No. 741,113. PATENTED OCT. 13, 1903.

R. I. CREELMAN.

KNITTING MACHINE.

APPLICATION FILED JAN. 3, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

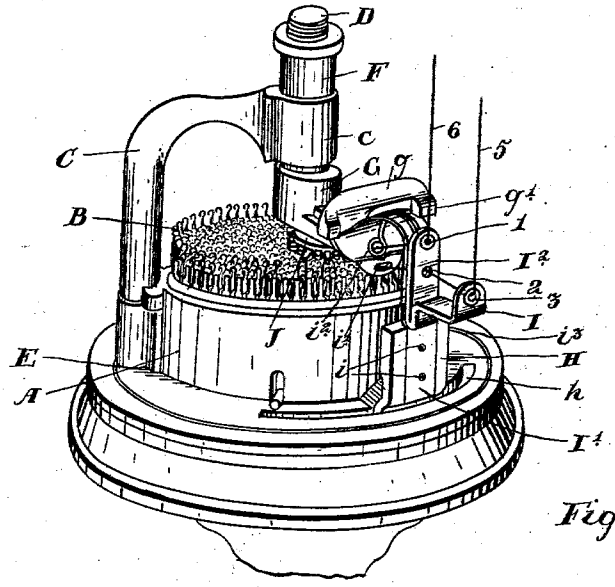


Fig. 1.

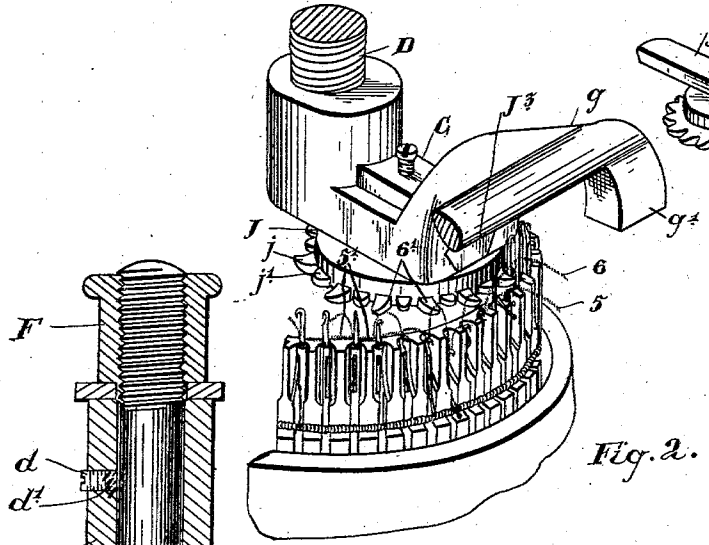


Fig. 3.

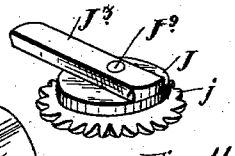


Fig. 4.

Fig. 2.

Witnesses.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 3 SHEETS—SHEET 2.

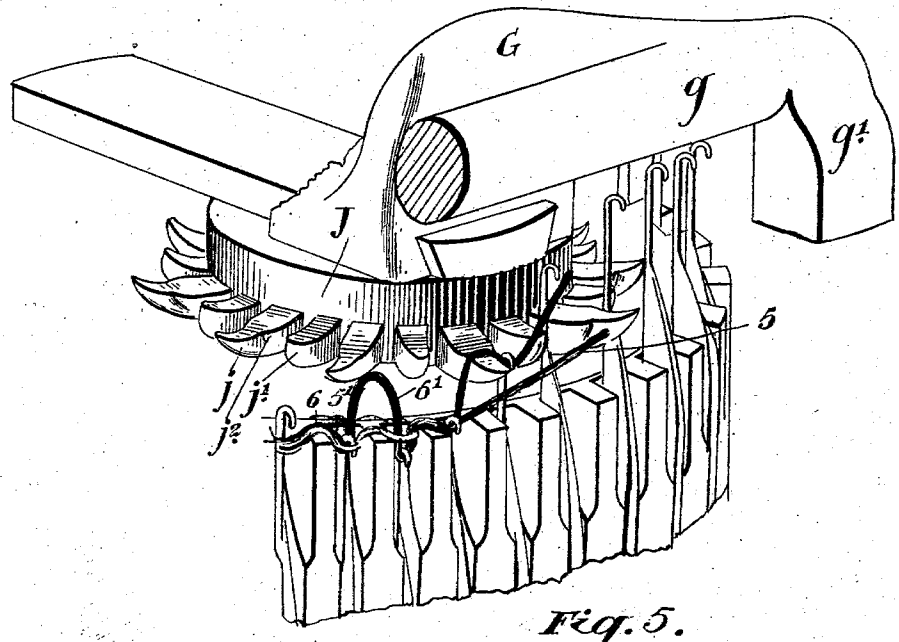


Fig. 5.

