

(No Model.)

3 Sheets—Sheet 1.

B. B. LAMPREY & A. C. BUGBEE.
KNITTING MACHINE.

No. 383,817.

Patented May 29, 1888.

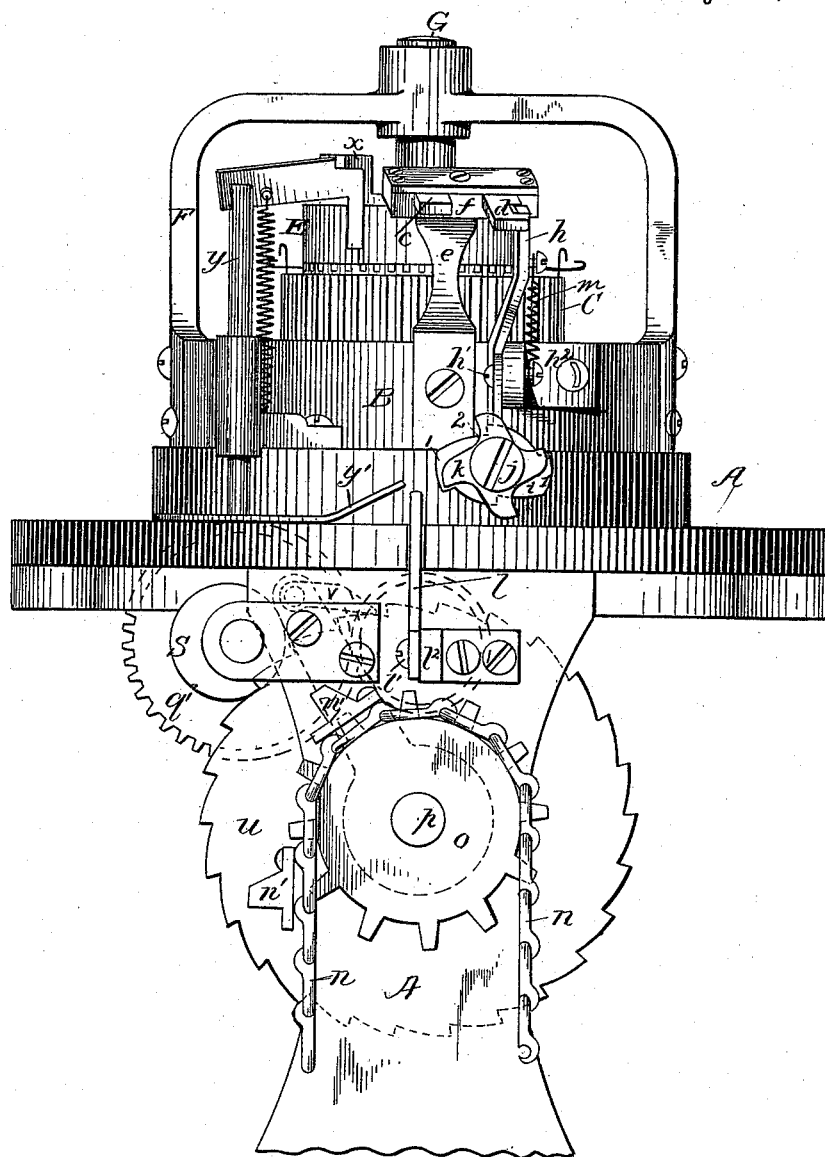


Fig. 1.

