

Jan. 24, 1956

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2,731,819

ELASTIC SELVAGE TOP FOR KNITTED ARTICLES AND METHOD

Filed March 26, 1952

4 Sheets-Sheet 1

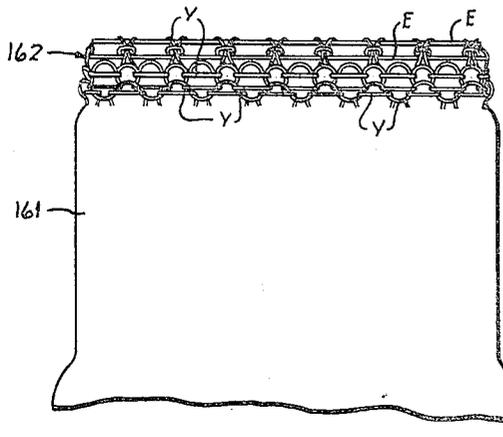
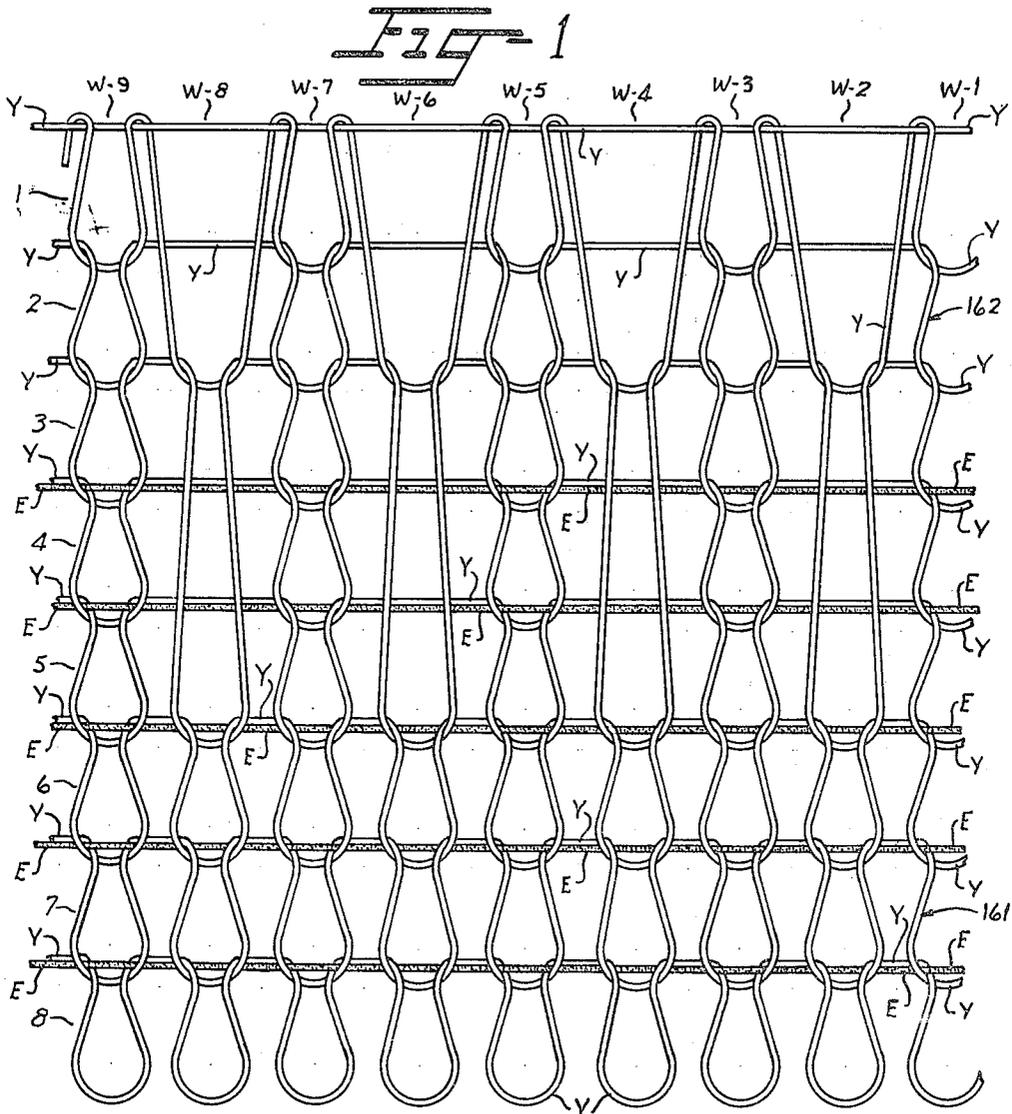