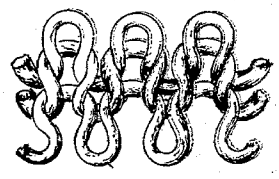


Fig. 8.

Witnesses.
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R. I. CREELMAN.

KNITTING MACHINE.

APPLICATION FILED JAN. 3, 1902.

NO MODEL. 3 SHEETS—SHEET 3.

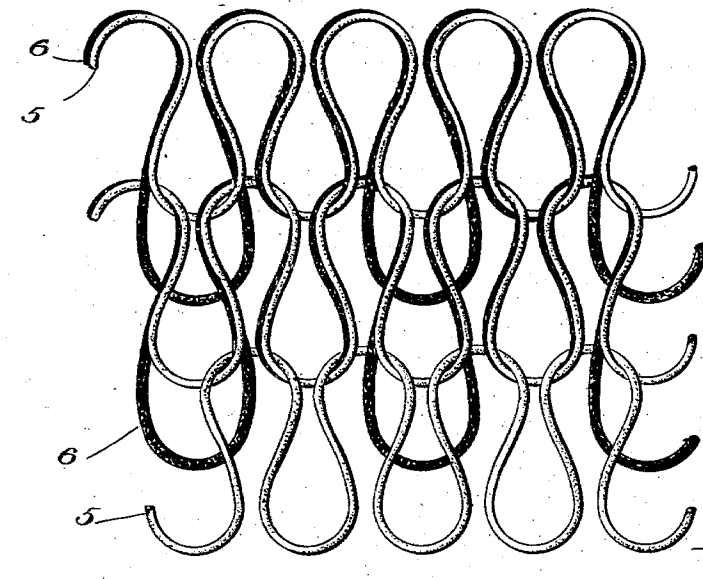


Fig. 6.

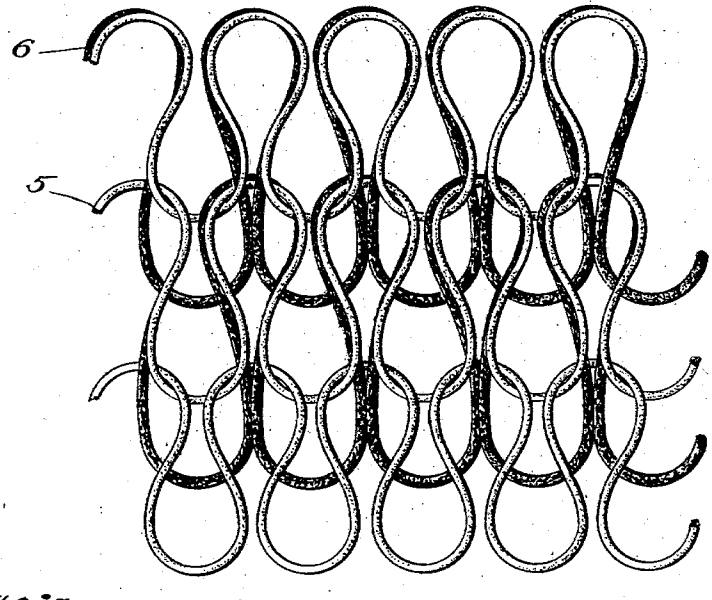


Fig. 7.

Witnesses.

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No. 741,113. Patented October 13, 1903.

UNITED STATES PATENT OFFICE.

RICHARD IRVINE CREELMAN, OF GEORGETOWN, CANADA.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 741,113, dated October 13, 1903.

Application filed January 3, 1902. Serial No. 88,341. (No model.)

To all whom it may concern:

Be it known that I, RICHARD IRVINE CREELMAN, manufacturer, of the town of Georgetown, in the county of Halton, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Knitting-Machines, of which the following is a specification.

My invention relates to improvements in knitting-machines, and is particularly adapted to those of the circular type; and the object of the invention is to devise a simple attachment whereby various garments may be knitted, either striped on the exterior and plain on the interior, or striped on the exterior and looped on the interior, or plain on the exterior and looped on the interior, or the length of the stitch controlled in ordinary knitting in a simple, cheap, and efficient manner; and it consists, essentially, of a toothed wheel having suitable or specially-formed teeth adapted to mesh with the needles in the cylinder, such wheel being provided with means whereby it may be adjusted both vertically and radially in relation to the needles, and the parts being otherwise arranged and constructed in detail as hereinafter more particularly explained.

