Jan. 16, 1962 R. H. LAWSON 3,016,726

KNIT FABRIC INCORPORATING ELASTIC THREAD AND GARMENTS FORMED THEREOF

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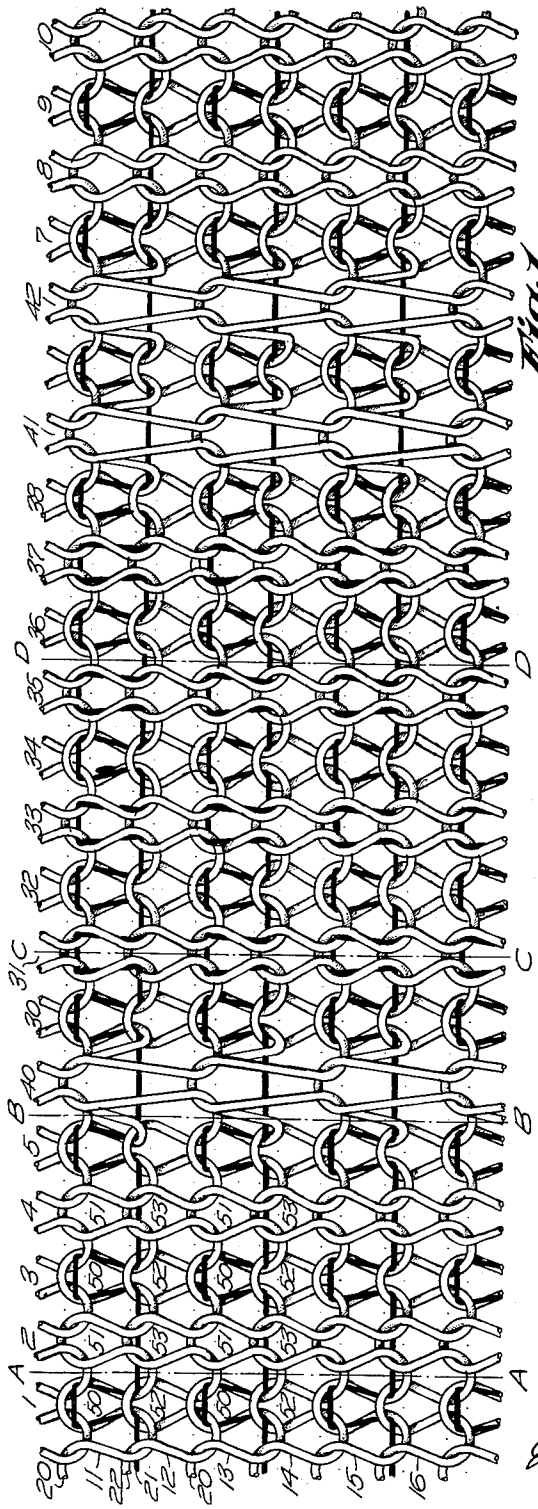


Fig. 1.

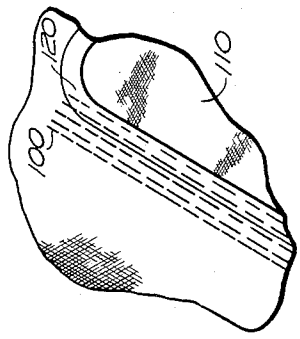


Fig. 6.

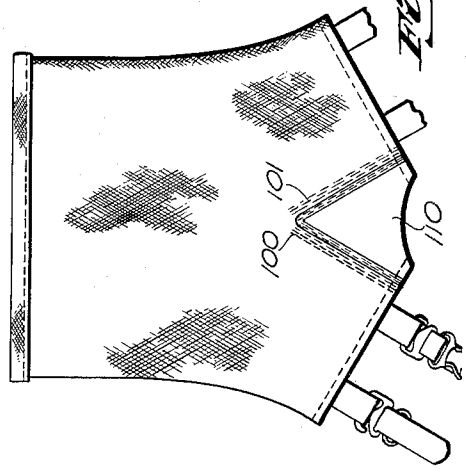


Fig. 5.

