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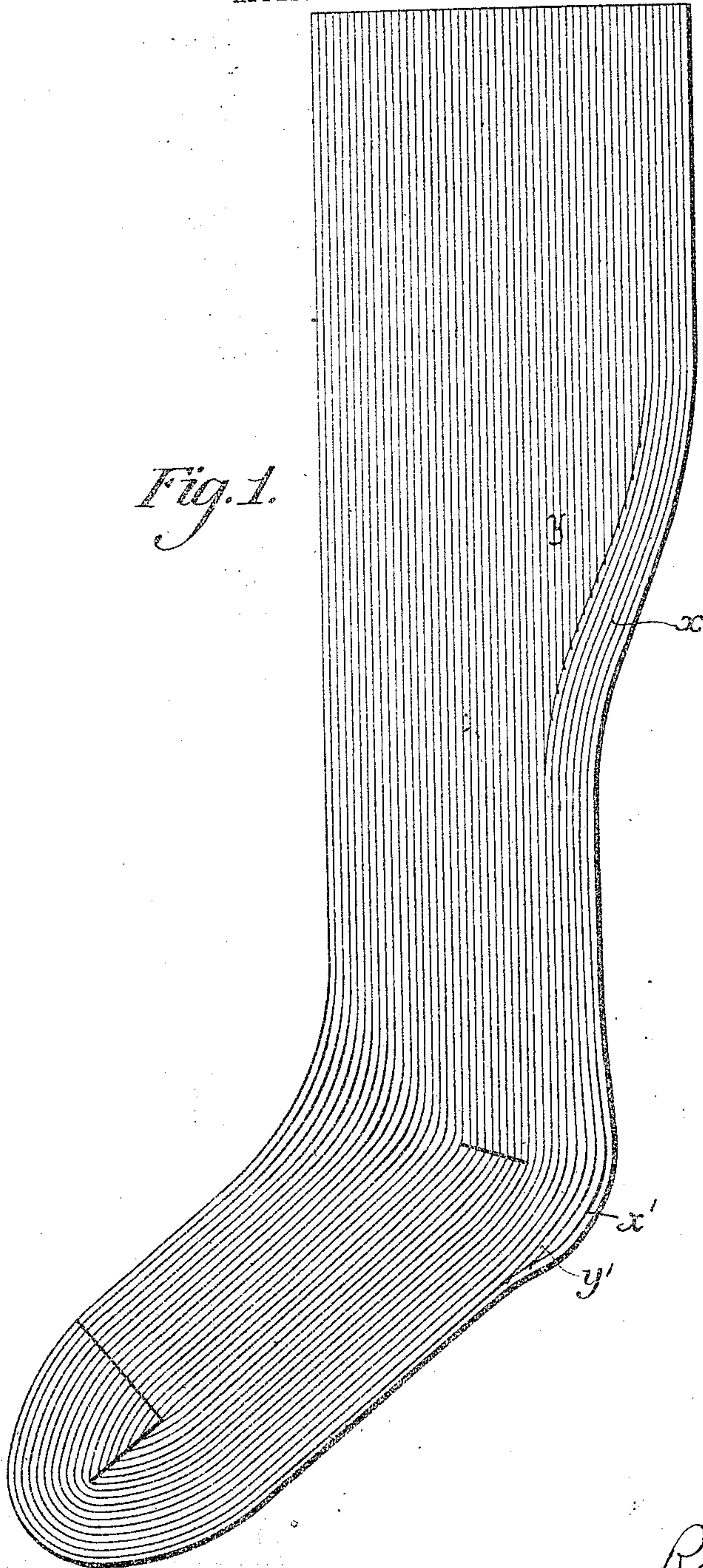
R. W. SCOTT.

NARROWED KNITTED WEB, HOSIERY MADE THEREFROM,  
AND MODE OF MAKING SAME.

APPLICATION FILED JUNE 5, 1906.

