July 5, 1949. L. H. COLTON 2,475,447

BEARD PRESSING MEANS FOR STRAIGHT BAR KNITTING MACHINES

Filed Dec. 19, 1944

5 Sheets-Sheet 1

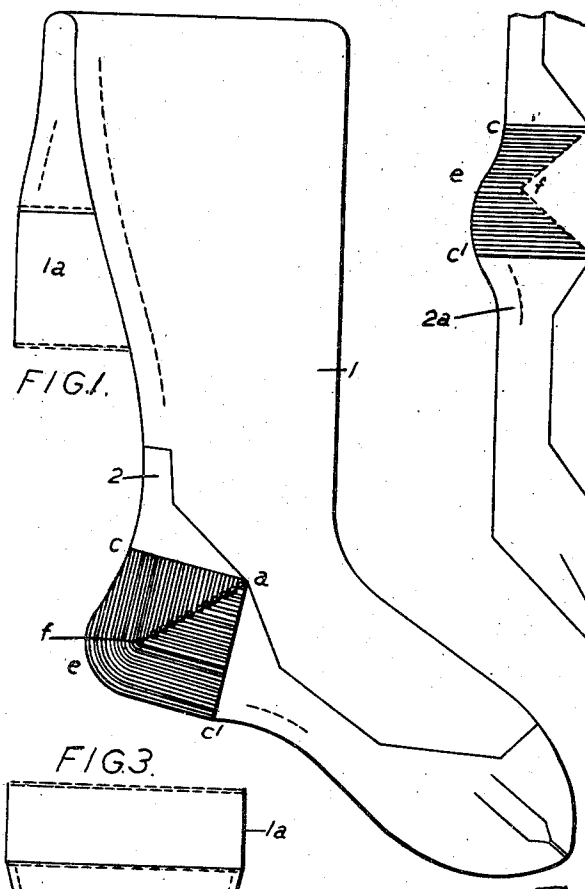


FIG.1.

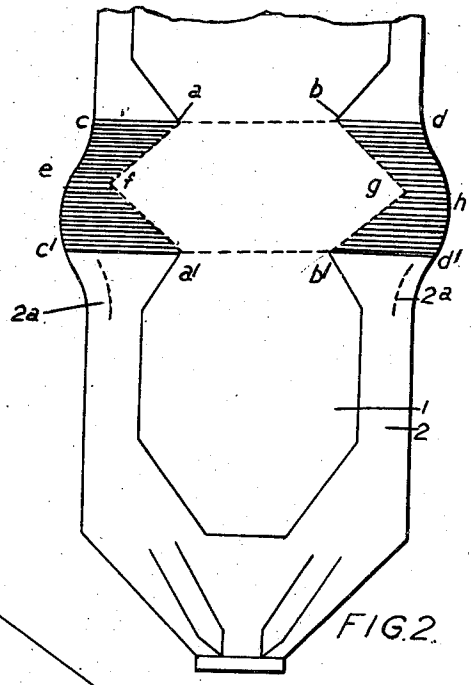


FIG.2.

FIG.3.

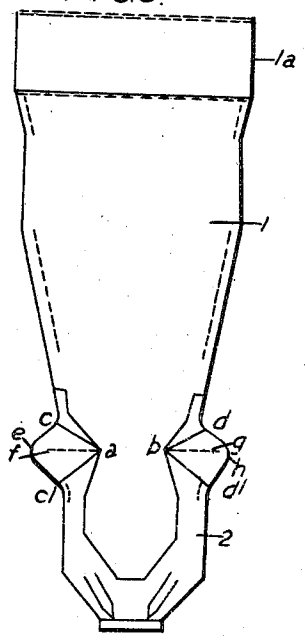
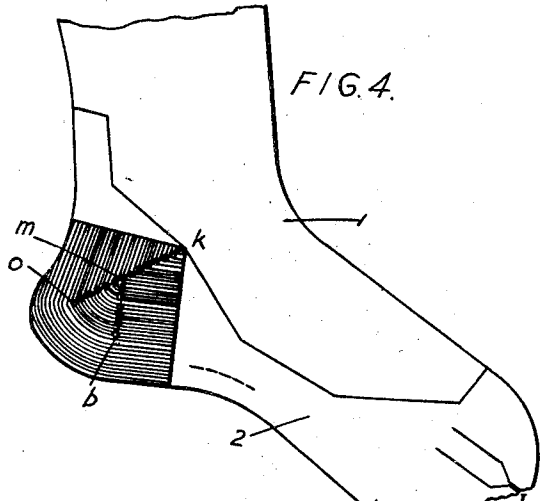


FIG.4.