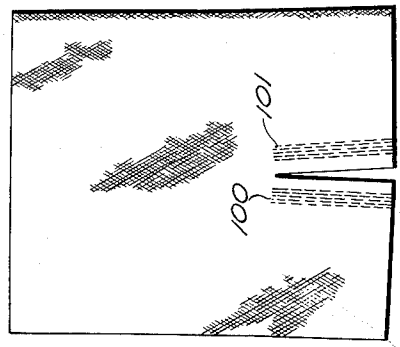


Fig. 4.

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Fig. 2.

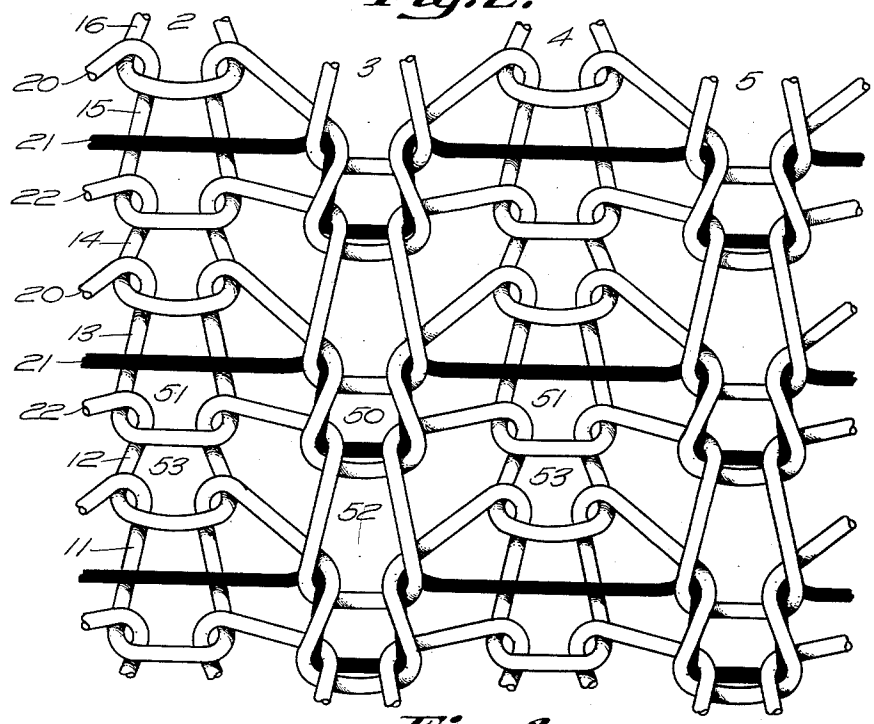
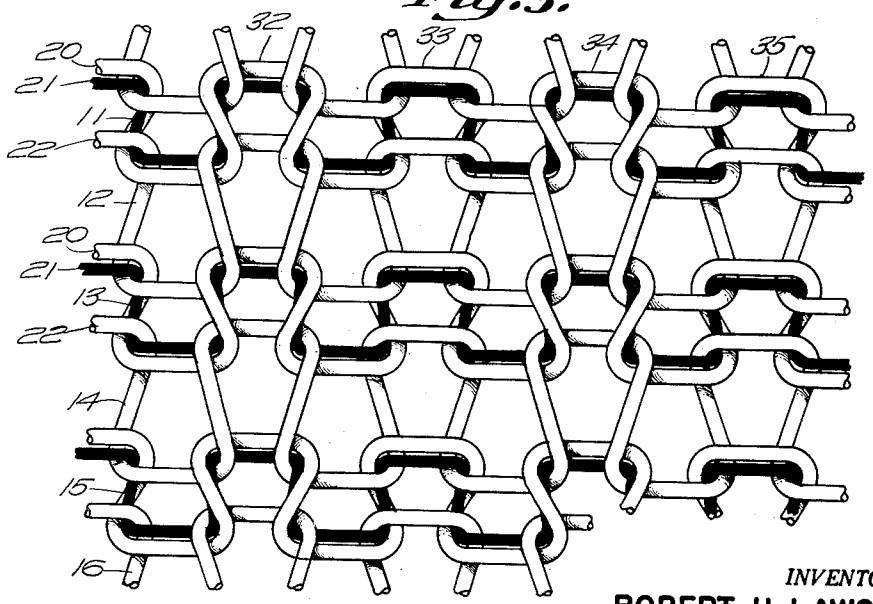


Fig. 3.



