R. W. SCOTT.

STOCKING OR SOCK AND METHOD OF KNITTING THE SAME.

APPLICATION FILED FEB. 14, 1913.

1,079,267.

Patented Nov. 18, 1913.

3 SHEETS—SHEET 1.

Fig. 2.

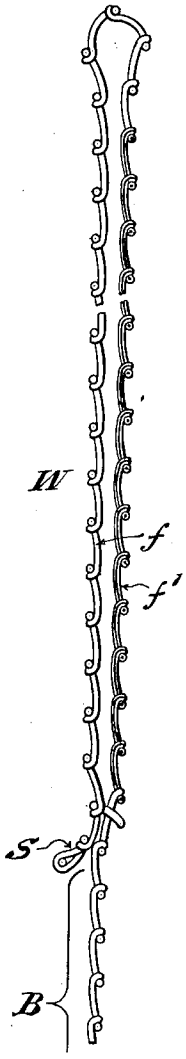


Fig. 3.

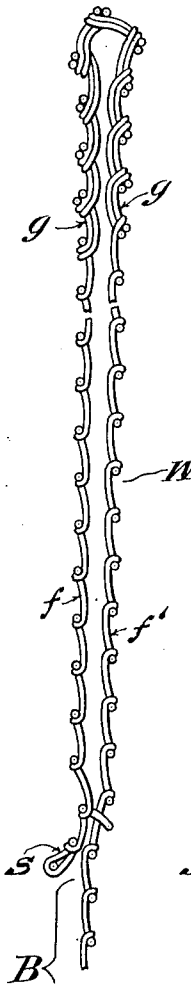
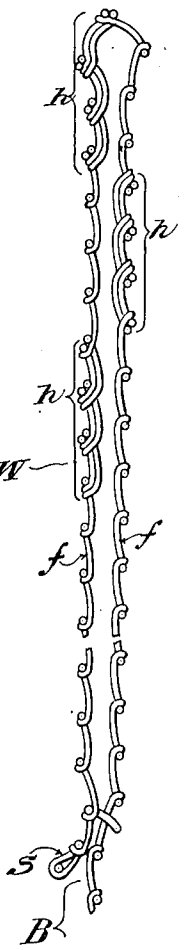


Fig. 4.



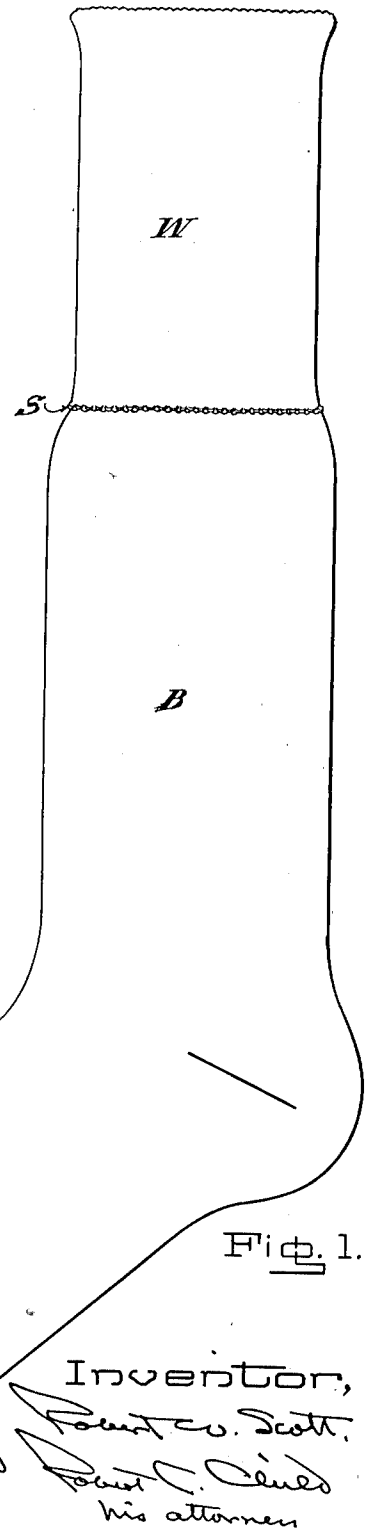


Fig. 1.

