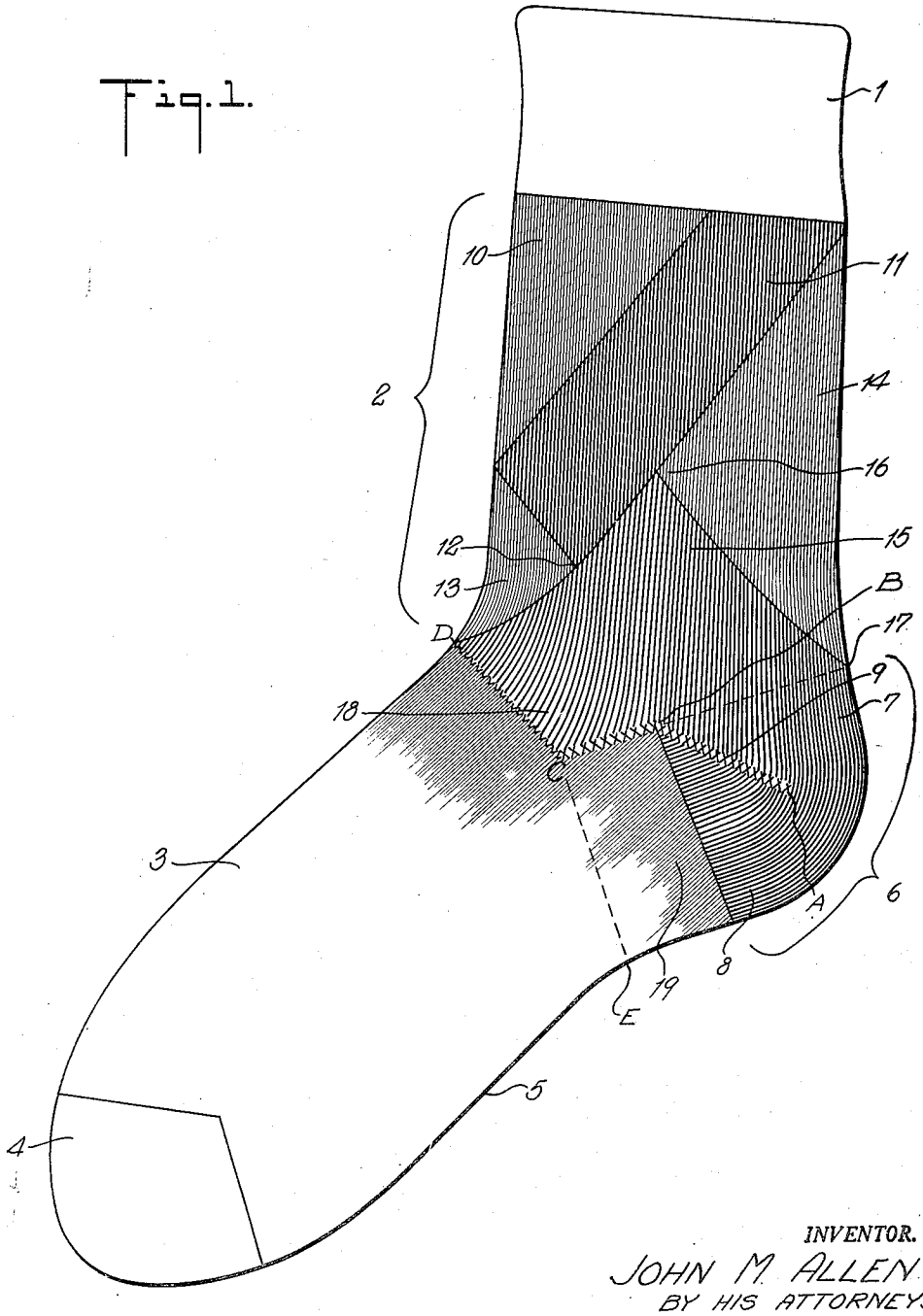
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CIRCULAR KNIT STOCKING AND METHOD OF MAKING SAME

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Fig. 1.



