No. 647,881. Patented Apr. 17, 1900.

R. W. SCOTT & H. SWINGLEHURST, JR.

KNITTING MACHINE.

(Application filed July 9, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

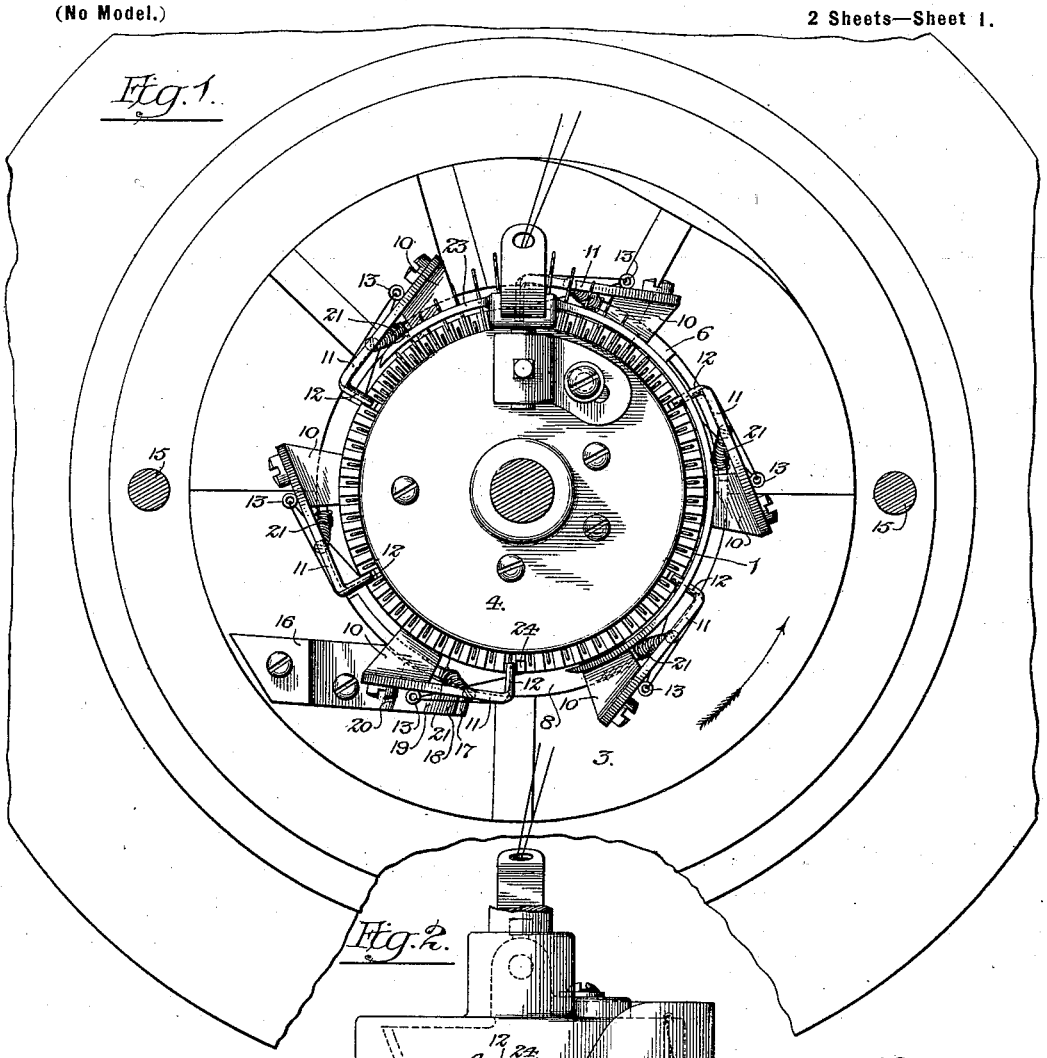

Fig. 2.