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Inventor,
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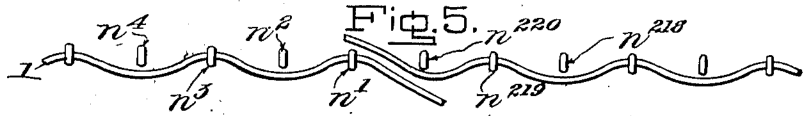

Fig. 5.

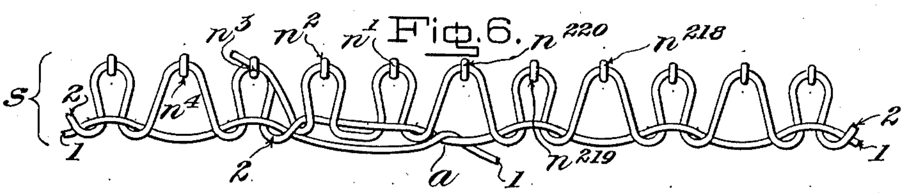

Fig. 6.

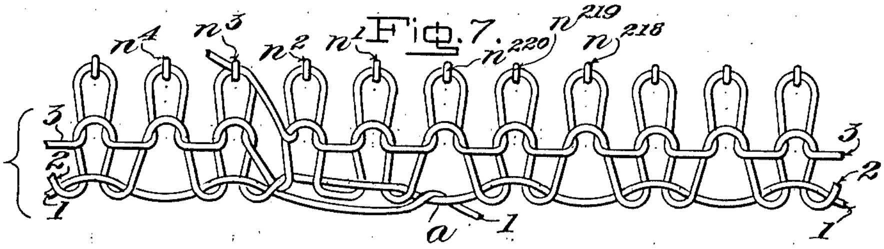

Fig. 7.

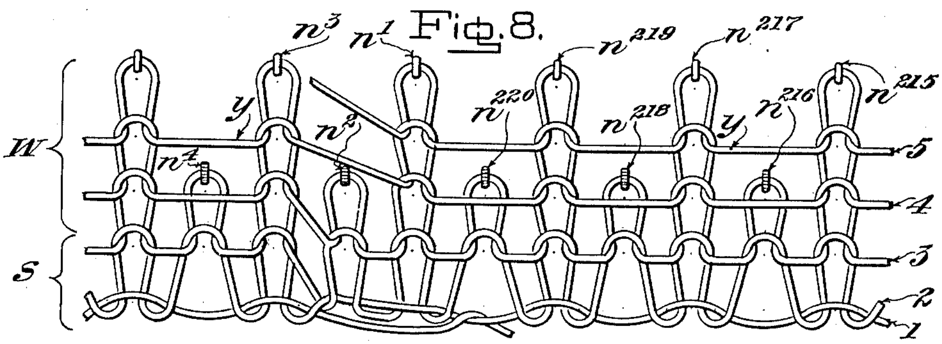

Fig. 8.

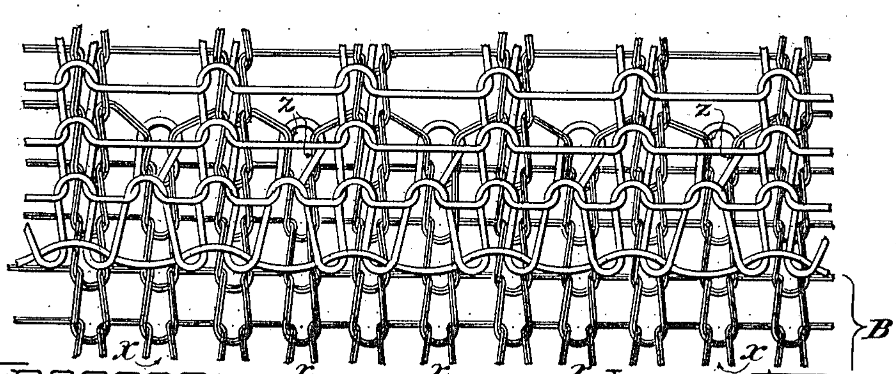

Fig. 9.

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3 SHEETS—SHEET 3.

Fig. 10.

