N. W. WESTCOTT.

Weft-Thread Knitting-Machine.

No. 166,831. Patented Aug. 17, 1875.

Fig. 1.

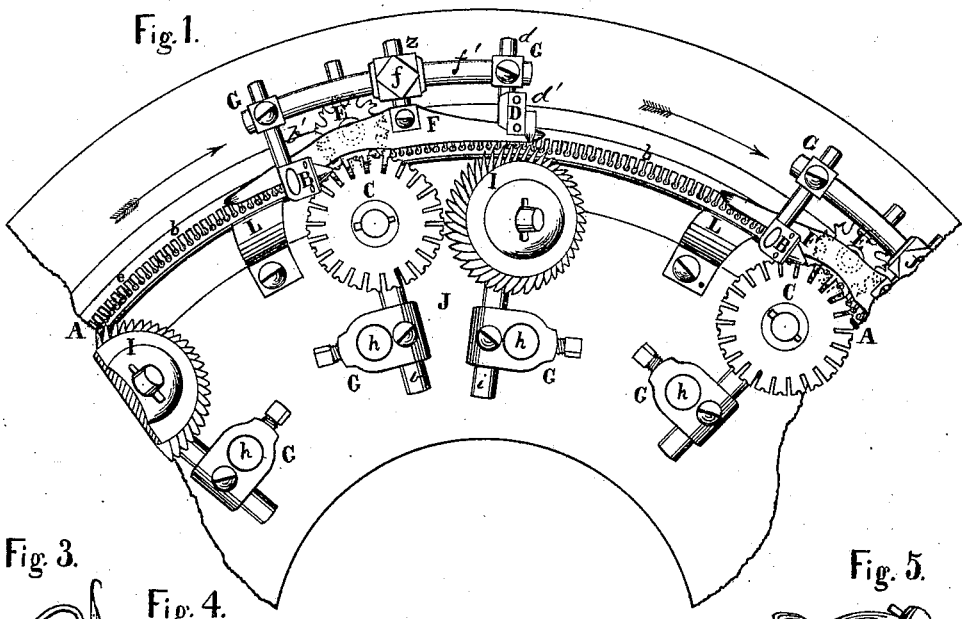


Fig. 3.

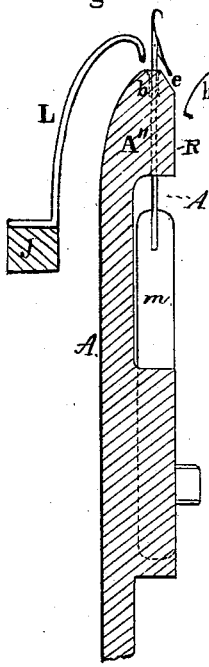


Fig. 4.

Fig. 2.

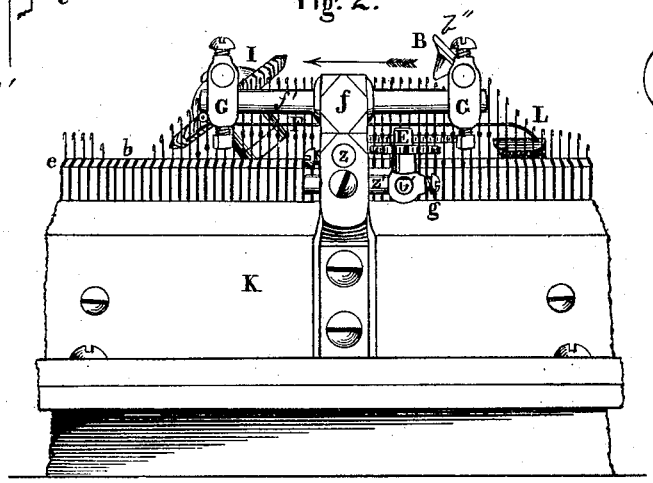


Fig. 5.

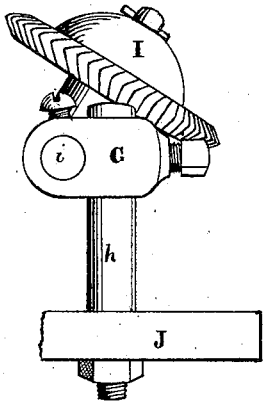


Fig. 6.

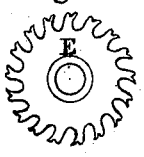
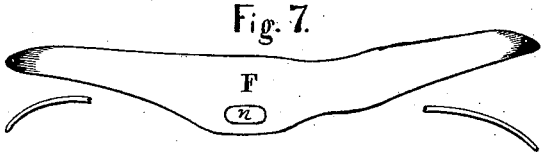


Fig. 7.



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IMPROVEMENT IN WEFT-THREAD KNITTING-MACHINES.

Specification forming part of Letters Patent No. **166,831**, dated August 17, 1875; application filed October 15, 1873.