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BEARD PRESSING MEANS FOR STRAIGHT BAR KNITTING MACHINES

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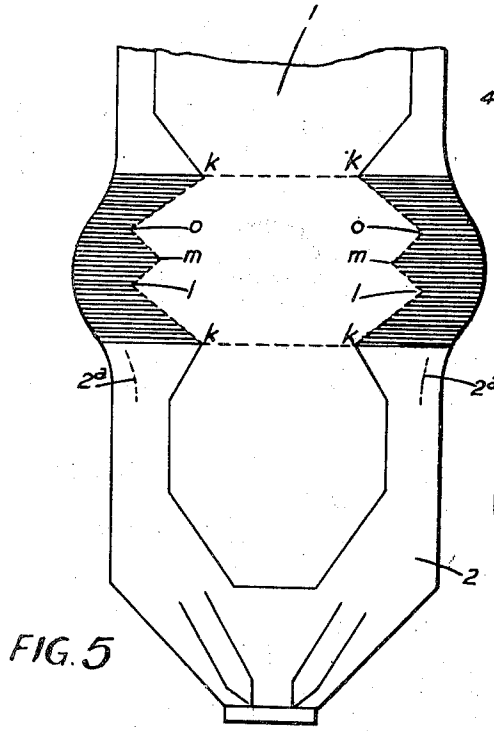


FIG. 5

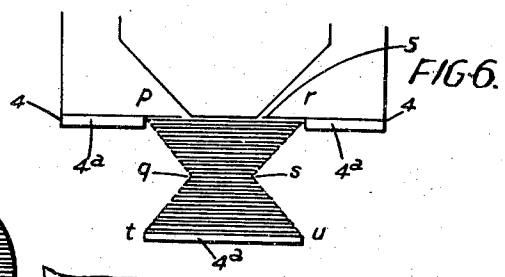


FIG. 6.

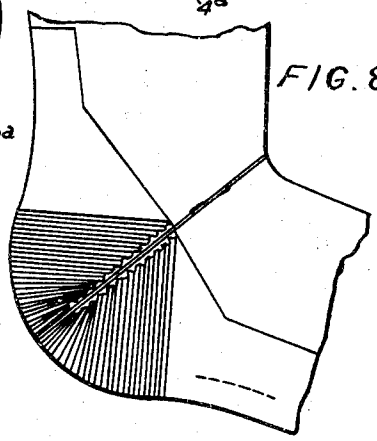


FIG. 8.

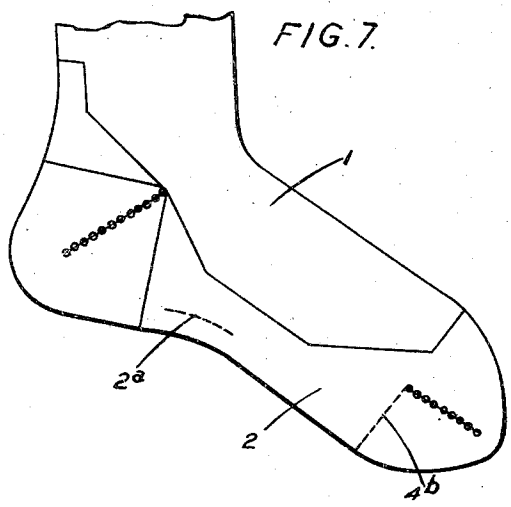


FIG. 7.

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BEARD PRESSING MEANS FOR STRAIGHT BAR KNITTING MACHINES

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FIG.9.

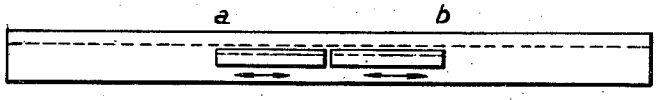


FIG.10.

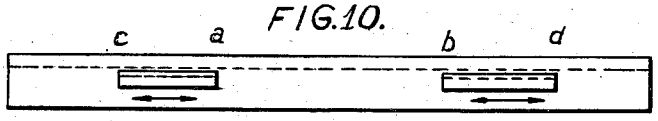


FIG.11.

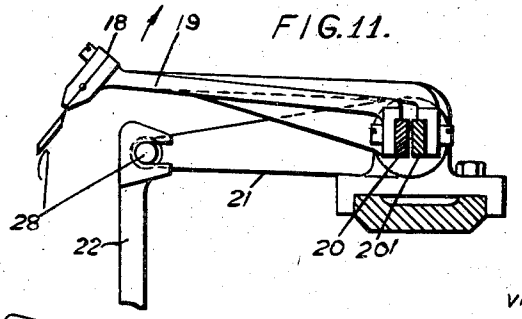


FIG.6a.

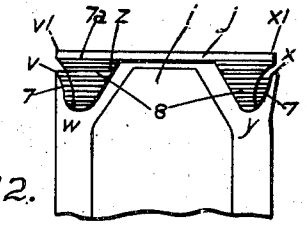
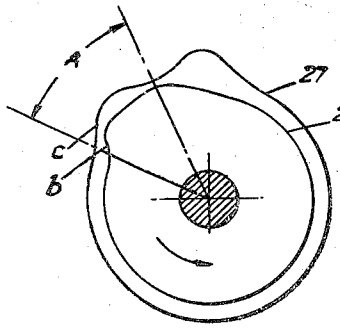


FIG.12.

FIG.13.



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FIG. 14.