2 SHEETS—SHEET 1.

*Fig. 1.*



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

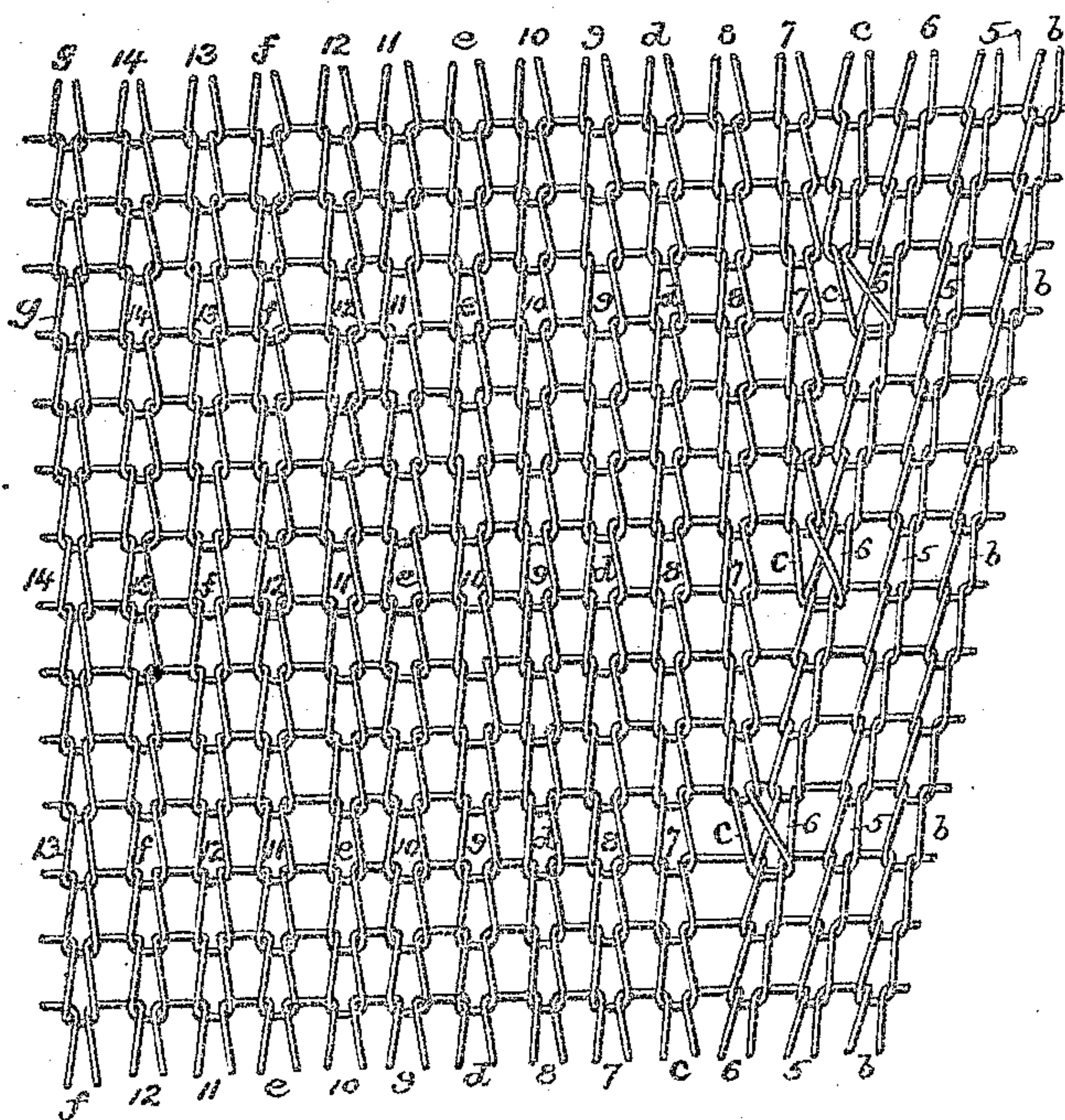
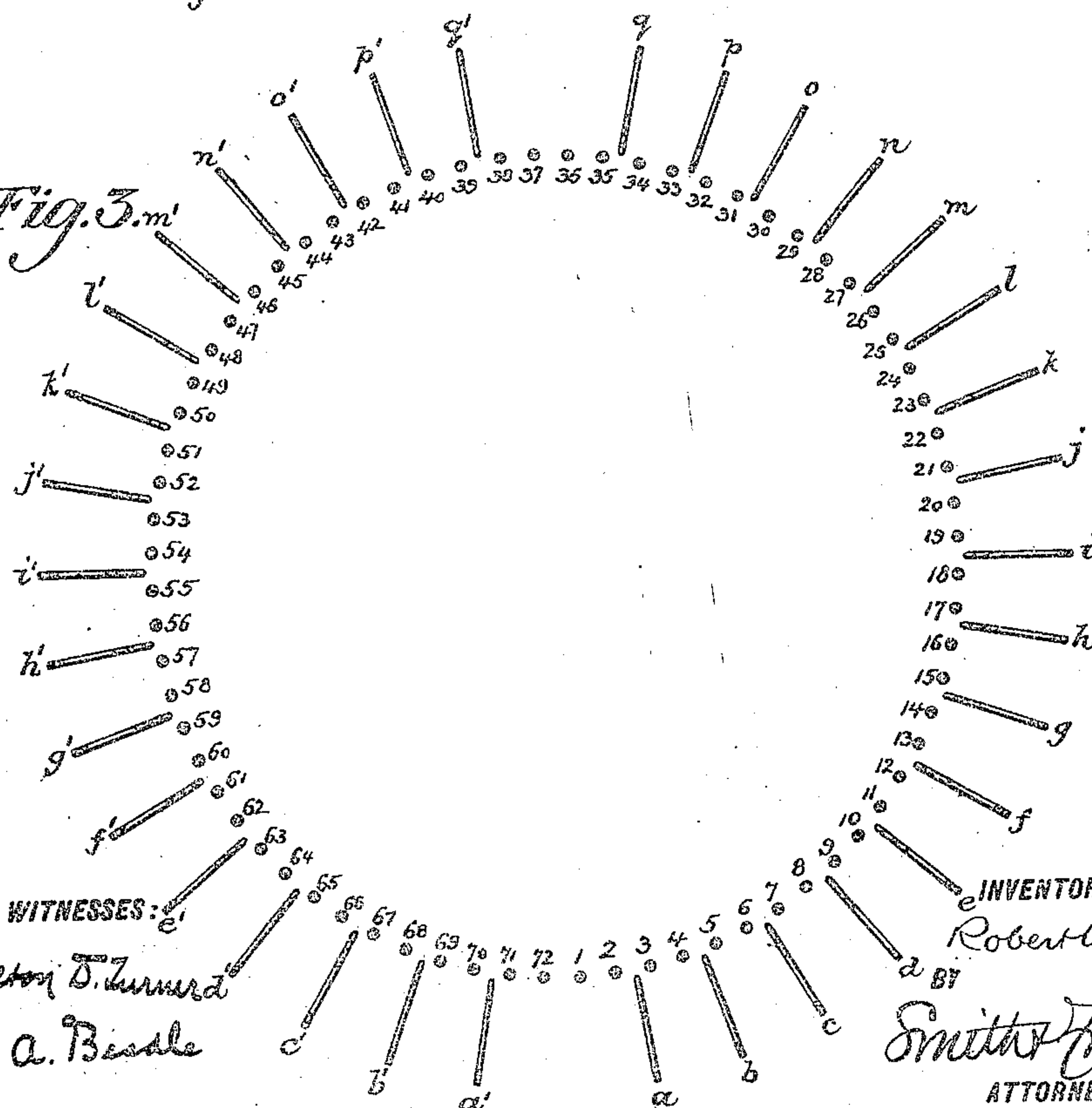