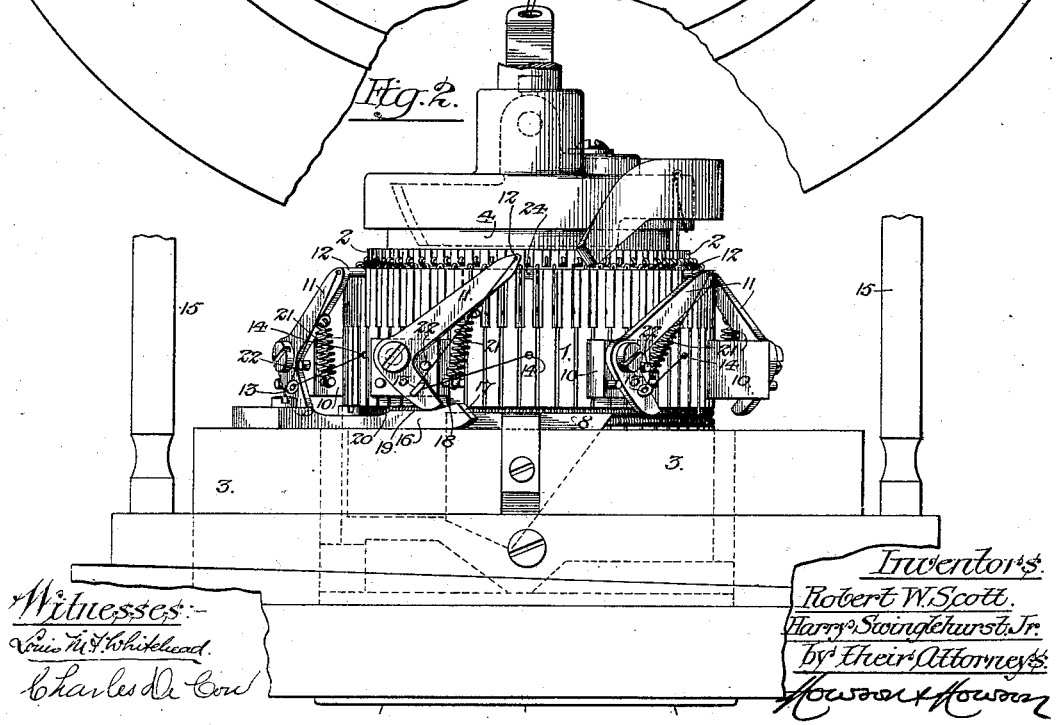

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Fig. 3.

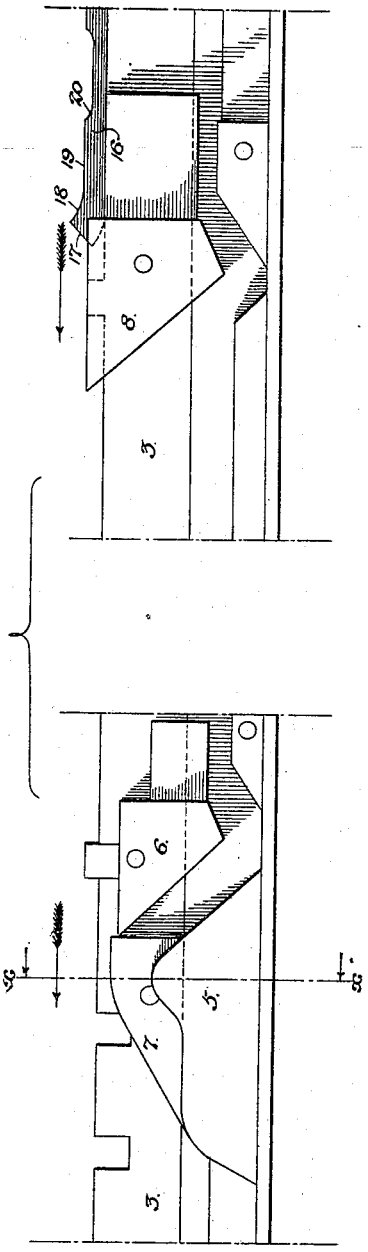


Fig. 8.

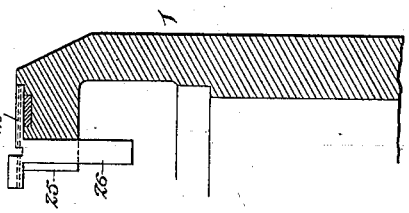


Fig. 7.

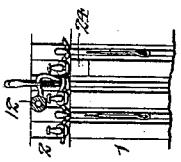


Fig. 6.

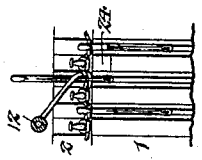


Fig. 5.

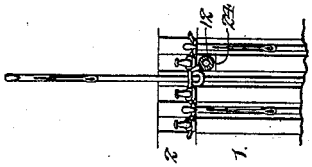
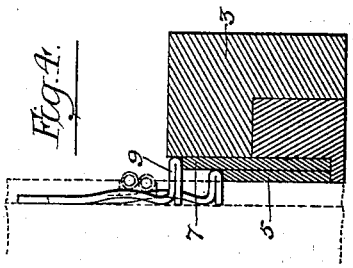


Fig. 4.



