W. H. McNary.

Knit Fabric.

No. 16,285. Patented Dec. 23, 1856.

Fig. 1.

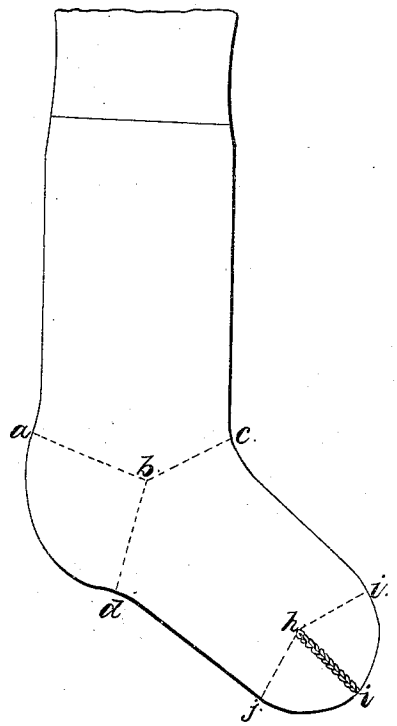


Fig. 2

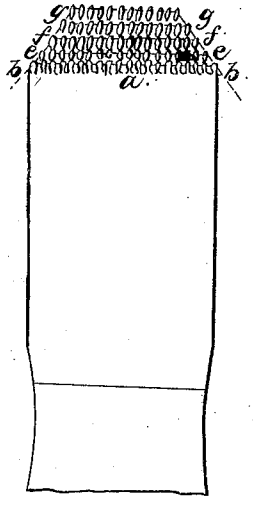
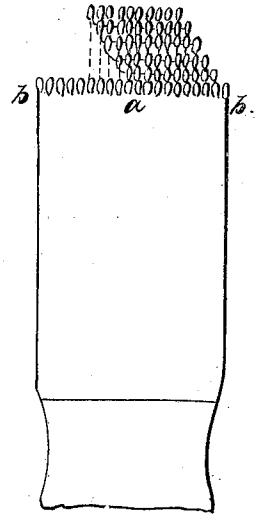


Fig. 3.



UNITED STATES PATENT OFFICE.

WILLIAM H. McNARY, OF BROOKLYN, NEW YORK.

MANUFACTURE OF HOSIERY.

Specification forming part of Letters Patent No. 16,285, dated December 23, 1856; Reissued February 17, 1857, No. 428.

To all whom it may concern:

Be it known that I, W. H. McNARY, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in the Manufacture of Hosiery; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention consists in a certain mode of operation, by which the heel of a piece of hosiery, and the toe also if desired, may be produced of a properly rounded or partly spherical form without a seam by knitting continuously from the leg toward the foot, or from the foot toward the leg, without removing the work from the needles, thereby not only expediting the manufacture but at the same time producing a neater and better article.

The invention may be carried out by means of either the circular or straight knitting machine but with more advantage by means of the circular machine, as with that machine it enables a perfectly seamless welt shaped stocking to be produced.

I will first describe, with reference to the accompanying drawings, the manner in which the invention is performed by the circular machine, and then a few words of explanation will suffice to show how it may be performed on a straight machine.

Figure 1, exhibits a side view of a sock. The leg is knitted, in the usual manner, as far as the line *a b c*, where the heel commences. It must be observed that before the heel commences this line is perfectly straight all the way around the stocking, but when the heel and toe are knitted on, it is made to appear in the side view, of the form shown. When the leg is thus completed, a row of stitches, or two or more rows, if the machine is constructed to knit two or more rows together, as is some times the case, is knitted from the point *b*, around past *a*, to a corresponding point *b*, on the opposite side of the sock, which is supposed to be exactly half way around, leaving the other half of the stitches from *b*, around past *c*, to the opposite corresponding point *b*, on the needles. A second row of stitches is then knitted in the opposite direction, on to the last-mentioned row, but is commenced, at one end on the second stitch and carried only to the last stitch but one of the former row, leaving the last stitch on the needle on which it was formed. A third row is then knitted, in the reverse direction, on the second row, commencing on the second stitch and proceeding only as far as the last stitch but one of the second row, leaving the last stitch on the needle on which it was formed. A fourth row is knitted on the third row in the same way, and in this way the knitting is always continued back and forth to the last stitch but one of the preceding row which is always left on the needle, thus reducing the number of stitches in every successive row of knitting but always keeping the same number of stitches on the needles. Instead of dropping only one stitch at each end of the row, two or more may be dropped in the same way.

By the above means a piece of knitting of a quarter or other requisite portion of a sphere is produced, which conforms to the natural shape of the human heel. After the knitting, in the above manner, has been carried on as far as desirable, which is generally till the row is reduced to a very small number of stitches, the knitting commences again all the way around the needles, which can be done at the end of any row knitted in the aforesaid manner as there is always the same number of stitches on the needles.