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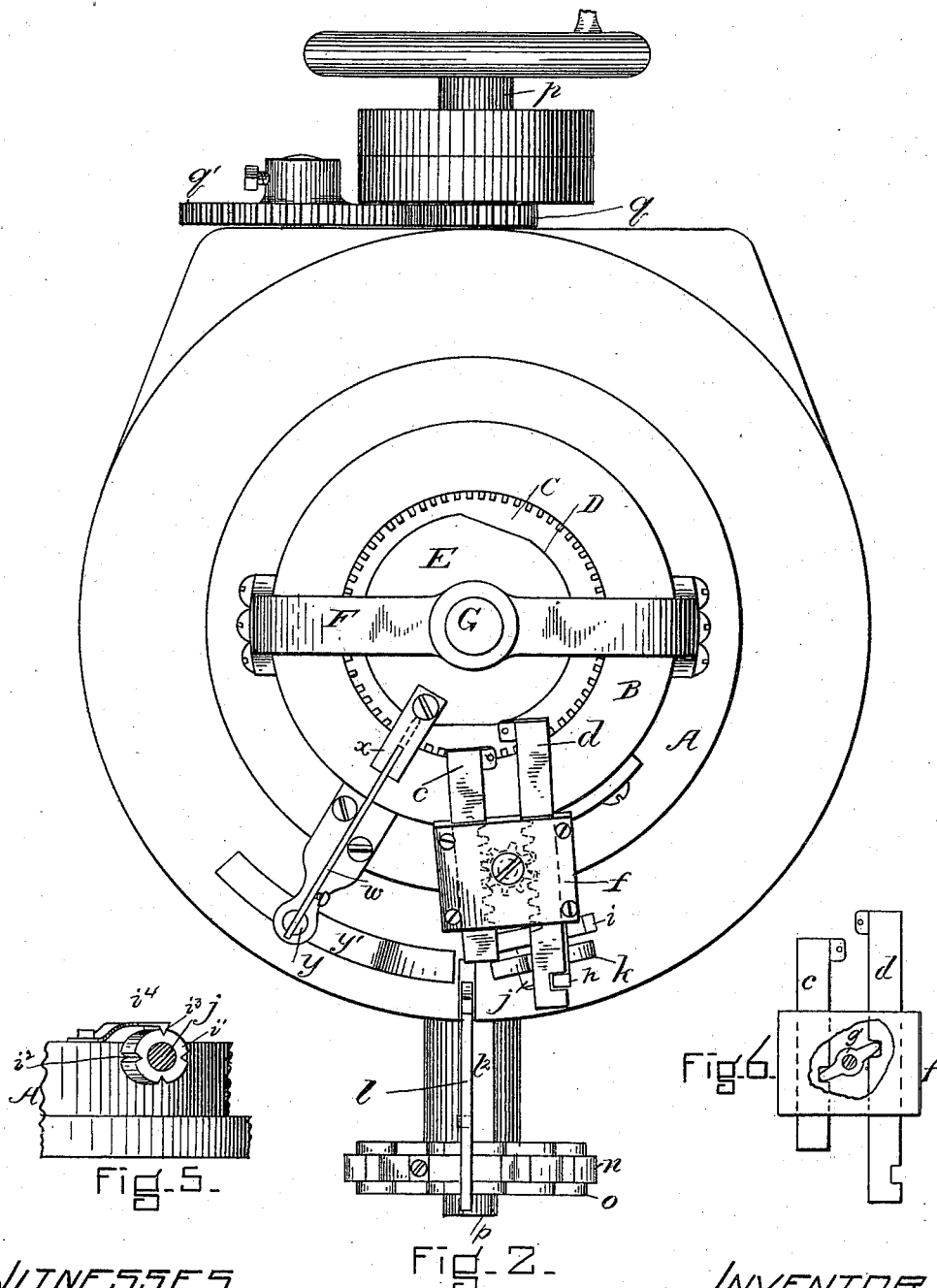
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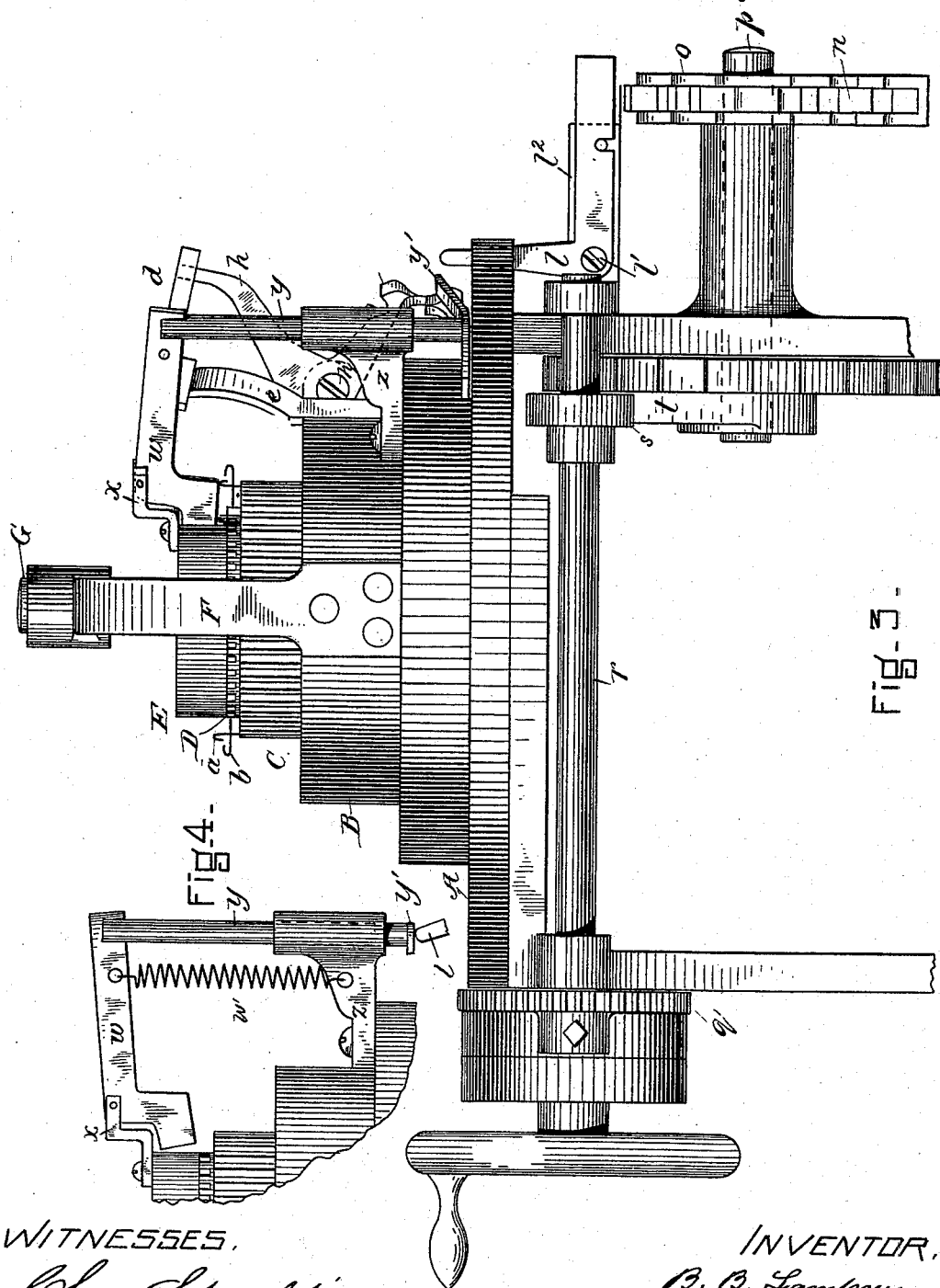
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UNITED STATES PATENT OFFICE.