Witnesses:-
Louis M. Whitehead.
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Inventors:-
Robert W. Scott.
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UNITED STATES PATENT OFFICE.

ROBERT W. SCOTT AND HARRY SWINGLEHURST, JR., OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO SAID SCOTT, OF SAME PLACE, AND LOUIS N. D. WILLIAMS, OF ASHBOURNE, PENNSYLVANIA.

KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 647,881, dated April 17, 1900.

Application filed July 9, 1898. Serial No. 685,490. (No model.)

To all whom it may concern:

Be it known that we, ROBERT W. SCOTT and HARRY SWINGLEHURST, Jr., citizens of the United States, and residents of Philadelphia, Pennsylvania, have invented certain Improvements in Knitting-Machines, of which the following is a specification.

The object of our invention is to construct a machine for producing ribbed knitted fabric having one or more vertical stripes therein, each composed of an independent yarn forming a chain of stitches interlocked with the stitches of the knitted fabric, and this object we attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a plan or top view, partly in section, of sufficient of a rib-knitting machine to illustrate our invention. Fig. 2 is a side view of the same. Fig. 3 is a view showing in a flat plane the cams carried by the cam-cylinder of the machine. Fig. 4 is a transverse section on the line $x\,x$, Fig. 3. Figs. 5, 6, and 7 are diagrams illustrating the operation of the machine, and Fig. 8 is a sectional view illustrating a special construction of machine in accordance with our invention.

Our invention is in the nature of an attachment to an ordinary circular rib-knitting machine, and in the drawings we have shown only so much of such a machine as is necessary to illustrate the application of our attachment thereto, 1 representing the fixed needle-cylinder of the machine; 2, the fixed dial; 3, the rotating cam-box, and 4 the rotating dial cam-plate, all of which may be constructed and driven in the usual manner. The rotating cam-box, however, has, in addition to the usual lift-cam 5 and draw-down cam 6, a supplementary lift-cam 7, extending above the top of the draw-down cam 6, and a supplementary draw-down cam 8 for engaging with and depressing the bits of the needles raised by said supplementary lift-cam 7, and those needles of the cylinder 1, upon which the independent striping-stitches are to be formed, have elongated butts 9, which project radially beyond the lift-cam 5 and are engaged by the supplementary lift-cam 7, as shown in Fig. 4, so as to be directed over the top of the draw-down cam 6, thereby permitting these needles to remain elevated until they are drawn down by the higher supplementary draw-down cam 8, the shorter bits of the remaining needles being actuated by the cams 5 and 6 in the usual manner.

Mounted upon suitable studs 10 on the outside of the needle-cylinder 1 are as many levers 11 as there are long-bitted needles in the cylinder, and each of these levers has at its upper end a yarn-guiding tube or eye 12, which is adapted to play across the path of one of the long-bitted needles. The yarn for each lever 11 is drawn from a bobbin suitably located and passes up through the interior of the needle-cylinder 1 and out through an opening 14 in said cylinder, thence through an eye 13 on the lever 11, and thence to the guide eye or tube 12 of said lever, this method of feeding the yarn to the guide-levers 11 being necessitated by the presence on the rotary cam-cylinder of the upright posts 15, which support the arch for carrying the spindle of the rotating dial cam-plate.

The yarn-guide levers 11 are operated successively by a cam 16, mounted upon the top of the rotating cam-box 3, adjacent to the supplementary draw-down cam 8, this cam having the contour shown in Fig. 3—that is to say, a lifting-incline 17, a preliminary drop 18, a dwell 19, and a final drop 20.

Each of the levers 11 is acted upon by a spring 21, whereby it is normally held in contact with a stop 22 on the stud 10, and each lever normally occupies the position shown in Fig. 5; but when the lower arm of the lever comes into contact with the lifting portion 17 of the cam 16 said lever is moved to the position shown in Fig. 6 and then is permitted to drop to the position shown in Fig. 7 by reason of the preliminary depression 18, remaining in this position while traversing the dwell 19 of the cam and finally being permitted to drop again to the position shown in Fig. 5 by reason of the second depression 20 of the cam.

Each of the striping-needles is raised to its highest position, as shown in Fig. 5, by the

cam 7 as it approaches the knitting-yarn guide (the latter being shown at 23 in Fig. 1) and remains in this position as it passes the guide, so that the knitting-yarn is simply laid across the needle, below the latch of the same.