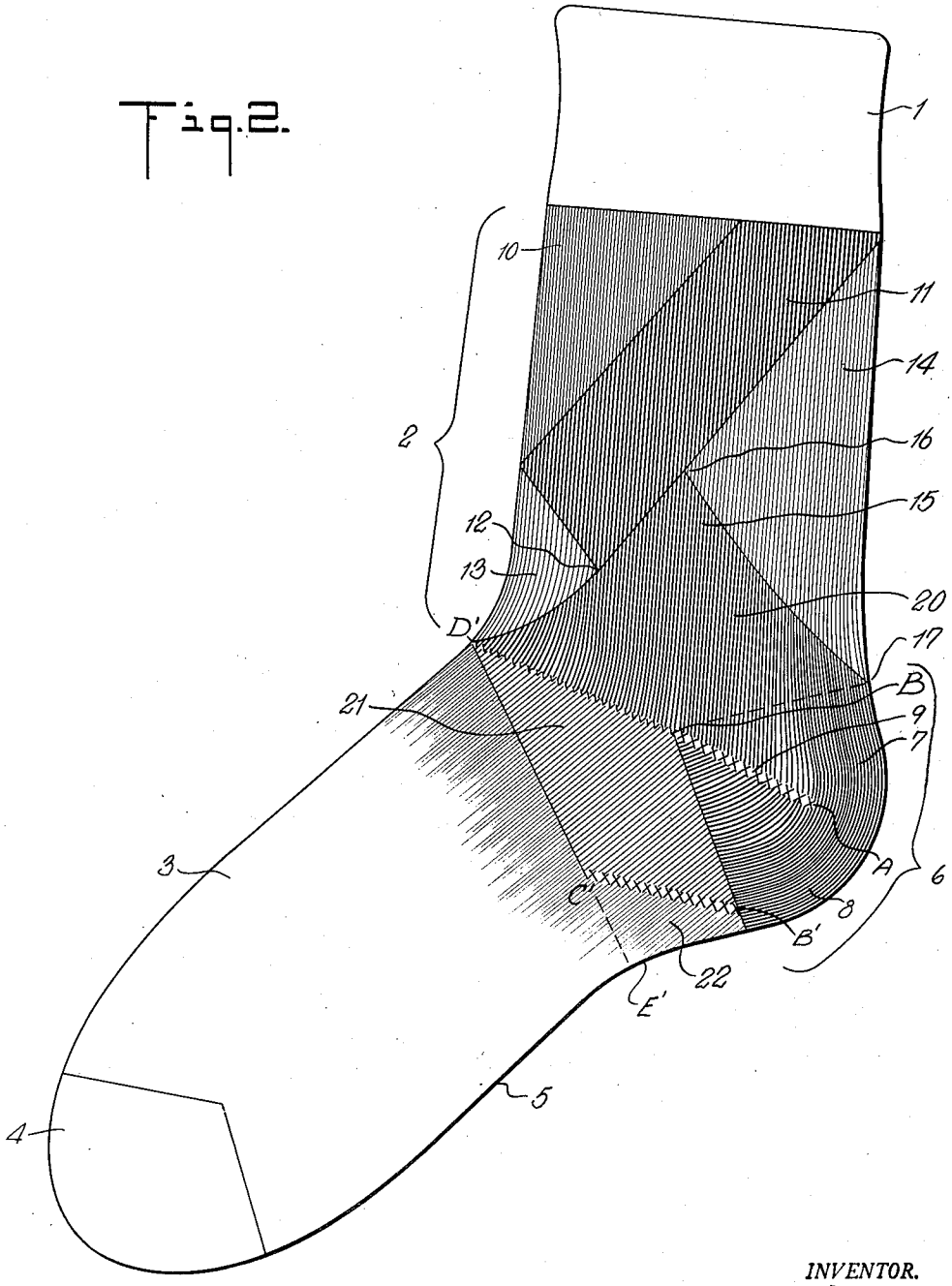
INVENTOR.
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Fig. 2.



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CIRCULAR KNIT STOCKING AND METHOD OF MAKING SAME

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14 Claims. (Cl. 66—179)