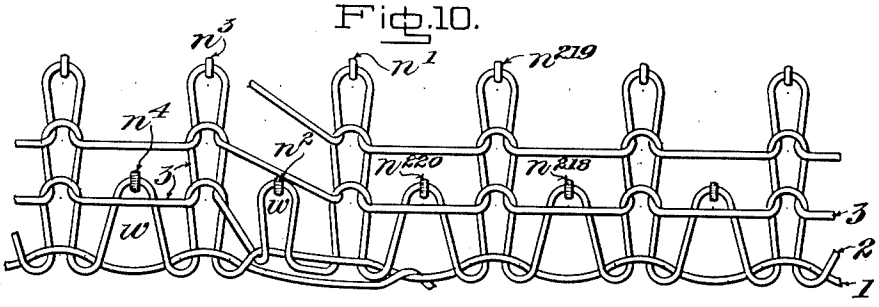


Fig. 11.

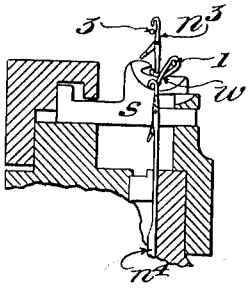


Fig. 12.

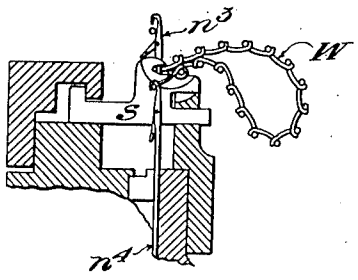


Fig. 14.

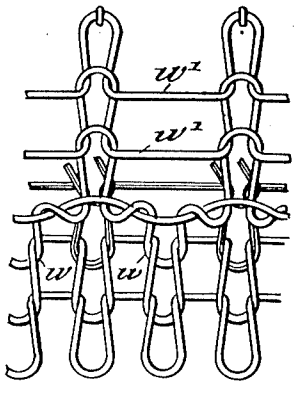
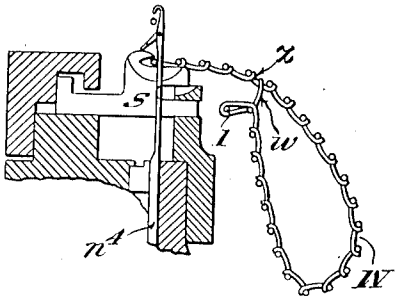


Fig. 13.



Witnesses:

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UNITED STATES PATENT OFFICE.

ROBERT W. SCOTT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO SCOTT & WILLIAMS, INCORPORATED, OF CAMDEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

STOCKING OR SOCK AND METHOD OF KNITTING THE SAME.

1,079,267. Specification of Letters Patent. Patented Nov. 18, 1913.

Application filed February 14, 1913. Serial No. 748,308.

To all whom it may concern:

Be it known that I, ROBERT W. SCOTT, a citizen of the United States, and resident of Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Stockings or Socks and Methods of Knitting the Same, of which the following is a specification.

An object of my invention is to provide stockings and especially half hose or socks with an improved structure to provide an end finish at the top thereof.

A further object is to provide a stocking of the character indicated which can be made in one continuous operation upon a circular knitting machine.

My invention therefore relates to a new fabric structure and the new method and steps of a method or art taken in producing said structure.

In the accompanying drawings, Figure 1 is an elevation showing a man's circular knit or seamless half hose or sock responding to my invention; Fig. 2 is a longitudinal section through the welt or hem W showing the knit structure conventionally and much enlarged for clearness; Figs. 3 and 4 are views similar to Fig. 2 showing respective modifications; Figs. 5, 6, and 7 are diagrammatic illustrations of the first, second and third courses of the fabric; Fig. 8 is a similar diagram showing the fabric at a later stage; Fig. 9 is a similar diagram showing the juncture of the welt and leg of the stocking after the completion thereof; Fig. 10 is a view similar to Fig. 8 illustrating a modified step in the procedure of knitting the same; Figs. 11, 12 and 13 are diagram sections of a circular knitting machine showing the fabric in three different stages of its production. Fig. 14 is a view similar to Fig. 9 showing the welt of the stocking illustrated in Fig. 10 after completion.

In the production of seamless half hose by methods at present known in the art, the manufacture of the seamless ankle or leg B and of the heel and toe have occasioned little difficulty and expense. A serious difficulty and expense has however arisen in connection with the attempt to provide a finish at the top of such stockings. So far as I am aware such garments as articles of commerce are generally provided with attached ribbed tops, the ribbed top in turn being provided with a welt structure, in most cases comprising only half the number of wales of fabric included in the ribbed section proper, to prevent the raveling of its upper end.

