(No Model.) 2 Sheets—Sheet 1.

S. M. LEVY.

LOOPING ATTACHMENT FOR KNITTING MACHINES.

No. 263,923. Patented Sept. 5, 1882.

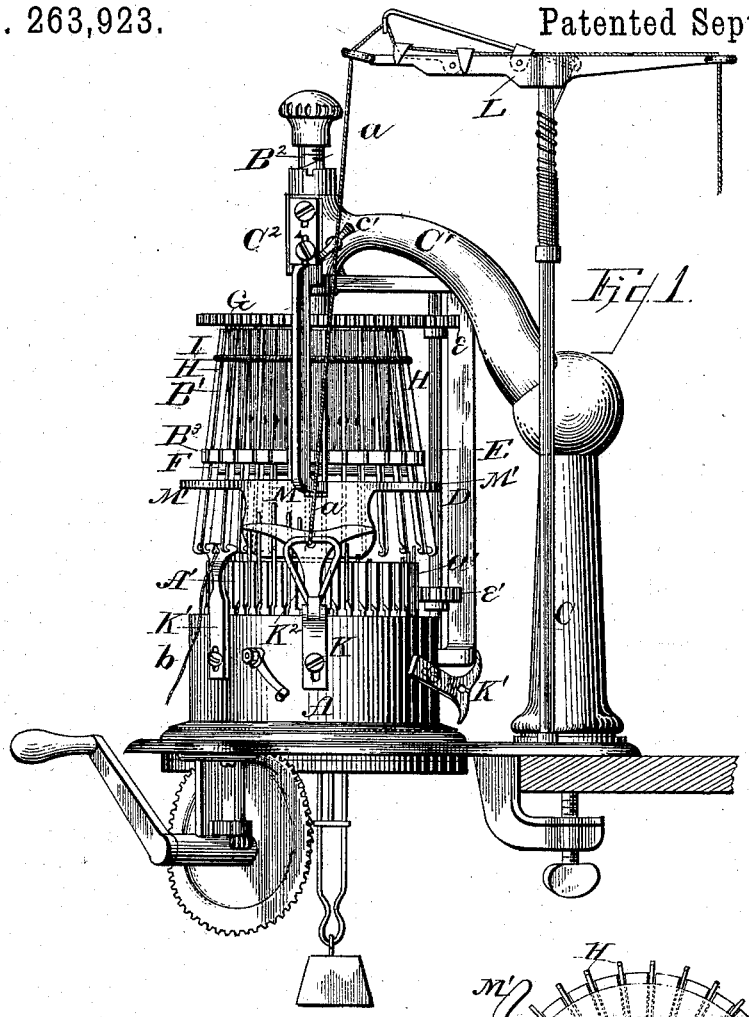

Fig. 1.

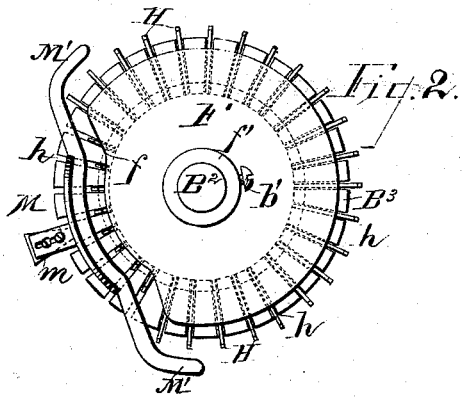

Fig. 2.

Witnesses:
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Wm. M. Hazel.

Inventor:
Sally M. Levy,
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(No Model.) 2 Sheets—Sheet 2.

