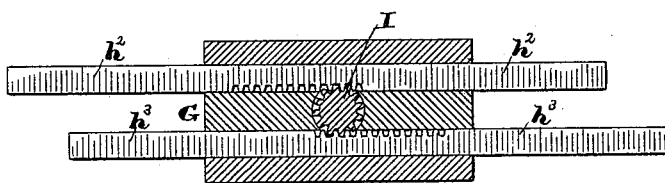
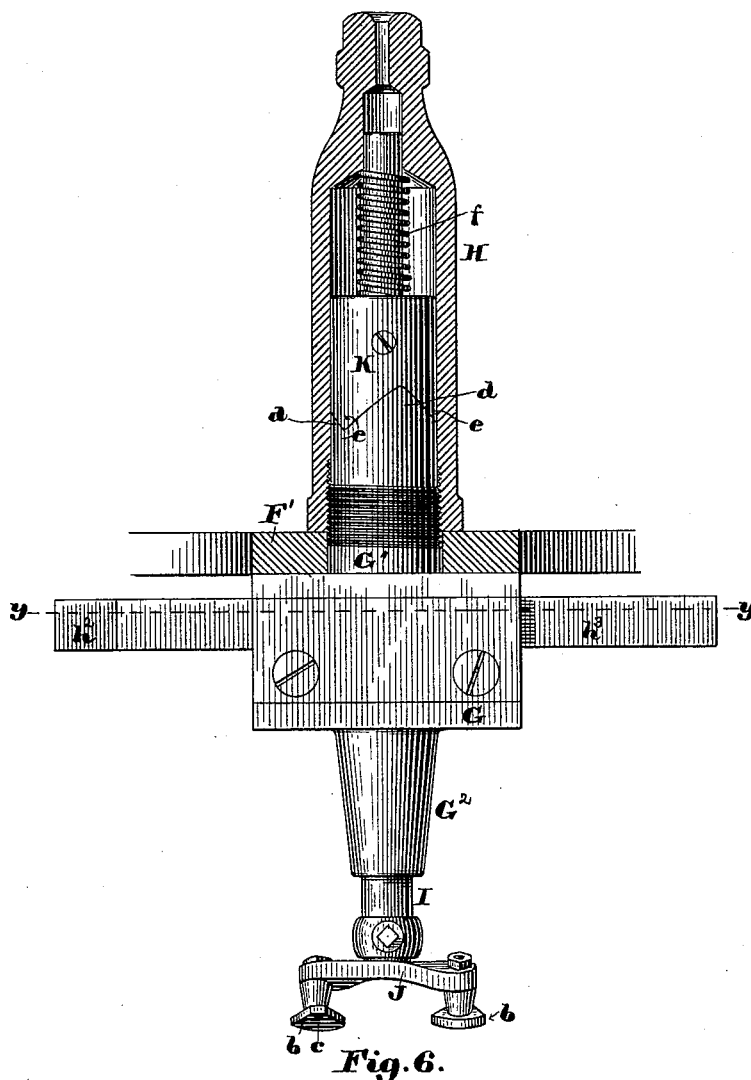
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UNITED STATES PATENT OFFICE.

WILLIAM ESTY, OF LACONIA, NEW HAMPSHIRE.

YARN-GUIDING MECHANISM FOR STRAIGHT-KNITTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 386,117, dated July 17, 1888.

Application filed September 10, 1887. Serial No. 249,335. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ESTY, of Laconia, in the county of Belknap and State of New Hampshire, have invented certain new and useful Improvements in Yarn-Guiding Mechanism for Straight-Knitting Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

My present invention relates to that class of knitting-machines which have two sets of needles arranged in parallel rows opposed to each other, or with the hooked ends of the needles in each row toward the needles in the other row, and especially to the yarn-carrier and to the means employed for operating the same, and is an improvement upon the inventions described in Letters Patent Nos. 371,563 and 371,564, granted to me October 18, 1887; and it consists in certain novel features of construction, arrangement, and combination of parts, which will be readily understood by reference to the description of the drawings and to the claims to be hereinafter given, and in which my invention will be particularly pointed out.

