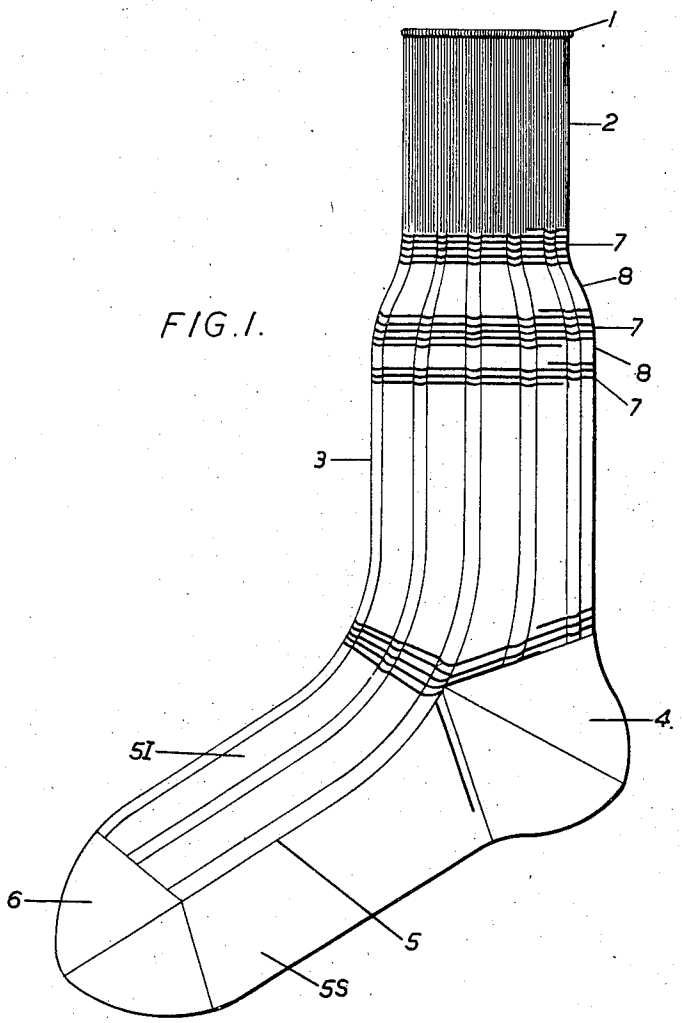
Aug. 3, 1954 F. E. DEANS 2,685,187

SEAMLESS SOCK OR THE LIKE

Original Filed March 19, 1951 2 Sheets-Sheet 1

FIG. 1.



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FIG. 2.

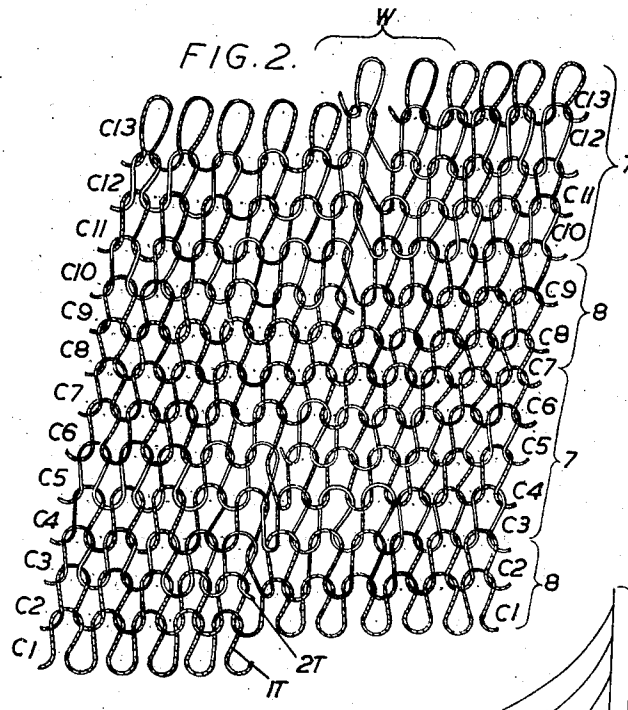
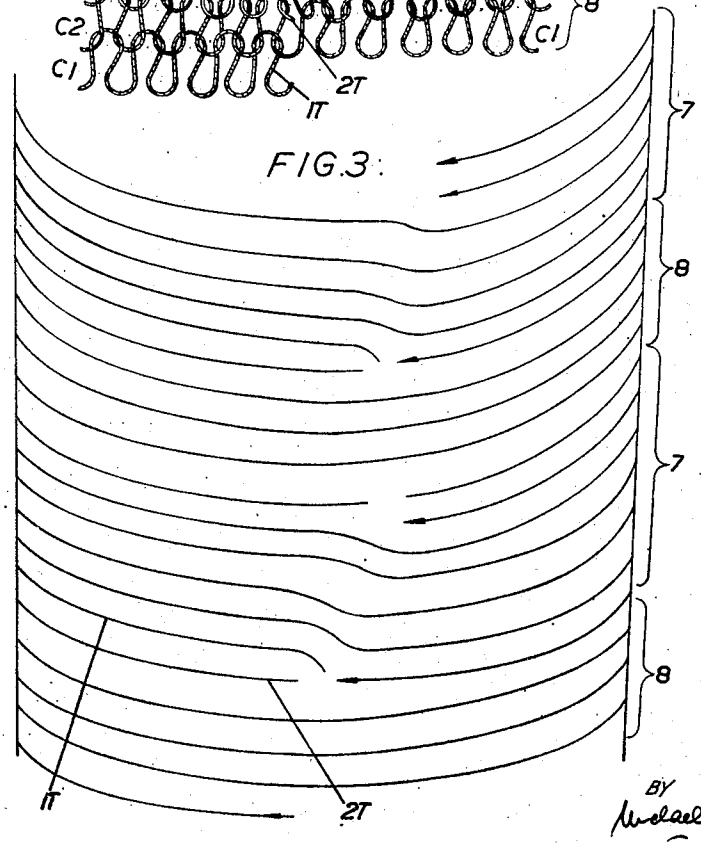