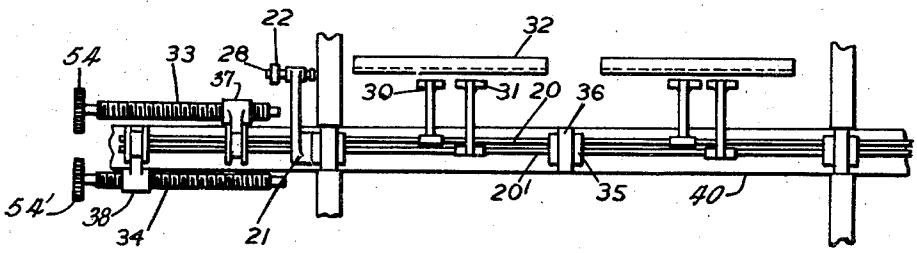


FIG. 15.

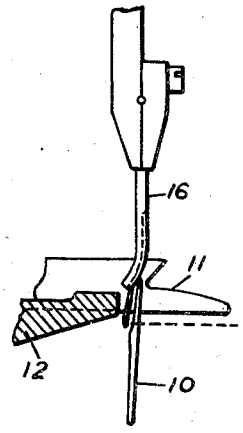
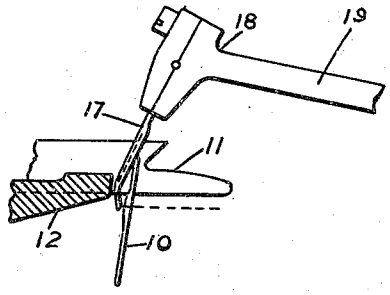


FIG. 16.



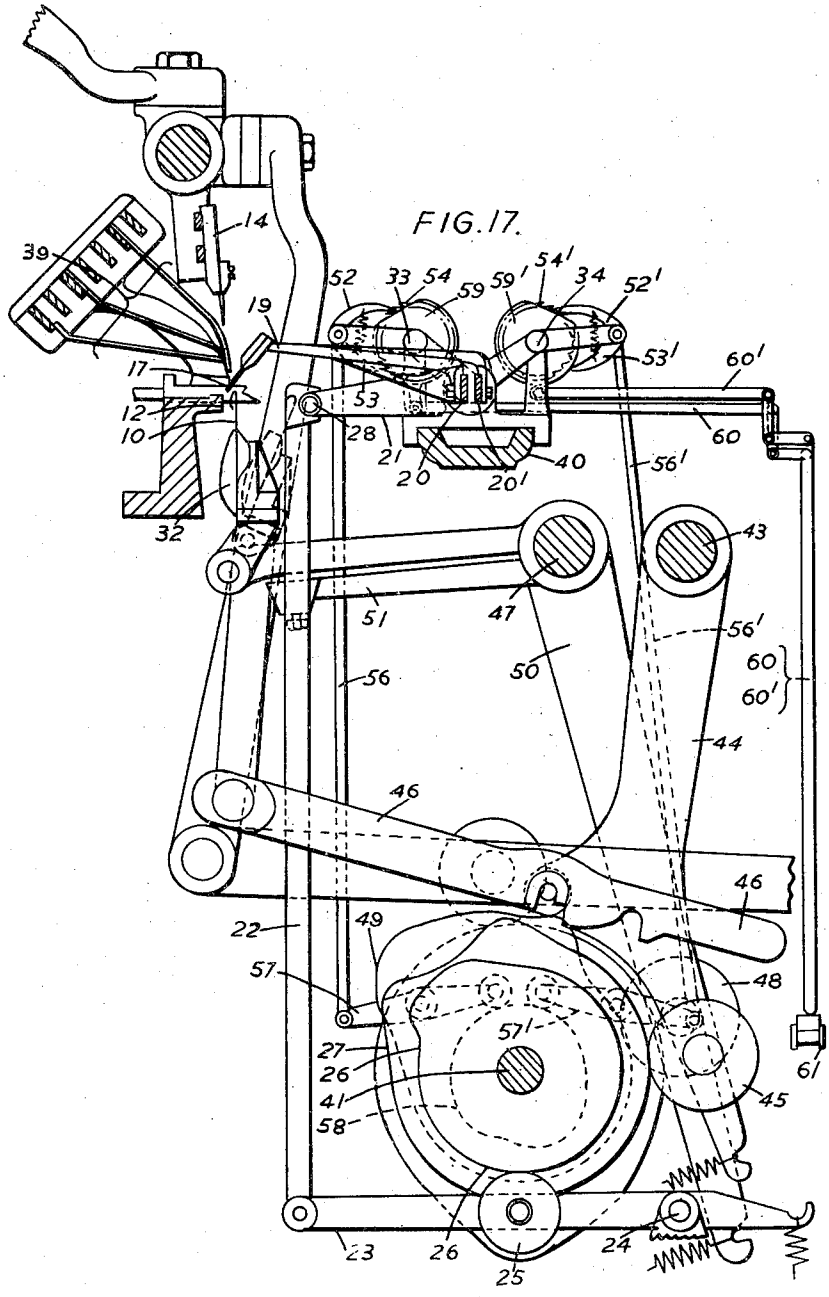
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BEARD PRESSING MEANS FOR STRAIGHT BAR KNITTING MACHINES

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FIG. 17.