FIG. 2

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160

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4 Sheets-Sheet 2

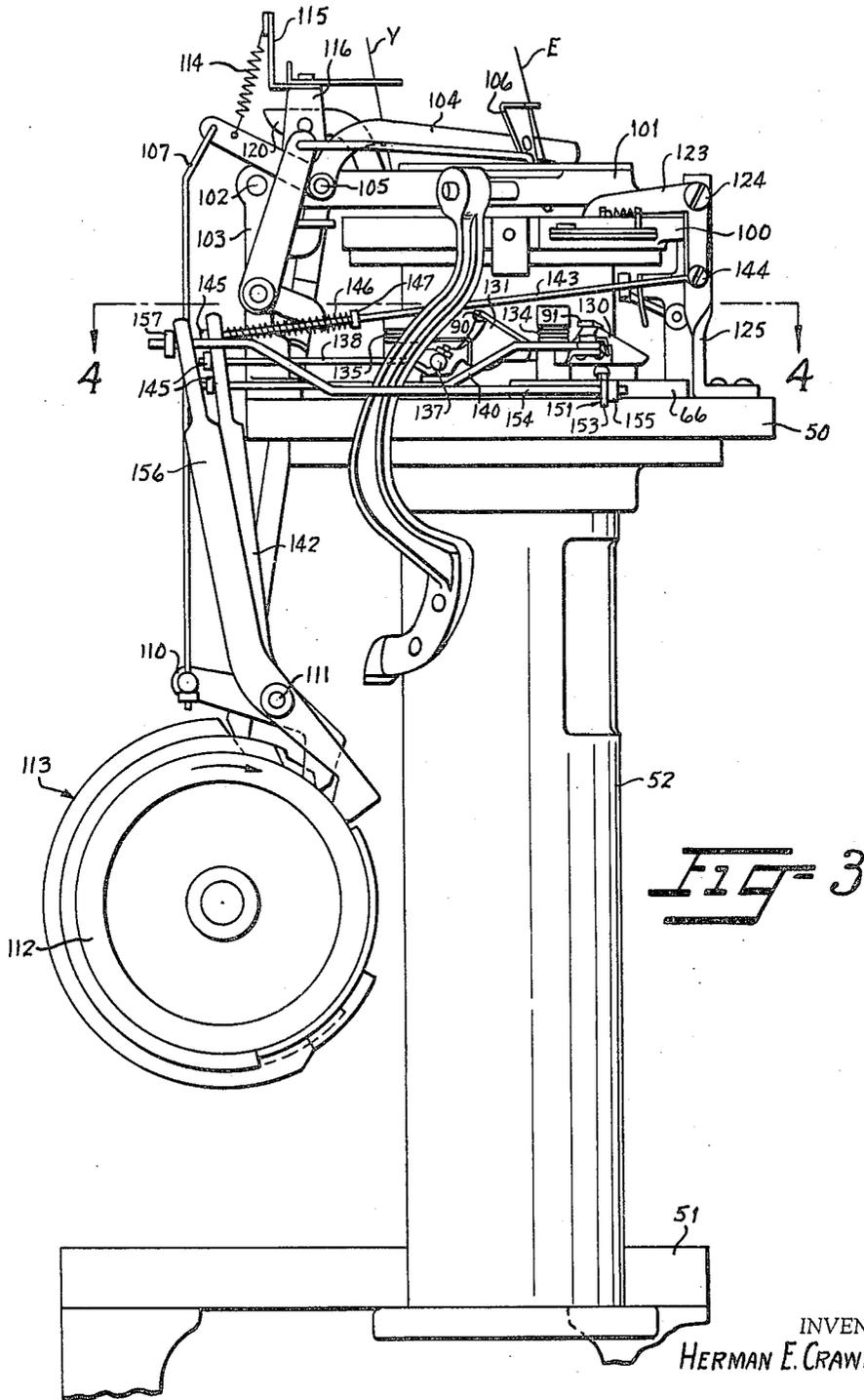


FIG. 3

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2,731,819

ELASTIC SELVAGE TOP FOR KNITTED ARTICLES AND METHOD

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Application March 26, 1952, Serial No. 278,587

12 Claims. (Cl. 66—172)

This invention relates to tubular knit products, such as men's half hose and the like, and more especially to an improved elastic selvage top structure therefor and method of knitting same.

It is the primary object of this invention to provide an elastic top structure for men's half hose and the like wherein a novel form of selvage top is knitted in conjunction therewith which includes a novel manner of interlacing the elastic yarn with the inelastic body yarn of the knitted fabric.

It is another object of this invention to provide a novel elastic top structure for tubular knit fabrics wherein a series of courses are knitted from only inelastic body yarn or yarns independently of the elastic yarn in initially forming the selvage top of the knitted article and, after which, the rubber or elastic yarn is laid in with courses subsequently knitted from the body yarn or yarns, loops formed from the body yarn in alternate or certain spaced wales formed in knitting the said series of courses being retained in the hooks of the needles of the circular knitting machine to be subsequently interknitted with a course knitted subsequent to the course in which the elastic yarn is originally laid to thus form tuck-stitches from the loops originally retained in the hooks of the needles and, in so doing, to draw the latter courses together by rolling the selvage top over upon itself, thus, reenforcing the selvage top to prevent unraveling of the same to provide a double thickness of elastic fabric without hindering the extensibility thereof and to also prevent the uppermost edge of the selvage top from curling outwardly as has been the case with stockings manufactured heretofore.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which—

Figure 1 is a greatly enlarged view of a portion of the fabric showing a preferred arrangement of the first few courses as knitted in accordance with the present invention;

Figure 2 is a fragmentary elevation of the top portion of a stocking illustrating the novel selvage top;

Figure 3 is a partial elevation looking at the left-hand side of a circular knitting machine particularly adapted for knitting the improved fabric structure illustrated in Figures 1 and 2.

Figure 4 is a fragmentary top plan view with parts in section taken substantially along the line 4—4 in Figure 3;

Figure 5 is an enlarged fragmentary vertical sectional view taken substantially along the line 5—5 in Figure 4 with parts shown schematically;

Figure 6 is a developed view in elevation of the circularly arranged needle and jack central cams of the circular knitting machine as arranged for knitting the fabric illustrated in Figures 1 and 2;

Figures 7 and 8 are fragmentary views similar to the lower control portion of Figure 6 showing the cams

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and 2b in different positions and the paths of the needle butts as effected thereby.

The present invention will be shown and described embodied in men's half hose or anklets, but it should be understood that it can be used in any seamless hosiery or other fabrics where a selvage top containing elastic yarn is desired. A rib topped stocking of a very attractive and finished appearance may be manufactured embodying the principles of the present invention in conjunction with the principles of the invention set forth in my Patents Nos. 2,420,771 of May 20, 1947, or 2,473,677 of June 21, 1949. However, it is to be understood that a fabric structure may be made in accordance with the principles of the present invention independently of the rib topped structure disclosed in said patents.

In the preferred embodiment of the invention, the elastic yarn is shown in Figure 1 as being laid in, however, it is to be understood that the top can be made with the elastic yarn knitted in or attached in any other desired manner. The selvage edge top of the fabric is unique in that the make-up course and one or more subsequent courses are knit from an inelastic or body yarn to form an anti-ravel looping by using the body yarn to draw the first two courses together by means of interlooping bights of this yarn with the yarn of, say, the third course in the fabric.

