

Dec. 8, 1964

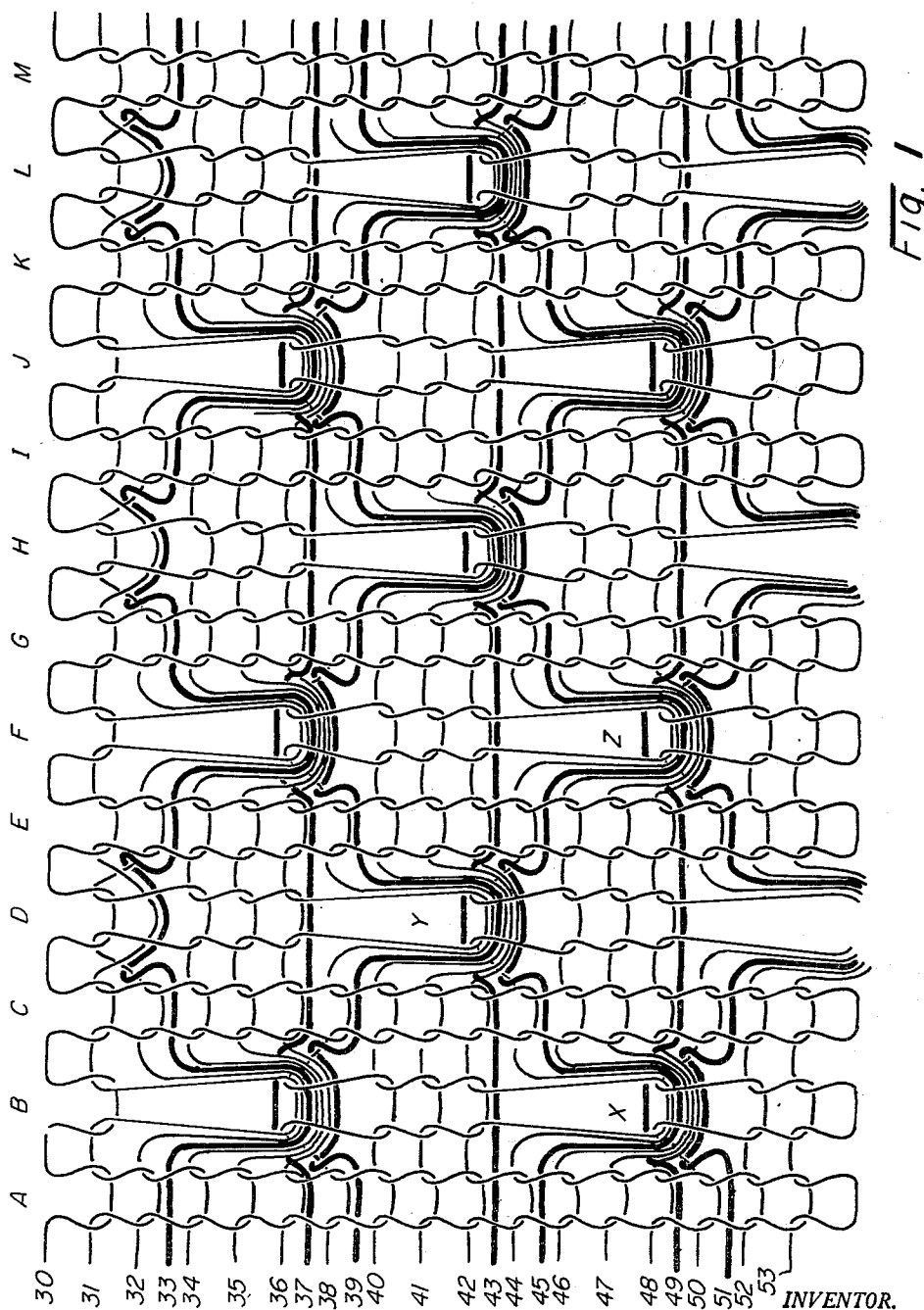
Z. MONDAY

3,159,990

ELASTIC BOBBY SOCK TOP

Filed Oct. 18, 1961

3 Sheets-Sheet 1



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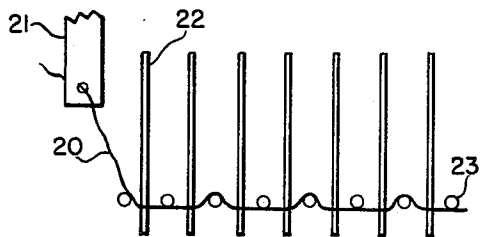