Figure 1 of the drawings is an end elevation of so much of a machine embodying my invention as is necessary to a clear understanding of the same. Fig. 2 is a partial plan of the same parts, the needles and sinkers being removed. Fig. 3 is a vertical section of the same on line *x x* on Fig. 2. Fig. 4 is an elevation of a portion of the ratchet-wheel, the pawl, and its lever for operating the endless cam-chain for adjusting the yarn-carrier stops. Fig. 5 is an elevation of one of said stops, its bar, and the gearing for moving the same. Fig. 6 is a vertical section through the cap of the yarn-carrier spindle, and showing the yarn-carrier locking device in elevation; and Fig. 7 is a horizontal section on line *y y* on Fig. 6. Figs. 6 and 7 are drawn to an enlarged scale.

In the drawings, A A are the end frames of the head of the machine.

B is the needle-bed.

C is the needle-reciprocating cam-bars, connected together by the yoke or bar D, to which power is applied to reciprocate said cam-bars through the medium of a lever and crank. (Not shown.)

E is a bar mounted in a fixed position above the rear needle-bed and parallel thereto, and having mounted thereon so as to be movable endwise thereof the yarn-carrier carriage F, provided with the horizontally-projecting shelf F', in an opening in which is inserted from the bottom the cylindrical hub G', projecting upward from the block G and secured in position by the cap or casing H, screwed thereto, as shown in Fig. 6. The block G is also provided with the downwardly-projecting hub G², through which hub, the block G, and the hub G' extends a cylindrical bearing, in which is mounted a spindle, I, in the lower end of which is secured the shank of the yarn-carrier J, in each end of which is secured one of the plates b, each provided with a yarn-guiding eye, c, as shown in Fig. 6.

The upper end of the hub G' has formed thereon a cam-surface composed of two projecting points, *d d*, and two depressions, *e e*, and the spindle I has secured thereon, above said hub, a collar, K, the lower end of which has formed thereon a cam-surface the counterpart of the upper end of the hub G', and a spring, *f*, surrounds said spindle between said collar and the capped end of the casing H and serves to press said collar into engagement with the hub G'.

The axis of the yarn-carrier coincides with or is in the vertical plane which lies equidistant between the two sets of needles *g* and *g'* and the two sets of fixed sinkers or work-holders *h* and *h'*.

The spindle I has formed thereon a pinion, with which the toothed racks *h²* and *h³*, arranged in bearings in the block G—one upon each side of said pinion—engage, and as either of said racks is moved endwise a semi-rotation is imparted to the yarn-carrier spindle and the positions of the yarn-guiding eyes are reversed.

The yarn-carrier carriage F is connected by the stand L to the rear needle-reciprocating cam-bar C, so as to be reciprocated thereby; or it may be disconnected from said cam-bar and be reciprocated in any other well-known manner, but in unison with said cam-bar.

M is one of the pattern-chains for throwing into and out of action the needles, and has an intermittent movement imparted thereto about

the axis of the supporting-drum M', in any well-known manner. Two stands, O, are secured upon the bar E, one at each end, and in bearings formed therein are mounted two bars, P, each having adjustably secured in one end thereof a stop-pin, *i*. So far the devices shown in this case are substantially the same as shown and described in Letters Patent No. 371,564, before referred to, and in Letters Patent No. 371,562, granted to me October 18, 1887.

The object of my present invention is to automatically adjust the stop-pins *i*, so that each of said stops shall act upon the same rack-bar, h^2 or h^3 , when knitting tubular work, so that a single stop-pin, *i*, at either end of the machine shall alternately act upon both rack-bars h^2 and h^3 when it is desired to knit a single flat web or section, as the heel or toe bulge of a stocking, or so that neither stop will act upon either rack-bar, as when it is desired to knit two flat webs or sections of fabric, one upon each set of needles. To this end I form in the under side of each of the bars P a series of rack-teeth, *j*, with which the teeth of the spur gear-wheel Q engage to impart motion thereto when rotated.

The hub of the gear Q has secured thereon the pinion B, with which the segmental gear on the front end of the lever S engages, while the opposite end of said lever has set in its under side a tooth, *k*, which rests upon an endless chain, T, mounted upon the chain-wheel T', firmly secured upon the shaft T², and to which an intermittent movement is imparted by means of the ratchet-wheel U, the pawl *l*, the lever *m*, the cam V, the spur gear-wheel W, and the pinion X, mounted upon the driving-shaft Y.

