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G. P. BOSWORTH

HOSIERY AND METHOD OF MAKING THE SAME

Filed July 5, 1919

Fig. 1.

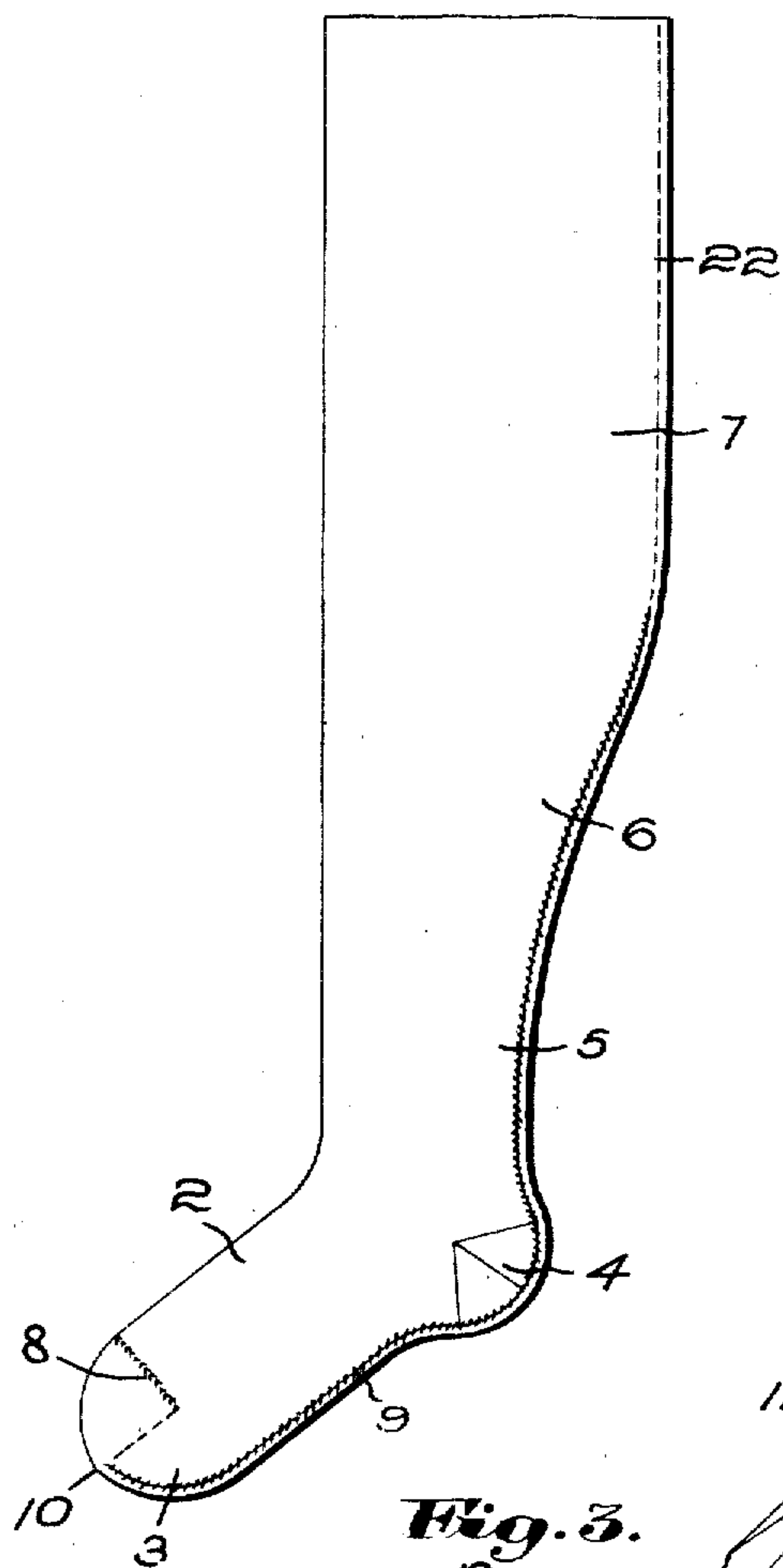


Fig. 2.