Fig. 2

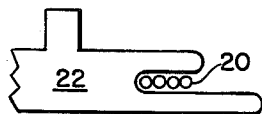


Fig. 3

T	K	K	K	T	K	K
T	K	K	K	T	K	K
T	K	K	K	T	K	K
T	K	K	K	T	K	K
K	K	T	K	K	K	T
K	K	T	K	K	K	T
K	K	T	K	K	K	T
K	K	T	K	K	K	T
T	K	K	K	T	K	K
T	K	K	K	T	K	K
T	K	K	K	T	K	K
T	K	K	K	T	K	K

Fig. 4

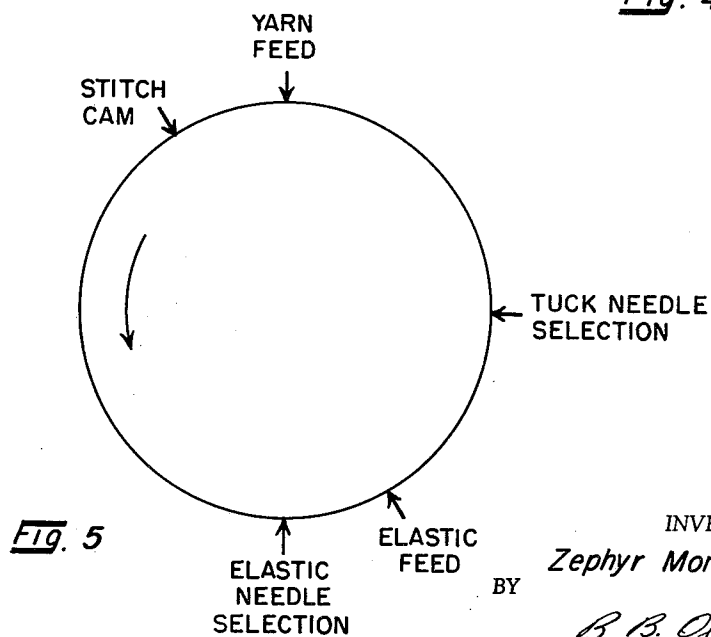


Fig. 5

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3 Sheets-Sheet 3

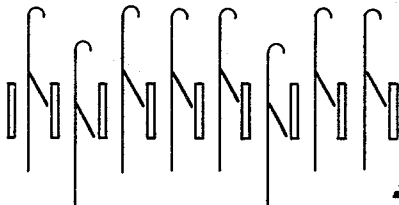
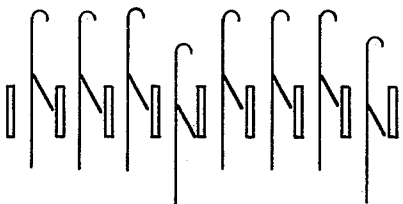
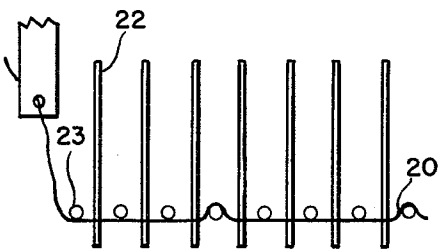
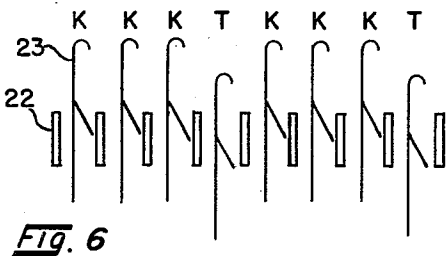
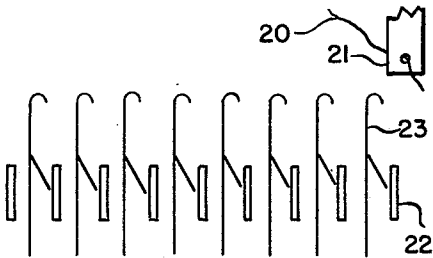
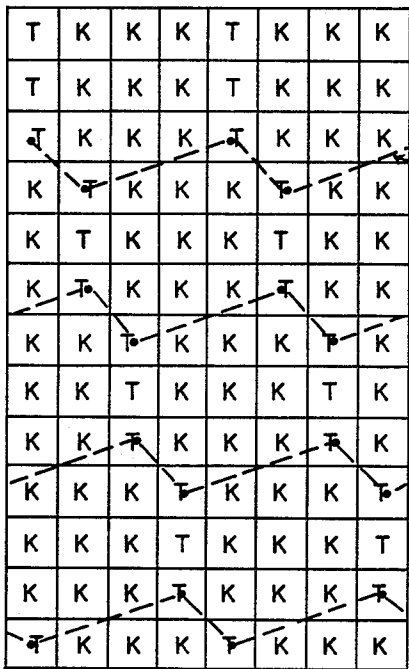