The chains T are formed of links having projecting teeth *n*, which serve as cams to act upon the teeth *k* of the levers S to raise the rear ends thereof, and thus cause a partial rotation of the pinion R and gear-wheel Q, and a consequent endwise movement of the stop-bars P, said levers S being moved in the opposite direction by the springs Q'.

The chains T are both composed of a series of links corresponding in length and number, but of various patterns, some having one, some two, some three, and some no cam projections, *n*, and said projections are arranged upon each chain, and the two chains are set upon their chain-wheels in different positions, according to the desired movements to be given to the stop-bars P at the two ends of the machine.

It is obvious that pattern-cam wheels may be used instead of the chains T by making them of considerable size, and therefore I do not wish to be limited in my claims to a chain-cam.

Any other well-known locking device may be used for locking the yarn-carrier at the conclusion of each semi-rotation thereof in connection with my automatically-movable reversing stops without affecting the principles of my invention.

The rack and pinion constitute a reversing mechanism for the yarn-carrier, and their use is preferred; but the employment of any well-known equivalents for the rack and pinion would be strictly within the scope of my invention.

A reciprocating and reversible yarn-carrier, a single rack, and movable stops for operating the same are described and claimed in Letters Patent No. 371,503, before referred to, and the same parts, with an additional rack for revolving the yarn-carrier and a device for locking said carrier, are described and claimed in Letters Patent No. 371,564, hereinbefore referred to, and hence I do not claim in this application anything claimed in said Letters Patent; but

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination, in a knitting-machine, of two straight and parallel rows of reciprocating needles, a reciprocating yarn-carrier having two yarn-guiding eyes and constructed and arranged to be semi-rotated or have its ends reversed, and thereby transfer each yarn carried thereby from one row of needles to the opposite row of needles at each end of its traverse, the reversing mechanism having provision for acting upon said yarn-carrier to reverse it, adjustable stops for controlling the operation of the said reversing mechanism, pattern-cams to control the position of the said stops to automatically effect the reversal of the yarn-carrier at predetermined times, and mechanism, substantially as described, connecting said adjustable stops and cams.

2. The two parallel rows of needles, means having provision for reciprocating said needles, a reciprocating yarn-carrier having two yarn-guiding eyes arranged upon opposite sides of its axis of revolution, and a rack and pinion for reversing said yarn-carrier, combined with a pair of movable stops, one at each end of the machine, to operate said rack, and pattern-cams to move the said stops into and out of the path of said rack, according as it may be desired to reverse said yarn-carrier to cross each yarn from one set of needles to the other or to deliver the same yarn to the same set of needles for two or more courses in succession.

3. The two parallel rows of needles, means having provision for reciprocating said needles, a reciprocating and reversible yarn-carrier having two yarn-guiding eyes arranged upon opposite sides of its axis of revolution, a pinion, and two rack-bars engaging therewith upon opposite sides for reversing the said yarn-carrier, combined with two movable stops for operating said racks, and pattern-cams for moving said stops from the path of one rack-bar to the path of the other rack-bar, and vice versa, substantially as and for the purposes described.

4. The two parallel rows of needles, means having provision for reciprocating said needles, a reciprocating and reversible yarn-car-

rier having two yarn-guiding eyes arranged
upon opposite sides of its axis of revolution,
the yarn-carrier-reversing mechanism having
provision for acting upon said yarn-carrier to
5 reverse the same, and the locking mechanism
having provision for retaining the said yarn-
carrier in position at the conclusion of each
semi-rotation thereof, combined with a pair of
movable stops arranged one at each end of the
10 traverse of said yarn-carrier, and pattern-cams
for moving the said stops into position to op-

erate said reversing mechanism or to prevent
the operation of said reversing mechanism, ac-
cording to the work to be done.

In testimony whereof I have signed my name 15
to this specification, in the presence of two sub-
scribing witnesses, on this 1st day of Septem-
ber, A. D. 1887.

WILLIAM ESTY.

Witnesses:

N. C. LOMBARD,

WALTER E. LOMBARD.