In the courses skipped by the above-mentioned bights of body yarn, the body yarn is knit only in spaced wales and is floated in the wales where the bights of the body yarn of the first course lie. A second series of subsequent courses are knit in a manner similar to the first few courses wherein elongated loops are formed from the body yarn in certain spaced wales by skipping these elongated loops past certain successive courses knit from the body yarn and knitting a subsequent course wherein loops are formed in all the wales to thus draw the second series of courses together from a point at the juncture of said first few courses and the second series of courses, and during the knitting of the second series of courses, in forming the top of the fabric, the elastic yarn is laid in the fabric, the elastic yarn preferably being laid in front of certain spaced or alternate wales and being laid in back of the wales between said spaced or alternate wales formed from the body yarn.

Thus, as illustrated in Figures 1 and 2, the inelastic body yarn is knit in alternate wales during a series of initial courses and the elastic yarn is omitted from the initial few courses resulting in a slight ridge about the stocking at the juncture of the inelastic selvage edge with the elastic portion of the top of the stocking.

The fabric illustrated in Figures 1 and 2 may be made on a slightly modified form of knitting machine of the type shown and described in the patents to Robert W. Scott Nos. 1,152,850, dated December 3, 1915, and 1,282,958, dated October 29, 1918. However, it should be understood that many other types of knitting machines may be employed for producing this type of fabric. Since many of the parts of the knitting machine are conventional, these parts will only be described briefly and a somewhat detailed description will be given of the modifications made in the machine.

The machine comprises the usual bed plate 50 supported in fixed relation to a base 51 by conventional means, not shown, and in which the upper end of a vertically movable sock horn 52 is mounted. The bed plate 50 has a cavity 53 (Figure 5) therein in such a gear 54 is disposed, this gear being driven by usual means, not shown, for imparting either reciprocatory or rotary movement to a conventional needle cylinder 55 according to a desired pattern. The needle cylinder 55 is provided with the usual circularly spaced vertically disposed grooves 56 in the periphery thereof in each of which

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a latch needle N is mounted for vertical sliding movement. The lower ends of alternate needles N are engaged by jacks, generally designated at J, which are also mounted for vertical sliding movement in alternate grooves 56 in the periphery of the needle cylinder 55 in the usual manner.

Alternate jacks, that is, the jacks underneath every fourth needle, indicated at J-1, are provided with short butts and the jacks therebetween, indicated at J-2, are provided with long butts. All of the jacks are used for the body yarn during the make-up thus causing all of the needles to take the body yarn. However, in subsequent courses only the long butt jacks are used in connection with the laying or knitting in of the elastic yarn, thus causing every fourth needle to take the elastic yarn although all the needles take inelastic yarn.

Referring particularly to Figure 6, it will be observed that the needle and jack control cams are arranged in substantially the same manner as that shown in said Scott patents, however, these needle and jack control cams are used in a slightly different manner than that set forth in said Scott patents in order to produce the fabric illustrated in Figures 1 and 2. Since these needle and jack control cams are conventional, only certain of the cams which are operated in a manner peculiar to the present invention will be described in detail while the remaining cams will merely be briefly described.

It will be observed in Figure 5 that the bed plate 50 also has a circular cavity 60 therein in which a conventional annular needle cam support plate 61 is secured in the conventional manner. This needle cam support plate 61 serves to support the various stationary cams shown in Figure 6 including a conventional cam ring 62 which surrounds the needle cylinder 55 in a well known manner. Suitably secured to the inner face of the conventional cam ring 62 and spaced upwardly from the lower edge thereof is a conventional jack guide ring 63 which is cut-away to provide an inverted V-shaped opening 64 therein and this jack guide ring 63 is also cut-away for the reception of a pair of jack guide ring segments 65 and 66 which are provided with upwardly converging lower surfaces defining a second substantially inverted V-shaped opening 67.

The jack guide ring segments 65 and 66 extend outwardly and are suitably secured to the upper surfaces of the cam support plate 61 by respective screws 70 and 71 (Figure 4). An advancing jack cam 72 is disposed in the V-shaped opening 64 and is suitably secured to the inner surface of the cam cylinder or ring 62 in a conventional manner. The inner surface of the advancing jack cam 72 is disposed in the same vertical plane as the inner surface of the jack guide ring 63.

Disposed in the opening 67 defined by the lower edges of the jack guide segments 65 and 66 is an inclined auxiliary jack elevating cam 74 which is movable radially of the needle cylinder, by means to be presently described, in order to, at times, be disposed in the path of only the long butt jacks, and, at other times, to be disposed so as to miss the butts on all of the jacks. There are also instances in which the cam 74 may be disposed in the path of the butts on all of the jacks J. This inclined jack elevating cam 74 is peculiar to the present invention and it will be observed in Figures 4 and 5 that the cam support ring 61 has a radially extending groove 75 therein in which a stem portion 74a, extending outwardly from the inclined jack elevating cam 74 is mounted for radial sliding movement.

This stem portion 74a extends outwardly substantially beyond the jack guide ring 63 and has a spring anchor 76 projecting upwardly therefrom to which the outer end of a tension spring 77 is connected. The tension spring 77 extends inwardly and is connected to a spring anchor 80 projecting from the jack guide ring 65. Thus, the tension spring 77 normally urges the inner face of

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the inclined jack elevating cam 74 inwardly toward the periphery of the needle cylinder 55. The manner in which this cam 74 is controlled will be later described in detail.

Conventional hardened cams 82 and 83 are disposed at a point at the rear of the knitting machine and rest upon the upper surface of the jack guide ring 63. These hardened cams 82 and 83, together, form a broad V-shaped opening, the sloping upper surfaces of which direct upwardly to return the butts of any needles, which may be passed into said opening during the knitting operation, to a mean horizontal plane.

Mounted on the cam plate 61 in a conventional manner and disposed centrally of the opening defined by the proximate surfaces of the hardened cams 82 and 83, is a conventional bottom center cam 84 and a conventional top center cam 85 which are spaced slightly apart from each other to permit the butts of the needles to pass therebetween during the knitting operation. A pair of spaced conventional stitch cams 86 and 87 are disposed adjacent opposite sides of the top and bottom center cams 85 and 84, respectively.

