

J. HOLMES.
MANUFACTURE OF STOCKINGS.

No. 176,179.

Patented April 18, 1876.

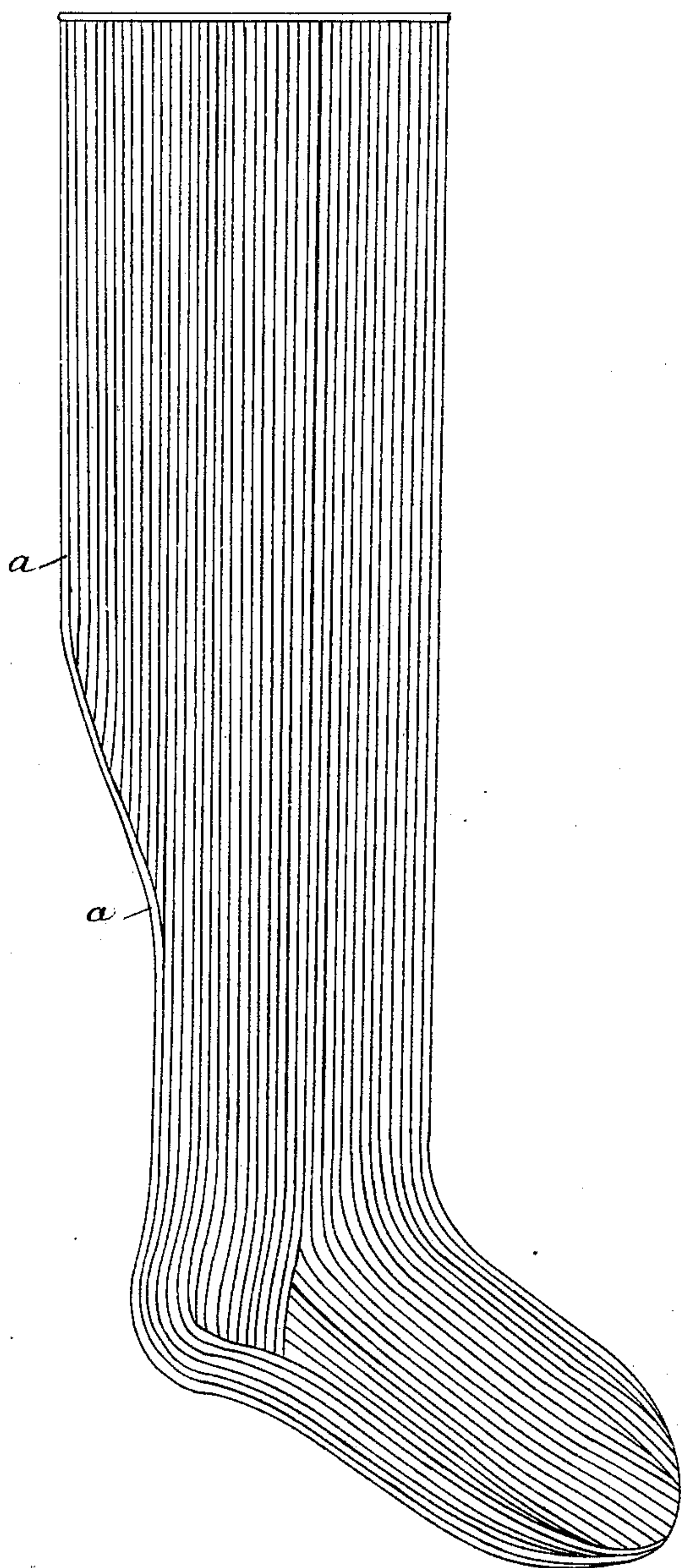


Fig. 1.