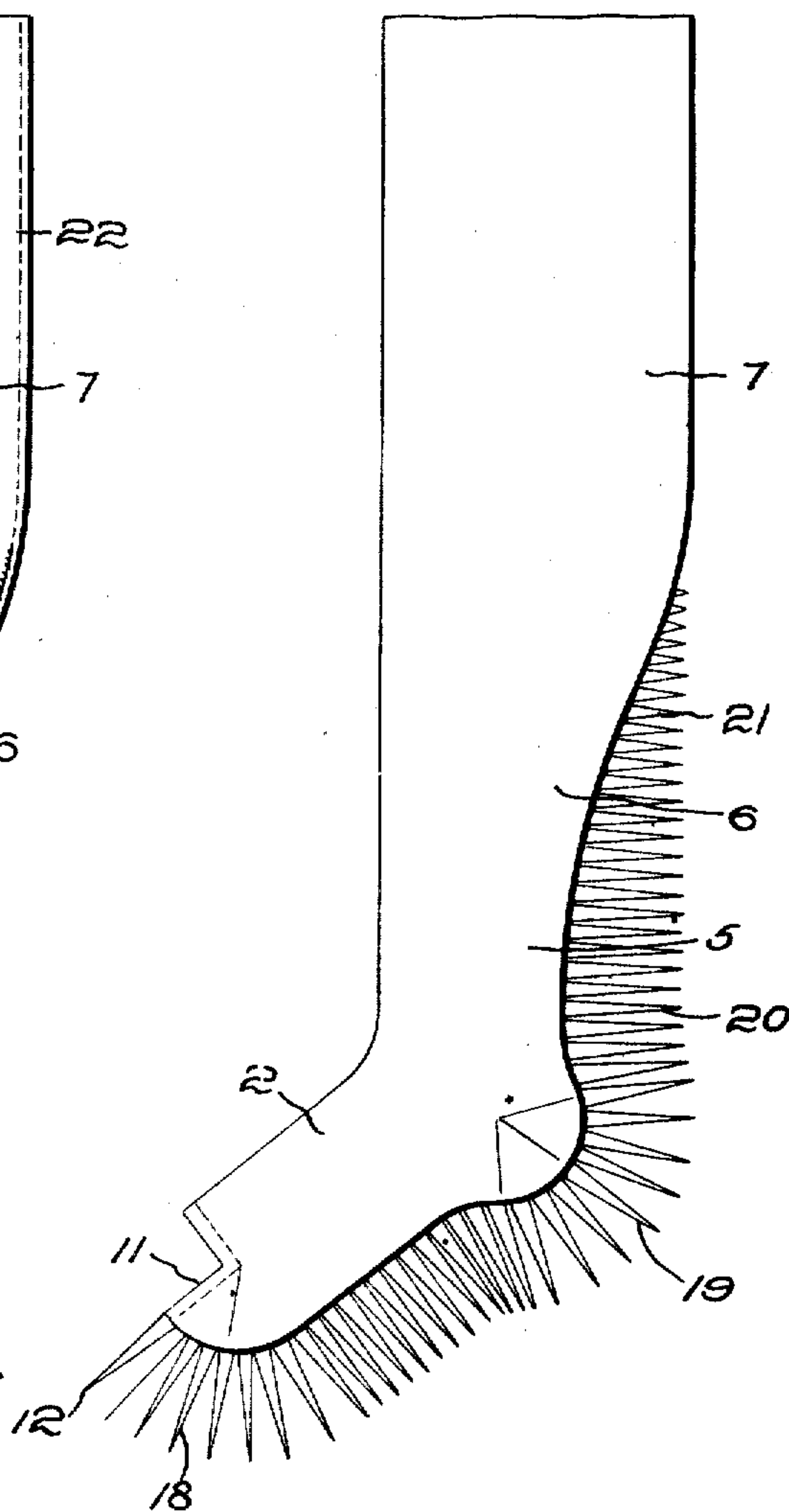