Disposed to the right of the stitch cam 86 in Figure 6 and astride the high point of the cam 82 is a pair of oppositely inclined needle lowering and elevating cams 382 and 2b. The cams 382 and 2b may be controlled and operated for radial movement relative to the needle cylinder by means such as that shown in Robert W. Scott Patents Nos. 1,148,055, dated July 27, 1915, and 1,272,865, dated July 16, 1918.

Although the needle cams 382 and 2b are conventional, they are employed in a slightly different manner in the present instance than that disclosed in said patents in that, at times, the cam 2b is adapted to be moved inwardly towards the needle cylinder to be engaged by the butts of only the long butt needles for elevating alternate needles to cause the butts of the same to pass through the stitch cams and the cam 382 is controlled so as to be engaged by either the long butt or short butt needles, or both, for lowering alternate needles in certain courses after they have been elevated by the cam 82 to cause these needles to pass beneath the stitch cams, thus resulting in the yarn being taken in the hooks of only the alternate needles at predetermined intervals. Accordingly, the needle cam 2b may be termed an alternate needle elevating cam and the needle cam 382 may be termed an alternate needle lowering cam.

Disposed to the left of the stitch cam 87 and the hardened cam 83 is a pair of inclined needle lowering and leveling cams 90 and 91 which are peculiar to the present invention. These needle cams 90 and 91 are movable radially of the needle cylinder so as to insure that the needles are properly positioned during the knitting or laying in of the elastic yarn and, also, so as to not interfere with the path of the butts of the needles during reciprocatory knitting of the heel and toe pockets of a stocking.

It is thus seen that the auxiliary jack elevating cam 74 and the needle lowering and leveling cams 90 and 91 are the primary elements of the machine which are provided in addition to the conventional needle cams of the machine for knitting a fabric structure of the type shown in Figures 1 and 2. However, as heretofore stated, the cams 382 and 2b are used in a novel manner although they are conventional cams. The manner in which the inclined needle lowering and leveling cams 90 and 91 are mounted and controlled will be later described.

The knitting machine also includes other conventional parts such as a sinker cap 100 in which the usual radially movable sinkers, not shown, are disposed and spaced above the sinker cap is the usual latch ring 101. The sinker cap 100 and the latch ring 101 are supported in a conventional manner, the rear end of the latch ring 101 being pivoted, as at 102, on a standard 103.

The standard 103 also pivotally supports an elastic yarn lever 104, as at 105. The front end of the elastic

yarn lever has an elastic yarn feed finger 106 thereon to which an elastic yarn E is directed from a suitable source, not shown. As is well known, the lower end of the elastic yarn feed finger 106 is disposed closely adjacent the inner surface of the latch ring and, at times, moves downwardly adjacent the needles for feeding the elastic yarn to the needles.

The elastic yarn feed finger 106 is controlled in a conventional manner, such as by a link 107 pivotally connected at its upper end to the rear end of the lever 104 and which extends downwardly and is pivotally connected to a control finger 110. The control finger 110 is oscillatably mounted intermediate its ends on a rod 111 which is secured to a part of the frame of the knitting machine. Disposed below the rod 111 is a main pattern drum 112 which is driven intermittently according to a desired pattern in the usual manner.

This pattern drum 112 has a plurality of circularly arranged cams 113 suitably secured to the periphery thereof. The control finger 110 is normally urged against the periphery of the pattern drum 112 or certain of the cams 113 by a tension spring 114 connected at its lower end to the lever 104 and being connected at its upper end to a bracket 115 suitably secured to the upper end of a post 116 integral with the latch ring 101.

The post 116 is bifurcated in the usual manner and pivotally supports a plurality of yarn feed fingers 120 intermediate the ends thereof, only one of which is shown, and which is controlled by conventional connections extending from the same to the pattern drum 112, to direct body or inelastic yarn Y to the needles according to a desired pattern.

The knitting machine also includes the many other necessary conventional parts and also preferably has a sinker control bell crank 123 thereon which is pivotally mounted, as at 124, on a standard 125 suitably secured to the bed plate 50. The rear end of the horizontal arm of the bell crank 123 has suitable means thereon for withdrawing the sinkers in the sinker cap from action adjacent the point at which the elastic yarn finger 106 is disposed during the introduction of the elastic yarn E to the needles so as to cause a ribbed effect in the elastic top of the stocking.

This sinker control means, of which the bell crank 123 is a part, is clearly disclosed in my Patents Nos. 2,420,771 of May 20, 1947, and 2,473,677 of June 21, 1949, and a detailed description thereof is thus deemed unnecessary. As a matter of fact, tubular knit fabric may be made embodying the principles of the present invention although the attachment disclosed in said last-named patents may be omitted from the machine. However, such an attachment greatly enhances the appearance of the top of the stocking.

The needle lowering and leveling cams 90 and 91 extend outwardly from the needle cylinder and are suitably secured to respective pivoted arms 130 and 131. The arms 130 and 131 (Figures 1 and 2) are pivotally mounted on respective vertically disposed stub shafts 132 and 133. The stub shaft 132 extends downwardly and is suitably secured to the horizontal portion of the jack guide ring segment 65. The lower end of the stub shaft 133 is suitably secured to the upper surface of the cam support plate 61.

The intermediate portions of the stub shafts 132 and 133 are surrounded by respective torsion springs 134 and 135. One end of the torsion spring 134 is connected to the stub shaft 132 and the other end engages an angle clip 136 suitably secured to the outer surface of the arm 130 to thereby normally urge the needle cam 90 into engagement with the needle cylinder 55. One end of the torsion spring 135 is connected to the stub shaft 133 and the other end thereof is connected to the outer surface of the arm 131 to normally urge the needle cam 91 into engagement with the periphery of the needle cylinder 55.