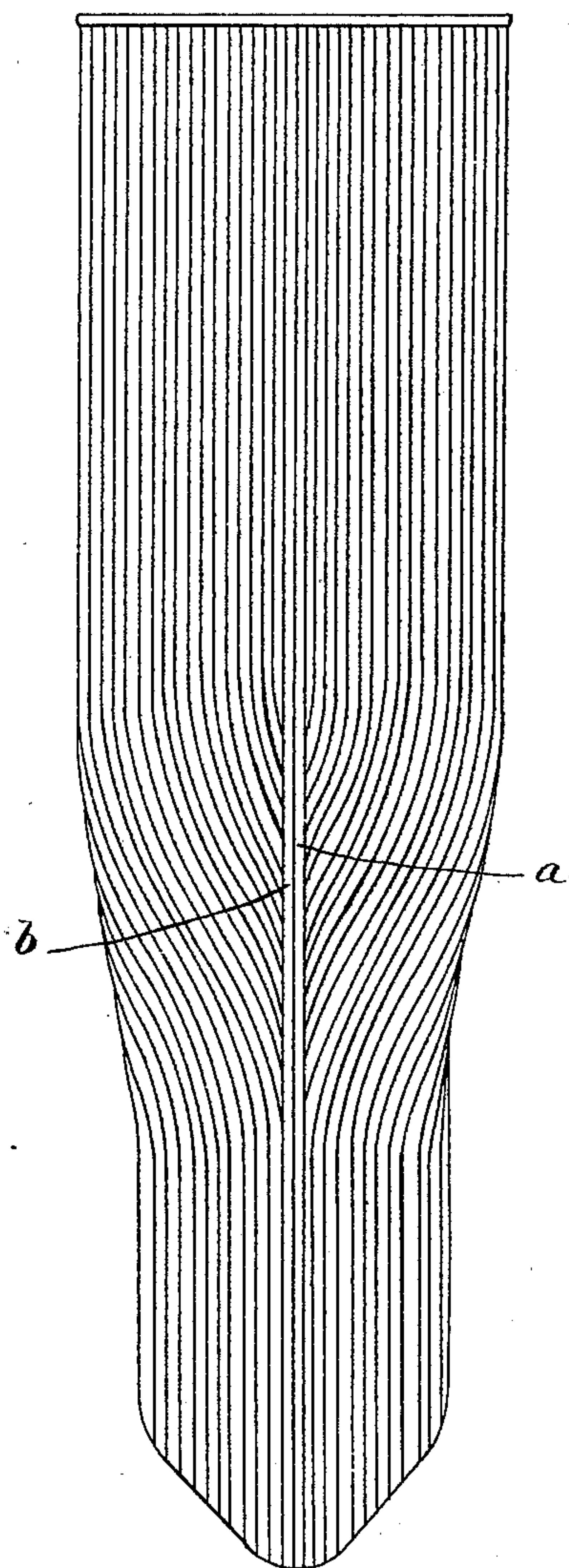


Fig. 2.