The manufacture of half hose by the usual method in the art has heretofore involved either separate manufacture of a ribbed top, which is thereafter transferred upon the needles of the circular knitting machine employed to knit the leg, heel, foot and toe portions in continuation thereof, or has necessitated the employment of a machine capable of knitting fabrics partly ribbed and partly plain, for instance such a machine as that illustrated in my Patent No. 834,763, October 30, 1906. Such machines are more expensive, more complex and more difficult to operate, however skilfully designed, than knitting machines having a single set of needles and capable of knitting the plain fabric parts of the stocking. The traditional ribbed top structure for these garments is of utility only as an end finish and to prevent curling of the fabric edge in most cases, although the traditional reason for using such structures is to provide an elastic section capable of maintaining the stocking in place on the wearer's leg. This function has, however, been largely or entirely superseded by the increasing use of supporting devices. I therefore propose to provide such stockings with an end finish or welt W of outturned integrally attached plain fabric, somewhat narrower than the ankle portion B of the plain fabric leg, and having sufficient lateral elasticity. As an end finish I am therefore able to provide an integral turn or fold of the fabric. Pursuant to these objects I have devised a fabric structure, and a method of making it enabling the manufacture of the entire garment upon a circular knitting machine having a single circular series of needles, at a continuous operation.

In my Letters Patent No. 864,433, dated August 27, 1907, I described a method whereby a turned welt or hem could be continuously formed, but only by the operation of a machine having two sets of needles, such for instance as a machine corresponding to the said Patent No. 834,763. Subsequently in my Patent No. 1,045,620, dated

will necessarily be fed with respect to the alternate needles or groups of needles or instruments in such a manner as to secure the passage toward the back of the intervening instruments of the yarn of such first course.

Referring now to Figs. 11, 12 and 13 I have shown, for illustration of one device for so placing the initial course, a machine having independent needles n^3, n^4, etc., and independently movable web-holders s. It will be understood that the yarn will be fed against the faces of alternately advanced needles, such for instance as needle n^3 shown in Fig. 11. The tensioning of the yarn against the face of the needle and holding it in the hook of the needle during the subsequent operation is of the utmost importance. I secure this by an advancing movement of the web-holders s after the yarn is fed to the needles, and maintain this tension of the yarn of the first course against the hooks of the instruments which took it until after the yarn of a second course has been taken as shown in Fig. 6, in order to insure the certain engagement of the loops of the new yarn of course 2 with the bights of the old yarn of course 1 held upon the needles which originally took the yarn course 1. I may withdraw the web-holders s and relieve the tension upon the initial course after the feeding (if the intervening needles n^4, etc., have first been advanced in front of the yarn before the withdrawing movement of the web-holders takes place, with respect to the yarn of course 1, but in that case the web-holders s will be inserted again before the operation of the needles at course 2 so as to maintain the tension at the critical time of knitting the second course.

