April 28, 1931. R. W. SCOTT 1,803,138

KNIT HOSIERY

Filed May 17, 1922

Fig. 1.

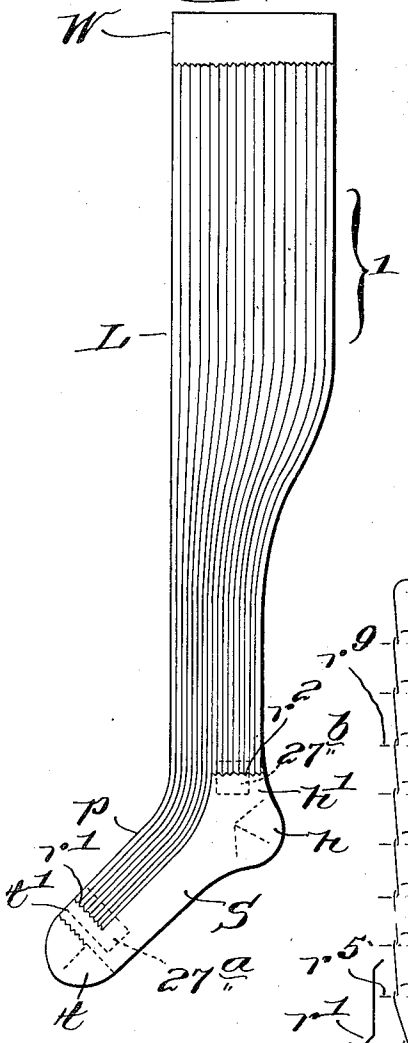


Fig. 2.

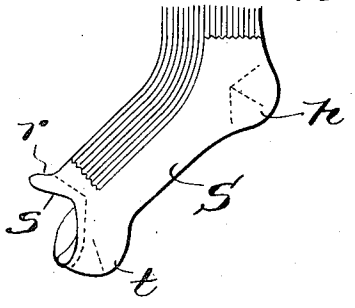


Fig. 3.

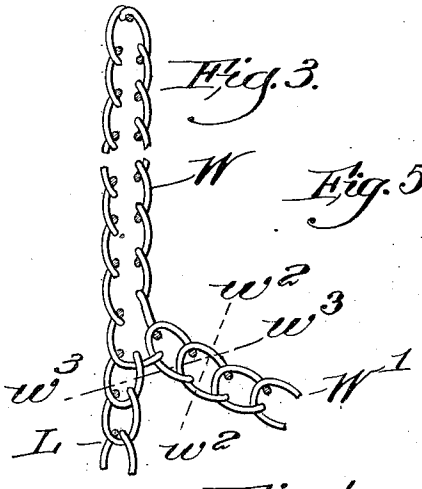
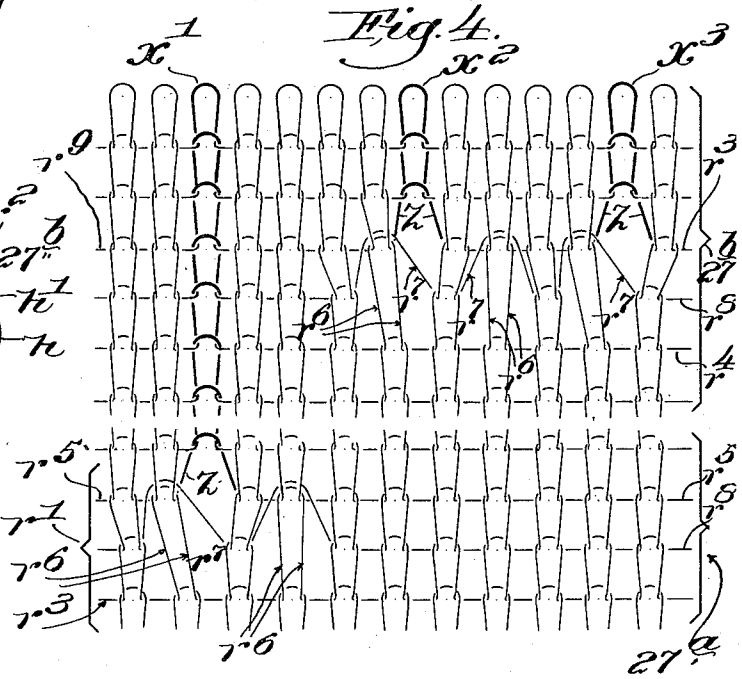


Fig. 5



Fig. 4.