A projection 137, extending from an intermediate por-

tion of the arm 131, has one end of a connecting rod or link 136 connected thereto and one end of a connecting rod or link 140 is pivotally connected, as at 141, to the angle clip 136. These connecting rods or links 138 and 140 extend rearwardly and slidably penetrate a control lever 142 which extends downwardly in Figure 1 and is pivotally supported intermediate its ends on the horizontal rod 111. The lower end of the control finger 142 bears against either the periphery of the main pattern drum 112 or certain of the cams 113 as the case may be.

Since the needle cams 90 and 91 are moved to inoperative position or to operative position at the same time that the sinker controlling means on the rear end of the bell crank 123 is moved to inoperative or operative position, the lower end of the vertical arm of the bell crank 123 has the front end of a connecting rod or link 143 pivotally connected thereto, as at 144 (Figure 1). This connecting rod or link 143 extends rearwardly and also slidably penetrates the upper portion of the control lever 142. The rear end of each of the connecting rods or links 138, 140 and 143 has a suitable collar 145 adjustably secured thereon and the collar 145 on the link 143 is urged against the rear surface of the control lever 142 by a compression spring 146, one end of which bears against the front surface of the control lever 142 and the other end of which bears against a collar 147 fixed intermediate the ends of the connecting rod or link 143. Of course, the collars 145 on the links or connecting rods 138 and 140 are urged into engagement with the rear surface of the control lever 142 by the respective torsion springs 135 and 134.

Thus, the compression spring 146 and the torsion springs 134 and 135 also urge the reading end of the control lever 142 into engagement with the pattern drum 112 or the corresponding cams 113.

As heretofore stated, the inclined jack elevating cam 74 is peculiar to the present invention and is normally urged inwardly toward the needle cylinder by the tension spring 77 connected at one end thereof to the pin 76. Now, the inner surface of the pin 76 is engaged by an arm 150 which is a part of a bell crank broadly designated at 151. The bell crank 151 is oscillatably mounted, as at 152, on the cam support plate 61 (Figures 4 and 5).

The bell crank 151 also has an arm 153 extending outwardly, at substantially right angles to the arm 150, the outer end of which is slidably penetrated by a connecting rod or link 154. The link 154 has a collar 155 on the front end thereof which bears against the front surface of the arm 153 of the bell crank 151. The connecting rod or link 154 extends rearwardly and slidably penetrates the upper portion of a control lever 156 which extends downwardly in Figure 1 and is oscillatably mounted intermediate its ends on the rod 111 heretofore described.

The rear end of the connecting rod or link 154 has a collar 157 adjustably secured thereon which is normally urged into engagement with the rear surface of the control lever 156 by the tension spring 77 (Figure 5) heretofore described. Thus, the tension spring 77 also urges the reading end of the control lever 156 into engagement with either the periphery of the pattern drum 112 or certain of the corresponding cams 113, as the case may be.

It is thus seen that I have provided pattern controlled means for controlling the position of the needle cams 90 and 91 and the jack elevating cam 74 relative to the needle cylinder 55.

Now, referring to Figures 6, 7 and 8, as heretofore stated, the alternate jacks J-1 are provided with relatively short butts and the jacks J-2 therebetween are provided with relatively long butts. Also, in order to carry out the present method of knitting, substantially half of the needles are provided with relatively short butts and the remaining needles are provided with relatively long butts as is usually the case in circular knitting machines arranged for knitting heel and toe pockets. However, although the particular machine used in carrying out the present method of knitting may not be used for knitting

heel and toe pockets in addition to the other usual parts of a stocking, nevertheless, it is necessary that some of the needles be provided with short butts and the remaining needles be provided with long butts.

Referring to Figure 2, there is shown a fragmentary portion of a stocking which includes a leg portion 160, a top portion 161, and the improved selvage top broadly designated at 162. This selvage top is a form of rolled welt, as will be evident as the description proceeds. It is preferable, but not necessary, that the top 161 and the selvage top 162 are ribbed, in which instance, the attachments disclosed in said Patents Nos. 2,420,731 and 2,473,677 may be employed. The fragmentary portion of the selvage top 162 shown in Figure 1 includes a make-up course and subsequent knitted courses 1 to 8, inclusive, and wales W-1 to W-9, inclusive.

The inclined needle lowering cam 382 in the right-hand portions of Figures 6, 7 and 8 is controlled by certain of the cams 113 on the main pattern drum 112 in order to occupy an inoperative position or a fully operative position or a partially operative position, and the inclined needle elevating cam 2b is controlled so as to occupy either an inoperative position or an operative position spaced from the needle cylinder. When the needle cam 2b is in operative position or the cam 382 is in a partially operative position, they will be engaged by the butts of only the long butt needles and, when the needle cam 382 is in fully operative position, it will be engaged by the butts of all of the needles.

After the stitches of a previous stocking have been cast off of the needles N, the needle cams 2b, 90 and 91 and the auxiliary jack elevating cam 74 are in withdrawn position and the needle cam 382 is in fully operative position. Thus, upon commencing knitting of a new stocking, the needles at the right-hand portion of Figure 7 approach the cam 382 at the level at which they left the cam 83. Accordingly, as the needles move from right to left in Figure 7, all of the alternate needles, including both short butt and long butt needles, are raised by all of the jacks J riding up the advancing jack cam 72.

The advancing jack cam 72 is of such height as to cause the butts of all of the alternate needles to pass above the inclined needle lowering cam 382 to subsequently successively engage and pass beneath the top center cam 85 and the stitch cam 87. Now, since there are no jacks beneath the needle between said alternate needles, the latter needles engage and are lowered by the needle lowering cam 382 and thus pass beneath the stitch cam 86, the bottom center cam 84 and the stitch cam 87.

The corresponding cams 113 on the main pattern drum 112 are so arranged that, as the last of the short butt needles passes the yarn feed finger 120, the yarn feed finger moves downwardly to operative position, as shown in Figure 6, to feed the inelastic or body yarn Y to the alternate long butt needles which follow said short butt needles.