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Patented July 5, 1949 2,475,447

UNITED STATES PATENT OFFICE

2,475,447

BEARD PRESSING MEANS FOR STRAIGHT BAR KNITTING MACHINES

Lewis Henry Colton, West Bridgford, Nottingham, England

Application December 19, 1944, Serial No. 568,818
In Great Britain November 6, 1943

6 Claims. (Cl. 66—89)

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This invention relates to stockings and socks of the type that are formed from a fashioned blank with selvedge edges which is subsequently seamed; it also relates to means for and the method of manufacturing the same.

One object of the invention is to improve the heels of such stockings, particularly as regards fit, appearance and durability; another important object is to provide means for producing fashioned stockings of the said type more economically than heretofore.

According to one aspect of the present invention a flat fashioned stocking blank is produced on a straight bar knitting machine of the Cotton's patent or similar type and near each selvedge of the blank at the location of the heel an inwardly extending suture is formed by withholding knitting on the centre section of the needles and by progressively decreasing the number of needles in operation extending outwardly from each side of said section and knitting only on the operative needles, holding the loops on the needles rendered inoperative and thereafter bringing such latter needles sequentially or in groups into operation.

The method of manufacturing on a straight bar knitting machine of the Cotton's patent and similar type a selvedged fashioned stocking blank with heel parts according to this invention consists in withholding knitting on the central section of needles and knitting successive courses on a progressively decreasing number of the side needles (i. e. needles extending at each side of the central section towards the selvedge) holding the loops on the needles which are progressively rendered inoperative, thereafter bringing such needles progressively into operation (the needles last rendered inoperative being first brought back into operation) until all of the side needles are in operation so that a suture is formed extending outwardly from each end of the central section towards but not to the selvedge and thereafter knitting on the side needles and the central section of the needles. The toe part of the stocking may be formed in like manner but whereas the heel parts will be formed at that part of the blank where the leg part is to be turned to the foot part the toe part will of necessity be formed at one end of the blank.

In an alternative the toe part is formed at one end of the blank by suspending knitting on a number of side needles without casting off the loops thereon knitting on a progressively decreasing number of central needles extending inwardly from each of the outermost needles of the central needles, holding the loops on the needles thus rendered inoperative, bringing such inoperative needles progressively into operation (the needles last rendered inoperative being first brought back into operation) until all the central needles are in operation so that two sutures are formed each extending inwardly towards one another the one from the one side of said central section of needles and the other from the other side of said section and thereafter knitting on the full complement of needles.

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Viewed from another aspect the invention consists in a fully fashioned stocking formed by joining or seaming a blank having selvedged edges produced on a straight bar knitting machine of the Cotton's patent or similar type, which blank has a heel part on each side thereof formed by a suture extending from the outside of the instep to a position short of the selvedge, the wales of the fabric in each heel part extending from the opposite sides of the suture at right angles or substantially at right angles to one another.

From another aspect the invention consists in the production on Cotton's patent or similar straight bar knitting machine by a continuous (uninterrupted) knitting process of a fully fashioned stocking blank having a heel of the type hereinbefore set forth in which a toe part on either side of the blank at one end thereof is formed by a suture extending inwardly from a position near the selvedge to a position short of the centre line of the blank.

From another aspect the invention consists in a stocking formed from a blank with selvedge edges produced by a continuous (uninterrupted) process of knitting on a Cotton's patent or similar straight bar knitting machine and having a heel of the type hereinbefore set forth in which a toe pocket is formed at one end by a central piece of fabric being of less width than the full width and having a suture extending inwardly from each selvedge for a distance less than one half the total width of said central piece.

Viewed from a still further aspect the invention comprises a fully fashioned selvedged hose blank having a heel part on each side and produced on a straight bar knitting machine characterised in this that each heel part is knitted without interruption as a continuation of the ankle portion and the foot sole part is knitted without interruption as a continuation of the heel part each heel part being of substantially triangular or sector configuration, the base or arc forming part of the selvedge and the apex being integrally knitted with a course of the instep fabric.

Viewed from yet another aspect of the invention consists in a method of knitting a full fashioned selvedged hose blank on a Cotton's patent or other straight bar knitting machine wherein the instep loops are held whilst the heels are being knitted and the said heels are connected to the sole portion of the blank by a continuous process on the same machine which knits the leg panel of the blank.

According to one aspect the invention consists in the provision of a selvedged full fashioned hose blank made on a Cotton's patent or other straight bar knitting machine wherein the heel portions are joined to the sole portions by a continuous process and wales of the fabric in each heel portion constituting a continuation of the ankle portion extend at right angles to the wales of the fabric in the said sole portion.

A further feature of the invention consists in the formation of a fashioned stocking blank with selvedge edges on a straight bar knitting machine of the Cotton's patent or similar type in which the heel parts are formed by withholding knitting on the central section of the needles, knitting for successive courses on a decreasing number of needles extending from either side of the central section towards the selvedge, retaining the loops on the inoperative needles and thereafter bringing said inoperative needles sequentially or in groups into operation and when all of the inoperative needles have been brought into operation knitting across all of the said needles in combination with members or instruments which are automatically brought into action sequentially and removed from action sequentially, firstly to prevent the loops being cast off the inoperative needles of each side groups and secondly to permit such loops to be cast off to form the suture.

