

R. HUNT.

STOCKING AND METHOD OF PRODUCING THE SAME.

No. 466,417.

Patented Jan. 5, 1892.

Fig. 1.

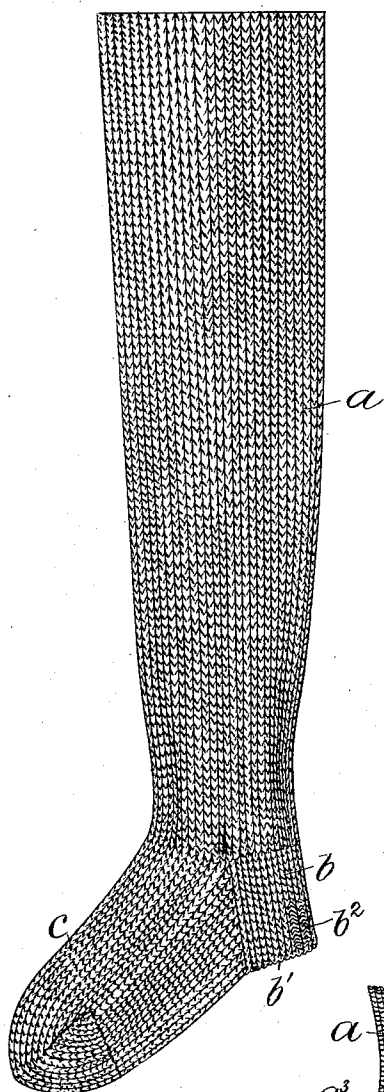


Fig. 2.

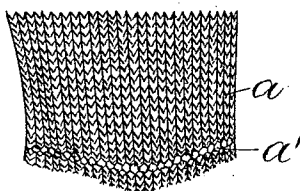


Fig. 3.

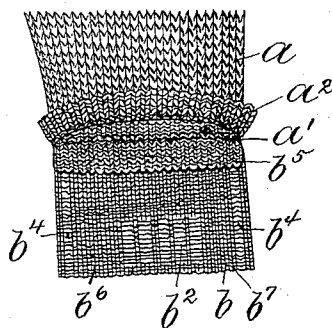


Fig. 4.

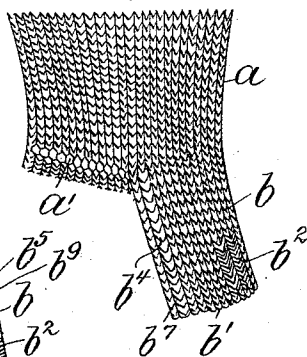
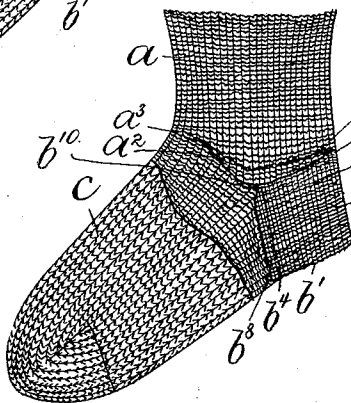


Fig. 5.



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Thomas M. Smith.

Inventor:
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Fig. 6.

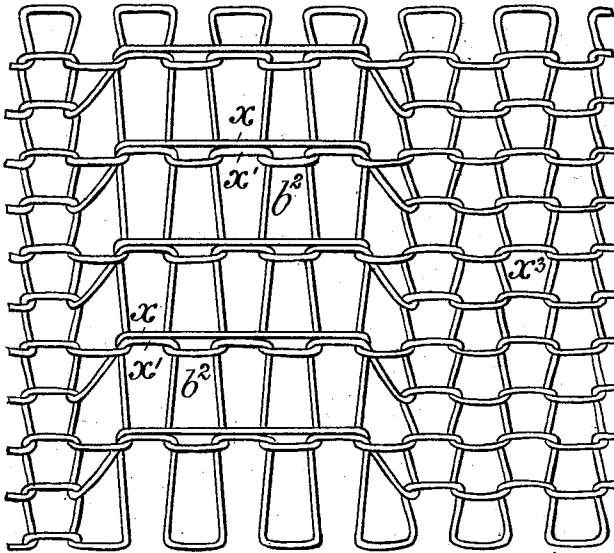


Fig. 7.

