

No. 634,510.

Patented Oct. 10, 1899.

D. F. SULLIVAN.

STRIPER ATTACHMENT FOR KNITTING MACHINES.

(Application filed Apr. 10, 1899.)

(No Model.)

2 Sheets—Sheet 1.

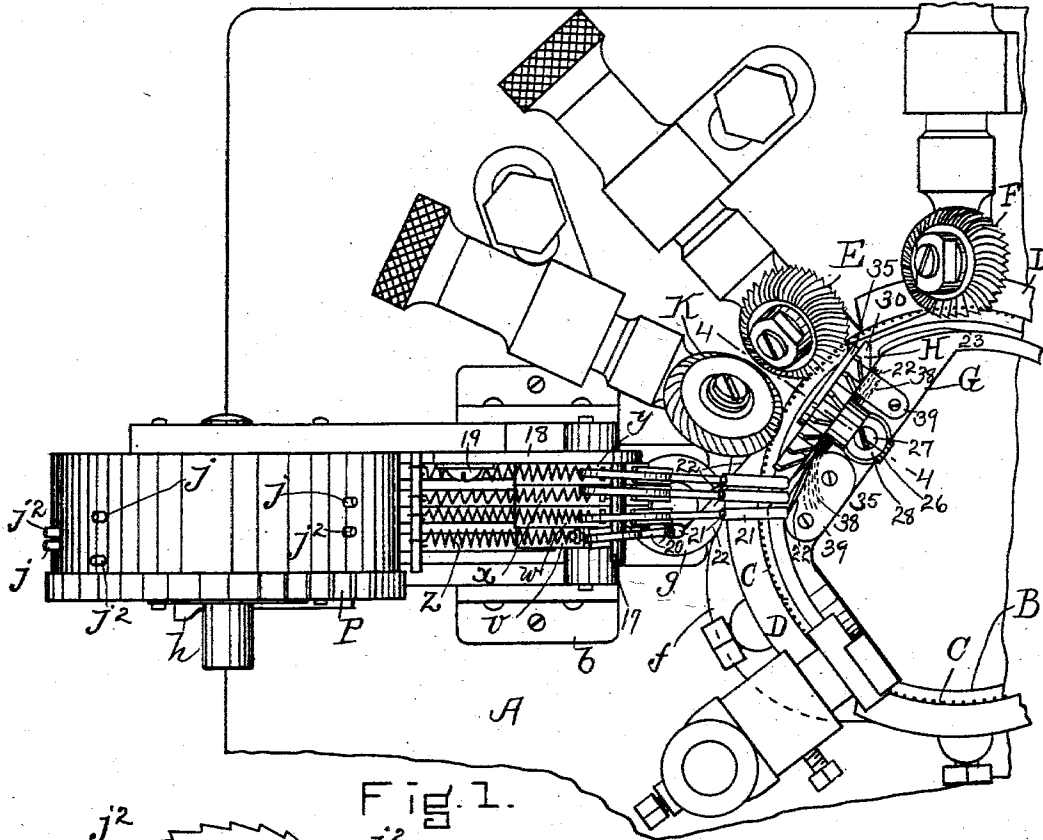


FIG. 1.

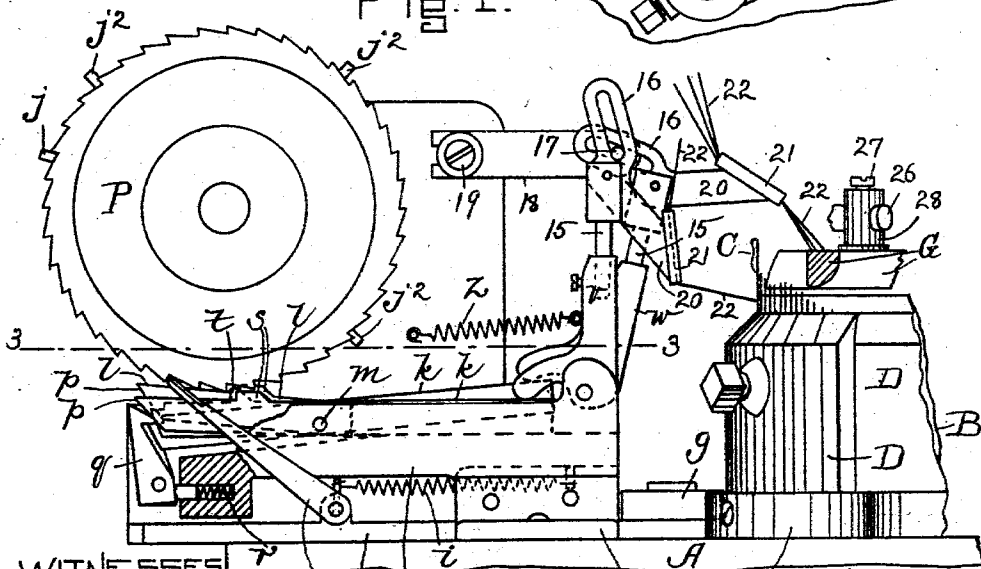


FIG. 2.