Fig. 8



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ELASTIC BOBBY SOCK TOP

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7 Claims. (Cl. 66—172)

This invention relates to an elastic stocking top stitch of the kind knitted on circular knitting machines and found in bobby socks and the like. More particularly, the invention relates to a patterned stocking top having elastic and non-elastic yarns formed into a unique arrangement of course and wale groups of knit and tuck stitches. The invention has as its object the provision of a new form of bobby sock top knit and tuck stitch enabling the obtaining of new and sharply defined patterns.

In accordance with one example of the invention, the knitting sequence of stocking top pattern courses to which the invention is directed involves first knitting in one course in which the elastic is laid in ahead of the regular yarn and is alternately caught by a given number of adjacent needles and then laid behind a needle. The needles prior to taking the yarn are selectively positioned so that those needles in the needle groups which have caught elastic will be shedded before taking yarn whereas those intervening needles behind which the elastic was laid will assume a tuck or non-shedding position. The needles tuck and shed stitches accordingly as they continue around the knitting circle after which they take new yarn and pass through the stitch cam. A second round of elastic is laid in front of and behind the same respective needles as was the case with the first round of elastic. However, before the needles which contain the second round of elastic reach the yarn feed they are again selectively positioned so that certain needles will knit and others will tuck after taking yarn. More particularly, the needles which are selected to tuck after receiving the second round of elastic are offset by a predetermined number of wales from the first selected tuck needles. The first selected tuck stitches are thus shedded off at this point and the second selected tuck stitches are started which results in the second round of elastic being caught in both the first selected and the second selected tuck stitches. As the needles carrying the second round of elastic take new yarn and pass through the stitch cam, the needles will tuck and knit according to the last selected tuck needles.

Continuing the sequence, as the needles holding the previously placed two rounds of elastic continue around the knitting circle and again approach the elastic feed they are all withdrawn so as not to take elastic. The needles after leaving the elastic feed are again selected for tucking and shedding as in the previous course following which the needles take new yarn and knit and tuck accordingly as they move through the stitch cam. As the needles again approach the elastic feed, the needles remain withdrawn and an additional course is knit without elastic and on the same tuck needle selection as in the previous course. After the two courses containing the elastic have been knit followed by the two courses not having the elastic a new sequence begins. That is, the course following the mentioned four courses would be the first course in another four course group and which would have a round of elastic laid into it in the same manner as the first round of elastic was laid into the first group of courses.

As distinct from my co-pending application Serial 74,700 filed December 8, 1960, now United States Patent No. 3,094,856, over which the present stitch is an improvement, it is to be especially noticed that the present stitch employs strands of elastic which are caught in two different sets of tuck stitch groups, one of which is being knit off and the other of which is just being started. This

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particular feature is believed to be entirely new in the knitting art and when combined with a stitch such as taught in my co-pending application gives pattern possibilities of unusual sharpness and definition especially where applied to bobby sock top knit constructions.