In order that the nature of the invention may be more readily understood reference will now be made to the accompanying drawings, in which—

Figure 1 illustrates by way of example a stocking according to this invention.

Figure 2 illustrates the manner in which the heel parts are formed.

Figure 3 shows the completed blank produced in the manner illustrated in Figure 2.

Figure 4 illustrates an alternative construction of heel.

Figure 5 shows the manner in which the heel of Figure 4 is produced.

Figure 6 illustrates one method of producing a stocking toe.

Figure 6*a* illustrates an alternative method of producing a toe.

Figure 7 shows a stocking toe produced in the manner illustrated in Figure 6.

Figure 8 illustrates an alternative type of heel produced in accordance with this invention.

Figures 9 and 10 are diagrams illustrating the movements of devices which render needles progressively idle, and active, in narrowing and widening respectively;

Figures 11 and 12 are sectional elevations showing the relevant parts of a straight bar knitting machine and means for deflecting the needles away from the presser;

Figure 13 shows an operating cam for said means;

Figure 14 is a plan of relevant portions of the machine; and

Figures 15 and 16 show alternate arrangements of needle-deflecting means.

Fig. 17 is a cross section through a straight bar knitting machine (of the known type having the conventional divided needle bar whereby the instep needles may be temporarily caused to refrain from pressing and to hold their loops, until subsequently restored to activity by the manipulation of the central part of the needle bar, while side needles beyond the group of instep needle continue to knit) equipped with mechanism according to Figs. 11, 12, 13, 14, and 16, and showing sufficient of the conventional machine components to permit the machine to be identified.

Stockings in accordance with this invention are adapted for production on any straight bar knitting machine of the Cotton's patent type. As is well known in the art stockings may be produced in a variety of different ways. In some cases the leg part is produced on one machine and the foot on another machine. During the past few years many proposals have been made for producing a complete blank on a single machine, or, in the alternative, a blank devoid of heel pouches has been produced on one machine and the heel tabs have been produced on a separate machine. Many stockings of the type hitherto produced are subject to the disadvantage that there is a join in the heel side part which weakens the stocking and tends to render it uncomfortable in wear. In other types of stockings this join is avoided by knitting what is known as the round heel but one of the disadvantages of this type of heel is that whilst the heel parts are being knitted the instep fabric is also being knitted with the result that there is a surplus of instep fabric which in wear creases or rucks and is unsightly. Another disadvantage of stockings with certain types of round heel is that it is very difficult if not impossible to make a satisfactory blank having the heel parts composed of thread different from the instep.

A further disadvantage inherent to many known types of stockings is that the speed of production is reduced (and hence the cost increased) consequent upon the necessity of fashioning during the knitting of the heel parts whilst with many known types of stockings after the blank has been formed the inner sides of the heel parts have to be joined by linking; the process of linking is both tedious and expensive whilst furthermore the linking is prone to break down under the stress of wear with the result that faults appear in the stocking particularly at the heel corner.

The main purpose of the present invention is to overcome these disadvantages and to provide means whereby on a straight bar knitting machine a complete fully fashioned stocking blank with selvedge edges can be produced by a continuous (uninterrupted) knitting process with integral heel portions: the blank is subsequently seamed or joined and in the completed stocking the heel is not weakened by a join, linking of the heel parts is obviated, there is no surplus fabric across the instep, and the foot of the stocking is turned by the heel so that it assumes its optimum angle relatively to the stocking leg.

Referring to Figure 1, the leg part including the welt is first produced in normal manner and may be fashioned by narrowing in known manner. At the commencement of the heel part knitting is suspended on the instep needles *a*, *b*, and two heeling carriers are brought into operation, one to knit on needles *a* to *c* and the other on needles *b* to *d*. At predetermined intervals in the knitting, say every course or every alternate

course, the number of needles in operation is reduced say by one or two needles (the traverse of each heeling carrier being varied accordingly) and the loops on the inoperative needles are not cast off. The number of needles in operation is reduced until the only needles in operation are *e, f,* on one side and *g, h,* on the opposite side Thereafter the inoperative needles are sequentially brought into operation in the direction from *f* to *a'* on one side and from *g* to *b'* on the other side until the full complement of needles *a'* to *c'* and *b'* to *d'* are again in operation, so that a suture is formed the suture on one side being indicated at *a, f, a'* and the suture on the other side being indicated at *b, g, b'*. The traverse of the heeling carriers is of course increased as the needles are brought into operation. Thereafter the heeling carriers are rendered inoperative and knitting proceeds on the full complement of needles *c', d'*; thereafter the foot part and toe are produced and, if desired, a toe pouch may be formed in similar manner to that in which the heel part is formed. The blank may be spliced as indicated at **2** if desired. The selvedges *cec'* and *dhd'* may be straight (unfashioned) or may be widened by carrier widening, it is found that by shaping the heel part by widening the completed heel is a better fit particularly if the distance *ac* on one side and *bd* on the other side is less than the distance *ac b'd'*.