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UNITED STATES PATENT OFFICE

ROBERT W. SCOTT, OF BABYLON, NEW YORK, ASSIGNOR TO SCOTT AND WILLIAMS, INC., OF NEW YORK, N. Y., A CORPORATION OF MASSACHUSETTS

KNIT HOSIERY

Application filed May 17, 1922. Serial No. 561,634.

This invention relates to articles of hosiery, including stockings, made of ribbed fabric and plain fabric, and containing ribbed fabric and plain fabric parts side by side, or end to end, or both.

One object of the invention is to provide a continuously knit, seamless stocking having, if desired, the usual seamless heel and toe pockets in plain fabric sections, having integral ribbed fabric portions beginning at a different place in the front and in the back of the stocking or other garment, and having an improved demarking structure between the ribbed fabric and the plain fabric; and also having, if desired, parts narrowed and widened appropriately, as by changes in the length or width of the stitch, changes in yarn or both; and also having, if desired, an automatically-made integral welt.

The invention also includes the art of making fabrics of the kind mentioned in such a way as to facilitate the manufacture in one operation, and especially to so devise the operations as to permit them to be the automatic function of a knitting machine having appropriate knitting, tensioning, yarn feeding and control devices for this purpose; for example, the machine of my application Serial No. 559,506, filed May 9, 1922 (Patent No. 1,641,554, September 6, 1927).

In carrying out my invention I prefer to provide for knitting the stocking herein shown and described as one preferred example only of fabrics corresponding to the invention in such a way as to begin the stocking at the toe end, and preferably to form each stocking as a separate piece of fabric begun on the bare needles of the machine, and cast off before beginning another stocking.

In the accompanying drawings:

Fig. 1 is a diagram elevation of a stocking showing one typical example only of the new article of hosiery;

Fig. 2 is a detail showing the stocking foot before looping, as delivered by the machine;

Fig. 3 is a longitudinal section through the top of the leg and the welt of the stocking shown in Fig. 1;

Fig. 4 is an enlarged outside or face view diagram of the fabric at the junctures of plain and ribbed knitting, for instance at the areas 27^a and 27^b of Fig. 1; and

Fig. 5 is a longitudinal section through the welt showing a modified product and a modified way of finishing the welt.

Stockings for winter or sporting wear, or for children, are most satisfactory when made of ribbed fabric, which combines elastic properties insuring comfort and a good fit with an excellent appearance. Stockings of the general type referred to have heretofore been made on hand-operated circular or straight machines, or by transfers of fabric from one machine to another, or from one set of needles to another set in the same machine, and therefore by relatively difficult and expensive operations.

Referring now to Figs. 1 to 4, these illustrate a preferred product and certain steps in the art or method of producing it. As shown, the stocking 1 comprises a seamless foot having the usual narrowed and widened plain fabric toe t, a plain fabric ring t' next to the toe; a plain fabric sole S and ribbed instep p, (which may have any desired number of wales proportionally to the total number of wales anywhere in the product); the usual heel h, and a short section of plain fabric h' above the heel.

The leg L is of rib knitting, preferably of uniform pattern such as 2-and-1 or 4-and-1, and at the junctures r' and r^2 between ribbed and plain, a sharp line of demarcation free from holes, of strong fabric and of attractive appearance, is secured by a structure presently explained. The leg is preferably fashioned at the calf by predetermined variation in the length of stitch, and the upper end of the stocking is provided with a welt W of plain fabric of desired length, ending in a cast-off section W^1 of ribbed fabric, Fig. 3, which may, if desired, be sewed to insure durability on the lines w^3—w^3, w^2—w^2, or both.