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Fig. 7.

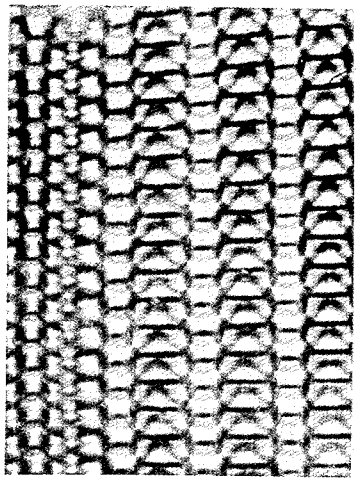
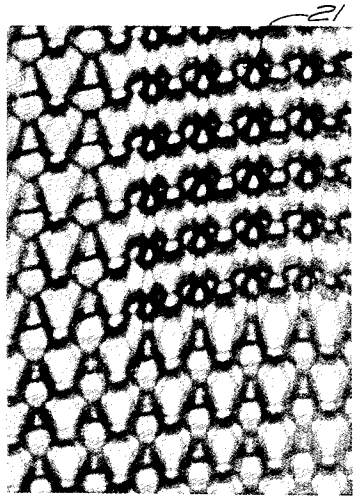


Fig. 8.



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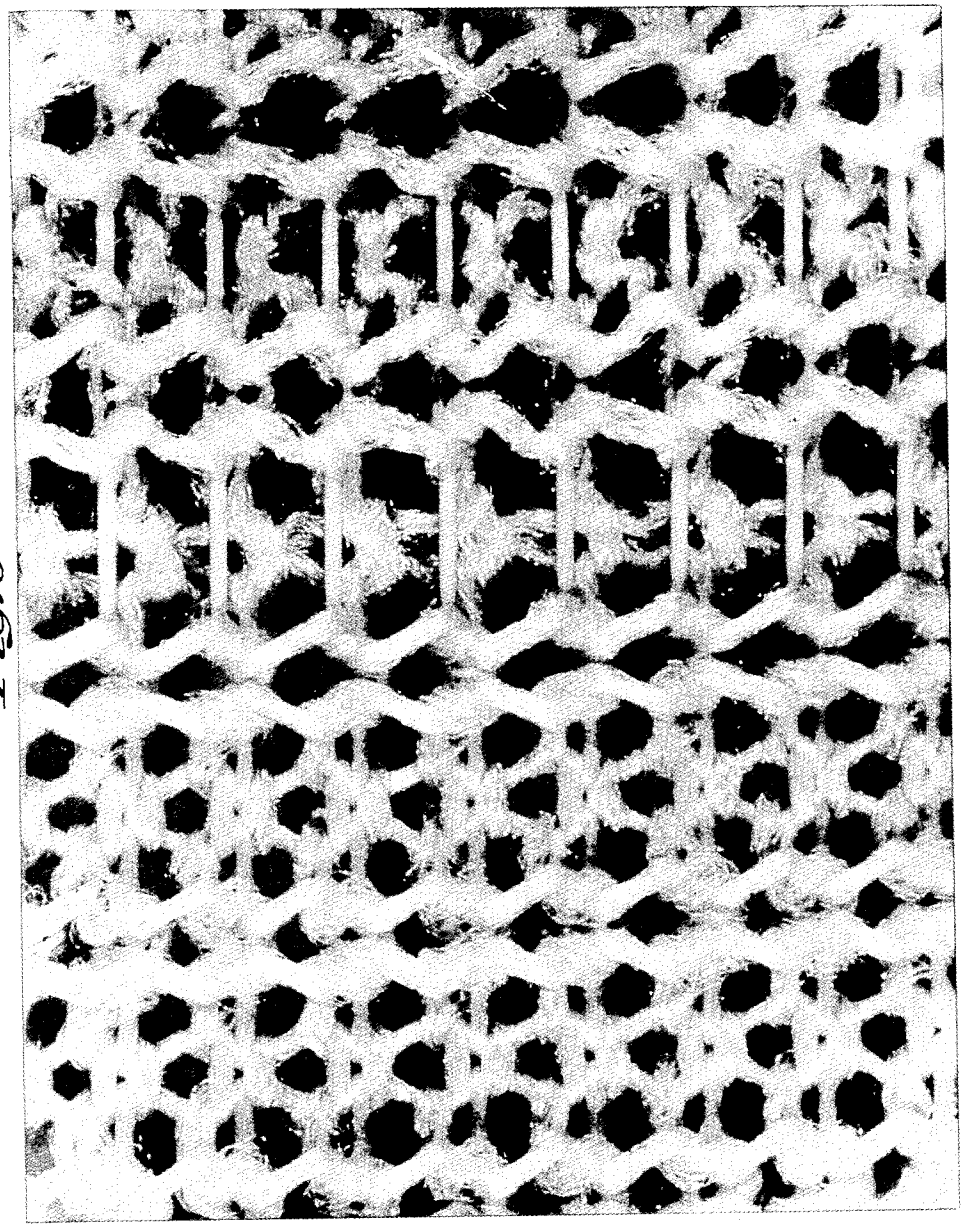