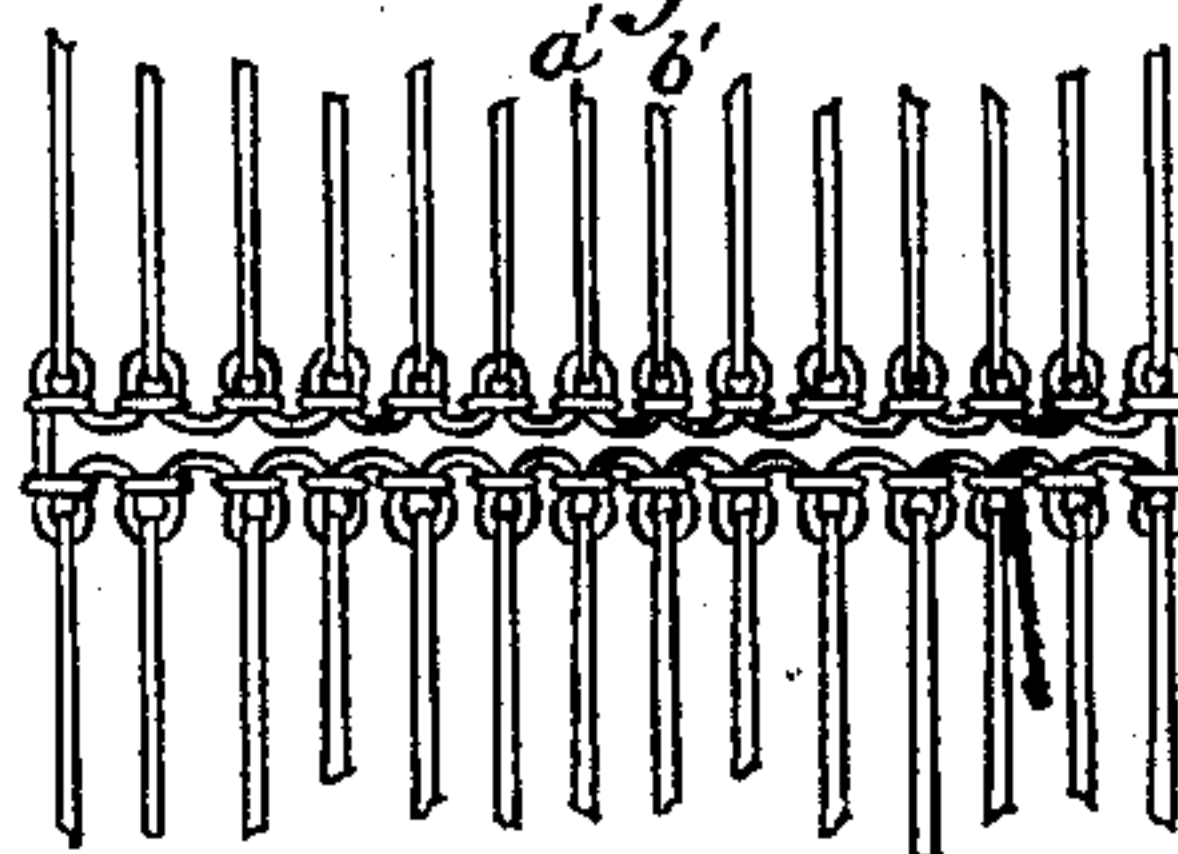


Fig. 5.

Witnesses.

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Inventor.

John Holmes

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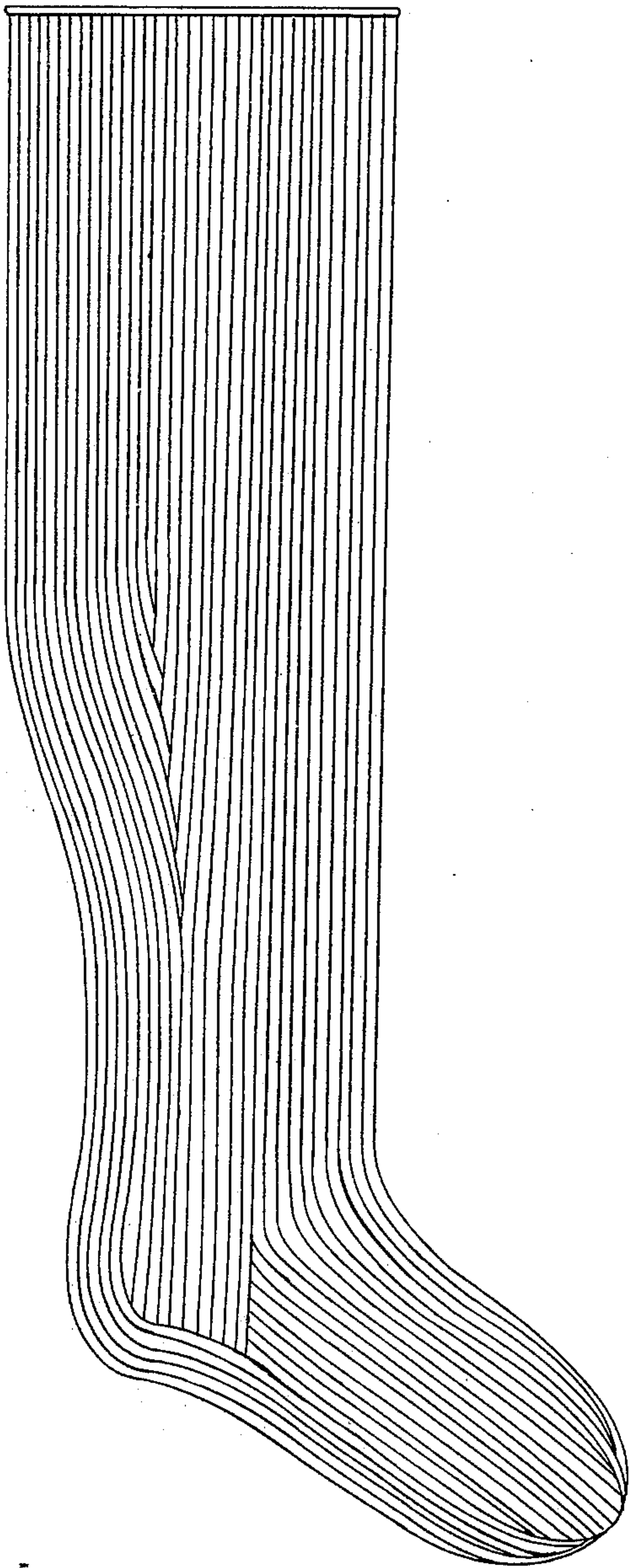


Fig. 3.