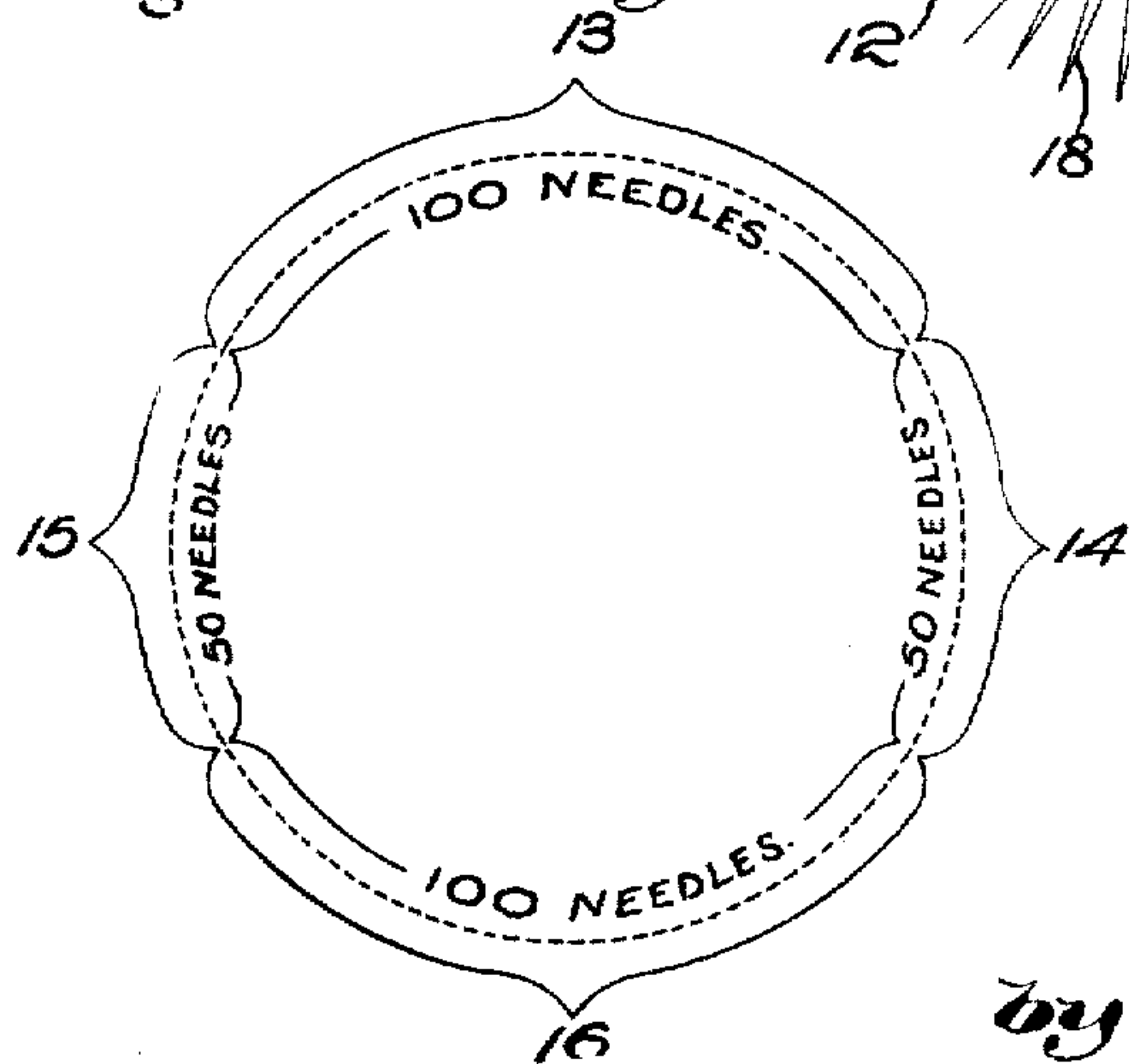