After the last of the long butt needles has moved from right to left in Figure 8 past the inclined needle elevating cam 2b, this cam then moves into operative position far enough to be disposed in the path of the butts on the long butt needles only, thus missing the short butt needles. However, since only short butt needles are then moving past the cam 2b, the alternate short butt needles will still be lowered by the cam 382 and the remaining short butt needles will still be elevated by the jacks J riding up the advancing jack cam 72 to cause the same to pass above the stitch cam 86 and, thus, through the stitch cams. Thus, the make-up course is formed in advance of the first knitted course 1 in the fabric as shown in Figure 1.

The particular function of the needles as described is preferable because this causes the body yarn to pass inwardly and outwardly between adjacent needles and holds the yarn against the needles preparatory to knitting the first knitted course 1. As heretofore stated, the needle cam 2b moves into operative position as the short butt

needles move past the same in forming the make-up course. This positions the needle cam 2b for operating upon the needles in knitting the first course 1.

With continued rotation of the needle cylinder, all of the long butt needles, which follow the latter short butt needles, are caused to pass through the stitch cams, since those needles between the said alternate needles, which are not elevated by the jacks J riding up the advancing jack cam 72, are engaged and elevated by the inclined needle elevating cam 2b to cause all of the long butt needles to pass above the stitch cam 86 and, successively, beneath the top center cam 85 and the left-hand stitch cam 87 so that stitches are formed in the hooks of all of the long butt needles in the course 1 in Figure 1.

While the long butt needles are passing above the needle cams 2b and 382, the needle cam 382 is then moved outwardly to partially operative position to where it will miss the butts of the subsequent short butt needles so that all of the short butt needles will also pass through the stitch cams, since the short butt needles between said alternate needles will engage and ride against the upper surface of the stitch cam 86 to subsequently pass beneath the top center cam 85 and the stitch cam 87 and, of course, the alternate short butt needles will still be elevated by the jacks J riding up the advancing jack cam 72. It is thus seen that all of the needles take the yarn from the yarn feed finger Y and form stitches therefrom in the first course 1 in Figure 1. The first knitted course 1 is the only course in which the inclined needle elevating cam 2b is used in knitting the improved selvage top 162 and the top portion 161.

Now, as the latter short butt needles are moving past the cam 382, the needle cam 2b is withdrawn to inoperative position preparatory to knitting the second knitted course 2 in Figure 1, wherein it will be noted that stitches are formed with only the alternate needles and the yarn is merely floated between the stitches formed with the alternate needles, the needles between said alternate needles merely retaining the loops formed in the course 1 thereon. To this end, since the needle cam 2b is in withdrawn position and the needle cam 382 is in partially operative position, the butts of the alternate long butt needles will engage and be lowered by the inclined needle lowering cam 382, causing the same to pass beneath the stitch cams and to fail to take the yarn in the hooks thereof.

It is evident that the needles between the latter alternate long butt needles will still be elevated by the jacks J as they ride up the advancing jack cam 72 and will take and knit the inelastic yarn Y as they pass through the stitch cams.

As the long butt needles are moving past the cams 2b and 382, the needle cam 382 then moves into fully operative position while the needle cam 2b remains in inoperative position. Thus, the subsequent alternate short butt needles, which are not raised by the jacks J riding up the advancing jack cam 72, are also lowered by the needle cam 382 and caused to pass beneath the stitch cams and the short butt needles therebetween are elevated by the jacks J with the result that the alternate needles in both the long and short butt groups take the yarn and form stitches therefrom in knitting the course 2. This completes the knitting of the course 2.

Any number of courses may be formed in the manner in which the course 2 is formed, however, it is preferable that a single course be formed in the manner in which the course 2 is formed prior to forming a course, such as the course 3 in Figure 1, wherein all of the needles again pass through the stitch cams, since the courses 1 and 2 form a slight ridge at the juncture of the selvage top 162 with the top portion 161 of the stocking as will be later described, and the greater the number of courses formed in the manner of the course 2, the more pronounced will be the ridge at the juncture of the selvage top and the top portion 161 of the stocking or tubular fabric.

After the desired number of courses are knitted in the manner in which the course 2 is formed in Figure 1, the course 3 is knitted. To this end, the inclined needle lowering cam 382 is withdrawn to inoperative position and, since both of the needle cams 2b and 382 are then in inoperative position, all of the needles will pass through the stitch cams and will take the yarn Y and form stitches therefrom to complete the course 3.

Upon the third course 3 being completed, the inclined needle lowering cam 382 again moves into fully operative position and, shortly thereafter, the elastic yarn feed finger 106 and the inclined needle lowering and leveling cams 90 and 91 move into operative position whereupon the needle cams 90 and 91 will be disposed in the path of the butts of any of the needles elevated to their levels. The inclined alternate jack elevating cam 74 is also moved into operative position at this time to where it will engage the butts of only the long butt jacks J-2.

The fourth course is then knitted wherein the alternate needles take and knit the body yarn and the needles therebetween pass beneath the stitch cams thereby forming the course 4 in substantially the same manner in which the second course 2 was formed. Thus, the needles between alternate needles will be withheld from knitting in forming the course 4 with the result that the stitches formed in the course 3 in Figure 1 and in wales W-2, W-4, W-6 and W-8 will merely be retained in the hooks of the needles, causing the body yarn to float past the last-named wales.

However, the elastic yarn is then laid in the course 4 and the elastic yarn E will be taken in the hook of every fourth needle. This is caused by the needle cam 90 lowering all of the needles after they have been raised by the hardened cam 83 and whereupon every fourth needle, disposed above the alternate jacks J-2, will be elevated because these alternate jacks J-2 having slightly longer butts thereon than the jacks J-1 therebetween.

As heretofore stated, the inclined auxiliary jack elevating cam 74 is spaced slightly from the periphery of the needle cylinder and, accordingly, will only be engaged by the butts of the long butt jacks J-2. Thus, the alternate jacks will elevate every fourth needle to take the elastic yarn E from the elastic yarn feed finger 106, whereupon these needles will then be lowered by the needle cam 91.

It is thus seen that, although every fourth needle takes the elastic yarn E from the elastic yarn feed finger 106, the latches of the needles are moved above the elastic yarn E as the needles are raised by the jacks J riding up the advancing jack cam 72. Of course, the elastic yarn E is cast off of the corresponding needles as the butts of these needles subsequently pass beneath the stitch cam 87. Accordingly, it is evident that the elastic yarn is merely laid in front of or outside of every fourth needle and is laid in back of or inside of the intervening needles.