Fig. 9

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KNIT FABRIC INCORPORATING ELASTIC THREAD AND GARMENTS FORMED THEREOF

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Filed Dec. 6, 1956, Ser. No. 626,643
5 Claims. (Cl. 66—177)

This invention relates to knit fabrics, more particularly those incorporating elastic thread elements, such as weft knit fabrics for foundation garments, and to garments fashioned of such fabrics.

Weft knit fabrics for foundation garments have been customarily made for the past several years with uncovered elastic thread. The uncovered elastic thread, being free of friction producing windings, provides the fabric with more power tending to make it return to its contracted width than is usually possible with covered rubber thread.

A 1 x 1 rib fabric having uncovered elastic thread knit in the dial or cylinder wales only has proved to be a very satisfactory fabric for two-way stretch girdles as well as for other garments using elastic fabric. However, when fabric is made in this way with fine yarns, to produce so-called "midget garments," the elastic thread is liable to pull the knitted loop drawn through it back so that said elastic thread forms substantially a straight line instead of being held in the knitted loop form. Thus, when the fabric is cut walewise to make panty girdles, bathing suits or other garments of this type, it is found that great difficulty is encountered in locking the rubbers at the seam so they will not pull away from the cut edge, back into the garment fabric with consequent loss of holding power in the garment and unsightliness in the fabric. This does not occur as readily in heavy fabrics where the yarn is of sufficient size so the loop is well filled out preventing the elastic thread from pulling the loop back through. A spiral covering on the elastic thread also provides sufficient friction to prevent the sliding, but such fabrics have a harsher feel and lack the "snap" of the fabrics made with uncovered elastic thread. The plated inelastic thread in fabrics made using uncovered elastic threads prevents said uncovered elastic threads from coming in contact with the body when the garment is worn and from direct light rays when the garment is off and exposed to light as when hung on a line for drying. This plating thread also prevents the garment from coming apart to form a hole in case the elastic thread is broken or when said elastic thread slips back out of its stitch.

It is known that uncovered elastic thread knit into every wale in every course as shown in FIG. 1 of Lawson Patent 2,009,361 provides an excellent locking of the rubber though the resulting fabric is dense and has its greatest power walewise instead of coursewise, the coursewise power being more desirable in foundation and elastic garments generally. When the uncovered elastic thread is knit in spaced courses and at all wales in 1 x 1 rib, the resulting fabric has very poor side stretch characteristics as far as foundation garments are concerned. The 1 x 1 rib fabric in which uncovered elastic thread is knit at either spaced or every course in the dial or cylinder wales only has excellent power coursewise, an easy stretch walewise, is soft and porous and in general has characteristics that are most desirable in elastic fabrics except that when such fabric is cut walewise and seamed, it is difficult to prevent the rubbers from pulling way from the seam and sliding back into the fabric.