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## NARROWED-KNITTED WEB, HOSIERY MADE THEREFROM, AND MODE OF MAKING SAME.

No. 897,496.

Specification of Letters Patent.

Patented Sept. 1, 1908.

Application filed June 5, 1906. Serial No. 320,268.

*To all whom it may concern:*

Be it known that I, ROBERT W. SCOTT, a citizen of the United States, residing in Leeds Point, Atlantic county, New Jersey, have invented certain Improvements in Narrowed-Knitted Webs, in Hosiery Made Therefrom, and in the Mode of Making Same, of which the following is a specification.

The object of my invention is to produce a stocking having a seamless heel and a seamless leg, with shaped calf portion having a band resembling the bordering wales, which are present in the calf portion of a stocking made from a flat fashioned web, my improved stocking being also provided, if desired, with a seamless toe pocket, and a seamless foot with gussets, whereby the instep portion of the stocking may be wider than the foot portion.

Certain features of my invention are also applicable to the production of seamless tubular webs having shaped portions with an equivalent for the usual bordering wales and intended for other purposes than the manufacture of stockings.

In the accompanying drawings:—Figure 1 is a view of sufficient of a stocking to illustrate my present invention, the wales of stitches being represented by single lines; Fig. 2 is an exaggerated view of part of the web illustrating my improved method of fashioning the same without disturbing the wales which represent the bordering wales, and Fig. 3 is a diagrammatic view representing an arrangement of needles in a knitting machine devised for the carrying out of my invention.

Referring in the first instance to Fig. 3 of the drawing the small circles numbered from 1 to 72 inclusive, represent the cylinder needles of a circular knitting machine provided with means for knitting seamless heel and toe pockets, and the letters from *a* to *q* and from *a'* to *q'* inclusive, represent fashioning needles which operate in an annular dial surrounding the cylinder above the top of the same, whereby these needles draw stitches in the same direction as the cylinder needles, and hence produce a plain web, the machine in this respect being distinct from one of the rib type, in which the dial needles are located on the inside of the cylinder and draw stitches in a direction opposite to those of the

cylinder needles. Supposing that a stocking is being knitted upon a machine of this character, the knitting operation begins at the top of the stocking with all of the needles in operation, hence the tubular web produced will contain 106 wales, 72 of these wales being knitted upon the cylinder needles, and the remaining 34 upon the dial needles. If, therefore, the stitches upon the dial needles were transferred to the adjoining cylinder needles, and said dial needles were put out of action there would be a reduction in the size of the tube from 106 wales to 72 wales, this reduction being abrupt if all of the dial needles transferred their stitches and were put out of action at once, and being more or less gradual if the dial needles transferred their stitches and were put out of action successively, the angle of reduction being graduated as desired, either by retirement of the dial needles singly or in series of two or more at once, or by knitting any desired number of courses of stitches between successive retirements of the dial needles.

In the production of the stocking such as shown in the drawing, a shaped calf with narrowings *y* and a foot tube with gussets *y'* are produced; and outside of the narrowings *y* is a band *x*, and outside of the gussets *y'* a narrower band *x'*, each of these bands consisting of a series or group of continuous parallel wales which resemble the bordering wales formed on the edges of the flat web from which an ordinary full-fashioned stocking is made, consequently, although in my improved stocking the wales comprising the bands *x* and *x'* are part of a continuous tubular web and not wales on the borders or edges of a flat web, I have, for convenience, referred to the groups of continuous parallel wales constituting said bands *x* and *x'* as "bordering wales" which they are in the sense that they border the narrowings whereby the shaping of the calf is effected and the instep gussets are produced. The dial needles are, by preference, retired singly and at relatively short intervals. The dial needles lettered from *c* to *q* and from *c'* to *q'* inclusive, are employed for the shaping of the calf portion of the leg of the stocking, and the dial needles *a*, *b* and *a'*, *b'* are employed for the production of the gussets at the instep portion of the stocking, the needles 1, 2, *a*,



3, 4, *b*, 5 and 6, and 72; 71, *a'*, 70, 69, *b'*, 68 and 67, being those upon which the bordering wales *x* in the shaped portion of the calf are produced, and the needles 1, 2, 72 and 71, 5 being those upon which the bordering wales *x'* in the gusseted portion of the foot are knitted. The number and disposition of the needles of the cylinder and dial thus shown are, however, purely arbitrary, and are not 10 intended to indicate the actual conditions in practice, as the operative machine will have more needles both in the cylinder and dial than are here represented.

I will describe the shaping operation as effected at the calf of the stocking, and the 15 gusseting operation as effected at the instep, in reference to one side of the stocking only, it being understood that the shaping operations at the opposite side of the stocking are 20 precisely the same. Assuming that the leg portion of the stocking is being knitted of full diameter, the first narrowing operation for the shaping of the calf portion of the stocking is effected by transferring the 25 stitches from the needles in the following way: *c* to 6, 7 to *c*, 8 to 7, *d* to 8, 9 to *d*, 10 to 9, *e* to 10, 11 to *e*, 12 to 11 and so on until needle *q* transfers its stitch to needle 34, whereupon said needle *q* is retired. After 30 the production of any desired number of courses of stitches further narrowing is effected by transferring the stitches in the same way until needle *p* is reached, which needle is then retired, and these operations are re- 35 peated, stitches transferred from each needle to its adjoining needle, and the needles *o*, *n*, *m*, *l*, *k*, *j*, *i*, *h*, *g*, *f*, *e*, *d* and *c* successively retired, by which time the full narrowing operation will have been completed, the 40 doubling being always effected from the needle *c* onto the needle 6, so that the wales produced upon the needles 6, 5, *b*, 4, 3, *a*, 2 and 1 are never disturbed but produce the band *x* of continuous parallel stitches and 45 the web produced upon the remaining needles retains its uniform appearance, there being no doubling of stitches in any of said wales. While I prefer to drop out the narrowing wale needles in regular sequence, this is not 50 necessary, as said needles may be dropped in any desired order, so long as the narrowing wale needle next to the innermost bordering wale needle is the last to be retired.