WITNESSES

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2 Sheets—Sheet 2.

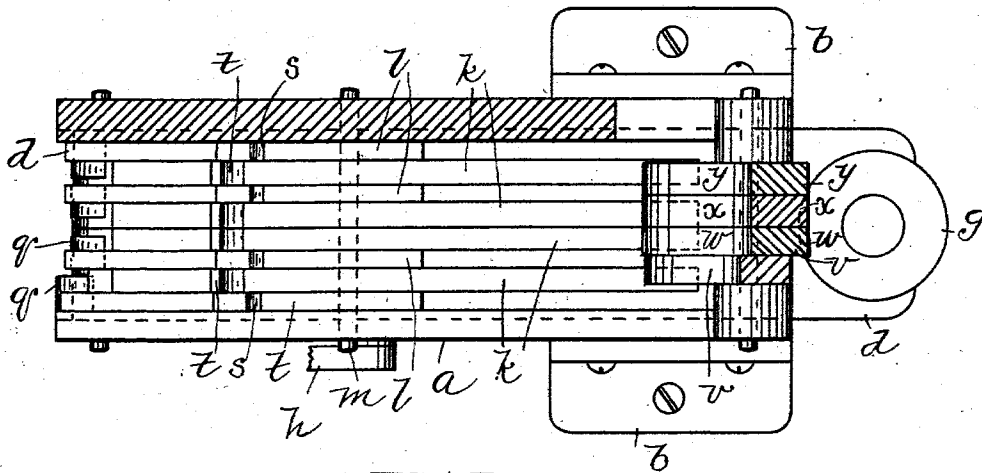
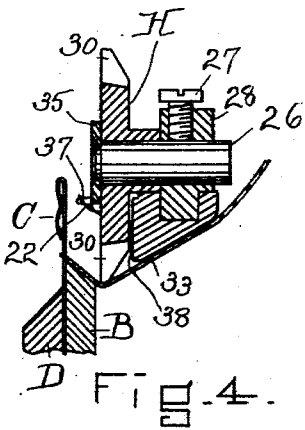


FIG. 3.



D FIG. 4.

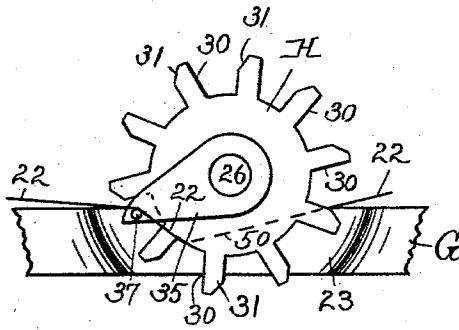


FIG. 5.

WITNESSES.

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UNITED STATES PATENT OFFICE.

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STRIPER ATTACHMENT FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 634,510, dated October 10, 1899.

Application filed April 10, 1899. Serial No. 712,356. (No model.)

To all whom it may concern:

Be it known that I, DANIEL F. SULLIVAN, of Lowell, county of Middlesex, and State of Massachusetts, have made certain new and useful Improvements in Striper Attachments for Knitting-Machines, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a top plan view showing a portion of the bed and a single head of a circular-knitting machine; Fig. 2, a side elevation of the same, partly in section; Fig. 3, a plan view of the slide and shipping levers, partly in horizontal section, on line 3 3 in Fig. 2; Fig. 4, a section on line 4 4 in Fig. 1, showing the cutter-wheel; and Fig. 5, a front elevation of said wheel.

Like letters and figures of reference indicate corresponding parts on the different figures of the drawings.

My invention relates especially to a mechanism for automatically throwing in and out of action various-colored yarns in the circular-knitting machine, the object being particularly to overcome the objections incident to the use of many devices of this class, wherein it is possible to employ only yarns of two colors effectively, by supplying a mechanism whereby a multiplicity of colors may be used in knitting a fabric, their action being positively governed by a pattern-wheel.

A further object obtained in my device is to throw a determined color out of action and sever it so nearly simultaneously with the insertion of a succeeding color that an almost inappreciable amount of "double knitting" results, and in so severing the yarn when out of action that the severing process shall not cause the undue tightening or drawing of stitches already formed with this color.