In the drawings the selvedge of the heel parts is shown as being bowed; actually such parts are preferably widened but are preferably not subsequently narrowed because there is no necessity to narrow and narrowing operations reduce the rate of production. When the heel parts are made however the selvedge thereof does conform substantially to the outline shown, partly because of the sutures that are formed and partly because of the usual sole narrowings indicated at **2***a*.

After the blank has been knitted it is seamed in known manner to form a completed stocking of the type indicated in Figure 1.

It will be seen that a strong heel without a weak joint is produced; the heel is properly turned through 90° from the back to the base of the wearers heel and good fit is thus assured. Furthermore comfort in wear is increased by virtue of the fact that the courses extending from opposite sides of each suture are substantially at 90° to each other. During the formation of the heel parts the instep needles are inoperative with the result that there is no surplus fabric across the instep whilst furthermore the complete blank is produced on the one machine by a continuous process; running-on and heel linking are obviated entirely.

One method of manufacturing an additional suture is indicated in Figure 5 from which it will be seen that the number of needles in operation in each side section is first reduced from *k* to *o*, then increased from *o* to *m*, then decreased from *o* to *l* and finally increased again from *l* to *k*. The foregoing is, of course, given merely by way of example and as stated one or more additional sutures of any desired shape may be formed; the completed heel of Figure 5 is illustrated in Figure 4.

It will be appreciated that along each suture a series of small holes is formed and the appearance of the suture may if desired be varied by knitting a small number (say two) of courses of plain fabric immediately after knitting the courses *ef* and *gh* (in the example illustrated

with reference to Figure 2) before commencing to re-introduce the inoperative needles. In other words after knitting the first part of the heel (that is, the panels *c, a, f, e* and *d, b, g, h* all of the needles (including the instep needles) extending from *c* to *h* are brought into operation and two courses are knit thereon; all of the needles *f* to *g* are now rendered inoperative and the panels, *e, f, a', c'* and *h, g, b' d'* are now knitted, the needles *fa'* and *gb'* being brought into operation progressively in manner described; thereafter knitting proceeds across the whole of the panel as formerly. The general effect of knitting in this manner is indicated at Figure 8. In an alternative method and for the purpose of "filling in" the holes along each suture after the panels *c, a, f, e,* and *d, b, g, h* have been knitted one or more courses are laid but not knitted on the needles *af, gb* and thereafter the inoperative needles are brought into operation sequentially as before described with the result that tuck loops are produced as the inoperative needles are brought into operation.

One method of producing a toe portion in accordance with this invention is illustrated in Figure 6. At one end of the blank side needles **4** are rendered inoperative and knittig proceeds on the central section of needles **5** and the number of needles is progressively reduced from *p* to *q* and *r* to *s*. From *q* to *t* and from *s* to *u* the inoperative needles on which the loops have been retained are progressively brought into operation so that sutures *p, q, t* and *r, s, u* are formed. The blank is folded and the loops extending from *t* to the centre of *ut* are joined to the loops extending outwardly from *p* to the selvedge and the loops from *u* to the centre of *ut* are joined to the loops extending outwardly from *r* to the selvedge. A series of roving courses **4***a* may be produced if desired. It will be appreciated that the number of needles in the centre section **5** is the same as the sum of the two outer sets of needles **4**. The completed toe produced in manner described is illustrated in Figure 7, and the toe is closed by linking along the line **4***b*.

In the manufacture of stocking blanks in accordance with this invention means are provided for controlling the needles during the formation of the heel parts in such manner that only selected needles press and the remainder hold their loops.

The machine is necessarily of the known form in which means are provided whereby a central group of needles (the instep needles) may be temporarily caused to cease pressing and to hold their loops while side needles (heel needles) outwards of said group continue to knit. There are two well known types of such machines, viz. the divided needle bar type and the divided presser bar type, and it has been elected to show a machine of the divided needle bar type in Figure 17. The mechanism of the divided needle bar is well understood in the art (and is fully documented in numerous patent specifications) and requires no further illustration or description herein.

For controlling the needles of each side section instruments may be employed; they may be suspended above the needles or they may project upwardly between the knocking-over bits. These instruments deflect the needles individually away from the presser.

The instruments may be actuated by the narrowing machine of the frame and are adapted

to be shogged along the narrowing machine by racking screw mechanism.

Specific methods of controlling the needles are indicated in the detail views Figures 10 to 17 inclusive. In these views only the principles of operation are illustrated; from a consideration of these views together with the appendant description it is clear that any person skilled in the art can readily carry the invention into effect.

Figs. 11, 16, and 17 show the bearded needles at 10, sinkers 11, presser 12, and needle-deflecting points 17 (alternative needle-deflecting points 16 are shown in Fig. 15). Fig. 17 further shows the conventional narrowing machine 14, thread carriers 39, table 40, main cam shaft 41, divided needle bar 32, press-shaft 43 rocked by truck lever 44, truck 45 and press cam 27, hand lever 46 for connecting the lever 44 to the needle bar, up-and-down shaft 47 rocked by truck 48, cam 49, and truck lever 50, and lever 51 connecting shaft 47 to the needle bar.

There are two groups of the needle-deflecting points (each group constituting a needle-deflecting appliance) as indicated by the small rectangles adjacent to the double-headed arrows in Figs. 9 and 10.