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This invention relates to a circular knit stocking and a method of making same, and more particularly to a patterned stocking having a better-fitting instep and heel. In circular knit hosiery the pocket for the heel is formed by inserting a segment of fabric between the leg and foot on the sole side of the stocking. The usual fabric for this purpose is a narrowed and widened heel pocket with a double-sided suture between the two segments. By a "double-sided" suture is meant one in which the successive end stitches on each side come from different courses of the fabric and are interknit to form the suture. Stockings made in this manner fit the foot in an uneven manner. There is surplus fabric on the instep side and an area of strain on each side of the stocking at the inner ends of the heel pocket. I have found how to shape a stocking by inserting extra fabric so as to produce a stocking which is improved not only as to fit but which also extends any diagonal pattern of which the leg may be made. This better-fitting construction is made in instances where at least part of the leg is knit reciprocatorily. According to my present invention there is provided a tapered insert which gives extra fabric all the way from the instep of the stocking to the bottom of the sole. I call my stocking a "diamond instep" stocking. The instep part of the insert is shaped like a wedge and is joined integrally on one side with adjacent fabric on the instep side of the stocking. It shapes the instep side of the stocking by allowing for the turning of the foot upwardly at an angle relatively to the leg. I also provide a gusset on the sole side of the stocking as part of this tapered insert. This gusset lengthens the sole relatively to the instep and matches the instep wedge of fabric to make a better-fitting stocking. I have found that such an improvement is particularly useful in a stocking having a leg design of diagonal sections knit of yarns of different colors. The sections are generally four-sided, i. e., diamond-shaped interfitting sections. Men's socks containing such patterns are known as "hand-fashioned diamond" socks. The sections of the design are knit successively and reciprocatorily. They are joined together by sutures made as the knitting progresses. One patent showing such a design is my U. S. Patent No. 2,260,650, dated Oct. 28, 1941, for Hosiery and Method of Manufacture.

In the drawings:

Figure I is a view in side elevation of a preferred form of a diagonal diamond-design circular knit stocking made in accordance with my invention; while

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Figure II is a similar view of a modified form of my invention in which one entire four-sided figure of the diamond design on each side of the stocking is below the direct instep line.

I will first describe the preferred embodiment of Fig. I. The stocking has the usual top 1, a leg designated generally by the numeral 2, an instep 3, a toe 4, a sole 5 and a heel generally indicated by the reference character 6. The heel comprises the usual narrowed and widened segments 7 and 8 joined together by a double-sided suture 9. It will be understood that extra segments may be added or other changes made in the heel without departing from my invention. The outer or heel end of the heel suture on each side of the stocking is designated by the letter A, and the inner end by the letter B. The stocking has a diagonal or diamond design made of staggered four-sided sections of fabric. They are knit reciprocatorily of yarns of different colors and joined together by suture lines.

Such a construction is customarily made on circular machinery by knitting the diagonal design sections or diamonds in succession by reciprocatory knitting. When making such stockings it is necessary to knit the patterned leg by hand manipulation of the machine. This is a comparatively slow and expensive process. Hand manipulation is used to make as little of the stocking as possible. For this reason, as soon as the leg has been knit, the heel, foot and toe are knit by automatic operation of the machine. The pattern in the leg therefore did not extend into the foot heretofore.

To make my stocking of Fig. I, after the top 1 is made the diamond 10 at the top front of the stocking is made by reciprocatory knitting. To do this half the needles on the heel side are thrown out of action and knitting proceeds reciprocatorily on the front half. This active group of needles is gradually narrowed to produce the tapered section 10. When this section has been completed, all needles are out of action. Knitting on one of the diagonal sections 11, located diagonally just below the section 10, is then begun on about one-quarter of the needles. As the knitting progresses, needles are removed on one side of the section and added on the other side to the point on the front of the stocking at the bottom of section 10. Beginning at this point, needles are narrowed on both sides until the lowest point 12 of the section 11 is reached.

The similar section 11 on the other side of the hose is then made in the same way, after which knitting is commenced at the top point of the diamond-shaped section 14 at the rear of the stocking. In making section 14, needles are added on each side until the widest part of the section at point 16 is reached, and then they are removed progressively on each side until the point 17 to be connected to the heel pocket is reached. The diamond-shaped section 13 in the front of the stocking below section 10 and joining sections 11 is then knit in a similar manner. As already indicated, each section is preferably knit of a yarn of a different color. The effect of this manner of knitting is to produce a pattern with sharply-defined edges, the general effect of the pattern being diagonal and diamond-shaped.

The next section to be knit after 13 and 14 is the section on each side which I have identified in Fig. 1 of the drawings by the numbers 15, 18. It includes part of my new insert in addition to part of the leg. It will be observed that section 13 terminates at the front of the instep at a point D opposite the heel. A straight line from this point D to the point B at the inner end of the heel—whatever the type of heel—will normally be a direct extension of the heel suture. I call this line BD the "direct instep" line. This and the heel line on the back where the heel begins together represent the line normally reached by knitting of the leg before starting the heel. When beginning the leg part 15 of the new section the stitches on the needles on each side of the machine run from the point D through the point 12 on section 11 to the point 16 at the top of the section and down again to the point 17 at the bottom of the section 14. At this point the section will be attached to the back of the upper or narrowed segment 7 of the heel. The leg part 15 of the section is knit by reciprocation beginning at the upper point 16 and widening out in both directions. The knitting reaches the points 17, B and D in the same course. This completes the leg part 15 of the section 15, 18.