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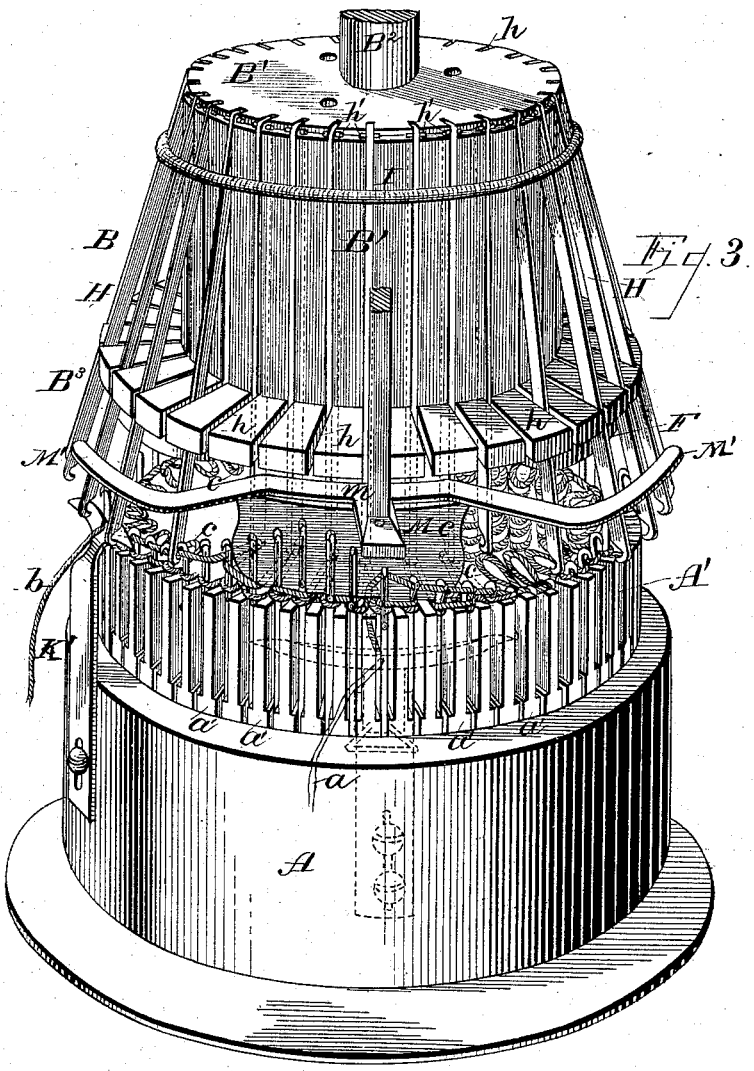

Fig. 3.

Witnesses:
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Wm. M. Hazel

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UNITED STATES PATENT OFFICE.

SALLY M. LEVY, OF MILWAUKEE, WISCONSIN.

LOOPING ATTACHMENT FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 263,923, dated September 5, 1882.

Application filed January 30, 1882. (No model.)

To all whom it may concern:

Be it known that I, SALLY M. LEVY, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Looping Attachments for Knitting-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention consists in an improved looping attachment for circular-knitting machines, as will be more fully set forth hereinafter.

In the drawings, Figure 1 is a view of my entire device in elevation. Fig. 2 is an under side plan view of the looping attachment proper with the gearing removed; and Fig. 3 is a perspective of the needle-cylinder and cam-shell and the looping attachment, (with gearing removed,) drawn to an enlarged scale, and showing the position of the work upon the hooks and needles.

A represents the cam-shell, and A′ the needle-cylinder, of my machine, and these parts may be of any ordinary construction which will permit the needle-cylinder to revolve, while the shell holding the needle-cams remains stationary. This is perhaps best illustrated in the machine patented to C. R. Tuttle April 14, 1874, No. 149,813, and I therefore refer to that patent for a full description of the shell and needle-cylinder shown in the drawings.