The fashioned portion of my improved 55 web presents the same appearance as that of a web fashioned upon a straight machine of the "Cotton" type, with this exception, that the transferred stitches overlap the bordering wales on the face of the web 60 instead of the stitches of the innermost bordering wales overlapping stitches of the adjoining standing wales, as they do when the bordering wales are carried inwardly onto the standing wales as in such "Cotton" 65 machine.

Having narrowed the tubular web from a diameter available for the leg portion of the stocking to one available for the ankle portion, the knitting of said ankle tube proceeds until the formation of the seamless 70 heel becomes necessary. This seamless heel is produced in the ordinary way, by temporarily throwing out of action but permitting to retain their stitches, the needles around one-half of the cylinder, say for in- 75 stance, those from 19 to 54 inclusive, and then knitting to and fro upon the remaining needles from 18 to 1, and 72 to 55, and upon the dial needles *a*, *b* and *a'*, *b'*, first narrowing and then widening upon the end 80 needles of the set, say for instance, the needles 9 to 18 inclusive, at one end and the needles 64 to 55 inclusive at the other end, and then resuming the production of tubular web for the foot. At this time the 85 formation of the instep gussets is effected by first transferring stitches from needle *a* to 2, 3 to *a*, 4 to 3, and *b* to 4, needle *b* then going out of action, while on the next narrowing the stitch is transferred from needle *a* to 90 needle 2, and said needle *a* is put out of action. The cylinder needles only are now in action, and tubular web is knitted upon the same for the production of the narrow foot, and after the completion of the latter 95 a seamless toe pocket is formed upon the needles 18 to 1 and 72 to 55, in the manner before set forth in explaining the formation of the heel pocket, and preparatory to beginning the formation of a new stocking 100 upon all of the needles.

By the above described operations I am enabled to produce a stocking having a seamless leg and foot, seamless heel and toe pockets, and shaped calf and gussets having bor- 105 dering wales, and therefore presenting the same appearance as the corresponding portions of what is termed a "full fashioned" stocking, the number of gusset-bordering wales being less than the number of bordering 110 wales in the shaped calf.

The use of one leg-fashioning needle for every two cylinder needles is preferred, because it is the customary practice in knitting 115 women's stockings to narrow the web to the extent of one-third of the number of wales contained therein. It will be evident, however, that more or less of these leg fashioning dial needles may be employed without de- 120 parting from the essential features of my invention, and the number of gusseting needles may also be varied in like manner, but these gusseting needles should never extend beyond the bounds of the central 125 group of cylinder needles which are always in action in knitting the heel, otherwise they would interfere with the fashioning of said heel.

While I have shown my invention as embodied in the production of a stocking, and 130



while I especially claim this product, my invention may also be adopted in the manufacture of shaped, tubular, seamless webs, with bordering wales on the shaped portions, and intended for other purposes than stockings, for instance, for making the legs of drawers, the sleeves of shirts, and the like.

I claim:—

1. A shaped, tubular, seamless, machine-knit web having bordering wales in the shaped portion, and narrowing wales interknitted with said bordering wales and overlapping the same on the face of the web.

2. A machine-knit stocking having a seamless heel, and a seamless leg having a shaped calf portion with bordering wales and narrowing wales interknitted therewith.

3. A machine-knit stocking having seamless heel and toe pockets, and a seamless leg with shaped calf portion having bordering wales and narrowing wales interknitted therewith.

4. A machine-knit stocking having seamless heel and toe pockets, a seamless foot, and a seamless leg having shaped calf portion with bordering wales and narrowing wales interknitted therewith.

5. A machine-knit stocking having a seamless heel and a seamless foot having instep gussets with bordering wales and narrowing wales interknitted therewith.

6. A machine-knit stocking having a seamless heel, a seamless foot having instep gussets with bordering wales and narrowing wales interknitted therewith, and a seamless leg with shaped calf having bordering wales and narrowing wales interknitted therewith.