In some cases, where a turned welt of ribbed fabric only is desired, the plain-fabric welt W^2, Fig. 5, made by the automatic operation of the machine, may be very short to serve only as a guide for use in applying

the inturned upper end of the leg L, at the predetermined length fixed by the machine-placed welt, to the pins of a looper, in order to sew down by the looper seam w^6 a portion of the inturned upper end w^7 of the ribbed leg to form the welt. When this is done, the fabric W′ and the machine-made welt W^2 may be raveled away or cut off after sewing. Whichever way of finishing the fabric is resorted to, the length, the stitch-length, the kind of yarn, and all other features of the structure made are well adapted to be made upon a circular rib knitting machine by operations which can be automatically controlled to insure uniformity of product.

Referring now to Fig. 2, in the preferred operation the stocking is begun by first forming a selvage s on the bare needles, for instance by the method explained in my reissued Patent No. 13,752, June 16, 1914, and by then making loopers' rounds r of plain fabric before beginning the toe t. The selvage made at the beginning of the loopers' rounds is, according to my said patent, a fast edge against raveling in the direction in which knitting proceeds.

The ribbed fabric beginning respectively at the structures r^1 and r^2 includes added wales x^1, x^2, x^3, etc. Fig. 4, which may be produced by causing dial needles to enter the spaces between any desired recurrent pairs of cylinder needles upon which only the plain fabric sections h, t, S, h^1, etc. are knit. To make the structures r^1 and r^2 this entrance of needles to knit the added wales x^1, x^2, etc. is in respect to and to take loops z in courses r^5, r^6, into which the loops of tucked (accumulated-loop) partial courses r^3, r^4 are detained to be cast off with the knit loops r^7 of the courses r^8. The tucked loops are independent in number, in the parts of the course containing them, of the number of rib wales x^1 etc., but preferably are in such number as to occur always in one or the other of the wales flanking that containing an initial dial loop z. The leg of a loop r^7 thus always extends across the eyelet-hole which would otherwise be formed.

For forming the selvage s, alternate needles of one of the two series, cylinder and dial, are arranged to be active and inactive, the remainder being ever-active. The tuck stitches in the demarking structures r^1 and r^2 are formed on these occasionally active needles by causing these needles to retain the loops r^6 until after having taken the yarn of the next succeeding course, the initial back-wale loops z being drawn in the next following course.

The partial courses of tuck stitches in the plain fabric sections at r^1 and r^2 preceding the beginning of ribbed fabric not only have the effect of closing the eyelet-hole which would otherwise appear by the legs r^7 of the second loop of the tuck stitches, but these relatively frequent tuck stitches so placed cause an outwardly raised line at the edge between ribbed and plain fabric of pleasing appearance, serving to set off the ribbed fabric from the plain fabric.

By causing the instep p of ribbed fabric to be knit side by side with the sole S, the tubular foot comprised of these two parts of the fabric can be made satisfactorily narrow as compared with the top of the leg, although the stocking contains an unchanged number of face wales (cylinder needle wales) throughout. By the described way of knitting, the increased width of the fabric, e. g., for the foot, caused by introducing into it the back or dial wales x^1 etc. at the part p is deprived of effect to widen the foot by limiting the number of wales x^1 in the foot to a segment p containing less than half the whole number of face-wales, and corresponding to a portion only of the wales complementary to those in the heel and toe. For example, the sole section S may contain 96 wales of plain loops; the instep section p may contain 64 face-wales and 18 back wales; the leg may contain 160 face-wales and 40 back wales, and the heels and toes may be formed on a segment 80 wales wide. A short stitch for the foot and ankle and a longer stitch for the leg L, accompanied, if desired, by change of yarn to a heavier yarn, will now produce a narrow foot and wide leg.