At the commencement of the formation of the heel parts the centre section of needles is withheld from knitting by any suitable means such as a divided needle or presser bar and a series of instruments 16 or 17 is provided for each side section of needles. The needles of each side section are moved forward to press in normal manner but selected thereof are restrained from pressing by instruments 16 in Figure 15 or 17 in Figure 16. The instruments 16 depend from brackets preferably carried by the narrowing machines which can be racked as desired and descend vertically to engage the needle head and push it away from the presser as the needles move towards the presser to press. These brackets can be swung up out of operation when not required. It will be seen that instruments 16 are formed with a curved end and are grooved to receive the needle head. The instruments 17 also depend, from brackets but are at an angle to the vertical; they move downwardly to engage the needle heads and push the needles away from the presser and so inhibit these from pressing. It will be appreciated therefore that with instruments of the type illustrated in Figures 15 and 16 all the needles of each section knit excepting those engaged by one of the instruments 16 or 17.

A convenient method of actuating the instruments 17 is shown in Figures 11, 12, 13, 14, 16, and 17. Each block of instruments is mounted in and depends from a bracket 18 carried by an arm 19 mounted on one of the rectangular rods 20, 20' which extend and are moved independently lengthwise of the machine. Such rods are mounted in guides and are adapted to be oscillated by lever 21 connected by link 22 to spring influenced lever 23 fulcrumed at 24 and provided with a cam truck 25 in engagement with a rotating cam 26. The instruments 17 are first moved forwardly and downwardly to engage the heads of the needles as shown in Figure 11 and the needles and instruments then move down and forwardly together towards the presser. The cam controlling pressing movements of the needles is shown at 27 in Figure 13 and it will be seen that in the section A the rise B on the cam 26 is steeper than the rise C on cam 27 with the result that the instruments 17 advance relatively to the needles to occupy the position shown in Figure 16 and thus push the needles away from the presser and prevent them from pressing. In the arrangement shown in Figures 11 and 12 the pin 28 can be disengaged from the rod and the arms swung back away from the needles, out of operation when not required.

Figure 14 is a plan view illustrating diagrammatically two sections of a frame fitted with instruments of the type shown in Figure 16. It will be seen that for each section there are two blocks 30, 31 of points 17 in conjunction with each section of needle bar shown at 32; the needle-deflecting appliances 30 which act on the needles at the left hand ends of the central group of needles of each section (and therefore termed the left-hand appliances) are all mounted on rod 20, while the appliances 31 which act on the needles at the right hand ends of the central group of each section of the machine (and therefore termed the right-hand appliances) are all mounted on rod 20'. Racking screw stops for rods 20, 20' are indicated at 33, 34 respectively. 23 is the spring pressed plunger pin connecting link 22 with arm 21 so that the arm can readily be disconnected from the link. The rods 20, 20' are free to slide through cylindrical bushes 35 rotatably housed in brackets 36 and are respectively connected to bushes 37, 38 which are respectively adapted to be shogged by racking screws 33 and 34. It will thus be seen that the blocks 30, 31 can be readily traversed or shogged by actuating the racking screw stops such as by a clawker controlled through suitable pattern mechanism which functions variably to determine the traverse of the blocks. Oscillating movement is imparted to the rods by member 21 so that the rods rotate with the bushes 35 about the axes of brackets 36; bushes 37 and 38 also rotate in unison.

In Fig. 17 screw-racking mechanism and patterning mechanism, of a conventional character, is shown. Those skilled in the art are familiar with mechanisms suitable for racking screws such as 33, 34; considering screw 33 there are clawkers 52, 53 engaging ratchet wheel 54 and oscillated by rod 56, truck lever 57, and rack cam 58. The clawkers are selectively bluffed by bluff 59 operated through controls 60 from the patterning device here shown as part of the usual chain 61. Like parts associated with screw 34 are shown at 52', 53', 54', 56', 57', 59', and 60'.

It will be appreciated that one of the advantages of the present invention is that complete hose blanks with selvedge edges including integral heel and toe parts may be produced on straight bar knitting machines of normal type with very slight alteration or addition to the machine.

Furthermore the rate of production is increased for the reason that the rate of knitting is not at any phase during the making of the heels reduced by narrowing operations; neither carrier widening in manner described nor the formation of the suture reduces the rate of knitting.

If desired, of course, after the leg panel with heel part has been made the blank can be pressed off and the foot part and toe can be knitted on another machine, or the blank may be made with leg, heel and foot parts and the toe parts only knitted on a separate machine. It is preferred that the complete blank shall be knitted on one and the same machine without interruption in the manner described herein.

I claim:

1. In a straight bar knitting machine of the

type having a bank of bearded needles for knitting a selvedged width of fabric and including a central group of needles and side needles at each end of said group, a presser, means for imparting pressing motions to all the needles in unison, and means for temporarily causing the needles of the central group to cease from pressing and to hold their loops, until subsequently restored to activity, while said needles beyond the ends of said group continue to knit; the combination of two needle-deflecting appliances for engaging the side needles and for deflecting them to a non-pressing attitude and for thereby causing such deflected needles to retain their loops, two rods extending lengthwise of the machine and each carrying one of the said appliances, bushes in which the rods are slidable endwise, means for sliding said rods to move the two appliances apart along the needle line and thereby to cause them to act on a progressively greater number of the side needles, and means for imparting movements of partial rotation to the bushes and to the rods to swing the appliances between operative and inoperative positions.