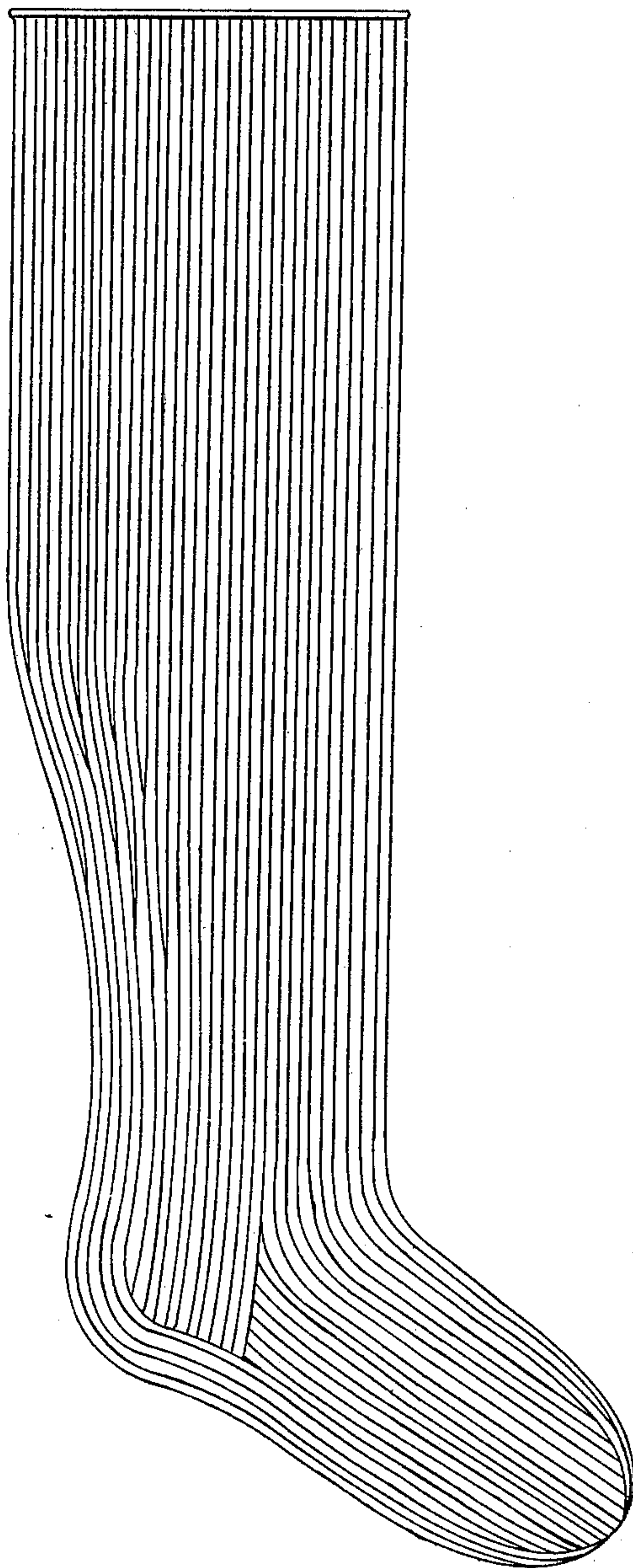


Fig. 4.

Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN HOLMES, OF NEWTON, MASSACHUSETTS.

IMPROVEMENT IN THE MANUFACTURE OF STOCKINGS.

Specification forming part of Letters Patent No. **176,179**, dated April 18, 1876; application filed July 9, 1875.

To all whom it may concern :

Be it known that I, JOHN HOLMES, of Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in the Manufacture of Stockings, of which the following, taken in connection with the accompanying drawings, is a specification :

My invention relates to the manufacture of circular-knit stockings by machinery, and has for its object the production of a much improved article at less cost than heretofore.

In the manufacture of stockings by machinery, as heretofore practiced, three methods have been employed, the first being to knit a flat web of varying width, narrowing at each edge for the purpose, and then uniting the two selvage edges by sewing or knitting the same together as an after operation, forming a seam in the back of the leg.

The second method is to knit a tube of uniform size, of suitable length for the leg, then widen a short distance and then narrow again, to form an enlargement for the heel, knit a short distance again of uniform size, and then narrow to form the toe. The stocking is then shaped by being drawn onto a form in a wet state and allowed to dry thereon.

