

J. Hollen.
Circular Knitting Mach
N^o 53,000. *Patented Mar 6, 1866*

Fig. 1.

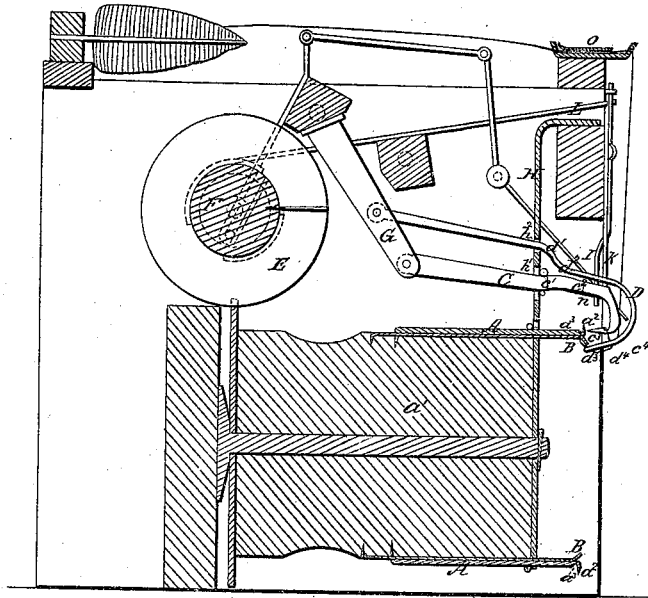


Fig. 2.

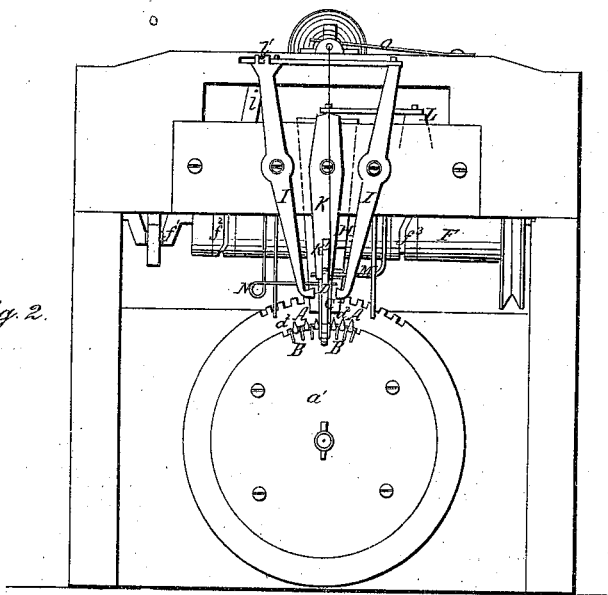
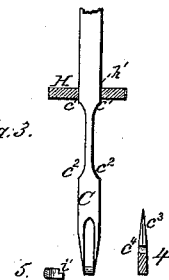


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOSEPH HOLLEN, OF BLAIR COUNTY, PENNSYLVANIA.

IMPROVEMENT IN ROTARY KNITTING-MACHINES.

Specification forming part of Letters Patent No. 53,000, dated March 6, 1866.

To all whom it may concern:

Be it known that I, JOSEPH HOLLEN, of the county of Blair, in the State of Pennsylvania, have invented a new and useful Improvement in Rotary Knitting-Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical longitudinal section, and Fig. 2 a front elevation, of a rotary knitting-machine having my said improvement applied thereto; Figs. 3 and 4, full-sized views of the respective upper sides of the front end and point of the stitch-lifting hook; and Fig. 5, a full-sized view of the upper side of the lower end of one of the hook-guides, like letters of reference indicating the same parts when in the different figures.

My said improvement relates, generally, to that class of knitting-machines which are intended for knitting stockings and bagging, and particularly to the rotary knitting-machine for certain improvements in which Letters Patent were granted to me, dated September 2, 1862, and has for its object greater simplicity in the construction and mode of operation, and therefore a lesser liability to get out of order, and being more suitable for family use.

My invention consists, substantially as hereinafter described and specified, in the peculiar form and construction of the needles; in the peculiar construction, arrangement, and mode of operation of the stitch-lifting hook, slotted stay, and vibrating arms; and in the construction, arrangement, and mode of operation of the thread-carrier, in combination with the needles, fabric-stays, and stitch-lifter.

In the drawings, A A are the needles; B B, the fabric-stays; C, the stitch-lifting hook; D, the thread-carrier; H, the slotted stay, and I I the vibrating arms.

Construction: The needles A consist of straight pieces of steel or iron wire secured parallel with each other around the carrying-cylinder a' , in the usual manner, each needle having its extreme outer end flattened, pointed, and bent so as to produce a short hook, a^2 , and a shoulder, a^3 , thereat, and so, also, that when applied to the said cylinder a' the said hooks will be radial, as seen in Figs. 1 and 2,