Fig. 3.



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UNITED STATES PATENT OFFICE.

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HOSIERY AND METHOD OF MAKING THE SAME.

Application filed July 5, 1919. Serial No. 308,383.

To all whom it may concern:

Be it known that I, GEORGE P. BOSWORTH, a citizen of the United States, and a resident of Central Falls, in the county of Providence and State of Rhode Island, have invented an Improvement in Hosiery and Methods of Making the Same, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to hosiery and to the method of making the same.

The object of the invention is economically to produce a stocking, more particularly of the full-fashioned knitted type, having a foot including toe and heel pockets and a leg portion including ankle and fashioned calf seamed respectively along the center of the bottom of the foot and up the center of the back of the leg to the top of the calf.

Referring to the accompanying drawings, wherein I have merely for the purposes of illustration disclosed one embodiment of my invention:

Fig. 1 is a side elevation of a completed stocking made in accordance with my invention;

Fig. 2 is a side elevation of one form of blank therefor; and

Fig. 3 is a diagram illustrating the arrangement of the needles employed in knitting the stocking blank.

In the drawings, referring particularly to Fig. 1, a stocking is shown embodying a foot 2, including toe and heel pockets 3 and 4 respectively, an ankle 5, a fashioned calf 6 and a tubular leg 7.

The toe pocket 3 is herein shown as having a seam 8 across the top thereof, and in addition to said seam there is a seam 9 extending from or near said seam 8 along the tip of the toe pocket around the tip of the toe as at 10 along the center of the bottom of the foot and up the center of the back of the leg to the top of the calf 6, but obviously within the scope and purpose of the invention said seam 9 may be extended if desired to the top of the leg 7, merely, however, to form an imitation or mock seam.

All of the parts hereinbefore mentioned may be and preferably are formed automatically in and by a continuous series of knitting operations upon one and the same

machine, and as hereinafter more fully set forth.

Although I shall herein refer to the stocking as a machine-knitted stocking and refer to its formation upon the machine of the general type, known as a circular knitting machine wherein either the needle cylinder or the knitting cams have relative rotary or reciprocatory movement, it is distinctly to be understood that within the scope and purpose of the invention the stocking may be knitted by hand or upon other types of machines than those to which reference has been made, as, for example, on a straight bar knitting machine or a knitting frame so-called. As previously stated, the stocking blank, from which the stocking embodying this invention is produced, is knitted upon a circular knitting machine and the production thereof involves both rotary and reciprocatory movements of the machine, and I will for convenience refer to these movements as being applied to the needle carrier or cylinder, rather than to the knitting cams. Obviously, the knitting of the stocking blank may be started either at the top of the leg or at the toe, but herein I shall refer to the operation as beginning at the toe and upon a circular series of needles having an interruption or gap in the circular continuity of wales formed by the withdrawal of a certain number of needles at a point in the circumference representing the center of the bottom of the foot portion of the stocking. Upon this interrupted series of needles I proceed to knit a plurality of courses either reciprocatingly or as herein shown by circular knitting, thereby to form a series of protective courses 11, opposite ends of said courses being connected together by floating yarns 12, which span the gap produced by the absence, during such knitting, of the above-mentioned withdrawn needles.

Having knitted a sufficient number of these protective courses, the next step is to produce the toe pocket 3, the first course in the formation thereof being effected by withdrawing from action in the usual manner the needles representing the instep needles which, in other words, are those upon which the upper portion or half of the foot of the stocking is knitted, said needles retaining their loops while thus withdrawn. Knitting next proceeds upon the remaining portion

of the needles which are arranged in two groups, substantially comprising the same number of needles, but separated by a gap produced by the withdrawn needles hereinbefore referred to.