Figure 1 is a perspective view of a circular-knitting machine provided with my improvements. Fig. 2 is an enlarged detail showing the loop as it is being formed. Fig. 3 is a radial section through the supporting-arm, wheel, and yarn-guide. Fig. 4 is a detail of the wheel particularly adapted to produce loops on the inside. Fig. 5 represents an enlarged view of the wheel J and the coacting portions, showing the manner in which the two threads engage with the teeth and the needles. Fig. 6 shows an enlarged view of a portion of the fabric as knitted into a striped material with the enlarged loops in the inner side. Fig. 7 is a similar view of a portion of a fabric knitted into plain material with enlarged loops on the inner surface, and Fig. 8 is a view of a portion of fabric knitted in plain knitting when coarse wool is used.

In the drawings like characters of reference indicate corresponding parts in each figure.

My attachment is particularly adapted to a knitting-machine in which two yarns are used, which yarns are adapted to be fed through separate feeding-eyes.

A is the needle-cylinder, and B the needles, which are held in the cylinder in the usual manner and operated by means of certain cams, which it is not necessary here to describe. The cam-ring always derives its rotation from any suitable source of power.

C is an arm which is held in a suitable socket on the flat portion of the cam-ring E, in which the cylinder A is held. The arm C at the top extends out at right angles to a point over the center of the cylinder A.

D is a spindle which extends up through the hub *c* of the arm C and is provided at the top with a threaded end on which fits the adjusting-nut F. Upon the lower end of the spindle D is secured the wheel-supporting arm G, which extends out radially and is provided with an upwardly-curved and laterally-extending outer end *g*, from which extends downwardly the stops *g'* at each end. The spindle D, hereinbefore described, is held so as to turn stiffly, and thereby provide for the adjustment of the outer ends of the arm G, by means of a set-screw *d*, which extends through the hub *c* and abuts the leather strip *d'*, held against the spindle D.

H is the standard of the yarn-carrier, which extends through a slot *h* in the horizontal portion of the ring E. I do not claim the construction of this portion, and I do not describe it further.

I is the yarn-carrier, which consists of the portions I' and I^2. The portion I' is secured to the standard H by the screws *i*, and such portion extends upwardly and inwardly in curved form into proximity with the needles, it being provided with the eyes *i'* i^2, one preferably directly over the other. The portion I^2 is bent so as to form a fork with one prong shorter than the other and is fastened to the portion I' by means of a pin i^3.

1 and 2 are feeding-holes situated one directly above the other and on a line with the holes *i'* and i^2, respectively. 3 is a hole in the outermost end of the portion I^2. The holes 3, 2, and *i'* form the guiding or feed holes for the yarn 5, passing into the needles, while the holes 1 and i^2 form the feed-holes for the upper yarn 6. These yarns may be of different color.

J is the toothed wheel, which I show in Figs. 1, 2, and 5 provided with long teeth j and short teeth j'. The long teeth j, it will be noticed, are narrow at the point and are formed intermediate of their length with shoulders j^2. The short teeth are of sufficient width and narrow at their point, so that they mesh uniformly with the needles, the same as the long teeth j. The wheel is set so that the long teeth project between the needles or outside of their periphery, and yet both the short and long teeth also mesh with the needles, and thereby convey a rotary motion to the wheel. The yarn is operated upon by the needles in the usual way; but as the upper yarn 6 passes into the needles it passes over the point of each long tooth j as it rotates, as shown in Fig. 5. It will therefore be seen that the long loops are formed by the needles drawing the thread down between the long teeth, the said long teeth acting in connection with the needles like the ordinary sinker edge of the needle-cylinder in forming the loops. The short teeth do not engage the thread, and consequently the loops intermediate of the long loops are formed of short length by being drawn over the ordinary sinker edge of the needle-cylinder. The wheel J being set any desired distance above the cylinder, it will necessarily be seen that the distance the top of the wheel is above the top of the cylinder will regulate the length of the loops 6′, which are formed by the teeth projecting into the needles and acting in conjunction therewith. I show in the drawings some of the loops formed and passing over the teeth, while the other loops 6′ as the wheel rotates are freed successively from the points of the teeth or dropped off the periphery of the teeth j. The reason that I form each alternate tooth j' short is so that I can produce the loops 5′ on the inside of the web and allow of the formation of external stripes by the different-colored yarn 5, such stitches on the needles being indicated by 5′. The wheel J is journaled on a spindle J^9, which is held in the dovetail-shaped sliding block J^3 in the arm G. The spindle J^9 is fixed in any suitable manner in the sliding block J^3, and the wheel J turns on the lower beveled end J^4 of the spindle. It will thus be seen that the wheel may be moved radially inwardly or outwardly, as desired, so as to bring it into a proper operative position in relation to the needles and yarn-feeders. It is held in place in such operative position by a set-screw K. The wheel J may be adjusted vertically by means of the nut F on the upper end of the spindle, so as to lengthen or shorten the loop formed to the interior of the stitching.