FIG. 3.



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SEAMLESS SOCK OR THE LIKE

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Original application March 19, 1951, Serial No. 216,292. Divided and this application February 11, 1953, Serial No. 336,379

Claims priority, application Great Britain March 24, 1950

6 Claims. (Cl. 66—188)

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This application is a divisional application of my copending U. S. patent application Serial No. 216,292, filed March 19, 1951, and entitled "Knitting Machines of the Opposed Needle Cylinder Type and Their Products."

This invention concerns improvements in seamless socks or the like and has particular reference to seamless socks or the like which are capable of being produced on the circular knitting machine disclosed in co-pending U. S. patent application Ser. No. 216,292 from which the present application is divided and to which reference is directed for further details of the machine.

The object of the invention is to produce a seamless sock or the like having an effect which has not hitherto been produced in such articles.

The invention provides a seamless sock or the like having a leg of which at least part consists of ribbed fabric, and heel and toe pouches of non-ribbed fabric, wherein the leg comprises spaced bands knitted of two distinct threads as a two-start spiral and intervening bands knitted of at least one thread as a one-start spiral, the region of introduction and withdrawal of the various threads of which these bands are knitted being confined to a few wales at the back of the leg.

The invention further provides an article as above, the foot of which has a ribbed instep and a plain sole, and is knitted of said alternating bands. For patterned effects at least the one-start spiral may be formed of different threads. The article may have a ribbed top and this top may be formed of the two-start spiral. A welt may also be provided.

The above and other features of the invention set out in the appended claims are incorporated in the construction which will now be described, as specific embodiments with reference to the accompanying drawings in which:

Figure 1 is a general view of a seamless sock according to the invention.

Figure 2 is an enlarged fabric view of part of the sock at the back of the leg.

Figure 3 is a diagrammatical view illustrating one and two course spiral knitting.

Referring now to Figure 1 the sock illustrated includes a welt 1, a top 2, a leg 3, a heel 4, a foot 5 and a toe 6.

Conveniently the welt, which may be a reverse welt, is provided in any known manner and the top 2 may be a one and one ribbed top.

The leg 3 may be conveniently made throughout of ribbed fabric such as broad rib fabric, say six and three rib, and it may comprise spaced

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bands 7 knitted of two distinct threads of a two-start spiral and intervening bands 8 of at least one thread as a one-start spiral. For further explanation of this arrangement reference is directed to Figures 2 and 3.

Referring now to Figure 2 it will be seen that the courses which are marked C1, C2, C3 and so on at the left hand side of the figure are lower than at the right hand side of the figure and this is because it is assumed that the starting of all the courses is in the region of the wales W, the threads being knitted starting at the wales W, and proceeding to the left and then proceeding round the sock to the right hand side of Figure 2 and from there towards the left, back to the starting point W. In the fabric illustrated the first or lower "intervening" band 8 is knitted of one thread 1T as a one-start spiral in courses C1 and C2; the first band 7 is knitted of two distinct threads 1T and 2T as a two-start spiral, loops of thread 1T being formed in courses C4 and C6 and loops of thread 2T being formed in courses C3 and C5.