It is thus seen that, by drawing the first three courses 1, 2 and 3 together, the elastic yarn may be introduced to the needles after a few courses have been knit, since drawing the initial courses together will only cause a slight ridge at the point at which the loops in the wales W-2, W-4, W-6 and W-8 are interknitted with the corresponding loops in the third course.

The fifth course is then knitted in the identical manner in which the fourth course was knitted. As a matter of fact, any desired number of courses may be knitted in the identical manner in which the course 4 is knitted. Thereafter, another course is knitted, which, in this instance, is the sixth course and wherein stitches are again formed in all of the wales and the elastic yarn is also laid in in the manner in which it was laid in in the fourth and fifth courses.

In knitting the course 6 the needle cam 382 is merely withdrawn to inoperative position to permit all of the needles to pass above the stitch cam 86 and to subsequently take the body yarn Y and to form stitches there-

from as the butts of all of the needles pass beneath the stitch cam 87. This causes the loops formed in the wales W-2, W-4, W-6 and W-8 in the course 3 to be interknit with corresponding loops in the course 6 thus drawing the three courses 3, 4 and 5 together or any number of courses which may be disposed between the courses 3 and 6. Since the alternate loops in the courses 3, 4, 5 and 6 draw the courses together, this forms the rolled anti-ravel selvage top or welt 162 on tubular knit fabric.

The sixth course 6 may be termed as a tie-in course since it represents the first course in the top portion 161 of the stocking shown in Figure 2. After the sixth course is knitted, as many courses as desired may be knitted in the identical manner in which the course 6 is knitted, it being understood that the needle cams 90 and 91 and the auxiliary jack elevating cam 74 remain in operative position so the elastic yarn is laid in with the courses knit from the inelastic yarn in an identical manner in which the elastic yarn was laid in in the fourth course 4.

After the desired number of courses have been knitted identical to the course 6 or the courses 7 and 8, it is evident that the elastic yarn feed finger 106, the auxiliary jack elevating cam 74 and the needle cams 90 and 91 are withdrawn from operative position to form normal stitches in the leg portion 160 from the inelastic or body yarn Y.

Since the needle cams 90 and 91 are in withdrawn position during the knitting of the inelastic portions of the stocking, it is evident that this will permit reciprocatory knitting since the butts of the needles moving from left to right in Figure 6 will then be so positioned that the leading needle upon each reciprocation may engage the corresponding narrowing pick P in Figure 6.

However, during the knitting of the elastic top portion 161 of the stocking in Figure 2, the alternate jack elevating cam has been described as being in such a position as to engage the butts of only the long butt jacks J-2. However, it is important to note that, after the tie-in course 6 is knitted, the elastic yarn E may be taken in the hooks of the alternate needles to form courses as courses 7 and 8 are shown in Figure 1. In order to position alternate needles so they take the elastic yarn E from the elastic yarn feed finger 106, the inclined jack elevating cam 74 is moved into fully operative position to where the butts of all of the jacks J-1 and J-2 will engage and ride up the cam 74. Thus, the courses in the top portion 161 may be like course 6 or like the courses 7 and 8, as desired. This completes the knitting of the improved rolled welt or selvage top 162 of the tubular fabric.

It might be stated that the slight ridge, formed by the first two knitted courses 1 and 2, due to the alternate loops extending from the first course being interknitted with the third course, is hardly noticeable after the stocking or tubular fabric has been knitted and boarded. Although the elastic yarn has been defined as being laid in the various corresponding courses, it is to be understood that the needles which take the elastic yarn may also retain the elastic yarn between the hooks and latches thereof as they pass through the stitch cams, if desired. However, it is preferable that the elastic yarn E be laid in in the manner heretofore described.

It is thus seen that I have provided a novel selvage top or welt for stockings and the like and a method of making such fabric wherein the elastic yarn may be knit or laid in the courses after a few courses have been knit solely from the inelastic yarn. This unique manner of forming the selvage top of the stocking also enhances the appearance of the stocking as it forms a rolled upper edge to the elastic top which will not ravel although the stocking may be pulled over one's foot many times.

This type of construction also increases the useful life of a stocking because of the double layer of elastic yarn

and, although this double thickness of elastic yarn is provided in the selvage top of the stocking, this does not hinder the extensibility of the top.

In the drawings and specification, there has been set forth a preferred embodiment of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. A plain knit stocking having a selvage top formed from inelastic yarn in each of a first plurality of courses, alternate loops drawing together such courses to form a ridge about the top of the stocking, a second plurality of courses immediately subsequent to the first plurality of courses, each of the second plurality of courses also being knitted from the inelastic yarn, an elastic yarn laid in said second plurality of courses and alternate loops in said second plurality of courses also being formed so as to draw together said second plurality of courses to form a rounded selvage top to the stocking with a ridge projecting from the juncture of the selvage top with the plain knit fabric.

2. A plain knit stocking having a selvage top containing relatively elastic and inelastic yarns, a plurality of courses including a first course formed from the inelastic yarn independently of the elastic yarn in combination with recurrent loops drawing together said courses, a plurality of succeeding courses also formed from said inelastic yarn and in which the elastic yarn is laid, recurrent loops in said plurality of succeeding courses drawing together some of said succeeding courses to roll over the upper portion of the stocking to form a rolled selvage top on the stocking with a slight ridge at the juncture of the rolled selvage top and the remaining of said succeeding courses.

3. A plain knit stocking having a selvage top containing relatively elastic and inelastic yarns, a plurality of initial courses formed from the inelastic yarn independently of the elastic yarn in combination with recurrent loops drawing together said initial courses, a plurality of succeeding courses formed from said inelastic yarn and in which the elastic yarn is laid, said elastic yarn being laid in front of certain spaced wales formed from the inelastic yarn and being laid in back of the wales formed from the inelastic yarn between said spaced wales, spaced loops in a first group of courses included in said plurality of succeeding courses drawing together said first group of courses to roll over the upper portion of the stocking to form a rolled selvage top on the stocking with a slight ridge at the juncture of the first group of courses and the rest of the succeeding courses.