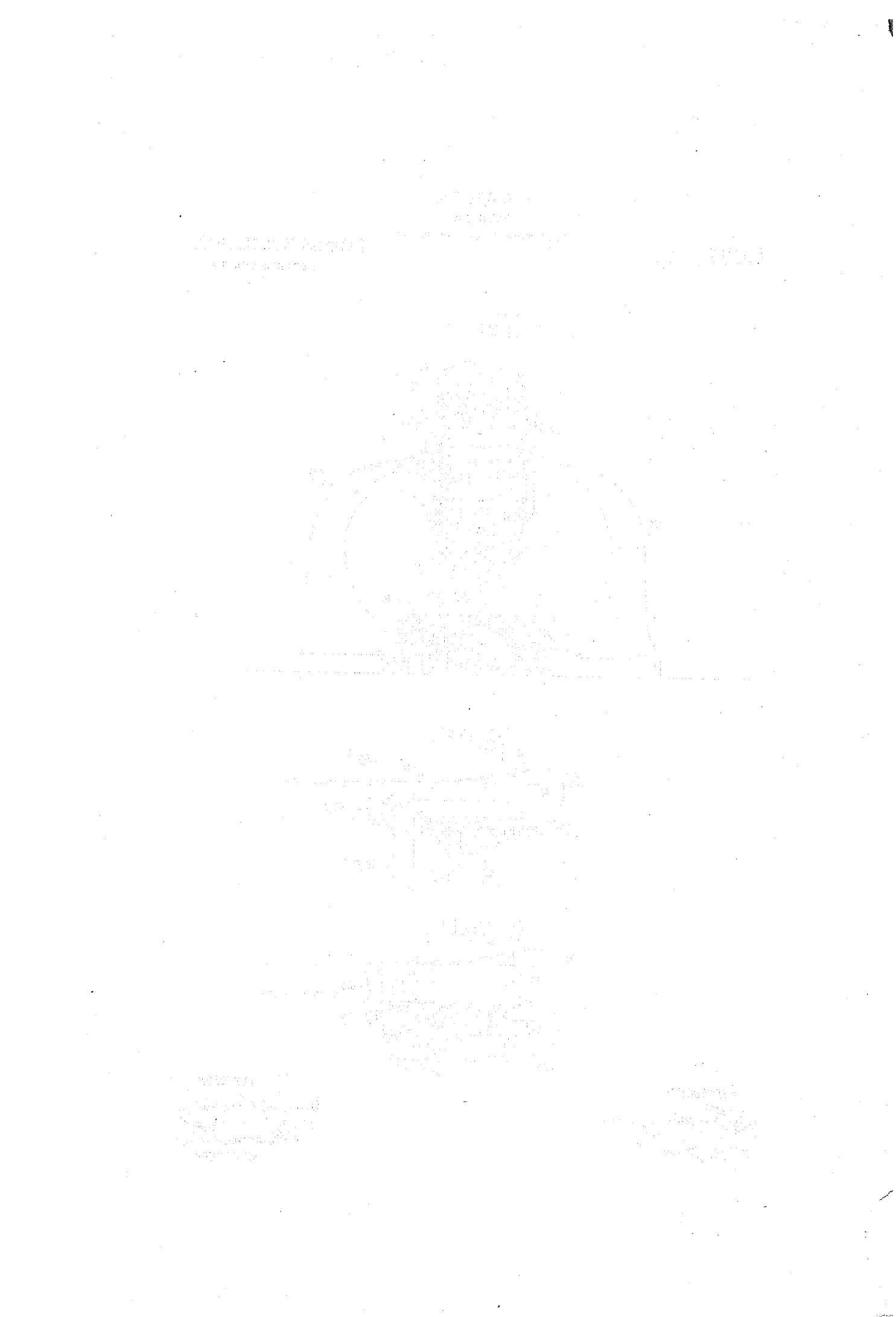
Those operations so far described secure two very valuable results; first, the holding against the faces of the needles n^1, n^3, etc., of the odd numbered series of the loops or bights taken by them, by reason of the described tensioning action of the web-holders and interlocking of the yarn behind the intervening needles of the even numbered series, thus to enable the certain starting of all of the first knit wales, which have their initial loops on said odd numbered needles; and second, the provision of the anti-raveling selvage structure shown in Fig. 2 of said Patent 1,045,621 as a protection for the subsequent uniting stitches at the juncture of the welt and body of the garment. By so arranging the first course, I am enabled to employ in the machine all of the customary high-speed and fine-gage stocking knitting devices, including independently movable web-holders, while rendering it impossible not to start knitting on the bare needles at the first course.

It will be apparent that many different devices may be resorted to for securing the arrangement of the yarn on the needles as shown in Fig. 5, and for then subsequently feeding all the needles and casting off their previous loops or runs of yarn. I have shown, described and claimed mechanism constituting one species of devices for this purpose in my application Serial No. 766,401, filed May 8, 1913, which is a continuation of my application Serial No. 746,070, filed Feb. 3, 1913, in connection with machine implements comprising latch needles, independently movable web-holders, and means to move alternate needles upward after the feeding of such a course, and during the forward thrust of the web-holders, to enable the certain starting of the knitting operation at all of the needles.

It is immaterial whether the special operation of the needles for the first course, in the case of a machine, is carried beyond the limits of the entire circle. As shown in Fig. 6, the needles n^1, and n^2 have for a second time been operated as indicated above, but the only result of this operation was to cast off the yarn of course 1 at the needle n^1 and to again pass the needle n^2 upwardly in front of said yarn. It will be apparent therefore that course 1 is, so long as the needles continue to be operated as indicated, automatically delimited to a complete circle. The end of the yarn of course 1 will, however, be twisted about and pass through a loop of itself at the beginning of its encirclement, as shown at a in Fig. 6. It will therefore be understood that when I refer to the first course, or an initial course, I imply so much of the yarn as is engaged by the knit loops in Fig. 6. Such a course is sufficient to lock against raveling every wale of a tubular fabric. The yarn having entered the hooks of all of the odd numbered needles a second course of the two courses essentially comprising the selvage strip S may now be supplied to the needles.