It will be observed that heretofore the knitting of patterned fabric has ordinarily stopped on this direct instep line BD and heel line B, 17, in order to permit the rest of the stocking to be knit automatically. Not only does this cause the pattern to end on a line above the top of the ordinary low shoe, leaving an ugly break in appearance, but the break is emphasized by the fact that the patterned section being knit lacks its downwardly-directed point at the instep line. According to my invention this patterned section 15, 18 is provided with its desired point and below the direct instep line, breaking up the abrupt ending in the pattern. This is done before the making of the heel.

To finish the entire section 15, 18, reciprocatory knitting is continued from point B to point D on one side of the stocking to make the triangle or wedge of fabric 18. The knitting is narrowed one needle per course along the instep suture CD and one needle every two courses along the wedge suture BC until the triangle is completed at a downwardly-directed point C. The edges of the triangle along the lines BC and CD therefore are "narrowed" edges. After completion of the wedge 18 on one side of the stocking, the wedge on the other side is knit in a corresponding manner. This gives an extension of the leg pattern, projecting the pattern below the direct instep line to a point which is normally hidden by the low shoe. This is achieved without in any way marring the continuity of the fabric at the instep line. While this triangle or wedge is knit integrally with the instep fabric of the leg, it is joined to the instep fabric of the foot by a single-sided suture. The latter is much less objectionable in appearance than having a double-sided suture extending directly to the front of the instep, and its location is such as to enhance the diamond pattern effect. Furthermore, it will be at least partially hidden by the wearer's shoe. By having a point of the wedge located at the front D of the instep, an extra piece of tapered fabric is inserted on the instep side of the stocking which provides the necessary geometrical addition to allow for an adequate turning of the foot with relation to the leg. As shown in Fig. I, the juncture line CD between the triangular wedge of fabric 18 and the instep side of the foot is a single-sided suture. The juncture line BC running from the inner end of the heel suture AB to the inner end C of the single-sided suture line is a double-sided suture.

This suture line joins the wedge to a gusset 19. This gusset, extending around the sole side of the stocking adjacent the forward edge of the widened heel segment 8, connects the two wedges 18 and completes the tapered insert characteristic of my invention. It is knit in a reciprocatory manner, preferably containing the same number of courses as are found in the wedges 18 on the double suture lines BC connecting it to the two wedges. Therefore the last course of the gusset 19 passes from point C on each side of the stocking through a point E at the sole which is the same number of courses from the heel as point C. This gusset 19 is knit after the usual narrowing and widening operations of making the heel. Of course, if the heel contains additional gussets other than the tapered gusset of my invention, they will be made before the gusset 19. It will be seen that my tapered insert is bounded on each side of the stocking by points B, D, C, E and the forward edge of the heel. The juncture between the widened segment 8 of the heel and my gusset 19 will be represented only by whatever change of yarn may be desired, as this novel gusset is knit in integral succession to the segment 8.

In the construction of Fig. I, the reciprocatory knitting of the gusset 19 commences on the same number of needles that were employed in knitting the last course of the heel segment. Needles may be added in any desired manner as the double-sided suture BC is formed. I find it preferable to add needles during reciprocatory knitting of the gusset 19 at a rate complemental to the rate of narrowing during the making of the wedge 18. When the gusset has been completed, the machine immediately begins rotary knitting. The foot is knit in integral succession to the gusset, the first course also completing the single-sided sutures CD on the instep side of the stocking. The sole 5, the instep 3 and the toe 4 are all knit in any of the usual manners.

I find that the double-sided suture BC extends below the top of the ordinary low shoe and provides a diversion for the inner end of the heel suture which is pleasing to the eye. Thus there is not only a completion of the patterned section 15, 18 and the insertion of the tapered insert extending completely across the stocking from the instep to the sole to make the stocking fit better, but also a diversionary appearance for

the heel suture which is properly concatenated with the leg pattern. Furthermore, there is no suture on the instep line to mar the fabric.