This invention has an important aim to provide, in a fabric made by knitting uncovered elastic thread in the dial or cylinder stitches only, a zone or zones that will

prevent such elastic thread from slipping back into the fabric when the fabric is cut walewise and sewn. Such purpose desirably is accomplished and is here disclosed as providing such a fabric zone that is readily made on a latch needle dial and cylinder machine. Other objects and advantages of the invention will be apparent from the following description in connection with the drawings, in which:

FIG. 1 is a diagrammatic showing of fabric containing the zone that is used to prevent the rubber slipping;

FIG. 2 is a showing of the stitches of FIG. 1 between dot-dash lines AA and BB as they appear in the fabric when said fabric is stretched both coursewise and walewise;

FIG. 3 is a showing similar to FIG. 2 but in the portion between dot-dash lines CC and DD;

FIG. 4 is an elevation view of a "blank" that has been cut preparatory to making a panty girdle of it;

FIG. 5 shows in elevation a completed panty girdle;

FIG. 6 is an enlarged showing of the seam connecting the crotch cloth with the fabric of the panty girdle; and

FIGS. 7 and 8 are photographic reproductions of actual fabric, wherein

FIG. 7 shows the fabric heavily stretched coursewise,

FIG. 8 shows the fabric heavily stretched both coursewise and walewise, and

FIG. 9 shows a portion of the fabric of FIG. 7 under greater magnification.

In FIGS. 1, 2 and 3, the uncovered elastic thread is represented by solid black lines 21 and the inelastic thread is represented by double lines 20 and 22. The particular fabric shown is 1 x 1 rib made using two feeds or a multiple thereof. Inelastic yarn of fine count in comparison with that which would normally be knit on the machine is fed to both sets of needles at both feeds. For example, the fabric of FIG. 2 which forms the basic fabric is made by feeding a 70/2 nylon "Helanca" yarn to both sets of needles of a 10 cut 13" diameter ribber and an 85's extruded rubber or its equivalent to the dial needles only of said ribber at alternate feeds to produce a garment the body of which may be only 8" wide to fit a "medium" size person, whereas the normal size garment from such a machine using normal size yarns would be 10" wide. The elastic thread is fed near the "bill" of the hook of the needle and thus the inelastic thread which is at the shank of said needle will plate over it.

In FIG. 1, wales 1, 2, 3, 4, 5, 7, 8, 9 and 10 are made as above and form the basic fabric. In course 11, the inelastic yarn 20 knits at all wales while the elastic yarn 21 knits at the dial wales only, which latter are numbered 1, 3, 5, 7, 9. In course 12, an inelastic yarn 22 knits alone at all wales. The "locking" zone is made up of wales 30 through 38 inclusive being bounded on the one side with tuck wale 40 and on the other side by tuck wales 41 and 42. This fabric is represented as having been knit from left to right as viewed in FIG. 1.

In the "locking" zone, the elastic thread is knit in every wale along with the inelastic thread 20 which latter is plated over it. This is accomplished by moving the rubber guide so that instead of feeding to the dial needle hooks only, it is so placed as to feed to the cylinder needles as well, just as they measure their stitches over the dial needles, the elastic thread being fed under the yarn guide so the cylinder latches in closing will catch it and feed it into the hooks of the cylinder needles. By tucking the cylinder needle at the start of this "locking" zone, it is possible to move the rubber guide so the rubber will always be caught by the following cylinder needle which knits instead of sometimes being caught by one cylinder needle and at other times by a neighboring cylinder needle. At completion of the locking zone, two

cylinder needles are tucked at the rubber feed to produce wales 41 and 42. This permits the rubber to be removed with certainty and at a definite wale from the cylinder needle wales as the rubber guide returns to normal position.

It is to be understood that the tuck wales 40, 41 and 42 bounding the "locking" zone while desirable may be dispensed with, but in such case the mechanism for introducing and eliminating the rubber from the cylinder needles must be more accurate than when they are used.