4. A plain knit stocking having a selvage top knit from an inelastic yarn in each of a first plurality of successive courses including the first course, recurrent loops skipping one or more of such courses to draw the courses together, a second plurality of successive courses also knit from said inelastic yarn contiguous to the first plurality of successive courses, an elastic yarn being present in each of the second plurality of successive courses knit from the inelastic yarn, and recurrent loops formed from the inelastic yarn skipping at least one of said second plurality of courses to draw the corresponding courses together thereby rolling over the top edge of the stocking and forming a slight ridge projecting from the stocking at the juncture of the first plurality of successive courses with the second plurality of courses.

5. A plain knit stocking having a selvage top knit from an inelastic yarn in each of a first plurality of successive courses including the first course, recurrent loops skipping one or more of such courses to draw the courses together, a second plurality of successive courses also knit from said inelastic yarn contiguous to the first plurality of successive courses, an elastic yarn being present in each of the second plurality of successive courses

knit from the inelastic yarn, recurrent loops formed from the inelastic yarn skipping at least one of said second plurality of courses to draw the corresponding courses together thereby rolling over the top edge of the stocking at the juncture of the first plurality of successive courses with the second plurality of courses, a third plurality of regularly knit courses formed from said inelastic yarn below the courses which are drawn together by the recurrent loops, and the elastic yarn also being present in each of the third plurality of successive courses.

6. A plain knit stocking having a selvage top knit from an inelastic yarn in each of a first plurality of successive courses including the first course, recurrent loops skipping one or more of such courses to draw the courses together, a second plurality of successive courses also knit from said inelastic yarn contiguous to the first plurality of successive courses, an elastic yarn being present in each of the second plurality of successive courses knit from the inelastic yarn, recurrent loops formed from the inelastic yarn skipping at least one of said second plurality of courses to draw the corresponding courses together thereby rolling over the top edge of the stocking at the juncture of the first plurality of successive courses with the second plurality of courses, a third plurality of regularly knit courses formed from said inelastic yarn below the courses which are drawn together by the recurrent loops, and the elastic yarn being laid in in each of the third plurality of successive courses.

7. A plain knit stocking having a selvage knit from inelastic yarn in each of a first plurality of successive courses including the first course, recurrent loops skipping one or more of such courses to draw the courses together, a second plurality of successive courses also knit from said inelastic yarn contiguous to the first plurality of successive courses, an elastic yarn being present in each of the second plurality of successive courses knit from the inelastic yarn, said elastic yarn being laid in front of certain spaced wales and in back of the wales formed from the inelastic yarn between said spaced wales, and recurrent loops formed from the inelastic yarn skipping at least one of said second plurality of courses to draw the corresponding courses together thereby rolling over the top edge of the stocking and forming a slight ridge projecting from the stocking at the juncture of the first plurality of successive courses with the second plurality of courses.

8. A tubular knit fabric having a selvage top formed from relatively inelastic and elastic yarns, a few courses, including the first course, knitted solely from the inelastic yarn, alternate loops drawing together said few courses, a succeeding group of courses knitted from the inelastic yarn, alternate loops drawing together said succeeding group and the elastic yarn being attached to every fourth loop formed from the inelastic yarn in each of said succeeding group of courses.

9. A tubular knit fabric having a selvage top formed from relatively inelastic and elastic yarns, a few courses, including the first course, knitted solely from the inelastic yarn, alternate loops drawing together said few courses, a first succeeding group of courses knitted from the inelastic yarn, alternate loops drawing together said first succeeding group, the elastic yarn being attached to every fourth loop formed from the inelastic yarn in each of said first succeeding group of courses, a second succeeding group of courses knitted from the inelastic yarn, and the elastic yarn being attached to alternate loops formed from the inelastic yarn in each of said second group of courses.

10. In a method of making a plain knit stocking on a circular knitting machine having a circular series of needles, the steps of forming a make-up course, then knitting at least one first course with all of the needles, then knitting at least one additional second course with alternate needles solely from an inelastic body yarn,

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thereafter knitting at least one third course with all of the needles solely from the inelastic yarn whereby said make-up course and said first, second and third courses are drawn together and thereafter knitting a predetermined number of courses from the body yarn while laying in an elastic yarn wherein alternate needles are withheld from knitting during the knitting of at least one course and are restored to action in a subsequent course whereby alternate loops formed from the inelastic yarn skip at least one of the courses in which the elastic yarn is laid in to draw the latter courses together.

11. In a method of making a plain knit stocking on a circular knitting machine having a circular series of needles, the steps of forming a make-up course, then knitting at least one first course with all of the needles, then knitting at least one additional second course with alternate needles solely from an inelastic body yarn, thereafter knitting at least one third course with all of the needles solely from the inelastic yarn whereby said make-up course and said first, second and third courses are drawn together, thereafter knitting a predetermined number of courses from the body yarn while laying in an elastic yarn wherein alternate needles are withheld from knitting during the knitting of at least one course and are restored to action in a subsequent course whereby alternate loops formed from the inelastic yarn skip at least one of the courses in which the elastic yarn is laid in to draw the latter courses together, and laying in the elastic yarn in front of certain spaced needles knitting from the inelastic yarn while laying in the elastic yarn in back of the intervening needles between said spaced needles.

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12. In a method of making a selvage top on a seamless stocking, the steps of feeding at least one inelastic yarn to form the make-up course, then knitting at least one first course in which loops are formed in all the wales and knitting at least one additional course in which recurrent loops skip one or more courses to draw the courses together, then laying an elastic yarn in the fabric while forming additional courses in which loops are formed from the inelastic yarn in alternate wales and so the elastic yarn is laid in certain spaced wales formed from the inelastic yarn and in back of the wales between said spaced wales formed from the inelastic yarn, then knitting in all the wales while laying in the elastic yarn to draw the latter additional courses together.

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