The second "intervening" band 8 is formed similarly to the first "intervening" band 8 of the thread 1T as a one-start spiral in courses C7, C8 and C9, and the second band 7 is formed similarly to the first band 7 of the thread 1T and 2T as a two-start spiral, loops of thread 1T being formed in courses C11, C13 and of the thread 2T in courses C10 and C12. Although it is stated that the intervening bands 8 are formed of one thread 1T as a one-start spiral, the machine on which the sock is knitted may have interchangeable yarn feeders at the feeding station from which the yarn 1T is fed, and thus, different intervening bands 8 and/or different courses in the intervening bands 8 may be formed of different threads from this station, but of course each band will still be made of a one-start spiral.

Figure 3 indicates the courses of said alternating bands 8, 7 (knitted respectively of one and two threads as one and two start spirals) diagrammatically by lines to enable the arrangement to be more clearly understood. This view also illustrates that the number of courses in each band 7, 8 need not be the same as shown in Figure 2.

Referring back to Figure 1 the foot 5 may have its instep 5I formed of ribbed fabric similar to the ribbed fabric of the leg 3, and the sole 5S may be made of plain fabric i. e. non-ribbed fabric; both instep and sole however may include said alternating bands knitted of threads as one-start and two-start spirals 8 and 7 respectively.

The heel and two pouches 4 and 6 are knitted of plain i. e. non-ribbed fabric, and conveniently do not have said alternating bands 7 and 8.

The ribbed top 2 of the sock may be knitted as a single start spiral, or as a two-start spiral as desired for the purpose of speeding up production or achieving a two-coloured effect.

The sock as described above may be made on a circular knitting machine conveniently that disclosed in the specification of co-pending U. S. patent application No. 216,292. Briefly this machine is of the type organised to knit tubular fabric by rotation and a pouch by oscillation (or reciprocation) and having opposed needle cylinders equipped with double ended latch needles controlled by sliders in the two cylinders and capable of transfer between the two cylinders, a cam box for each cylinder, cams in the boxes for moving the sliders and the needles, said cams in each box including knitting cams operable at a knitting station during the rotation and oscillation, and means for producing relative rotation and oscillation between cylinders and the cam boxes. For the purpose of producing the seamless sock this machine is provided with a set of interchangeable yarn feeders at the knitting station, patterning mechanism for effecting their selective interchange at a small group of the needles, auxiliary knitting cams in the two boxes at an auxiliary knitting station spaced circumferentially from the first or main station, and an auxiliary yarn feeder at the auxiliary yarn station, feeder control mechanism for introducing and withdrawing the auxiliary feeder as required during rotation knitting, the change being confined to the said group of needles, and for withdrawing it at the commencement of the pouch, and cam control mechanism for rendering the auxiliary knitting cams inoperative when the auxiliary feeder is withdrawn so that the needles continue to knit only at the main station. For the sock illustrated, the small group of needles referred to consists of those needles which knit a few wales located centrally at the back of the leg.

It will be appreciated that when knitting proceeds at both the knitting stations two courses are produced at each revolution, the fabric being knitted as a two-start spiral whereof one spiral is knitted of the thread fed at one station and the other is knitted of the thread fed at the other station; when knitting proceeds at one station only (e. g. the main station) the fabric is produced as a single start spiral. Fabrics of the two kinds may therefore alternate, to produce the alternate bands previously referred to in desired manner in the sock.

I claim:

1. A seamless sock or the like having a leg of which at least part consists of ribbed fabric, and heel and toe pouches of non-ribbed fabric, wherein the leg comprises spaced bands knitted of two distinct threads as a two-start spiral and intervening bands knitted of at least one-thread as a one-start spiral, the region of introduction and withdrawal of the various threads of which these bands are knitted being confined to a few wales at the back of the leg.

2. An article according to claim 1, the foot of which has a ribbed instep and a plain sole, and is knitted of alternating bands similar to those of the leg.

3. A seamless sock or the like according to claim 1 having the intervening bands knitted of different threads as a one-start spiral.

4. A seamless sock or the like according to claim 1 having a ribbed top formed of the two-start spiral.

5. A seamless sock or the like having a welt, a ribbed top, non-ribbed heel and toe pouches, and a ribbed leg and a foot with ribbed instep and non-ribbed sole comprising spaced bands knitted of two distinct threads as a two-start spiral and intervening bands knitted of at least one thread as a one-start spiral, the region of introduction and withdrawal of the various threads of which these bands are knitted being confined to a few wales at the back of the leg.

6. A seamless sock or the like having a welt, a ribbed top, non-ribbed heel and the pouches and a ribbed leg and a foot with ribbed instep and non-ribbed sole comprising spaced bands knitted of two distinct threads a two-start spiral and intervening bands knitted of at least one thread as a one-start spiral, the region of introduction and withdrawal of the various threads of which these bands are knitted being confined to a few wales at the back of the leg, and the ribbed top being of a different rib from the leg or instep and being formed of the two-start spiral.

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