BENJAMIN B. LAMPREY AND ALMON C. BUGBEE, OF LAKE VILLAGE, NEW HAMPSHIRE, ASSIGNORS TO THE LAMPREY MANUFACTURING COMPANY.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 383,817, dated May 29, 1888.

Application filed July 5, 1887. Serial No. 243,340. (No model.)

To all whom it may concern:

Be it known that we, BENJAMIN B. LAMPREY and ALMON C. BUGBEE, of Lake Village, in the county of Belknap and State of New Hampshire, have invented certain new and useful Improvements in Knitting-Machines, of which the following is a specification.

Our invention relates to knitting-machines adapted to the production of striped goods, and, as here shown, it is particularly applicable to circular rib-knitting machines.

It is the object of our invention to provide improved means for automatically operating and controlling the operations of two yarns of different colors in such manner that a tubular fabric can be produced having alternate stripes of different colors and of any desired width repeated to the end of the tube without stopping the machine to change the yarns to throw one color out of action and another into action.

It is desirable and, indeed, essential in machines of the kind mentioned that the means for feeding the yarns to the needles and for changing the colors should operate with absolute certainty, since if the new yarn is not brought into action at exactly the proper point imperfect work will be produced, and the same thing will result if the yarn thrown out of action is not properly severed and controlled.

By our improvements the ends of exactness and certainty of operation are attained, and the machine at the same time made exceedingly simple in construction, so as to be economic of manufacture and not liable to get out of repair.

Although in the subsequent description the invention will be set forth as applied to circular rib-knitting machines, it will appear obvious to those skilled in the art that its use is not necessarily confined to this particular type of machines, but may by the exercise of mere mechanical skill be applied to other kinds of machines.

Reference is to be had to the accompanying drawings, and to the letters of reference marked thereon, forming a part of this specification, the same letters indicating the same parts wherever they occur.