As heretofore made, so far as I am aware, stockings having ribbed insteps have been produced only by transfer operations between the needles of the respective series used for ribbed knitting. This is so difficult and expensive an operation, or requires such an expensive and complex machine for machine production, as to have left the market without any ribbed-leg stockings also having ribbed insteps, except very expensive stockings made by hand, or by manually-governed machines.

The compromise usual in the art is a stocking having a ribbed leg and a plain foot, the ribbing beginning or ending all around the leg at the same point above the heel. These stockings are not satisfactory for wear with low shoes. This invention provides a satisfactory stocking in which the ribbed pattern extends unaltered over all parts of the stockings exposed in wear.

What I claim is:

1. A tubular knit fabric partly ribbed and partly plain having ribbed fabric following a plain fabric portion in the direction of the length of the fabric, the ribbed fabric at one circumferential segment of the tube beginning at a different point in the length of the tube from the ribbed fabric in another circumferential segment of the tube, the plain fabric being provided with an eyelet-hole closing structure at the beginning of the rib fabric.

2. A knit stocking having a leg and instep of circular-knit rib fabric, and having an integrally formed foot with a plain fabric sole, the plain fabric wales being continuous throughout the stocking and containing segmental courses containing tuck stitches, the initial loops of the back-wales of the rib fabric instep and the back of the rib fabric leg being respectively taken from segments of circular plain-fabric courses next following the tucked segmental courses and near the toe, and above the heel.

3. A knit stocking having a leg and instep of circular-knit rib fabric, and having an integrally formed foot with a plain fabric sole, the initial loops of the introduced back-wales of the rib fabric instep and the back of the rib fabric leg being respectively taken from segments of circular plain-fabric courses having therein tuck stitches adapted to mark off the rib fabric and close the initial-loop eyelet-holes.

4. A knit stocking having a leg and instep of circular-knit rib fabric, and having an integrally formed foot with a plain fabric sole, the initial loops of the back-wales of the rib fabric instep and the back of the rib fabric leg being respectively taken from segments of circular plain-fabric courses having therein tuck stitches adapted to mark off the rib fabric and close the initial-loop eyelet-holes, the back-wales of the rib fabric having fewer initial loops than there are tuck stitches in the preceding plain fabric segment where the said initial loops occur.

5. A circular-knit seamless stocking having the usual heel and toe, a ribbed instep and a ribbed leg, and a plain fabric sole, the fabric having the same number of face-wales throughout, the back-wales being initiated in succession to the plain fabric near the toe and above the heel respectively for the ribbed instep and the back of the leg of the stocking, the courses preceding the initial loops containing stitches accumulated by tucking in wales flanking the initial stitches of the back-wales.

6. A stocking blank having in succession a starting selvage, loopers' rounds, a narrowed and widened toe; a plain-fabric sole and a ribbed-fabric instep side by side; a narrowed and widened heel; and a leg ribbed all around, terminating in a tubular plain fabric welt and following courses of ribbed fabric, the initial loops of the back-wales of the ribbed fabric being drawn from segments of courses of the plain fabric having loops interlocked with detained loops from a preceding course.

7. A stocking partly ribbed and partly plain having a seamless tubular foot and seamless ribbed tubular leg comprising throughout face wales of knit loops, a part of a course only at one place in the length of the stocking next to ribbed fabric containing tuck stitches in said face wales, and a course elsewhere in the length of the stocking next to ribbed fabric containing tuck stitches in said face wales on the other side of the stocking from said part of a course.

8. A stocking having a seamless tubular foot and seamless tubular leg, a part of a course only at one place in the length of the stocking containing tuck stitches, and having at the other side of the tube constituting the stocking a part only of a course containing tuck stitches, said partially tucked courses being in face wales of the knit fabric and separated in the direction of the length of the stocking, the fabric extending in the direction of the length of the stocking from a course next to said tucked partial courses being ribbed.

Signed by me at New York, New York, this eighth day of May, 1922.

ROBERT W. SCOTT.