So far as above described the operations have resulted in the laying of the first course 1 in the form shown in Figs. 5 and 6 and the drawing of a second course 2 into a series of loops extending alternately above and below said first course. I now knit a third course 3, as shown in Fig. 7, upon all of the needles if it is desired to form a selvage strip or band of three courses, and in some cases I may knit yet another course.

Referring now to Fig. 8, I proceed to knit fabric for the welt upon every other needle, conveniently upon those needles of the odd numbered series n^1, n^3 etc., which took the yarn at the initial course. To this end I retire from action the alternate needles n^2, n^4, etc., to n^{220} of the even numbered series. This may be done as a machine operation by causing said needles not to advance far enough to clear their loops, and to remain



pared with the prior art practice of providing a ribbed top, in view of the saving of yarn which may be effected by confining the superior yarn to the face *f* and knitting the back *f'* of an inferior yarn. The reverse fabric of the welt W, which it will be noticed in the described construction comprises one-half as many wales as the leg of the stocking, may be much varied in diameter by altering the length of its loops, and in practice, it will be understood, such fabric will generally be of a longer stitch length than the fabric of the leg portion B.

What I claim is:

1. A stocking of plain fabric having an integral outturned welt of plain fabric comprising a course containing uniting loops penetrated by loops of wales of the body fabric, and having a course of yarn free from engagement with the body fabric, in engagement with said uniting loops.

2. A stocking having a plain fabric body and a plain fabric welt united to the body at each end thereof by stitches in less than the whole number of wales, and having a free strip of selvaged fabric attached by said stitches, said strip having as many wales therein as the body fabric, and more wales than the welt.

3. A sock or half-hose knit from top to toe having foot and body parts, and a long double plain fabric welt, the initial courses of which project as a strip of free fabric at the juncture of said welt and body parts.

4. A knit garment having a body portion and an integral selvaged welt united to the body portion by loops in certain wales of a course subsequent to the initial course and by the continuation of other wales of the welt throughout the body portion.

5. A knit garment having a body portion and an integral selvaged welt united to the body portion by loops of a course subsequent to the initial course penetrated by the initial loops of some of the wales of the body portion and by the continuation of other wales of the welt throughout the body portion.

6. A stocking of knit fabric having a beginning selvage strip, uniting stitches terminating certain wales only of said strip, a welt in continuation of the remaining wales of said strip, and a leg portion whose initial course is drawn through all the terminal stitches of the welt and all of the uniting stitches.

7. A stocking of knit fabric having a beginning selvage strip, comprising a course of yarn engaging the initial stitches in certain wales only, and a following course in all the wales, uniting stitches terminating certain wales only of said strip, a welt in continuation of the remaining wales of said strip, and a leg portion whose initial course is drawn through all the terminal stitches of the welt and all of the uniting stitches.

8. A stocking having foot and leg parts, and a long double plain fabric welt as an integral prefix of some of the wales only of the leg part, and a selvaged strip as an integral prefix of the other wales of the leg and all of the wales of the welt.

9. A knit fabric having a body portion and an integral welt united to said body portion by initial loops in some of the wales of the body penetrating loops of a course of the fabric subsequent to the initial course thereof, and by initial loops of the remaining wales of the body portion drawn through the terminal loops of the welt fabric.

10. The method of knitting a fabric having a body part and an integral welt on a continuous series of hooked instruments which consists in first supplying alternate instruments with yarns passing behind the remaining instruments, then supplying yarns to all of said instruments and casting off the first yarn; in subsequently causing alternate loops to be retained upon their instruments while successive knit courses are formed upon and cast off of the remaining instruments; and in then forming an initial course of fabric for the body part upon all of the instruments.

11. The method of knitting a stocking, complete except for the closure at the toe, which consists in first forming upon a circle of previously bare needles a circular strip of selvaged fabric, having an initial course engaged by some only of said needles and a subsequent course engaged by all of said needles, in thereafter withholding some of the loops during the performance of circular knitting for a plain fabric turned welt in continuation of the remaining loops, in then knitting an initial circular course at all of said instruments engaging the final loops of the welt and said withheld loops, and thereafter knitting a circular seamless leg, heel, foot and toe portions in continuation of said circular course.

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

ROBERT W. SCOTT.

Witnesses:
ARTHUR M. BLADES,
MINOT G. CROZIER.