In carrying out my improvement I make use of means which will be readily understood by all conversant with such matters from the following explanation.

In the drawings, A represents the bed of a circular-knitting machine, B the cylinder, C the needles, D the head-plates, E the loop-

wheel, F the dividing-wheel, and G the horn or "push-down," these parts being all of the well-known arrangements, form, and operation, excepting the horn G, disposed inside of the cylinder, an edge of which is flattened slightly to afford room for the action of a cutter-wheel H, hereinafter described. The ordinary presser-wheel and knock-over wheel are not shown in the drawings, as they have no bearing on this invention; but I employ a wheel K, similar in construction to the ordinary landing-wheel inverted, and I dispose it between the looper and the yarn-carriers outside the cylinder.

On the bed A, mounted in a frame *a*, held by brackets *b*, there is a slide *d*, arranged radially of the cylinder and fitted to be moved horizontally by a cam *f* on said cylinder engaging a wheel *g* on said slide during each course. This slide carries a pallet *h*, tensioned by a spring *i*, connecting with the frame, Fig. 2, and which serves also to retract said slide. The pallet *h* engages ratchet-teeth on a pattern-wheel P and rotates said wheel the distance of one tooth for each revolution of the cylinder. Said wheel in its periphery is supplied with prearranged holes in which pins *j* may be inserted for respectively engaging levers *k l*, pivoted in the frame *a*. These levers *k l* have a common pivot *m* and swing vertically in the frame above the slide *d*. The levers *l* are unlatching-levers, their outer ends being beveled at *p*, Fig. 2, and resting on the toes, respectively, of a series of dogs or latches *q*, which are tensioned by push-springs *r*. These latches are designed to overlap and lock the outer ends of the yarn-carrier shipping-levers *k* when depressed, as hereinafter described. In the device, as shown, I employ four carrier-levers *k* and four latch-levers *l*; but this number may be varied at will, according to the number of colors of yarn it is desired to employ. Each latch-lever *l* has a boss or lug *s* on its upper face in position to be engaged by a pin *j*² on the pattern-wheel, and the levers *k* have similar lugs *t* for engagement by pins *j*, these pins depressing the outer ends of said levers at determined intervals in the revolution of the pattern-wheel P. A series of bell-crank levers *v w x y* are mounted on a common pivot in the

frame, their short arms being each in engagement with the inner end of a lever *k* and their long arms connected with the frame by a coiled spring *z*. In the vertical arm of each bell-crank a rod 15 is adjustably secured and carries a link 16. These links work on a fixed pin 17, fast in an arm 18, adjustable on the frame by a screw 19. From each link there extends an arm 20, carrying on its outer end a tube or yarn-guide 21. The bell-cranks and their supported mechanism described constitute the yarn-carriers. The yarns 22 of various colors are respectively threaded through the carrier-tubes 21 as they come from the bobbins and before delivery to the needles C. The carriers are thrown into or out of action by the operation of the levers *k*, actuated by the pattern-wheel in manner to be described hereinafter more specifically. The outer ends of the levers *k* for carriers out of action are normally held depressed by the latches *q*.

The edge of the horn G, just in front of the looper E and landing-wheel K, is flattened at 23 to admit a vertically-arranged cutter-wheel H, mounted to rotate on a fixed pivot 26, adjustably held by screw 27 in post 28 on said horn. The blades 30 of this cutter-wheel (see Fig. 5) radiate from its body and are formed for a shear cut and with the rear corner of their outer ends chamfered at 31 to harmlessly engage the work 33, (see Fig. 4,) by the tension of which said cutter-wheel is rotated. A cutting-plate 35 is fast on pivot 26 in rubbing contact with the outer face of wheel H, with the blades 30 of which it effects the shear cut described. On the nose of this plate there is a laterally-projecting stud 37, over which the thread 22 is passed after being thrown out of action and before severing. Behind said rotary cutter H and between it and the horn is disposed a portion of waste or ravelings 38, (indicated by dotted lines in Fig. 1,) held by plates 39, screwed to the horn. This acts as a frictional hold for the severed ends of the yarn 22.