The fabric-stays B each consist of a short piece of slender steel or iron wire secured to the cylinder a' , so as to be parallel with and between the needles, and having its outer or front end bent toward the center of the front end of the cylinder a' at an angle of about forty-five degrees, as shown in Figs. 1 and 2. The cylinder a' is rotated by means of a "snail," E, on the driving-shaft F, in the usual manner. The stitch-lifting hook C consists of a piece of steel of rectangular cross-section, which is reduced to about one-third of its thickness between the points c' and c^2 , (see Fig. 3,) and has its outer end tapered, bent downward and inward, and its extreme end brought to a point, c^3 , having a triangular cross-section and a notch, c^4 , in its upper edge, adapted in size to receive and retain the thread or yarn of a stitch during the operation of the hook in lifting the stitch off of the needle. The inner end of the hook-piece C is pivoted to an arm, G, which is vibrated by means of a crank, f' , on the shaft of the driving-cylinder F, so as to give to the hook C an alternating motion backward and forward, the body of the hook C sliding in a slot, h' , which is of the same width as the thicker parts of the said body, and made in the stay-piece H, which is fixed to the frame of the machine. On the front of the machine are the two connected vibrating arms I I, one being arranged on each side of the forward end of the stitch-lifting hook C for the purpose of guiding it. The lower end of each arm I is bent inward, so that it will abut against the side of the hook C' in guiding the latter, and is at this part recessed vertically on its inner side at i , (see Fig. 5,) so that it will also compel the hook C to take a downward direction as it comes forward. These arms I I are operated by means of a vibrating bar, V, (see Fig. 2,) which is itself vibrated horizontally by means of a cam-groove, f^2 , in the operating-cylinder F, so as to bring the arms which are coupled together alternately in contact with the sides of the hook C during the time the thin part (from c' to c^2) of the hook C is passing in the slot of the stay-piece H, and thus cause the front end of the said hook to move from right to left, and vice versa, during its forward and backward motion. The thread-carrier D is also pivoted to the arm G, and therefore moves simultaneously with the hook-bar C. It also passes loosely

through a hole, h^2 , in the stay-piece H. It is bent at d' and d^2 so as to cause its outer end to rise and fall gradually as it is moved backward and forward in the slot h^2 . Its outer end is bent so as to pass down over and clear of the outer end of the stitch-lifting hook C. It has also suitable holes d^3 d^4 in its outer end for receiving the yarn or thread. The latter is represented by the faint or red lines in Figs. 1 and 2. Its lateral motions are governed by means of the vibrating arm K through a slot, K' , in which it is confined laterally. The bar K is operated by means of another bar, L, which is vibrated horizontally by means of a cam-groove, f^3 , in the operating-cylinder F. The bent wire M keeps the stitch-lifter C from rising too high, and the wire spring N keeps it from falling too low when in motion. The cam-grooves f^2 f^3 in the cylinder F are each formed so as to give the same vibrations to their respective bars L and L' , whether the said cylinder be turned or rotated either forward or backward, and are also arranged in their relation to the snail E so as to correspond with the rotary motions of the cylinder a' .

Operation: The thread or yarn having been passed from the usual spool or cop beneath the usual tension-spring O, and thence downward and through the holes d^4 d^3 of the carrier D, and looped or passed over the needles and under the fabric-holders alternately, or attached to one of the stitches which may have been previously formed on them, and motion then given to the driving-cylinder F, the needle-cylinder a' rotates so as to bring a needle directly opposite to the point of the lifting-hook C, when the said point of the hook approaches and enters the stitch on the needle, and the thinner portions c' c^2 of the body of the hook is drawn backward into the slot h' of the stay H, and one of the arms I then comes into contact with the side of the hook and pushes it sufficiently to one side to cause its point c^3 to pass to one side of the needle. From thence the hook passes upward as the lifter C continues to be drawn backward until the said stitch is caught in the notch c^4 thereof and carried backward from the point of the needle, when the thread-carrier D, having also been drawn backward and raised upward by its bent portion d' to d^2 , moving in the hole h^2 of the stay H, is pushed laterally by the arm K, so as to carry the thread, which has previously been passed by it under one of the adjacent fabric-holders B, across and behind the

point of the needle A, and then moving forward the thread is caught by the needle, and the lifting-hook C, also coming forward, carries its loop over the point of the needle, and then, coming in contact with the recess i' in the other arm I, is forced laterally thereby, and also moves downward, causing it to release the loop or stitch, when the said arm I then recedes from the hook C and allows it to be brought into its original position by the positive motion produced by the slot h' and the thicker portion of the said lifter, the carrier D also attaining its original position at the same time by the motion of its bent portion d' to d^2 in the hole h^2 and the return of the slotted arm K to its original vertical position. In this manner the machine continues to knit around the fabric in either direction, and consequently, by changing the direction of the motion of the rotating driving-cylinder F, the direction of the course in knitting will be varied accordingly, as is required in knitting for the heel of a stocking, without requiring any adjustment of the thread-carrier or other parts of the machine.

It will be readily seen that this machine is much more simple of construction and operation than many rotary knitters heretofore used, and that it will therefore be less likely to get out of order in use, and be altogether more effective and better suited for family use.

Having thus fully described my improvement in rotary knitting-machines, what I claim as new therein of my invention, and desire to secure by Letters Patent, is—

1. The needle A, the same consisting of a straight piece of wire having one end flattened, pointed, and bent, so as to produce the hook a^2 and shoulder a^3 thereat, as set forth in the drawings, the said needle being also secured rigidly in the cylinder which carries it, so that its said hook a^2 shall be radial in its position thereon, as described and specified.

2. The stitch-lifting hook C, the slotted stay H, and the vibrating arms I, the same being constructed and arranged to operate together as and for the purposes described.

3. The carrier D, when constructed as described and arranged to operate in combination with the needles A, fabric-stays B, and stitch-lifter C, as described and set forth.

JOSEPH HOLLEN.

Witnesses:

JAMES P. GLASGOW,
WM. H. EBAUGH.