The line *d*, *b*, *c*, represents the line where the knitting is commenced all around again to form the foot, and the part included between the lines *a*, *b*, and *d b*, show the spherically-knitted part containing the heel.

I will attempt to exhibit in Fig. 2, the manner in which the heel is produced, which may serve to illustrate the operation more clearly than the foregoing description. This view is a back view of the leg of a stocking having a few rows of the heel stitches knitted on the leg, being represented in the inverted position it occupies in the machine. Of course only that half of the leg which is to have the heel knitted to it is visible in the back view. The line where the circular knitting of the leg ceases is indicated by *b*, *a*, *b*, to correspond with the letters of reference of Fig. 1. The line of loops *e*, *e*, represents the first row knitted half way around to commence the heel, the line of loops *f*, *f*, the second row, and the line *g*, *g*, the third row and it will be seen that each row has one stitch less than its predecessor,

at each end. This figure does not give an absolutely correct representation of the heel knitting, as it really appears, for the edge indicated by the red line would be held straight on the needles and the heel knitting would bulge out, but this is the only way to represent it so as to give an idea of the relative arrangement of the rows of knitting. This spherically knit heel is, as far as known to me, an entirely new feature in the manufacture of hosiery.

Fig. 3, exhibits another way of forming the heel on the same principle. This is a back view of similar character to Fig. 2. The leg is knitted to the line *a*, *b*, *c*, as shown in Fig. 2, in the same way as before described, and then a row of stitches is commenced from the same point *b*, as before described and extended a little beyond the center *a*, of the back of the leg. A second row is knitted on this first row back again toward *b*, but terminated as before described on the last stitch but one of the first row, and a third row is commenced on the second stitch of the second row and carried one stitch beyond and knitted to that stitch on the line *b*, *a*, *b*, which is the same line as *a*, *b*, *c*, Fig. 1, next beyond where the first row terminated. A fourth row is commenced on the next stitch still farther along the line *a*, *b*, *c*, and carried back again to the last stitch but one of the third row. A fifth row is then knitted back again from the second stitch of the fourth row and extended one stitch beyond the last stitch thereof and knitted to the next stitch of the line *a*, *b*, *c*, and so on. In consequence of the difficulty of representing the piece thus formed to produce the heel, owing to the bulging out of the part, I have not shown the last stitches at the left hand end connected with the row of stitches *b*, *a*, *b*, but merely shown dotted lines to indicate which stitches on the line *b*, *a*, *b*, the several rows of heel stitches connect with; when this piece is knitted to extend to the opposite point *b*, to that where it was commenced a second piece of the same form is commenced upon it from the last named or left hand point *b*, and worked in the opposite direction, and by working two or more pieces in this way the heel is completed and the foot may be commenced as described with reference to Fig. 1. This last method of performing my invention is inferior to that first described as it does not give so neat an appearance to the work and is only described to show that the spherical piece may produced in more ways than one, by the same principle of operation.

The toe may be produced of a spherical form in either of the ways above described. The toe, represented in Fig. 1, which has a seam at *h*, *i*, is supposed to be produced after proceeding with the circular knitting of the foot from the line *c*, *b*, *d*, to the line *j*, *h*, *i*, where the toe is to commence and then knitting half way around in either of the ways above described, to produce a piece of the form of a quarter or other portion of a sphere like the heel piece and then a piece of a similar form on the other half and knitting the edges together, thus leaving the seam *h*, *i*, where the said edges meet or by knitting half way around from one side to form a hemispherical piece, the seam may be brought in the line *h*, *j*, or *h*, *i*.

Hosiery with seamless toes may be produced on the same principle by knitting the toe first, commencing to knit on one half of the needles in either of the modes above described of producing the heel till a piece forming a sufficient portion of a sphere is produced. This piece is then put on the whole of the needles and the knitting is proceeded with all around it to commence the foot which is knitted all around the needles as far as the line *d*, *b*, *c*, and then the knitting on one half of the needles only is commenced again to form the heel. After the heel is completed, the knitting all around the needles is proceeded with again to make the leg.

The same results may be obtained in a straight knitting machine by making the seam up the front of the hose instead of up the back, as is the common practice, but the particular mode of operation need not be here described as the description of the application of the invention to circular knitting will enable persons skilled in the art to adapt it to a straight machine.

I do not confine myself to the use of any particular machinery to produce the results herein described, but

What I claim as my invention and desire to secure by Letters Patent, is—

The production of the heels and toes of hosiery by knitting a spherical piece on the cylindrical or straight portions of the leg or foot by the mode of operation herein described, whereby the same number of stitches is always left remaining on the needles, and the cylindrical or straight portion is enabled to be proceeded with again when desired, thus enabling the whole leg and foot to be produced by a continuous operation of the devices or machinery employed.

WM. H. McNARY.

Witnesses:
J. F. Buckley,
W. Tusch.

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