The third method is that employed by those using the Lamb knitting-machine, which is as follows: A suitable number of stitches being taken up on each row of needles to make the top of the stocking of the required size, a given number of rounds are knit, when the outer stitch at one end of one row of the needles is taken off from its needle and placed upon the needle next to it and the needle from which the stitch was removed is thrown down out of action, when one, two, or more rounds are knit, and the outer stitch at the same end of the other row of needles is moved one needle toward the center and its needle is thrown down out of action. This operation is repeated until the tube is reduced to suitable size for the ankle, the narrowing in every case being at the same edge of the flat tube. The requisite number of rounds are then knit without narrowing, when it becomes necessary to form the heel. To do this in a proper way to produce a good shaped stocking, it becomes necessary to take the tube from the machine,

removing all the stitches from the needles, and replace the tube in the machine in such position that the line of narrowing in the leg, or the stitch in said line, shall occupy the center needle in the front or rear row of needles instead of the end needle in either row, as before. The process of knitting the heel and foot need not be described here, as my invention relates to the knitting of the leg, and is an improvement upon the last-mentioned method, and obviates the necessity of removing the tube from the machine and turning it around and taking up the stitches again by hand, as above described.

My improved method differs from either of those described ; and it consists, first, in narrowing or widening, for the purpose of shaping the leg of a seamless or circular-knit stocking produced by machinery along one or more lines in the rear half of the leg, so as to throw all the curve or swelling of the leg into the rear half, while the front remains straight, and also so that the stocking may be completed by knitting the heel and foot without removing the work from the machine, and taking up the stitches again by hand in a different position. To accomplish this very desirable result, I make use of the "transfer-comb," so-called, in narrowing the leg, taking, by its aid, all the stitches to the left or right of the needle where it is desired to narrow, according as said narrowing-needle is at the left or right of the center, and transferring all of said stitches, one or more stitches, toward the center of the row of needles in either direction, and throwing down out of action the two end needles. This is repeated as often as necessary to give the desired shape to the leg of the stocking, which may be varied at will by simply knitting a greater or less number of times around between any two successive narrowings.

At every alternate narrowing a stitch should be transferred from the two end needles in the front row of needles to the needles in the rear row, from which the end stitches have just been removed, for the purpose of equalizing the widths of the two sides of the flat tube, as well as the number of needles in action in each of the two rows of needles.

In practice, I prefer to narrow in two places

one upon each side of, and one stitch removed from, the center of the rear row of needles, leaving the two center rows of stitches without breakage from the top of the stocking-leg to the heel. This makes a very neat finish, but it is obvious that a very good-shaped leg may be produced by narrowing upon either side of the center at any point between the center and a point three or four stitches distant from the end of the row of needles in action, or the successive narrowing may be made at varying distances from the center of the row of needles, or the narrowing may all be done directly in the center of the row of needles.

In case the stocking is knit from the toe toward the top the operations are simply reversed.

Figure 1 is a side elevation of a stocking illustrating my improvement. Fig. 2 is a rear elevation of the leg. Figs. 3 and 4 represent, in elevation, modifications of my invention; and Fig. 5 is a plan diagram to illustrate the position of the work in the machine.

In the stocking illustrated in Figs. 1 and 2, *a b* represent the two lines of stitches occupying the central position in the back of the stocking, and next to which, upon either side, all the narrowing for shaping the leg is done. These stitches *a* and *b* are knit throughout upon the needles *a'* and *b'*, the narrowing being accomplished by taking all the stitches to the left of *a'* and transferring them one stitch to the right, and all of the stitches to the right of *b'* and transferring them one stitch to the left, this being done by means of the transfer-comb, so called, by taking all the stitches from the needles to the comb and moving them to the left or right, as desired, and then placing said stitches upon the needles again, all in a well-known manner.

In the modification shown in Fig. 3 the narrowing is done at a greater distance from the center of the back, but in regular order, all in the back half of the leg.

In the modification shown in Fig. 4 the nar-

rowing is scattered promiscuously over the central portion of the back half of the leg. In either case the narrowing is done in the central portion of the rear half of the leg, and upon the needles in the central part, or near the central part, of the rear row of needles by the aid of the transfer-comb, taking all of the stitches to the right or left of the point of narrowing at the same time and transferring them toward the center of the row of needles one or more stitches, as the case may be, while, at the same time, the work is in the proper position in the machine to complete the stocking by knitting the heel and foot without removing the work from the machine, turning it around, and picking up the stitches again by hand.

By this method the stocking can be made much quicker, and, consequently, cheaper, than by the methods now in use, and a better-finished stocking is produced than by the old method.

I do not claim that there is anything new in narrowing by the aid of the transfer-comb, as I am aware that that has been done before; but

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

The method herein described of producing seamless machine-knit stockings shaped to conform to the leg of the wearer by narrowing or widening entirely upon one row of needles, transferring for the purpose two or more stitches at each narrowing or widening from each end of said row of needles one or more stitches toward or from the center thereof, as the case may be, all as and for the purposes described.

Executed at Boston this 7th day of July, 1875.

JOHN HOLMES.

Witnesses:

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E. A. HEMMENWAY.