The stocking top is preferably formed on a circular knitting machine generally of the Banner type and which preferably includes a sinker top, a cylindrical bank of latch needles, needle jacks, and, in order of counter-clockwise sequence looking down on the knitting circle, a selector, such as a jack selector, for selecting needles to take elastic, an elastic feed, a separate selector for selecting needles to shed and tuck respectively, a yarn feed and a stitch cam mechanism. One mechanism arrangement suitable to the invention is described and claimed in my separate application Serial 151,215, entitled Method and Apparatus for Elastic Bobby Sock Top, filed November 9, 1961.

For an understanding of the invention, reference is made to the drawings in which:

FIGURE 1 is a stitch diagram showing one embodiment of the invention.

FIGURE 2 is a schematic plan view showing how the elastic is laid in during makeup.

FIGURE 3 is a partial elevation view of a sinker showing how elastic is laid in the throat of the sinker.

FIGURE 4 is a diagram illustrating how the regular yarn in the stitch of FIGURE 1 is arranged by knit and tuck stitches.

FIGURE 5 is a schematic plan view showing how the principal machine knitting elements are arranged for the invention.

FIGURE 6 is a schematic elevation view showing how the needles are selected for taking elastic during patterning.

FIGURE 7 is a schematic plan view showing how the elastic is taken on the needles in the pattern courses.

FIGURE 8 is a schematic elevation view showing the relative tuck needle positions between adjacent groups of courses.

FIGURE 9 is a schematic elevation view showing how the needles are lowered to avoid taking elastic.

FIGURE 10 is a diagram illustrating an embodiment having only the alternating type elastic.

Reference is first made to FIGURE 1. During the makeup courses, not shown, in FIGURE 1, alternate needles are raised to take the elastic only for four courses. No yarn is taken or stitches formed during these courses and as indicated in FIGURES 2 and 3 the elastic 20 after leaving the elastic feed 21 is brought into the throat of the sinker 22 and is laid behind and in front of the respective needles indicated at 23. The four courses of elastic are now shedded and regular yarn is taken on all the needles following which all the needles knit as they pass through the stitch cam. Such makeup procedure is well known in the art and may, of course, take the described or other form. The invention itself is primarily directed to the pattern courses in a bobby sock type stitch and for this reason no further explanation is deemed necessary so far as the makeup courses are concerned.

After completion of the makeup courses, the knitting may proceed immediately to the pattern courses tuck stitch and elastic arrangement according to the invention and a description is first given of the knitting of a patterned fabric such as the portion of fabric illustrated by FIGURE 1. In FIGURE 1, the strands of regular yarn are shown in relatively light lines and the strands of elastic are indicated in relatively heavy lines. For reference purposes, the wales of FIGURE 1 have been labeled A through M respectively and the strands of yarn and elastic have been labeled 30 through 53 respectively.

As previously mentioned, the stitch arrangement of the

invention involves knitting repetitive groups of courses, each group having tuck stitch wales alternating with a plurality of knit stitch wales and offset from the tuck stitch wales in the preceding and following groups. Overlooking the elastic yarns for the moment and considering only the regular yarns, the stitches of FIGURE 1 can be diagrammed so far as the regular yarns are concerned by a stitch diagram such as shown in FIGURE 4. In FIGURE 4, the vertical columns represent wales and the horizontal rows represent courses. The squares containing T marks represent tuck stitches whereas the squares containing K marks represent knit stitches. In analyzing this diagram, it can be seen that the yarn is arranged in groups of courses, that every course contains tuck stitches alternating with a plurality of knit stitches, that the tuck stitch wales in one group of courses are offset from the tuck stitch wales in the preceding and following groups and that there is no clearing or all knit course as such between groups of courses. These basic characteristics of the regular yarn stitch should be kept in mind, as the description proceeds.

As a starting point in the sequence, we will consider elastic strand 37 which like strands 43 and 49 can be seen as having been laid in substantially coursewise. The needles employed are arranged in a circle as generally indicated in FIGURE 5 and as they rotate will consecutively (a) be selected for elastic taking purposes, (b) have elastic fed to needles selected for elastic, (c) be selected for tuck and knit, (d) have yarn fed to all needles and (e) will pass through a stitch cam. These particular aspects of the needle motion are most pertinent to the invention, therefore no attempt has been made to illustrate the sinker and other conventional cam actions that are more well known.