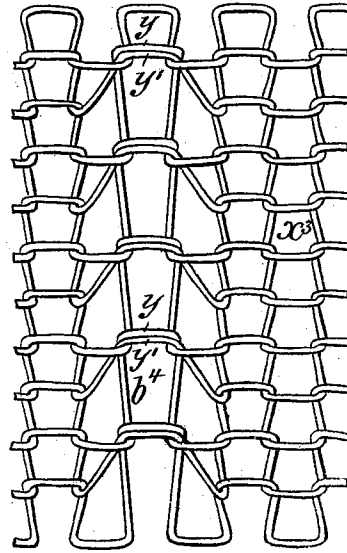
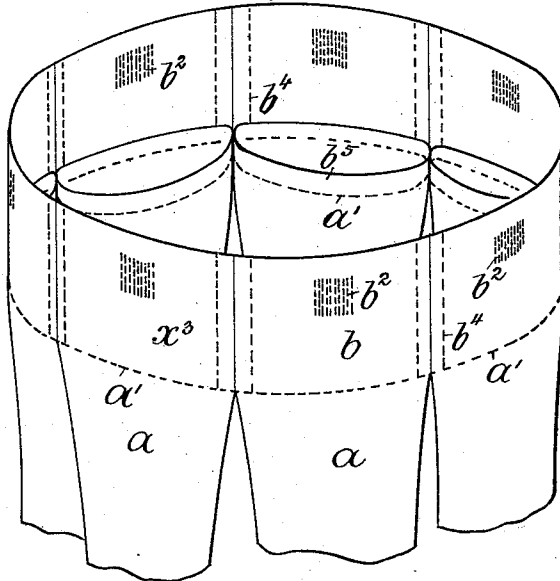


Fig. 8.



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UNITED STATES PATENT OFFICE.

ROLAND HUNT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF
AND WILLIAM BROWN, OF SAME PLACE.

STOCKING AND METHOD OF PRODUCING THE SAME.

SPECIFICATION forming part of Letters Patent No. 466,417, dated January 5, 1892.

Application filed April 17, 1891. Serial No. 389,277. (Specimens.)

To all whom it may concern:

Be it known that I, ROLAND HUNT, a subject of the Queen of Great Britain, but now residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Stockings and Methods of Producing the Same, of which the following is a specification.

The principal objects of my present invention are, first, to provide a neat, comfortable, durable, and comparatively inexpensive stocking or sock having a wide or full instep, a seamless square heel, and a seamless leg and foot, consisting of a continuous web without remnants or raw edges; second, to afford a simple, expeditious, and efficient method of knitting such a stocking or sock by means of known appliances, and, third, to provide a stocking or sock having the heel thereof shaped or rounded off at the corner without the formation of a welt, knot, or seam and without the throwing of needles out of and into action in order to perform the well-known operation of widening and narrowing.

My invention consists of a stocking or sock formed of a continuous web of fabric comprising a leg, a seamless foot, and a seamless square heel having a portion formed with multiple-looped stitches that afford the required shape at the corner, the parts at the bottom being grafted together and the said heel being without side seams or welts.

My invention further consists of a stocking or sock having a square heel provided with one or more rows of multiple-looped stitches to permit of the corner of the heel being rounded off or shaped.

My invention further consists of the method of producing such stockings or socks, and comprises knitting a tubular form of leg by means of a circular-knitting machine—that is, a knitting-machine having self-acting latch-needles disposed in a circular head—transferring certain of the stitches of several of these tubular legs by means of the fingers or in any preferred manner to the needles of a round machine—that is, a circular machine provided with a notched presser-wheel for

closing the spring-beards of certain of the needles to permit of the escape of the loops of the stitches in the ordinary manner and during the formation of each course of stitches and also for permitting the spring-beards of the other needles to remain in open or normal position during the formation of several courses of stitches, thereby causing several loops to be retained upon said needles before the stitch is released—and knitting on a tubular web having mock seams and narrowings of multiple-looped stitches and then cutting said tubular web between the mock seams into square heels, then looping the two ends of each heel together by means of a looper or in any preferred manner, then transferring certain of the stitches of the mock seams and the remaining stitches of each leg to a circular-knitting machine—that is, a machine having self-acting latch-needles disposed in a circular head—then knitting the foot, and then unraveling the portion of each leg that projects beyond the line of union of the leg, foot, and heel.

In the practical application of my improved method of knitting stockings or socks according to my invention I employ, preferably, a circular-knitting machine—that is, a machine having latch-needles disposed in a circular head and adapted to form a ribbed or plain tubular leg—circular-knitting machines—that is, machines having latch-needles disposed in a circular head and adapted to form a plain seamless foot—loopers or machines for knitting fabrics in contradistinction to machines for sewing the same, and round-knitting machines—that is, machines having spring-beard needles disposed in a circular head and having a notched or recessed presser-wheel provided with a removable cap and adapted to close the spring-beards of the needles when the cap is on in such manner as to cause the same to let off the loops of all the stitches during the formation of every course of stitches, and also adapted to permit the spring-beards of certain of the needles, when the cap is off, to enter the notches or recesses of the presser-wheel during the formation of several courses of stitches, whereby two or

more loops are formed in succession upon such needles before the stitches are let off therefrom, while the remaining needles are pressed by the periphery of the presser-wheel 5 in the same manner as they were by the cap—that is to say, in such manner that the loops of the stitches are let off during the formation of every course of stitches.