B represents my looping attachment, suspended above the needle-cylinder by means of the arm C′, extending from the standard C, and into which the said arm C′ is socketed, so as to be either turned to one side or wholly removed therefrom, as desired. Another standard, D, is cast with or secured to the arm C′, and has bearings above and below for the upright shaft E, carrying pinions *e* and *e′*. The looping attachment B consists essentially of a cylinder, B′, secured to a central sleeve or collar fitting loosely on a rigid shaft, B^2, which passes up through a slot in the end of the arm C′, to which it is secured at the desired height by a set-screw, *c′*. Below this cylinder is a stationary horizontal plate, F, having a cam-edge, *f*, and this plate is cast with a collar, *f′*, on its under side, by means of which it is rigidly secured to the shaft B^2 by a set-screw, *b′*. A horizontal gear, G, is secured rigidly to the top of the cylinder B′, so as to mesh with the cogs of the upper pinion, *e*, on the shaft E, while the lower pinion, *e′*, on said shaft meshes with the ribs or needle-guides *a′* on the needle-cylinder A′. Thus when motion is communicated to the needle-cylinder in the ordinary manner the guides on this cylinder mesh with the pinion *e′* on shaft E and transmit the motion through pinion *e* to the gear G, which latter thus turns the cylinder B′, to which it is rigidly secured, and therefore the needle-cylinder and looping attachment will always of necessity move exactly together—a feature of great importance, as will be explained farther on. The base of the cylinder B′, just above the plate F, is extended outwardly all around, forming a flange, B^3, and this flange, like the cylinder, is provided with grooves *h* at regular intervals, (corresponding in the figures here shown to every second needle-guide or rib *a′* in the needle-cylinder,) and within these grooves are fitted the hooks H, the upper ends of which are provided with pins *h′*, and these pins rest within and upon a shoulder formed on the upper edge of the cylinder B′, as shown in Fig. 3. These hooks are further secured in place by means of an encircling spring, I, the said hooks being slightly grooved at the point where the spring is applied to keep the latter from slipping out of position, while the flange B^3 guards against accidental lateral displacement of these hooks when they are moving out from or in toward the cylinder B′ on the cam-plate F, as hereinafter described. The lower ends of these hooks curve inwardly to support and guide the extra or looping thread *b*, and to form the desired loops *c* therewith, as hereinafter explained.

Secured to the outside of the shell A are my thread-guides and latch-openers K K′ K′, and a tension and take-up device, L, rises from the base of the machine. This tension and take-up device is of ordinary construction—such, for instance, as in the Tuttle patent, hereinbefore named—and supplies a thread, *a*, in the ordinary manner to the central thread-guide, K, for the purpose of knitting the ordinary stocking-stitch, requiring no special description. The guide K is adjustable vertically by means of slot and set-screw, and receives the yarn or

thread *a* through a slit in the top above the hole, through which the thread passes to the needles, while a loop, K^2, prevents the thread from being pulled up out from the thread-guide by the take-up. The other thread-guides, K′ K′, are of similar construction, though I have shown them without the loops K^2, inasmuch as they ordinarily receive their threads horizontally, and hence without danger of its being pulled up out of the slits therein. Only one of these guides K′ is used at a time, the other (shown at the right in Fig. 1) being only used when the machine is reversed. All of these guides have extended arms, which serve to keep the latches of the needles open, so that the thread may be readily received therein.

M represents a vertical guide-plate, suspended from the arm C′, above the knitting-point and between the cylinders A′ and B′ of the machine, and behind the needles which form the stitches. Arms M′ are secured to this plate, and extend horizontally from behind it to the right and left, conforming in their shape to the shape of the cam-edge on the horizontal plate F, thus forming a passage-way for the hooks H behind the vertical guide-plate M. The said plate M, with its arms M′, is adjustable horizontally, as shown at *m*, Fig. 2, by slot and set-screw, so as to determine the distance inward which the hooks H shall travel, and thus regulate the length of the loops *c;* and also adjustable vertically, as shown at c^2, Fig. 1, as further explained hereinafter, while the function of the plate M itself is to force the extra or looping thread *b* down below the latches of the needles, and so keep the loop *c* from being actually knitted into the fabric.