The fabric of Fig. II has the diamond pattern arranged in a slightly different manner. In this construction the sections 10, 11, 13 and 14 are the same as in Fig. I. However, the two patterned sections 20 of the leg differ. They are not knit with any fabric below the direct instep line as continuing courses without any intervening sutures. In this construction the tapered ends of my insert are formed by wedges 21 each of which itself completely constitutes an extra section of the pattern. Each wedge, as heretofore, tapers to a point D' at the front of the instep but is joined on the instep line to the leg patterned section 20 by a single-sided suture BD' in direct extension of the double-sided heel suture AB. On the other or lower instep edge of wedge 21, however, the wedge and the instep side of the foot are knit together without any intervening suture. Thus it will be observed that in both figures the wedge is united to the adjacent instep fabric of the leg above it and to the adjacent instep fabric of the foot below it, as continuing courses without any intervening suture on one side, and by a single-sided suture on the other.

As in the case of Fig. I, there is a gusset located just forward of the widened segment of the heel, joining the two wedges and completing the insert. In Fig. II the gusset is numbered 22. The junctures between the gusset 22 and the wedges 21 preferably are double-sided sutures B'C'. Instead of having a triangular wedge in this embodiment, there is a four-sided wedge. The end of the double-sided suture B'C' adjacent the heel, instead of being coincidental with the inner end B of the heel suture AB, is located nearer the sole. This puts the end C' of the suture nearest the foot down to a wale which is nearer the sole than the wale in the wedge which meets the inner end B of the heel suture. This suture B'C' illustrates another feature of this embodiment of my invention, namely, the possibility of removing the double-sided suture between the wedges and the gusset completely from the portion of the stocking visible when worn with a low shoe.

In the making of the stocking of Fig. II, the sequence of operations is the same as Fig. I down to and including the knitting of the part 15 of that figure. Thus, the last course knit in the patterned section 20 of the leg of Fig. II extends from the point 17 where this section meets the narrowed section 7 of the heel to the inner end B of the heel suture and thence to the point D' at the instep of the stocking. After this course has been made, the heel is knit in any customary manner. Next the wedges 21 are knit of their colored yarn. Reciprocatory knitting commences on each side of the stocking between the inner end B of the heel suture and the end B' of the gusset-wedge suture B'C' near the sole. This knitting is in direct course succession to the widened segment of the heel without any intervening sutures. As the reciprocatory knitting progresses, needles are added at the direct instep line BD' ends of the courses on each side of the stocking and are subtracted at the lower ends where the double suture lines B'C' are being started. While the adding and subtracting can bear any desired numerical relation to each other, I have indicated a slower narrowing along the gusset-wedge suture B'C' than the widening which is taking place in making the single-sided suture BD'. In this way the end C' of each double-sided suture between the gusset and a wedge is in a wale nearer the bottom of the stocking than the inner end B of the corresponding heel suture AB. The wedges 21 are completed when the knitting reaches the line C'D'. The gusset 22 extending under the sole is then made. To do this the needles corresponding to the fabric between the points B' on the two sides of the stocking begin to knit fabric. During this reciprocatory knitting the active segment of needles is increased gradually at each end. In this way the needles which were thrown out of action at B'C' in making the edge of the wedge 21 are thrown back into action progressively. This completes the double-sided suture B'C'. It also completes the gusset 22. The machine then shifts to rotary knitting on all its needles, knitting integrally to the fabric on both the sole and the instep sides of the stocking. The sole, instep and toe are made in any usual manner and the stocking completed.

It will be seen that in both Figs. I and II, the sole gussets 19 and 22 are knit by reciprocatory knitting commencing at the forward edge of the heel and widening until the downward point of the wedge is reached. Wrinkles at the instep are avoided and surplus fabric is provided at the side of the ankle where needed. In both figures the pattern is extended below the direct instep line and the presence of a double-sided suture extending to the instep side of the stocking has been avoided. It will also be noted that the difference in nature of the sutures CD and BC is admirably suited to their functions. Thus, the double-sided sutures BC and B'C' not only turn the wales like the single-sided instep sutures CD and C'D', but also have an extra stepped relation of the stitches to allow for the angles at which the double sutures cross the wales.

It will be seen that the pattern appearance of the stocking, as well as the fit, has been much improved.

I claim:

1. A circular knit stocking having a reciprocatorily knit heel, a leg and a foot, in combination with a tapered insert comprising a gusset and two wedges, the gusset extending under the stocking adjacent the forward edge of the heel and being united to the wedges by sutures, the wedges being located just below a line running directly from the inner end of the heel suture to the front of the instep, one on each side of the stocking with a point at the front of the instep, each wedge and adjacent instep fabric being knit together as continuing courses along one instep edge of said wedge without any sutures intervening between the wedge and that adjacent fabric, whereby a better fitting stocking is produced.