In the use of my improvement the cam *f* on plate D of the cylinder B drives the slide *d* and moves the pattern-wheel one tooth, as described. One yarn—the outer, as shown in Fig. 2—is in the needles and knitting. Each tooth of the pattern-wheel represents one course of the cylinder, so the pins *j* *j*² are arranged peripherally at distances apart determined by the number of courses required for each color of yarn. When the last course of this color is about being completed, a new color is thrown in. This throwing in is accomplished by a pin *j*² on the pattern-wheel engaging boss *s* on the latch-lever *l*, driving its outer end against a latch *q* and freeing the corresponding carrier-lever *k* therefrom, so that its spring *z* acts to draw back or elevate the carrier into the position of carrier *v* in Fig. 2. Its guide-tube 21 by this movement being depressed, the thread 22 is drawn across needles C, the tension of the waste 38

on the free end of the yarn, disposed in said waste in manner hereinafter described, being sufficient to admit of this. The yarn is carried to the inverted landing-wheel K, which holds it down below the beards of the needles until it is taken by the looper and begins knitting. Now after a predetermined interval a pin *j* on the wheel P will engage the boss *t* on the carrier-lever *k* of the first-described yarn, depressing its outer end until the corresponding latch *q* overrides and locks it. This movement elevates the short arm of the carrier bell-crank, driving its long arm, carrying the yarn, toward the cylinder or into the position shown for carriers *w x y*. The link 16 by this movement causes the tube-guide carried on its arm to be projected vertically upward and over the heads of the needles and within the periphery of the cylinder. The cylinder still advancing and the first thread continuing to draw through the guide is carried first behind the cutter-wheel H, and then (the drawing-point transcribing a circle) it crosses the periphery of the cutter-wheel (see dotted line 50, Fig. 5) and is carried over the stud 37 on the fixed cutting-blade 35. After this yarn leaves the looper E of course it does not knit, but the tension is still retained until it has entered several of the blades of the dividing-wheel F. At this point a tooth or blade 30 of the cutter-wheel H, which has continuously rotated by the coursing of the work 33, drives said yarn against blade 35 and severs it. The strain exerted by the severing is resisted by the tension of the blades of the dividing-wheel, and thus any pulling or puckering of the portion already knit from this strand is prevented. The yarn in passing behind the cutter-wheel entered the mass of waste 38, which exerts sufficient friction thereon to retain the severed end projecting from the guide 21, as indicated in the drawings for the carriers *w x y*. The end of the yarn is thus held for the throwing-in process above described. After severing, as described, there is a loose or tag end of yarn left on the work in length the distance from the shear cut to the dividing-wheel F; but this, as will readily be understood, may easily be removed in trimming. The throwing in of a new color before the severing of the first yarn results in a portion of double weaving, but so slight is it that it is deemed unobjectionable.

It will be seen that by means of my improved device as many yarns of different colors may be used and alternated as desired, a change of the position of pins in the pattern-wheel effecting this.

A salient feature of my invention lies in the fact that in throwing out a color it is accomplished instantly by guiding or directing it radially inside the cylinder, where it is immediately out of the way and cannot be knit in double on itself.

Other features are the preventing of drawing of the stitches while severing the yarn, the use of a shear cut for this purpose effect-

ed within the cylinder, and the automatic retention of the severed end by waste friction, whereby the yarn may be returned to the needles without stopping. This tension, moreover, is sufficient to hold said end taut until the yarn is taken by the looper, which renders the work much more effective.

Having thus explained my invention, what I claim is—

1. In a striping device for circular-knitting machines a rotary yarn-cutter actuated by contact with the finished portion of the knitted fabric.

2. In a striping device for circular-knitting machines a rotary yarn-cutter actuated by contact of the blades with the finished portion of the knitted fabric and disposed in fixed position within the needle-circle.

3. In a striping device for circular-knitting machines, a rotary yarn-cutter disposed within the cylinder and actuated by contact with the finished fabric; a fixed blade cooperating therewith; and a projection on said blade for engaging and guiding the yarn as it leaves the loop-wheel of said machine substantially as and for the purpose described.

4. In a device of the character described a cutter disposed within the needle-cylinder and a frictional packing behind said cutter into which said cutter is arranged to direct a

yarn thrown out of action and before severing it substantially as and for the purpose specified.

5. In a device of the character described, the horn; the cutter-wheel mounted thereon and having radial blades in position to be engaged and actuated by the finished fabric; the fixed blade in rubbing contact with said wheel and the projection on said blade for guiding the thread as it is thrown in or out of action.

6. In a device of the character described the horn in combination with the fixed blade the rotary cutter-wheel and the packing between said horn and wheel.

7. In a device of the character described the horn disposed within the cylinder in combination with the vertical rotary cutter journaled on said horn and having blades in position to be engaged by the finished work a material distance from the needle-cylinder whereby said cutter is actuated; the fixed blade coacting with said cutter and provided with the guide projection; and a holding device for retaining an end of the thread after being severed by said cutter.

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Witnesses:

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