These various machines and the mode of 10 operation thereof are well understood, and therefore are not described or illustrated herein.

In the production of a stocking or sock embodying the features of my invention by the 15 employment of the above machines and in accordance with my improved method I prefer to proceed in the following manner:

A series of plain or ribbed seamless tubular legs are knit in the ordinary and well-understood manner by means of a circular-knitting machine, and one or more rows or courses of loose stitches are formed near the lower edge of each of the tubular legs, for a purpose to be presently described. Certain of 25 the stitches—for example, half of them—from the courses of loose stitches of a series of legs comprising, for example, seven tubular legs, are then transferred in any preferred manner to the spring-beard needles of a round-knitting machine, and a tubular web is knit 30 onto these seven legs. During this operation the spring-beards of fourteen of the needles of this round machine are not closed by the presser-wheel at every course of stitches, as is customary in knitting on such a machine, but, 35 on the contrary, are permitted to enter recesses or notches in the presser-wheel at certain courses of stitches—for example, at every second course of stitches—whereby the beards are left open during the formation of said courses of stitches, so that several—in the present instance two—loops instead of one are formed on such needles before the beards are closed, the stitches thus let off forming two parallel 45 mock seams extending throughout the length of the tubular web and between each two of these seven legs. During this operation certain of the spring-beard needles of the round machine—for example, five sets of three needles 50 each—located opposite the respective legs are caused to receive two or more loops in succession before the stitches are let off and during the formation of a number of courses of stitches—for example, fifteen—in the manner 55 hereinbefore described, so that narrowings of multiple-looped stitches are formed, and these narrowings contract the fabric. The tubular web is now cut between the parallel mock seams, so that each leg is provided with an integral square heel. The ends of each of 60 the square heels are then knit together by means of a looper in order to close up the lower portion of the heel. The stitches comprising the mock seams and the remaining 65 stitches of the row of loose stitches—in the present instance one-half of them—of each of

the legs are transferred to the latch-needles of a circular-knitting machine and a seamless foot is knit. It may be remarked that by 70 transferring the stitches of the mock seam to a circular-knitting machine it is possible to form a wider or fuller instep than could be obtained if the foot was knit on the round machine. After the foot has been knit onto 75 the leg and the heel the uncut edges of the fabric, extending on the interior of the article at the lines of union between the heel, leg, and foot, are unraveled or pulled out, so that the lines of union are rendered smooth, flat, and scarcely perceptible. In fact, after the 80 unraveling operation the heel, leg, and foot form one continuous and perfect web.

The nature and objects of my present invention will be more fully understood from the following description, taken in connection 85 with the accompanying drawings, forming part hereof, and in which—

Figure 1 is a side elevation of a stocking embodying features of my invention and showing the square heel shaped by means of 90 rows or narrowings of multiple-loop stitches. Fig. 2 is a similar view of the lower portion of the leg of a stocking, showing a row of loose stitches for use as a guide in knitting on the heel and foot. Fig. 3 is a view of the 95 leg of a stocking or sock with a heel knit thereto, showing rows of mock stitches at the sides of the heel. Fig. 4 is a side elevation showing the ends of the heel illustrated in Fig. 3 looped or knit together. Fig. 5 is a 100 view of portions of the interior of a stocking, showing the cut edges extending from the lines of union of the heel, leg, and foot, also showing portions of said edges unraveled to form a continuous web. Fig. 6 is an enlarged 105 view showing the formation of the multiple-looped stitches of the narrowing in the square heel. Fig. 7 is a similar view showing the application of the multiple-looped stitches in the production of the mock seams; and Fig. 110 8 is a diagrammatic representation of seven legs having knitted thereto a tubular web, showing the disposition of the mock seams and of the narrowings.

Referring to the drawings, and especially to 115 Fig. 1, *a* is a tubular seamless leg, either shaped or not, as required. *b* is a square heel having the ends thereof looped or knit together at *b'* and shaped or rounded off by means of five sets of narrowings or rows of multiple-looped 120 stitches *b²*, extending for twelve or fifteen courses of stitches. Each of these courses of multiple-looped stitches or narrowings *b²* is formed by causing one loop *x'*, Fig. 6, to be retained upon the spring-beards of each of 125 several needles—in the present instance three needles—until a second loop *x* is placed thereon, whereupon both loops are released. The spring-beards of the needles may be caused to retain the long loops *x'* during the formation 130 of a course of stitches by permitting them to enter recesses in the presser-wheel of

the machine and may be caused to let off the stitches x and x' by causing the periphery of the presser-wheel to contact with and close the spring-beard of such needles. The heel b may be made of heavier or stronger yarn than the leg a and is knit integral therewith. c is a seamless foot knit onto the leg a and heel b , so that the leg a , heel b , and foot c comprise a seamless stocking having a square heel, in contradistinction to a stocking having a square heel and in which the heel, foot, and leg, or some parts thereof, are joined, united, or shaped by means of sewing.