To all whom it may concern:

Be it known that I, NATHANIEL W. WESTCOTT, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Weft-Thread Knitting-Looms, of which the following is a full, clear, and exact description, which will enable others skilled in the art to make and use my invention, reference being had to the accompanying drawings making part of this specification.

This invention has relation to circular latch-needle knitting-machines; and it consists in the construction and novel arrangement, in connection with a series of rising-and-falling needles, of the devices hereinafter described, whereby the weft-thread may be introduced into the knit fabric.

In the accompanying drawings, Figure 1 represents a plan or top view of a section of one head, embodying my improvements. Fig. 2 is a front elevation of the upper portion of one head, showing the outside post, with the connections or parts arranged thereon. Figs. 3, 4, 5, 6, and 7 are details.

The object of this invention is to provide, in a circular latch-needle knitting-machine, means whereby a weft or filling thread may be interknit into the fabric with the loops or stitches, with little or no danger of the breaking or raveling of the yarn or thread or of the dropping of stitches.

The letter A in the accompanying drawings indicates the rotating needle-carrying cylinder, and K the body of the frame, having secured to it, externally, a post, *f*, perforated or otherwise provided with bearings at its middle portion for the adjustable shanks *z* and *z'*, and at its upper end with a curved cross-head, *f'*, for the adjustable blocks G, which carry the adjustable shanks *b'* and *d* of the delivery-trumpets, hereinafter described. The rotating cylinder A is recessed next the inner wall of the cylinder K, in which the cam-groove, which effects the rise and fall of the needles, is located, as shown at A', Fig. 3 of the drawings. Below this recess the body is grooved radially to the depth of, and for the reception of, the shanks *m* of the needles. Above the recess the overhanging annular rib A'' is also grooved radially, thereby providing a partition between each needle and those which are adjacent, and a space in which the needle is movable outward from its vertical bearing, when pressed in this direction by a suitable device. At their upper and outer corners the partitions R, between the needles, are beveled, as shown at *e* on the drawings, to prevent the abrupt striking of the descending ends of the latches. At the upper part of each needle-space in said rib A'' that portion which surrounds the needle, when in the ordinary vertical or undeflected position, is enlarged for a distance downward, about equal to the length of the needle-latch, forming a shallow pocket, *b*, into which the yarn or thread can be drawn without damage. The safety of the thread is still further provided for by countersinking the mouth of this pocket, as shown in Fig. 3 of the drawings. In consequence of the shallowness of said pockets, and their location about the needle only when in the upright or undeflected position, they do not allow play to the needles when deflected, in which condition they are required to be held in a positive manner between the walls R of the narrow grooves.

For the purpose of forming a path or passage between the needles for the reception of the filling or weft thread as it passes from the delivery-trumpet, two-toothed wheels are employed. The larger of these wheels, designated by the letter C, is arranged on the inside of the circle of needles, and serves to deflect each alternate needle outward in its groove by pressing with the notched end of its tooth against the back of said needle. This wheel is seated on a journal-post at the end of an arm, *v*, which is adjustable about its axis, and lengthwise in a box, G, which is adjustable in a similar manner upon an upright post, *h*, which is secured to the inner plate or disk J. Suitable set-screws being provided in connection with these bearings, as shown in the drawings, the wheel C may be adjusted in any position which may be required to suit the character of the work. Opposite this deflecting-wheel C, on the outside of the circle of needles, and at a lower plane, is arranged a smaller wheel, E, which is also toothed, and serves to keep the needles, which are not deflected, in upright position in their bearings. In order that the movement of the

needles which are carried by the notched teeth of the deflecting-wheel may have free radial sweep, the notches between the teeth of the regulating-wheel E are enlarged by making the delivery-wall of each tooth concave. In this manner I insure that the ends of the teeth of the regulating-wheel will have sufficient breadth to engage the front of the needles which remain in the upright position, and that the side walls of said teeth will not be in the way of, or obstruct the rise and sweep of, the alternate needles which are deflected by the wheel C. The regulating-wheel E is mounted upon a bearing which is located at the end of an arm, v', which is adjustable in a box at the end of the adjustable arm z', which is seated in the body of the post f. As the alternate needles are deflected the filling is fed into the channel formed between them and the upright needles from the trumpet B, which is carried at the end of a shank, b', which is adjustable in the box G on the bearing f' at the upper end of the post f. This trumpet is arranged to deliver into the path between the said needles as they are lifted by the cam-rise. Therefore the width of the trumpet-cone is not limited by that of the path between the needles, the trumpet not being required by this arrangement to be located between the needles in said path. Above the trumpet-cone a flange, b'', is provided, forming a part of the trumpet, and having two conical perforations, arranged horizontally with reference to each other, and serving for the passage of two threads, in such a manner that neither will engage with the other while running from the spools or cops to the path between the needles. The bunching or catching of the threads is by this means, in a great measure, avoided, and, on account of the distance of the perforations from the delivery-cone, and the angular relation of the flange-bearing thereto, a valuable uniform tension is effected.