2. In a straight bar knitting machine of the type having a bank of bearded needles for knitting a selvedged width of fabric and including a central group of needles and side needles at each end of said group, a presser, means for imparting pressing motion to all the needles in unison, and means for temporarily causing the needles of the central group to cease from pressing and to hold their loops, until subsequently restored to activity, while side needles beyond the ends of said group continue to knit; the provision of means for causing an increasing number of side needles, working outwards from each end of the central group, temporarily to refrain from pressing and to hold their loops until subsequently restored to activity, which means comprises two needle-deflecting appliances for engaging the needle heads and for thereby deflecting the side needles to a non-pressing attitude, two rods slidably and rotatably mounted to extend side by side lengthwise of the machine, means for moving the two rods endwise, but in opposite directions, to shift the appliances along the needle line, and cam-operated means for imparting movements of partial rotation to the two rods, and their appliances, in unison during the operation of the machine to bring the appliances into and out of needle-deflecting attitude.

3. In a straight bar knitting machine of the type having a bank of bearded needles for knitting a selvedged width of fabric and including a central group of needles and side needles at each end of said group, a presser, means for imparting pressing motions to all the needles in unison, and means for temporarily causing the needles of the central group to cease from pressing and to hold their loops, until subsequently restored to activity, while side needles beyond the ends of said group continue to knit; the combination of two needle-deflecting appliances for each engaging the heads of a plurality of side needles and for deflecting the engaged needles to a non-pressing attitude so that they hold their loops, there being one such appliance operable at each side of the central group of needles, racking mechanism for racking these appliances outward to cause them to operate on additional side needles thereby progressively to increase the number of loop-holding needles and for subsequently racking them inwards to progressively reintroduce side needles into activity, and means for lowering said appliances into and raising them from operative position.

4. In a multi-section knitting machine of the type having, for each section, a bank of bearded needles for knitting a selvedged width of fabric and including a central group of needles and side needles at the right and left hand ends of said group, a presser, means for imparting pressing movements to all the needles in unison, means for temporarily causing the needles of the central group to cease from pressing and to hold their loops, until subsequently restored to activity, while side needles beyond the ends of said group continue to knit, and fashioning points operable at the selvedges of the fabric; the combination of a right-hand and a left-hand needle-deflecting appliance to each section of the machine, for engaging the heads of the right and left hand side needles respectively and for deflecting them, upon the central group of needles being caused to hold their loops, to a non-pressing attitude in which the deflected side needles also hold their loops, two rods extending lengthwise of the machine past the said sections, one rod having the right-hand appliances mounted on it and the other having the left-hand appliances mounted on it, mountings in which said rods are slidable endwise, screw-racking mechanism for shifting said rods endwise in opposite directions and causing the two appliances of each section to move apart and thereby to deflect additional side needles to the non-pressing attitude, and means for bringing said appliances into and out of action.

5. In a straight bar knitting machine of the type having a bank of bearded needles for knitting a selvedged width of fabric and including a central group of needles and side needles at each end of said group, a presser, means for imparting pressing motions to all the needles in unison, and means for temporarily causing the needles of the central group to cease from pressing and to hold their loops, until subsequently restored to activity, while side needles beyond the ends of said group continue to knit; the provision of means for causing an increasing number of side needles, working outwards from each end of the central group, temporarily to refrain from pressing and to hold their loops until subsequently restored to activity, which means comprises two needle-deflecting appliances for engaging the needle heads and for thereby deflecting the side needles to a non-pressing attitude, two rods slidably mounted to extend side by side lengthwise of the machine for shifting the appliances along the needle line, means for progressively moving said rods endwise, in opposite directions, to cause the two appliances to move progressively apart and thereby to deflect an increasing number of the side needles to non-pressing attitude, and means for bringing said appliances into and out of operation.

6. In a straight bar knitting machine of the type having a bank of bearded needles for knitting a selvedged width of fabric and including a central group of needles and side needles at each end of said group, a presser, means for imparting pressing motions to all the needles in unison, and means for temporarily causing the needles of the central group to cease from pressing and to hold their loops, until subsequently restored to activity, while said needles beyond the ends of said group continue to knit; the provision of means for causing an increasing number of side needles, working outwards from each end of the central

group, temporarily to refrain from pressing and to hold their loops until subsequently restored to activity, which means comprises two needle-deflecting appliances for engaging the needle heads and for thereby deflecting the side needles to a non-pressing attitude, two rods mounted to extend side by side lengthwise of the machine and having one appliance mounted on one rod and the other appliance mounted on the other rod, means for moving the appliances progressively apart to deflect an increasing number of the side needles to non-pressing attitude, means for moving both rods simultaneously, about an axis extending lengthwise of them, to bring the appliances into and out of operation, and a mounting for the rods permitting the said movement.

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