7. A machine-knit stocking having seamless heel and toe pockets, and a seamless foot with instep gussets having bordering wales and narrowing wales interknitted therewith.

8. A machine-knit stocking having seamless heel and toe pockets, a seamless foot having instep gussets with bordering wales and narrowing wales interknitted therewith, and a seamless leg having a shaped calf portion with bordering wales and narrowing wales interknitted therewith.

9. A machine-knit stocking having a shaped, seamless leg with bordering wales and narrowing wales interknitted therewith, and a seamless foot with gussets, also having bordering wales and narrowing wales interknitted therewith, the latter bordering wales being less in number than those of the leg.

10. A machine-knit stocking having a shaped, seamless leg with bordering wales and narrowing wales interknitted therewith, a seamless heel, and a seamless foot with gussets, also having bordering wales and narrowing wales interknitted therewith, the latter bordering wales being less in number than those of the leg.

11. A machine-knit stocking having a

shaped, seamless leg, with bordering wales and narrowing wales interknitted therewith, a seamless heel, and a seamless foot with gussets having bordering wales and narrowing wales interknitted therewith, the latter wales and their bordering wales being continued unbroken around the rear of the heel.

12. The mode herein described of producing a shaped, tubular, seamless web, said mode consisting in first knitting the web upon two sets of needles, one set comprising needles employed to knit bordering wales and standing wales and the other set comprising needles upon which are knitted narrowing wales, transferring a wale in a part of the fabric some distance removed from the bordering wales, and correspondingly shifting stitches of all of the wales intervening between said transferred wale and the bordering wales, the final transferred stitch being interknitted with a bordering wale.

13. The mode herein described of producing a stocking having a shaped, seamless leg and a seamless heel, said mode consisting in first knitting a tubular web upon two sets of needles, one set comprising needles employed to knit bordering wales and standing wales, and the other set comprising needles upon which are knitted narrowing wales, transferring a wale in a part of the fabric some distance removed from the bordering wales, and correspondingly shifting stitches of all of the wales intervening between said transferred wale and the bordering wales, the final transferred stitch being interknitted with a bordering wale, repeating this operation until the desired narrowing of the web has been effected, then suspending the knitting operation upon a portion of the fabric, and then narrowing and widening upon the remaining portion to produce a seamless heel pocket thereon.

14. The mode herein described of producing a stocking with shaped, seamless leg, seamless heel, and narrowed seamless foot, said mode consisting in first knitting a tubular web upon two sets of needles, one set comprising needles employed to knit bordering wales and standing wales and the other set comprising needles upon which are knitted narrowing wales, transferring a wale in a part of the fabric some distance removed from the bordering wales, and correspondingly shifting stitches of all of the wales intervening between said transferred wale and the bordering wales, the final transferred stitch being interknitted with a bordering wale, repeating this operation until the desired narrowing has been effected, suspending the knitting operation upon a portion of the fabric, narrowing and widening upon the remaining portion, including foot narrowing wales, to form a seamless heel pocket, resuming the production of tubular web, repeating the narrowing operation as before until the desired narrow-



ing of the foot tube has been effected, and then proceeding with the knitting of said narrowed foot tube.

15. The mode herein described of producing a stocking with shaped seamless leg, seamless heel, narrowed seamless foot, and seamless toe pocket, said mode consisting in first knitting a tubular web upon two sets of needles, one set comprising needles employed to knit bordering wales and standing wales and the other set comprising needles upon which are knitted narrowing wales, transferring a wale in a part of the fabric some distance removed from the bordering wales, and correspondingly shifting stitches of all of the wales intervening between said transferred wale and the bordering wales, the final transferred stitch being interknitted with a bordering wale, repeating this operation until the desired narrowing of the web has been effected, then suspending the knitting opera-

tion upon a portion of the fabric, narrowing and widening upon the remaining portion, including foot narrowing wales, to form a seamless heel pocket, resuming the production of tubular web, then narrowing in the same manner as before until the desired narrowing of the foot tube has been effected, then proceeding with the knitting of said narrowed foot tube, and then repeating the operations before resorted to in order to form a seamless heel pocket for the purpose of producing a seamless toe pocket upon said narrowed foot tube.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ROBERT W. SCOTT.

Witnesses:

HAMILTON D. TURNER,  
KATE A. BEADLE.