The operation of my device will be readily understood from the foregoing description of its construction. The knitting-thread *a* is fed from the take-up L through the thread-guide K to the needles to form the stocking-stitch, all as shown clearly in Fig. 1; but the operation of my looping attachment is best shown in the enlarged view, Fig. 3. The extra thread *b*, which is to form the loops *c*, is fed through the thread-guide K′, (shown at the left of the drawings,) and as the latches of the needles are open the said thread *b* is carried against the needles by the hooks H, while the said hooks, as the machine revolves, travel inwardly along the cam-edge *f* of the plate F, behind the plate M and its arms M′, and so carry the extra thread inwardly between and past the needles; and as the hooks H pass through the described passage-way, with the thread *b* upon their points, they form the loops *c* therewith. These hooks H are disposed at regular intervals, so that one hook will come between a pair of needles, leaving a given number of needles or pairs of needles between that hook and the next. In the illustration given there is a hook between the needles that form each pair, but no hooks between the said pairs themselves—that is, none between the right-hand needle of one pair and the left-hand needle of the succeeding pair—and therefore there will be in this instance one loop formed to and between every series of two consecutive stocking-stitches. The vertical guide-plate M bears down upon the thread *b* upon the hooks H just as the hooks enter the passage-way described behind the plate, and thus the plate M forces the said thread below the latches of the needles, which rise at this point to form the stocking-stitch with the other thread, *a*. As soon as the looping-thread *b* is forced under the latches the knitting-thread *a* is caught by the needles, and the latter begin to descend (by the well-known action of the cams in the shell of the machine) and the latch closes over the knitting-thread *a*, forming the ordinary stocking-stitch therewith, and as the needles reach their lowest point the stocking-stitches made in the previous round are pulled over the tops of the needles, together with the looping-thread, which is thus folded in between the new stitches and those of the round last made, while the hooks H, as they emerge from the passage-way described, free themselves from the thread *b*, leaving it in inwardly-projecting loops *c*. This action goes on continuously as long as the machine is operated, and results in the production of a circular seamless web having longitudinal rows of loops *c*, regularly caught or folded in between the longitudinal rows of stitches, without being actually knitted into the fabric, all as shown and described in my application for the process and product, executed on the same date with this application and filed January 10, 1882. In that application I have set forth my said process and product fully, and so need not further describe them here.

It will be apparent from the foregoing that if I desire to construct a fabric with the rows of loops farther apart, this can be accomplished by leaving out certain of the hooks H at any desired intervals; or the grooves *h* in the cylinder B′ may be placed farther apart, so as to come only after, say, every third or every fourth needle in the needle-cylinder, instead of after every other needle, as shown in the present drawings; or, similarly, the said grooves may be made nearer together, so that there will be a hook after every needle; but as it is essential that the hooks H should come between certain of the needles and not be in line with them, it is of the greatest necessity that the needle-cylinder A′ and the hook-cylinder B′ should move exactly together, because the slightest variation therefrom might result in breaking the needles or mixing up the threads, and hence the importance of the device D E *e* *e′*, already described, for meshing with the needle-cylinder and the gear on the upper cylinder, and thus transmitting motion from one to the other and keeping the hooks between the needles.

When it is desired to knit the main fabric closer the needle-cylinder has to be moved up-

ward, (by means such as are shown in the Tuttle machine, already referred to,) and therefore the device M M′ is constructed so as to be vertically adjustable, and this device must in such case be moved upward in correspondence with the said needle-cylinder. Similarly, if a looser fabric is desired, the needle-cylinder is moved downward, and the device M M′ should then also be moved downward, so that whatever the position of the needle-cylinder may be the part M will always be so placed relatively thereto as to force the looping-thread under the latches of the needles in said cylinder, while by the horizontal adjustment of the said device M M′ the length of the loops *c* is determined, as that depends mainly upon the distance inward that the hooks H, which carry the looping-thread, are compelled to travel.

When desired, the looping attachment B can be swung to one side (or wholly removed) and the knitting-machine used, as heretofore, for making a plain circular web. In this way articles can be made having a plain circular seamless web part of their length and partly with the rows of inward-projecting loops, as described, thus giving an infinite variety of finish and appearance to articles constructed upon my improved machine.

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

1. The combination of a looping attachment provided with depending hooks for supporting and operating an extra thread with the needle-cylinder and needles of a circular-knitting machine and a vertical guide-plate for forcing the said extra thread below the latches of the said needles, whereby it will not be knitted into the fabric, as set forth.

2. In combination with a circular-knitting machine, a looping attachment consisting of a grooved cylinder provided with depending hooks, with an exterior flange at the base of the cylinder grooved coincidently therewith, and a bottom plate having a cam-edge, together with a vertically and horizontally adjustable guide-plate having arms conforming in shape to the cam-edge of the bottom plate, substantially as described, and for the purpose set forth.

3. In combination with a circular-knitting machine, the looping attachment B, having grooved cylinder B′, grooved flange B^3, depending hooks H, and bottom plate, F, with cam-edge *f*, and the vertically and horizontally adjustable guide-plate M, with cam-shaped arms M′, substantially as described, and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 5th day of January, 1882.

SALLY M. LEVY.

Witnesses:
STANLEY S. STOUT,
HAROLD G. UNDERWOOD.