2. A circular knit stocking according to claim 1 in which each wedge is united to adjacent instep fabric along its other instep edge by a single-sided suture.

3. A circular knit stocking according to claim 1 in which it is the instep fabric of the leg that is knit without any sutures between it and the wedge, whereby there is no direct suture line in the fabric from the front of the instep to the inner end of the heel suture to mar the appearance of the instep.

4. A circular knit stocking according to claim 1 in which the heel has narrowed and widened segments joined by a heel suture on each side of the stocking, the sutures between the wedges and

the gusset joining the inner ends of the heel suture together.

5. A circular knit stocking according to claim 4 in which the sutures joining the wedges and the gusset are inclined toward the toe from the direct instep line and there is a single-sided suture between each wedge and the foot joining the instep to the wedge-gusset suture, whereby extra fabric is inserted all across the stocking to the instep without the presence of a suture at the instep line.

6. A circular knit stocking according to claim 1 in which the leg contains a plurality of diagonal patterned sections having downwardly-directed points and each wedge contains a downwardly-directed point to the side of the front of the instep and below the direct instep line, whereby the pattern of the leg is extended below the direct instep line.

7. A circular knit stocking according to claim 1 in which the gusset and the wedges contain approximately the same number of courses, whereby the gusset and wedges together constitute an insert of uniform width except for the points at the front of the instep of the stocking, and a better-fitting stocking is produced.

8. A circular knit stocking according to claim 1 in which there is a single-sided suture between the leg and each wedge, whereby an extra patterned section below the direct instep line is added to the pattern.

9. A circular knit stocking according to claim 8 in which the sutures between the gusset and the wedges are double-sided ones but do not extend up to the inner ends of the heel sutures, whereby no double-sided suture on the instep of the stocking will show above a low shoe.

10. A method of making a patterned, circular knit stocking, comprising the step of making a leg by reciprocatory knitting on varied groups of needles until the heel line and the direct instep line are reached, in combination with the steps of knitting reciprocatorily a heel and a tapered insert extending around the stocking, at least part of the insert being knit after the heel, then knitting a foot to the insert by rotary knitting; the knitting of the instep portion of the insert including the connection to the fabric along one instep edge of the insert without any suture by means of knitting continuing courses, and the connection to the fabric on the other instep edge by knitting on varied groups of needles to produce a single-sided suture.

11. A method of making a patterned, circular knit stocking according to claim 10 in which before the heel is made a triangular wedge is knit as continuing courses without any sutures intervening between it and the leg at the instep portion of the insert, whereby part of the pattern of the leg extends below the direct instep line.

12. A circular knit stocking having a heel with narrowed and widened segments with a double-sided suture therebetween, a leg, a foot, an insert between the foot and the leg and heel comprising a tapered wedge of fabric on each side of the stocking located between the foot and the leg and knit to one of those two pieces of fabric as continuing courses without any sutures intervening between the wedge and that piece of fabric, and knit to the other of those two pieces of fabric by a single-sided suture, in combination with a gusset extending around the sole side of the stocking forward of the heel, composed of a number of courses equal to the maximum number of courses in each tapered wedge and joined to the tapered wedge on each side of the stocking by a double-sided suture.

13. A circular knit stocking having a heel with narrowed and widened segments with a suture therebetween, a leg, a foot, and an insert between the foot and the leg and heel, said insert comprising a gusset in combination with two triangular inverted wedges, the gusset being located around the sole of the foot adjacent the heel ending in a point adjacent the foot several wales nearer the instep than the narrowed and widened heel, one of the wedges being located on each side of the instep below the direct instep line with a point at the instep, each wedge and adjacent instep fabric in the leg being knit together as continuing courses along one instep edge of the wedge without any sutures intervening between the wedge and the fabric above the direct instep line, each wedge coming to a downwardly-directed point below said line, and each wedge being joined to one of the tapered ends of the gusset.

14. A circular knit stocking having a seamless knit narrowed and widened heel, a foot, a leg composed of diagonal patterned sections, a suture in the heel and a reciprocatorily knit gusset located between the heel and the foot and extending completely around the sole of the stocking, in combination with two triangular-shaped pieces of fabric, one on each side of the front of the stocking knit as continuing courses without any sutures intervening between it and adjacent instep fabric along one side of the triangle, each such piece having one point adjacent the inner end of the heel suture on its side of the stocking, another point at the middle of the instep, and a third point below a line adjoining the first two points, the sole gusset being connected to one side of each triangular piece by a double-sided suture, whereby a stocking with patterned sections both above and below the instep line is produced.

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