The warp or looping thread-guide D is located in advance of the trumpet B on the forward arm of the head f' of the post f. Its delivery-cone is arranged radially and horizontally, and at the lower end of an angular arm, d', which is provided with two conical guiding-perforations for the passage of the thread. This angular arm is supported by a shank, d, which is adjustable in the adjustable box G on the forward arm of the cross-head of the post f, a suitable set-screw being provided to fix the adjustment. The delivery end of the warp-thread trumpet D is adjusted at a proper distance in front of the needles, so that the looping-thread is guided to the outside of said needles as they fall under the operation of the cam-groove, their hooked ends dropping below the upper edge of the rotating cylinder A. F designates an adjustable latch-guard, consisting of a long horizontal plate curved on its inner edge in concave form, to correspond with the convexity of the series of needles, outside of which it is located, and bent downward at its ends to correspond with the rise and descent of said needles. Its length, therefore, is equal to the distance from the rising needles to the falling needles, in advance of the warp-guide B. The object of this guard is to prevent the latches of the needles from flying up when the needles rise through the old loops in forming new loops. The latch-guard is secured to a stem which is adjustable in the post f. The angular relation of the latch-guard to the line of needles can be regulated by means of the clamp-screw, which passes through the slot u and fastens the guard to the stem z. At the part of the guard opposite where the needles are deflected the curve of the inner edge of the guard is formed upon a shorter radius, to correspond with the curvature in the line of needles, effected by the pressure of the dividing-wheel C. The two ends of the guard are gradually bent downward and rounded outward on their inner edges, one end serving to guide the latches of the rising or advancing needles, so that they will pass along the inner edge of said guard, while the other end prevents the receding latches from flying up before passing beyond the warp-guide D. This device, therefore, serves to prevent the latches from flying out of place along the length of the guard, and from being injured in passing in front of or leaving the guard. The latches are also protected from injury by beveling the upper edge of the rotating cylinder, so that there will not be at this point an abrupt shoulder, but an inclined ledge, e, by which the ends of the latches are guided off when they strike the abutment. The weft-thread is carried down on the old loops by the presser-wheel I, which is seated upon a journal at the end of a shank, i, which is made adjustable lengthwise as well as axially in a box, G, which is adjustable in a similar manner on a post, h, at right angles with said shank, secured to the inner disk J of the machine. Suitable set-screws being provided, this presser-wheel can be adjusted accurately and firmly to any required position in relation to the falling heads of the needles at the end of the latch-guard.

At the point where the needles commence to rise in advance of the wheel C, I arrange the presser-guide L, the lower end of which is secured to the edge of the central disk J, and its upper portion bent over and downward in hook form, and rounded at the ends of the hook. The shank of said guide is so formed and located that a sufficient distance will be left for the passage of the fabric between its under surface and the rotating cylinder A, as shown in Fig. 3. By means of this presser-guide the formed loops are prevented from being carried up by the rising needles, which is apt to be the case in closely-knit fabrics where the loops are necessarily drawn tightly around the needles, and which would materially interfere with the successful introduction of the weft-thread.

It is essential in the production of a successfully-working knitting-machine that all its parts should harmonize, or act in perfect con-

cert with each other, and at the same time that they should be firm and positive in their operation. It is the object of the present invention to provide a machine of the character mentioned, whereby, in connection with the positive latch-needle, devices are employed which are capable of being readily brought by hand-adjustment into the delicate harmonious relation required, and at the same of such positive and firm character that their action may be relied upon, when properly adjusted according to the character of the work.

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

1. In a circular latch-needle knitting-machine, the combination, with the latch-needles and their seat-rib A″, of the external regulating-wheel E and the internal dividing-wheel C, constructed and arranged substantially as specified.

2. The combination, with the latch-needles of a knitting-machine and their annular seat-rib A″, of the internal presser-guide L, internal dividing-wheel C, and external latch-guard F, constructed and arranged substantially as specified.

3. The combination, with the latch-needles and cam-rise of a circular weft-thread knitting-machine, of the adjustable latch-guard F, having the form and arrangement herein shown and described.

4. In a circular weft-thread knitting-machine, the combination, with the latch-needles, cam-rise, and internal dividing-wheel C, of the longitudinally and axially adjustable weft-thread guide B, substantially as specified.

5. The annular needle-seat rib A″, grooved at A′, and having the needle-bearings slotted outward through the external wall, in contact with the needles in their lower portions, and enlarged at their upper portions to form thread-pockets *b*, all said parts being constructed and arranged substantially as specified.

6. In a circular weft-thread knitting-machine, the knitting-head, consisting of the wheels E C I, the latch-guard F, and the thread-guides B D, each axially adjustable in two planes at right angles with each other, and longitudinally adjustable in two directions at right angles with each other, the post *f*, and the presser-guide L, all constructed and arranged in connection with the seat-rib A″, the latch-needles, and the frame of the machine, substantially as specified.

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Witnesses:

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