To better understand the arrangement of the needles at this point, let it be assumed that there are three hundred needles in the entire machine, one hundred of which represent the instep needles and comprise the group 13 (see Fig. 3), which at this point in the operation are withdrawn from action retaining their loops, another hundred of said needles represent the needles upon which the fabric constituting the toe pocket is to be formed and these needles are separated into two groups 14 and 15, of say fifty needles each, by a third group 16 of one hundred needles, which latter group was withdrawn at the start of the knitting operations.

Reciprocating knitting now continues upon the groups 14 and 15 to effect the usual narrowing and widening operations necessary to produce the toe pocket 3, which narrowing and widening operations include the gradual withdrawal of needles from opposite ends of the series, until the required number have been withdrawn, and subsequently restoring said needles in a reverse order to unite the courses previously formed by the narrowing operation. Owing to the separation of the toe pocket needles into two groups by the needles 16, said toe pocket will be formed in two sections separated by a gap corresponding to the withdrawn group of needles 16, said gap being spanned by floating yarns 18.

Following the knitting of the last widening course of said toe pocket, the needles of the group 13 are restored to action and circular knitting proceeds upon all the needles except those of the group 16, thus forming the fabric of the foot 2 between the toe and heel pockets 3 and 4 respectively. Upon completion, the last circular course of the foot prior to the first narrowing course of said heel pocket, the instep needles 13 are again withdrawn from action retaining their loops, and reciprocating knitting is effected upon the groups 14 and 15 to produce said heel pocket 4, the needles of said groups being first gradually reduced in number during said knitting and subsequently increased in reverse order to form the narrowing and widening courses, each including a floating yarn 19, which spans the gap produced by the withdrawal of the needles 16.

The instep needles 13 are again restored to action and circular knitting follows for a certain number of courses to produce the ankle portion 5 of the stocking, the courses of loops composing said ankle portion being less than a complete circle and having opposite ends thereof connected by floating yarns

20, which span the gap produced by reason of the inaction of the needles 16.

The gap spanned by the floating yarns 12, 18, 19, 20, and likewise those intervening between the yarns 18 and 19, extends along the center of the bottom of the foot and up the center of the back of said ankle.

Following the completion of the ankle portion 5 of said stocking, the fashioned calf 6 is next knitted, and preferably upon a gradually increasing series of needles,—that is to say, the needles of the group 16 during the formation of said fashioned calf, are gradually restored to action at opposite ends of the interrupted circular series of needles including the groups 13, 14 and 15, said needles 16 being operated automatically and at the desired intervals to effect the desired angle of increase for said fashioned calf, opposite sides of said calf being preferably symmetrically shaped during said knitting operations, which operations continue until all the needles of the group 16 have been restored.

As a result of the gradual restoration of said needles 16, the floating yarns 21, spanning the gap at the back of said calf, will gradually decrease in length as they approach the upper end of said calf until they finally merge in the tubular leg portion 7, which is knitted herein subsequently to the knitting of the calf 6, said tubular leg having no seam or gap formed therein, it being knitted upon a full or complete circle of needles including the groups 13, 14, 15 and 16.

Following the completion of said tubular leg 7, the stocking may be removed from the machine or knitting may continue upon the machine to repeat the above-described operations and thereby knit a second or a series of similar blanks.

To complete the stocking from the blank hereinbefore described, the floating yarns spanning the gap along the center of the foot and up the center of the back are severed and corresponding edges of the various sections are then stitched together to form a seam 9 extending from the tip 10 of the toe or from the seam 8 along the center of the toe pocket, center of the foot and heel pocket, up the center at the back of the ankle 5 and the center of the calf 6 to the top of said calf or, if desired, said seaming operations may be continued to the top of the stocking and thereby effect the formation of a mock seam as shown at 22. Furthermore, the protective courses 12 are raveled back and the first course of the heel pocket is stitched to the first course of the instep portion of the stocking to form the seam 8 across the top of the toe.