Of the drawings, Figure 1 represents a front

elevation of a circular rib-knitting machine embodying our invention. Fig. 2 represents a top plan view of the same. Fig. 3 represents a side elevation, the view being taken at right angles to that represented in Fig. 1. Fig. 4 is a detail view showing the yarn-severing knife in a different position from that in which it is pictured in Fig. 3. Fig. 5 is a detail view, hereinafter referred to. Fig. 6 is a detail view showing modified means for connecting the yarn-carriers.

In the drawings, A designates the bed or frame; B, the rotary cam-cylinder; C, the needle cylinder; D, the dial-plate for the horizontal needles; E, the rotary cam-dial, whereby the horizontal needles are operated; and F, the arch or yoke connecting the rotary cam-cylinder B with the cam-dial E through the medium of spindle or shaft G.

The several parts mentioned are all of common and well-known construction, and may be supposed to be fully and regularly equipped for the production of ribbed work on the cylinder-needles *a* and dial-needles *b*.

c d designate yarn-guides for feeding yarn to the needles, one yarn at a time, and operating in such manner that when one yarn is thrown out of action the other will at the same instant be brought into action.

e designates a bracket secured at its lower end to the cam cylinder B, and provided on its upper end with a plate, *f*, forming a support and guide for the yarn-guides *c d*, as also a support for one of the elements whereby the yarn-guides are operated.

Each yarn-guide is formed as a rack-bar—that is, the inner edge of each yarn-guide is provided with teeth, as shown in dotted lines in Fig. 2—and a pinion, *g*, turning on a stud secured to bed-plate *f*, is arranged between the yarn-guides in such manner as to engage the teeth of the same, so that when one yarn-guide is moved in one direction the other will be moved in the opposite direction, thus throwing one into and the other out of operation.

The shank of yarn-guide *d* is a little longer than that of guide *c*, and the outer end of said guide *d* is loosely engaged by the upper end of a bell-crank lever, *h*, pivoted at *h'* to a bracket,

h^2 , secured to the cam-cylinder. The lower end of bell-crank lever h rests on the face of a cam, i , adapted to turn on a stud, j , secured by the base-ring of the cam-cylinder.

5 k represents a toothed or star wheel secured to cam i , and adapted to turn with it on stud j .

Cam i is provided with two high points, 1 1, and two low points, 2 2, said points being substantially opposite the four arms or teeth of
10 the star-wheel, so that if the said star-wheel should be turned intermittently the distance of one tooth each time the lower end of lever h would first ride up on one of the high points of the cam and again down upon one of the low
15 points, (spring m operating to keep the lower end of lever h in contact with cam i .) with the result of moving yarn-guide d in and out radially and operating yarn-guide c in a similar manner.

20 In order to retain the cam-wheel i in proper position after being turned a quarter-revolution and until it is again acted upon, I provide said cam-wheel with a slightly-elongated hub, i^1 , having V-shaped or rounded notches i^2 ,
25 which are engaged by a lug, i^3 , on the free end of a spring, i^4 , secured to the ledge of the cam-cylinder C. As a means for moving star-wheel k intermittently the distance of one tooth at the desired times, we have provided
30 quite simple devices, which we will now proceed to describe.

l designates a bell-crank lever, pivoted at l' to a bracket, l^2 , secured to the frame of the machine, the vertical arm of which lever extends through a slot formed in the base, and
35 the horizontal arm extends out over a pattern-chain, n , arranged on and adapted to be carried around by a sprocket-wheel, o , secured to and turning with a stud or shaft, p , having
40 bearings in the frame of the machine. Said pattern-chain n is provided with lugs or swells n' , adapted to be brought into contact with the outer end of the horizontal arm of lever l and rock it upon its pivot or fulcrum l' , so as to
45 bring the upper end of its vertical arm in the path of travel of star-wheel k to impart a quarter-turn thereto and effect a change in the position of the yarn-guides, as has been described. Sprocket-wheel o is rotated to carry pattern-chain n around by means which will next be
50 described.

p' designates the main shaft, on which is secured a gear-wheel, q , engaging another gear-wheel, q' , secured to a shaft, r , having bearings
55 in the frame of the machine and provided on the end adjacent to sprocket-wheel o with a cam, s , adapted to operate on the upper end of a pawl-carrying arm, t , turning loosely on stud or shaft p .

60 u designates a ratchet-wheel rigidly secured to shaft p , the teeth of which ratchet-wheel are adapted to be engaged by a pawl, v , pivoted to the upper end of arm t , so as to rotate said ratchet-wheel as said arm is oscillated by the
65 operation of cam s .