The hereinbefore-described stockings may be manufactured according to my improved method in the following manner:

Referring to Fig. 2, a is a tubular leg of a stocking provided near the bottom thereof with a row of loose stitches a' . This tubular leg is preferably made upon a circular-knitting machine, and the course of loose stitches a' is formed in the usual manner. The course of loose stitches a' serves as a guide when a series of these legs are transferred to a round-knitting machine. Several of these tubular legs—for example, seven—are then transferred to a round-knitting machine, and the spring-beards of the needles thereof are inserted into certain of the stitches—for example, half of them from the course a' of loose stitches of each leg. A tubular web x^3 is then knit onto the seven legs, Fig. 8, and rows of multiple-looped stitches or narrowings b^2 , extending throughout any required number of courses of stitches—for example, twelve or thirteen courses of stitches—are formed by employing a notched presser in the manner hereinbefore described. This presser is also provided with notches adapted to cause the spring-beards of certain of the needles to form mock seams b^4 near the respective sides of each heel b by causing single needles to retain one loop y until the loop y' is formed, Fig. 7, and to release both the loops y and y' at the formation of the next course of stitches throughout the whole of the web x^3 . The tubular web x^3 is then cut between each two mock seams in order to separate the seven partially-completed stockings, so that each tubular leg is provided with a square heel b , having mock seams b^4 extending throughout its entire length and with narrowings or rows of multiple-looped stitches b^2 . Of course the lower portion of the leg a will extend into the interior of the stocking, so as to form a cut edge or flap b^5 , which is subsequently removed in a manner to be hereinafter described. The ends b^6 and b^7 of the heel are then looped—that is, knit together, Fig. 4—by means of a suitable looper. The stitches comprising the mock seams b^4 and the remaining half of the stitches comprising the course of loose stitches a' are then transferred to a circular-knitting machine, and a seamless foot c , Fig. 5, is knit onto the same in the usual or in any preferred manner. Of course the lower portion of the

leg a and the sides of the heel b extend beyond the union of the leg a and heel b and form flaps or cut edges a^3 and b^8 , which are subsequently removed in a manner to be presently explained. The stocking is then turned inside out and the flaps a^3 , b^5 , and b^8 are unraveled, so as to leave a continuous web of fabric forming the leg, foot, and heel of the stocking. In Fig. 5 the continuous web formed by unraveling the flaps a^3 , b^5 , and b^8 is shown at a^3 , b^9 , and b^{10} .

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A stocking or sock formed of a continuous web of fabric, comprising a leg, a seamless foot, and a seamless square heel having a portion formed with multiple-looped stitches that afford the required shape to the corner, the parts at the bottom being grafted together, and the said heel being without side seams or welts, substantially as described.

2. A stocking provided with a seamless foot and a square heel having the rear portion formed with rows of multiple-looped stitches to afford the required shape or condition to the corner thereof, substantially as described.

3. The method of producing stockings or socks, which consists in knitting a series of seamless tubular legs, then knitting a tubular web onto certain of the stitches of said legs, cutting said web into square heels, then knitting or looping the ends of each of the heels together, and then knitting a seamless foot onto each of the said heels and the remaining stitches of the legs, substantially as and for the purposes described.

4. The method of producing stockings or socks, which consists in knitting a series of tubular legs, then knitting a tubular web having parallel mock seams onto said legs, then cutting said web between the mock seams to form square heels, then knitting or looping the ends of each of the heels together, then knitting a seamless foot onto the stitches of the mock seams of each of the heels and the remaining stitches of the legs, and then unraveling the remnants formed by the marginal sides of each of the heels, substantially as and for the purposes described.

5. The method of producing stockings or socks, which consists in forming a series of tubular legs, then knitting a tubular web having narrowings or rows of multiple-looped stitches onto certain of the stitches of said legs, then cutting said web to form square heels, and then knitting a seamless foot onto the sides of each heel and onto the remaining stitches of the leg, substantially as and for the purposes described.

6. The method of producing stockings or socks, which consists in knitting a series of tubular legs, then knitting a tubular web onto certain of the stitches of each of said legs, then cutting said tubular web to form square heels, then looping the ends of the

heel together, then knitting a foot onto each
of the heels and onto the remaining stitches
of each of the legs, and unraveling the rem-
nants formed at the union of the legs, feet,
5 and heels, substantially as and for the pur-
poses described.

In witness whereof I have hereunto set my

signature in the presence of two subscribing
witnesses.

ROLAND HUNT.

Witnesses:

THOMAS M. SMITH,
RICHARD C. MAXWELL.