Prior to taking an elastic strand such as strand 37, the needles are selected for elastic taking purposes and are positioned alternatively three up, one down as shown in FIGURE 6. The needles will then move past the elastic feed and the elastic will be caught in front of the raised needles and behind the low needles as in FIGURE 7. In FIGURE 1, those needles forming wales C, D, and E for example have strand 37 laid in front of the needles whereas the needle forming wale B has strand 37 laid behind the needle.

As the knitting progresses, the needles will be selected for tuck and knit or shed position and in the case of needles carrying a coursewise strand, such as strand 37, those needles which just previously caught the elastic will be selected to move to a shed or knit position whereas those needles behind which the elastic was just previously laid will be selectively positioned at tuck or non-shedding position. The designations "T" and "K" in FIGURE 6 indicate the respective tuck or knit positions assumed by the needles immediately after they receive a coursewise elastic strand such as strand 37.

The needles next pass the yarn feed where all needles take regular yarn such as strand 36 following which stitching takes place according to the knit-tuck pattern established by the immediately prior tuck needle selection. In the fabric of FIGURE 1, it can be seen, for example, that regular yarn strand 36 is tucked in wales B, F, and J whereas it is knit in the other wales.

Following laying in of each coursewise type elastic strand, such as strand 37, the knitting proceeds with laying in of an alternating type elastic strand such as strand 39. As the needles complete the course containing strand 37, they will again be selected for taking elastic but in this instance will be selectively positioned as they were for strand 37. That is, each coursewise strand of elastic such as strand 37 and the alternating strand of elastic immediately following such as strand 39 are both laid in front of and behind the same respective needles. However, after the needles have taken the second strand of elastic such as strand 39 and before taking the regular yarn, they are selectively positioned to knit-tuck positions

which are offset from those knit-tuck positions first selected. In the example of FIGURE 1, this tuck stitch offset is by two wales.

In FIGURE 8, the described offset effect is illustrated by two respective banks of needles. The needles in the top bank might represent, for example, the knit-tuck needle array for strand 37 whereas the bottom bank might represent the knit-tuck needle array for say, strand 39. It can be seen that the tuck needles selected for the bottom array are offset by two wales from those in the top array. It will of course be understood that only a few needles have been shown as this knit-tuck selection process repeats itself around the knitting circle.

As the needles continue around the knitting circle, all needles take regular yarn and then knit according to the last selected knit-tuck pattern. Following formation of stitches, the needles are again selected for taking elastic but in this case, the elastic selection consists of lowering all needles so that they will pass below the elastic feed without taking elastic as generally indicated by FIGURE 9. The knit-tuck selection continues however with the selection pattern being the same as for the previous course and two courses are knit without elastic.

Following, the last mentioned two courses, the fabric is ready to receive another coursewise type elastic strand such as strand 43. Just prior to feeding this next elastic strand to the needles, the needles will be selected for taking elastic in a three up and one down pattern so as to have the elastic laid alternatively in front of three and behind one needle. However, the needles that are selected to be down at this stage are offset by two wales from those that were selected to take elastic at the time of entering coursewise type elastic strand 39 into the fabric. Referring back to FIGURE 8, if we consider the top bank of needles to represent needles selected for taking elastic strand 37, then the bottom bank of needles would represent needles selected for taking elastic strand 43. The net result of selecting the elastic and tuck needles in the manner described and of changing the particular needles selected by offset positions at the times described results in a fabric such as that of FIGURE 1.

The most interesting point about this fabric is that some of the elastic strands such as strands 33, 39, 45, and 51 are caught alternatively in adjacent tuck stitch groups. For reference purposes, certain of the tuck stitch groups in FIGURE 1 have been labeled X, Y, and Z. We can see, for example, that elastic strand 45 is caught in group X, then group Y, then group Z, and so forth. This unusual elastic yarn arrangement gives rise to new pattern possibilities.