By the construction so far described it will

be seen that as the machine is operated ratchet-wheel u will be rotated, carrying pattern-chain n around, and changing the position of the yarn-guides as often as a lug or swell, n' , is brought
70 in contact with the horizontal arm of lever l .

We have employed other means and arrangement of parts to effect a rotation of ratchet-wheel u ; but that here shown and described is
75 deemed sufficient to give an understanding of the manner of making and using the invention. When a change of yarns is effected, the yarn thrown out of action is severed at the proper point, and this result we accomplish by the means now to be explained. 8c

w designates an arm pivoted to a bracket, x , secured to cam-dial E. Said arm is provided on its inner end with a sharp knife-edge, adapted to enter a crease or groove which is perfectly
85 formed in the edge of the cam-dial at the point where the knife rests against it.

y designates a vertically-moving rod supported by and having a bearing in a bracket, z , secured to the base of the cam-cylinder. Said rod is loosely connected at its upper end
90 with the outer end of arm w , and is provided on its lower end with a shoe, y' , resting on the base A. A spring, w' , connected at its upper end with arm w and at its lower end with bracket z , serves to hold the outer end of arm
95 w down upon the upper end of rod y , and the shoe y' down upon the base A, in which position the knife will be held against the edge of the dial-cam E, as has been explained. It is
100 now noted, also, that the shoe y' travels on the same circumferential line as the star-wheel k .

The operation of the machine may now be explained as follows: The yarn in operation will be fed to the needles by its yarn-guide in proper position for the purpose until a cam
105 lug or swell, n' , on the pattern-chain n , comes in contact with the horizontal arm of lever l , when said lever will be rocked on its pivot or fulcrum, throwing the upper end of the vertical arm of said lever in the path of travel
110 of star-wheel k , striking one of the teeth or arms of said star-wheel, and turning it one-quarter revolution, changing the position of the yarn-guides, as has been before explained, throwing the yarn previously in operation out
115 of position to be fed to the needles and bringing the other yarn into action. Directly after passing star-wheel k the upper end of the vertical arm of lever l will come in contact with the upturned or inclined end of shoe y' , pass
120 under said shoe, and raise rod y with the effect of opening the knife, as represented in Fig. 4. This operation will be effected at the moment that the yarn thrown out of action will be drawn on a line between the knife and cam-dial E, when
125 the upper end of lever l will pass from under shoe y' and permit the knife to close, as represented in Fig. 3, severing the yarn and holding the severed end until the yarn-guides are again operated for the purpose of changing the
130 yarns, as before explained.

By the construction and arrangement of de-

vices as here shown the yarn thrown out of action is severed quite near to the point where the needles rise to catch the yarn to form loops or stitches therefrom, thus insuring the complete knitting in of the cut end and avoiding the necessity of employing a brush or other device to brush the cut end into the hooks of the needles, it being well understood by knitting artisans that if the cut end were not completely knit into the fabric imperfect work would be produced.

Instead of employing a pinion, *g*, between the guides *c d* to secure the movement of one by moving the other, we may employ a small lever, *g'*, pivoted on the plate *f* of bracket *e*, and loosely connected at its ends with the shanks of the yarn-guides, as represented in Fig. 6.

Changes may be made in the form and arrangement of parts constituting our invention without departing from the nature or spirit thereof.

Having thus described our invention, what we claim is—

1. The needles and their supports, a rotary cam-cylinder and cam-dial, two yarn-guides, devices, substantially as described, between

said yarn-guides, whereby when one guide is moved in one direction the other will be moved in the opposite direction, a lever fulcrumed on the cylinder, a cam adapted to turn on a pivot secured to the cam-cylinder, said lever being loosely connected at one end with one of said yarn-guides and in contact at the other end with said cam, and suitable devices for intermittingly operating said cam, combined and operating substantially as set forth.

2. The cam-cylinder, a cam-dial, a knife-arm pivoted on said cam-dial and having its knife-edge adapted to contact with said dial, a vertically-movable rod loosely connected at its upper end with said knife-arm, and devices, substantially as described, for intermittingly raising said rod, combined and operating substantially as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 28th day of June, A. D. 1887.

BEN. B. LAMPREY.
ALMON C. BUGBEE.

Witnesses:

E. L. CHENEY,
F. P. WEBSTER.