As soon as the needle, under the influence of the supplementary draw-down cam 8, has been drawn down so far that the yarn from the lever-eye 12 can cross the needle without engaging with the latch said lever is operated by the cam 16, so as to carry its yarn across the face of the needle, as shown in Fig. 6, and as soon as the latch rises and confines the striping-yarn the eye 12 moves backward slightly, as shown in Fig. 7, so as to slacken the striping-yarn and permit it to be drawn down to form a new stitch, the former stitch of striping-yarn and the loop of knitting-yarn being simultaneously cast off of the needle as the latter reaches its lowest position, the yarn-guiding eye 12 then resuming its normal or original position, as shown in Fig. 5, preparatory to a repetition of the operation on the next rotation of the machine.

We have shown our invention in connection with a machine having but a single feed for the knitting-yarn; but it will be manifest that it can be applied to multiple-feed machines as well, there being one cam 16 for each set of needle-operating cams when it is desired to insure the formation of a stitch of the striping-yarn for each course of knitted fabric.

Our invention can also, it will be evident, be applied to plain-knitting machines without dial-needles and intended for producing ordinary single-knitted fabric.

Some or each of the striping-yarn guides may, if desired, operate in conjunction with a pair of adjoining striping-needles instead of with a single needle, where a wider stripe is to be produced than that resulting from a single row of stitches.

In order that the dial-needles may work closely to the top of the needle-cylinder without interference by the striping-yarn guides 12, the top of the needle-cylinder is notched or recessed, as shown at 24, in order to receive each of said guides 12 when the latter is in the depressed position shown in Fig. 5.

When it is desired to employ a large number of striping-yarn guides, we prefer to adopt the construction shown in Fig. 8, in which 25 represents a ring secured externally to the upper portion of the needle-cylinder and slotted for the guidance of the shanks 26 of the striping-yarn guides 12^a, said slots being disposed at such an angle in respect to the vertical that the yarn-guiding eyes will cross the needles in the proper path. The same means may be employed for operating these guides as we have described for operating the lever-guides—that is to say, a cam for lifting them and springs for depressing them.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. The combination in a knitting-machine having a needle-cylinder with two characters of needles, cams for imparting knitting movement to one character of needles, and other cams for projecting the other character of needles to a greater extent than the first, with a striping-yarn guide and provision for operating the same whereby its yarn will be applied to said projected needle or needles, and striping-stitches will be formed solely upon the latter and interlocked with the knitted fabric.

2. The combination in a rib-knitting machine, of a needle-cylinder and its needles, a dial and its needles, one or more knitting-yarn guides, cams for operating the cylinder and dial needles so as to cause them to knit, cams for selecting a certain needle or adjoining needles, a striping-yarn guide and means for operating the same whereby its yarn will be applied to said selected needle or needles so as to form stitches solely upon the latter.

3. The combination in a knitting-machine, of a needle-cylinder having two characters of needles, a knitting-yarn guide, cams for actuating one character of needles so as to cause them to knit, means for imparting special movement to the other character of needles, a striping-yarn guide adapted to feed yarn to said selected needle or needles, and a cam for operating said striping-yarn guide, said cam being constructed to impart to the guide first a rising movement and then a two-stage return movement with a dwell between the two stages of such return movement.

4. The combination in a rib-knitting machine, of a needle-cylinder and its needles, a dial and its needles, one or more knitting-yarn guides, cams for operating the needles of the cylinder and dial so as to cause them to knit, means for selecting a certain needle or adjoining needles to receive a striping-yarn, a striping-yarn guide, and provision for feeding yarn to said striping-yarn guide from the inside of the needle-cylinder.

5. The combination in a rib-knitting machine, of a needle-cylinder having needles one or more of which have longer bits than the others, a knitting-yarn guide, a cam-box having lift and draw-down cams for acting upon the short-bitted needles, and other lift and draw-down cams for acting upon the longer-bitted needle or needles so as to raise the latter to a higher point than the other needles and permit a temporary retention of that position, a yarn-guide for applying a striping-yarn to such raised needle or needles, and means for operating said striping-yarn guide.

6. The combination in a rib-knitting machine, of a needle-cylinder having a notched or recessed upper portion, needles in said cylinder, a dial and its needles, one or more knitting-thread-guide cams for operating the

needles of the cylinder and dial so as to cause them to knit, means for imparting special movement to a certain needle or needles, a striping-yarn guide normally occupying a position in a notch or recess of the needle-cylinder, and means for operating said yarn-guide so as to cause it to apply its yarn to the selected needle or needles.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ROBERT W. SCOTT.
HARRY SWINGLEHURST, JR.

Witnesses:
WM. BUCKLEY,
STOCKTON BATES.