While I have herein shown and described merely for illustrative purposes one specific embodiment of my invention, and have dis-

closed and discussed in detail the construction and arrangement incidental to such disclosure, it is to be distinctly understood that the invention is limited neither to the mere details or relative arrangement of the parts of the stocking nor to the specific application herein shown, but that extensive variations from the illustrations may be made without departing from the principles thereof.

Claims:

1. A stocking including continuous circular knitted instep of the foot, ankle and fashioned calf portions and reciprocatingly knitted toe and heel pockets, and a seam extending from the top of the toe over the front thereof and thence along the center of the bottom of the foot and along the center of the back of the leg.
2. A stocking blank having circular knitted foot, ankle and fashioned calf portions and fashioned toe and heel portions separated along the toe and the bottom of the foot and along the center of the heel and back by a gap spanned by floating yarns, the floating yarns at the calf portion of said blank gradually decreasing in length from the bottom to the top thereof.
3. A stocking blank having a foot including toe and heel pockets formed with a gap extending longitudinally of the toe and the heel and the bottom of said foot and spanned by floating yarns, an ankle and a fashioned calf also provided with a gap at the back, spanned by floating yarns, the floating yarns of said calf varying in length to correspond with the fashioning of said calf, and a seamless tubular leg constituting a continuation of said calf.
4. That method of making a stocking which comprises commencing the knitting at the toe, knitting reciprocatingly upon two separated series of needles to form a toe pocket in two parts connected together by floating yarns, then in knitting circularly upon an interrupted series of needles to produce a tubular web having a gap spanned by floating yarns, said web constituting the arch of the foot, then in knitting upon two separated series of needles, reciprocatingly to form a heel pocket in two sections connected together by floating yarns, then in knitting circularly upon said interrupted series of needles to produce a tubular web having a gap spanned by floating yarns, said web constituting the ankle of the stocking, then in knitting circularly upon said inter-

rupted series of needles and in gradually adding needles thereto to form a fashioned calf, and finally in knitting circularly upon a full set of needles to form a seamless tubular web constituting the leg of the stocking.

5. A stocking blank consisting of a plurality of circularly knitted travelling back courses, toe pocket, heel pocket, ankle and fashioned calf, each formed with a gap spanned by floating yarns, the gaps of said several sections uniting in a continuous aperture extending from the top of the toe over the top thereof and thence along the bottom of the foot and the back of the leg to the top of the calf of the blank, and a tubular leg formed without gap and integral with said calf.

6. That method of making a stocking which comprises commencing the knitting at the toe, knitting reciprocatingly upon two separated series of needles to form a toe pocket in two parts connected together by floating yarns, then in knitting circularly upon an interrupted series of needles to produce a tubular web having a gap spanned by floating yarns, said web constituting the arch of the foot, then in knitting upon two separated series of needles, reciprocatingly to form a heel pocket in two sections connected together by floating yarns, then in knitting circularly upon said interrupted series of needles to produce a tubular web having a gap spanned by floating yarns, said web constituting the ankle of the stocking, then in knitting circularly upon said interrupted series of needles and in gradually adding needles thereto form a fashioned calf, in knitting circularly upon a full set of needles to form a seamless tubular web constituting the leg of the stocking, and thence removing the floating yarns and seaming the stocking lengthwise the toe pocket, along the bottom of the foot and the heel and the back of the ankle and calf.

7. A stocking having narrowed and widened heel and toe pockets and circularly knit foot, ankle and leg portions, the calf being fashioned, said stocking having a seam extending from the top of the toe pocket along the upper and under side of the toe pocket lengthwise thereof, thence lengthwise the under side of the foot, the heel and the back of the ankle and leg.

In testimony whereof, I have signed my name to this specification.

GEORGE P. BOSWORTH.