In Fig. 4 I show a detail of a wheel with all the teeth j formed as long teeth, very similar to the teeth j in the wheel described as to Figs. 1, 2, and 5. It will be noticed that the teeth in both wheels have a concaved or upper side, so that the points of the teeth extend upwardly. The lower sides of the teeth are beveled so as to extend upwardly from a point at about the pitch-line of the teeth to the upper outer point.

Among the advantages derived from the construction of my attachments—viz., the wheel J and its coacting parts—there may be mentioned not only the striping and looping simultaneously or the looping done alone, but also that such wheels J may be used for controlling the length of the stitch in ordinary knitting by adjusting it vertically in relation to the needles.

It will be seen that with the thread 6 the one loop is formed over a long tooth of the wheel J and that the next loop is formed over the edge of the needle-cylinder, as ordinarily. This makes a series of short and long loops of the thread 6, and these long loops when the color of thread 6 is different from thread 5 will appear as in Figs. 7 and 8 intermediate of the courses and will produce a striped effect.

In the use of my machine of course I provide a suitable means for carrying one or more bobbins, this depending, of course, upon the construction of the machine. I am enabled also by moving the arm G so that one or the other of the stops comes against the feed-arm to throw the engaging portion of the tooth-wheel away from the feeding-point of the cam-carrier, so that the looping-teeth of the wheel will be out of action at the period when the loop should be formed, and then no loop can be formed, and this is an important desideratum, as will be understood by those accustomed to the use of knitting-machines and knowing the value of changing the style of the stitch for forming articles where no loop is required—such, for instance, is the wristbands of mitts, the lining of which would be formed by loops.

In Fig. 6, 5 and 6 represent the lower and upper yarns, respectively. It will be noticed in this figure that each loop formed by the yarn 5 is of an equal length, whereas the loops formed by the yarn 6 are alternately formed in a long loop and a short loop. This is caused by knitting this material with the wheel J. It will be noticed that this wheel has alternately long and short teeth, whereby the yarn 6 is alternately formed into a long and short loop by merely being caught by the long teeth to form the long loop and missed by the short teeth, so as to cause a loop of an ordinary length to be formed. By knitting the fabric in this form with two threads of a different color a stripe is formed in the material when the material is drawn tight. Of course the figure shows the material in a greatly-magnified scale and a very loose form.

In Fig. 7 it will be noticed that the yarn 5 is made in short loops of equal length and the yarn 6 is made in long loops of equal length. This material is knitted by the wheel shown in Fig. 4 of the drawings as they now stand.

This wheel has long teeth of equal length, whereby the yarn 6 is knitted into long loops. This form of fabric is for a plain material.

What I claim as my invention is—

1. The combination with the cylinder and needles thereof and a feeding-arm and two feeding-eyes therein, located one substantially above the other, of a wheel held on a suitable support suspended over the center of the machine and provided with teeth having recessed upper sides and the point of each tooth narrow and the tooth tapered from point to base, so as to form a broad base and a narrow space between the bases of the teeth in which the needles mesh as and for the purpose specified.

2. The combination with the cylinder, and needles thereof, and a feeding-arm and two feeding-eyes therein located one substantially above the other, of a wheel held on a suitable supporting-arm suspended over the center of the machine and provided with alternate long and short teeth, both of which are designed to mesh with the needles and the longer teeth being adapted to carry the yarn to form the loop as and for the purpose specified.

3. The combination with the cylinder, and needles thereof, and a feeding-arm and two feeding-eyes therein located one substantially above the other, of a wheel provided with teeth meshing with the needles and constructed as specified, the supporting-arm carrying the wheel, the spindle carrying the supporting-arm and the extension-arm through which the spindle extends, such extension being held on the rotatable part and extending over the center of the machine as and for the purpose specified.

4. The combination with the cylinder and needles thereof and a feeding-arm and two feeding-eyes therein located one substantially above the other, of a wheel provided with teeth meshing with the needles and constructed as specified, the supporting-arm carrying the wheel, the slide in which the wheel is journaled, such arm having a dovetailed groove into which the slide fits and means for holding the slide stationary in the groove as and for the purpose specified.

5. The combination with the cylinder and needles thereof and a feeding-arm and two feeding-eyes therein located one substantially above the other, of a wheel provided with teeth meshing with the needles and constructed as specified, the radial arm carrying the wheel and supported on a spindle over the center of the cylinder and provided with an outer end and extending laterally to each side of the arm and provided with stops, the extension-arm carrying the spindle and supported on the rotatable part and a pressure device located in the hub of the arm against the spindle as and for the purpose specified.

RICHARD IRVINE CREELMAN.

Witnesses:
M. MACLAREN,
R. SHIELDS.