(Specimens.)

W. ESTY.

METHOD OF MANUFACTURING WIDENED TUBULAR KNIT FABRICS.

No. 419,191. Patented Jan. 14, 1890.

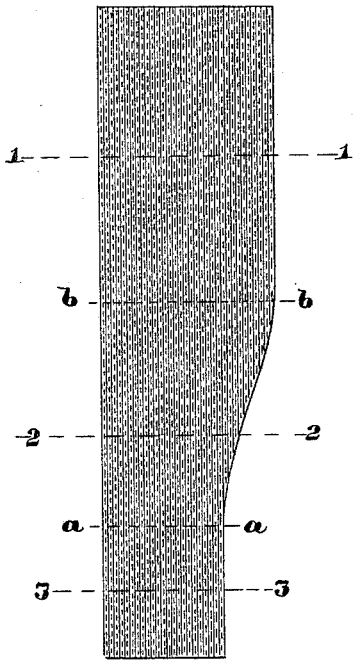

Fig. 1.

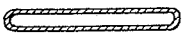

Fig. 2.

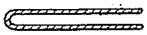

Fig. 3.

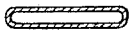

Fig. 4.

Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM ESTY, OF LACONIA, NEW HAMPSHIRE, ASSIGNOR TO CHARLES A. BUSIEL, JOHN T. BUSIEL, AND FRANK E. BUSIEL, ALL OF SAME PLACE.

METHOD OF MANUFACTURING WIDENED TUBULAR KNIT FABRICS.

SPECIFICATION forming part of Letters Patent No. 419,191, dated January 14, 1890.

Application filed February 6, 1889. Serial No. 298,800. (Specimens.)

To all whom it may concern:

Be it known that I, WILLIAM ESTY, of Laconia, in the county of Belknap and State of New Hampshire, have invented a new and useful Method of Manufacturing Widened Tubular Knit Fabrics, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to the art of manufacturing widened tubular knit fabrics by machinery; and it consists in the art or method of making widened tubular knit fabrics by taking up the required number of stitches for the smallest end of the fabric upon the needles of a straight-knitting machine having two parallel rows of needles, one-half of said stitches upon each row of needles knitting the required number of circular courses to give the desired length to the smaller straight part of the tube, then a series of back-and-forth courses, feeding the yarn from the carrier to all of the needles in action in one row, then crossing over and feeding it to all of the needles in action in the other row, then again feeding the yarn to the needles of the last-mentioned row, and again crossing over and feeding it to the first-mentioned row of needles, and widening by throwing into action a new needle in each row at the end where the yarn does not cross from one row to the other, said new needles being thrown into action as often as desired to give the required taper to the fabric, and the widening being continued until the required length of the tapered portion is obtained, thus producing a section of a widened open or non-tubular web, and then knitting a sufficient number of circular courses on all of the needles in action to complete the required length of the fabric, and completing the widened tube by seaming together the widened selvage-edges of the open or non-tubular section.

Figure 1 of the drawings is a side elevation of a stocking-leg knit by my improved art or method. Fig. 2 is a section on line 1 1 on Fig. 1. Fig. 3 is a section on line 2 2 on Fig. 1, and Fig. 4 is a section on line 3 3 on Fig. 1.

This invention is applicable to the manufacture of stocking-legs, shirt-sleeves, drawers-legs, or any tubular knit fabric a portion of which is required to be straight and another portion to be tapered.

In carrying out this invention I use a straight-knitting machine having two parallel rows of needles, and take up upon said needles as many stitches as are required to give the desired size to the ankle, and knit a series of circular courses—say till the line *a a* is reached—thus forming a section of a tube of suitable length, according to the use for which the fabric is designed, said tube having a section, as shown in Fig. 4. I then knit a series of back-and-forth courses and widen at intervals more or less frequent, according as a more or less abrupt increase in the width of the fabric is required, said widening being done by throwing new needles into action at one end of each row of needles while the yarn is delivered to one row of needles, the yarn being crossed from one row of needles to the other row at the end opposite to that where the new needles are thrown into action and fed to all the needles in action in the second row of needles, is then reversed and fed to the same row of needles, is crossed over to the first row and fed to all the needles in action in said row, is again reversed and fed again to said first row, and so on continuing to feed the yarn back and forth to both rows of needles, but being crossed from one row to the other only at one end until a sufficient length of widening is obtained, thus forming a section of a widened open or non-tubular web from the line *a a* to the line *b b*, a transverse section of which at any point between said lines will be as shown in Fig. 3. After reaching line *b b*, I then knit a greater or less number of circular courses on all of the needles in action to form a section of a tube having a cross-section, as shown in Fig. 2, and of the desired length. This operation may be repeated in cases where two or more widened sections are required, as in the case of the shirt-sleeve or drawers-leg.

The advantage of knitting stockings by this process over what is described in the Letters Patent No. 371,566, granted to me October 18, 1887, is that a much closer and firmer seam is obtained in the widened portion of the leg, the openings in the widened portion

of the leg incident to knitting the stocking by the process described in said prior patent being entirely obliterated in the stocking knit by this new process, thus making the stocking very much more desirable.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

The method of making a widened tubular knit fabric by machinery, which consists in taking up upon the needles of a straight-knitting machine having two parallel rows of needles as many stitches as are required in the smallest end of the fabric, knitting a suitable number of circular courses on a uniform number of needles to form a straight tube of the desired length, knitting a suitable number of back-and-forth courses and widening at intervals more or less frequent to form a widened section of an open or non-tubular web of the desired length and taper by throwing new needles into action at the same end of both rows of needles, knitting a greater or less number of circular courses on all the needles brought into action to form the desired length of straight tube, and then seaming together the selvage-edges of the flat section to complete the tube.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 4th day of February, A. D. 1889.

WILLIAM ESTY.

Witnesses:
E. F. REEVES,
JOHN W. ASHMAN.