To summarize the manner in which the pattern courses in the fabric of FIGURE 1 are formed, we can say that one round of elastic, a coursewise type, is laid in with the elastic going behind needles that are left down in tuck position and in front of the remaining needles. This is likewise followed by needles taking regular yarn and forming knit or tuck stitches according to how each was positioned in the knit-tuck pattern. Then a second round of elastic, an alternating type, is laid behind and in front of the same needles as before. However, before reaching the regular yarn feed new tuck needles are selected which are offset by a given number of wales from the first selected tuck needles. This is followed by all needles again taking yarn and forming knit or tuck stitches according to this second or last tuck needle selection. Two courses follow during which no elastic is fed to the needles. The first course in a new four course sequence is then knit for which the tuck needles do not change from their last position and the elastic goes behind the needles that are held in such tuck position and behind the remaining needles, as was the case in the first sequence.

So far as the alternating type elastic strands are concerned, it can be said that such strands alternate by reason of (a) being laid into the fabric in a course where certain tuck stitch groups are being knit off and others

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are being formed (b) being caught in both the groups that are being knit off as well as in those that are being formed and (c) being held with the regular yarn in the tuck stitch groups being formed for a given number of courses.

The alternating elastic yarn and tuck stitch sequence may vary from the embodiment of FIGURE 1. While employment of both coursewise and alternating type elastic strands are preferred, I have found other new effects are possible when only alternating type elastic strands are employed. For example, FIGURE 10 illustrates in diagrammatic form a modification in which the sequence repeats in groups of three courses, there are no continuous all knit wales as in FIGURE 1, the tuck stitches are offset by only one wale and only an alternating type elastic strand is employed as represented by the dashed line 60. These and other modifications of the invention will appear to those skilled in the art.

Having described my invention, I claim:

1. In a knit stocking top comprising a repeated continuous sequence of uniform groups of a plural number, not less than three, of courses knit of inelastic yarn, each group having interspersed with knit stitch wales a plurality of uniformly spaced wales in each of which spaced wales one tuck stitch extends throughout the courses of such group, said spaced wales being uniformly laterally offset at least one wale from group to group, the improvement comprising elastic yarn alternately laid into a tuck stitch wale of a first one of said groups, then into an offset tuck stitch wale of a second one of said groups adjacent to the first, then back into a further offset tuck stitch wale of the first group, and then back into a further offset tuck stitch wale of the second group and continuing in the alternating manner around the top, the knit-off loop of each of said tuck stitches being composed solely of said inelastic yarn.

2. A knit stocking top as claimed in claim 1 wherein only one knit stitch wale extends continuously through said groups between each pair of adjacent offset tuck stitches.

3. A knit stocking top as claimed in claim 1 wherein the tuck stitch wales of each group are spaced apart by three knit stitch wales.

4. In a knit stocking top as claimed in claim 1 and further including elastic yarns laid coursewise in at least one course in each of said groups.

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5. In a knit stocking top as claimed in claim 1 in which each of said regular yarn courses are identical in having the same predetermined plural number of knit stitches alternating with single tuck stitches and in which each of said groups is identical in having the same plural number of courses.

6. In a knit stocking top as claimed in claim 1 in which said alternating elastic yarn is laid in at each juncture of said groups.

7. In a knit stocking top comprising a repeated continuous sequence of uniform groups of a plural number, not less than three, of courses knit of inelastic yarn, each group having interspersed with knit stitch wales a plurality of uniformly spaced wales in each of which spaced wales one tuck stitch extends throughout the courses of such group, said spaced wales being uniformly laterally offset from group to group with one knit stitch wale extending continuously through said group between each pair of adjacent offset tuck stitches, the improvement comprising first elastic yarn alternately laid into a tuck stitch wale of a first one of said groups, then into an offset tuck stitch wale of a second one of said groups adjacent to the first, then back into a further offset tuck stitch wale of the first group, and then back into a further offset tuck stitch wale of the second group and continuing in this alternating manner around the top, the knit-off loop of each of said tuck stitches being composed solely of said inelastic yarn; and elastic yarn laid coursewise in at least one course in each of said groups.

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