In the panty girdle, there may be two "locking" zone stripes 100 and 101 made on each side of the garment (making four stripes in all) with a space of regular fabric between. The fabric has been cut between these stripes 100 and 101 as shown in FIG. 4 for insertion of the gusset 110 as shown in FIG. 5. FIG. 6 shows the seam 120 that locks the gusset to the fabric with the "locking" zone stripe alongside it. The "locking" zone stripe may, if preferred, be closer to the cut edge so as to be covered by the seam. Good results, however, will be obtained if the "locking" stripe is some distance from the seam.

FIGS. 2 and 3 are drawings produced from a photographic enlargement made of the fabric while said fabric was greatly stretched coursewise as well as lengthwise. Wales and stitches have been numbered as in FIG. 1.

It will be observed in FIG. 2 that the loops 50 containing rubber in wales 1, 3, 5, 7 and 9 in course 11, 13, 15, etc. are extremely small due to the elastic thread's tendency to straighten out. As a matter of fact, if the fabric had been stretched less lengthwise, it would have been found that the elastic thread formed substantially a straight line as shown in the accompanying photographs which are referred to in detail hereafter, FIGS. 7 and 8. The cylinder loop 51 made from the inelastic yarn used in loop 50 is very large as a result of loop 50 being small. Also, in the following courses 12, 14 and 16, the dial loops 52 that connect with the elastic thread loops 50 are enlarged by the pull of said elastic loops due to their tendency to become small so the elastic thread may straighten. The cylinder loop 53 made of thread 22 is small as would be expected.

In wales 30 through 38 that form the locking zone as shown in FIG. 3, the loops forming courses 11, 13 and 15 and which all contain the elastic thread are small but of definite loop structure and have been observed to retain such loop structure even when at rest. The inelastic loops of courses 12, 14 and 16 in wales 30 through 38 are uniform in size as regards both the dial and cylinder loops as would be expected. This loop structure provides a strong resistance against the rubber slipping through it. By making this zone narrow, its poor coursewise stretch characteristics do not become apparent.

Photographic FIG. 7 was made with the fabric stretched heavily coursewise, while that of FIG. 8 was made with the fabric heavily stretched both coursewise and walewise, to compare with FIGS. 2 and 3. Each of FIGS. 7 and 8 shows the inside of the fabric the same as FIGS. 2 and 3 but opposite to FIG. 1, which latter shows the outside of said fabric. The locking zone corresponding to that of FIG. 3 is seen at the bracketed areas on FIGS. 7 and 8.

In the photographic views, FIGS. 7 and 8, the blackest lines are pictures of the rubber. In FIG. 7 the rubbers in the basic fabric are nearly in line whereas in FIG. 8 there is nearly ⅛ in. between them, showing the effect of walewise stretching. However, it will be noted that the rubber loops in the locking zone are full in both the views.

In the above description, reference has been made to using the locking zone in vertical stripes. It should be understood, however, that within the invention checkerboard, stepped and other zone formations are available in which squares of locking zone fabric are interspersed between squares of the regular fabric. In any instance it is sufficient that the locking zone is formed reasonably close to the seamed cut edge and covers the length walewise of said edge, irrespective of whether the zone as a whole follows in a straight vertical line or has offset portions as by a series of squares or other formations.

My invention is not limited to the particular embodiments thereof illustrated and described herein, and I set forth its scope in my following claims.

I claim:

1. A garment incorporating a knitted fabric comprising a base fabric of relatively inelastic yarn in which an uncovered elastic thread is knit into spaced courses but into not more than alternating stitches of those courses in which it occurs and by its elasticity tends to unknit itself in those spaced-apart stitches where it is knitted, said fabric having one or more locking zones extending walewise commensurately with the length of a walewise cut-line to be formed in the fabric and extending coursewise over a multiplicity of wales, said locking zone having said uncovered elastic thread knit into all the fabric stitches in each of the courses corresponding to those in which it occurs in the base fabric and due to its resistance to becoming unknit in said stitches being thereby held against slippage through the fabric when the latter is stretched in the plane of the fabric whether before or after walewise cutting of the fabric adjacently along and outside a locking zone, said fabric being cut along a line generally paralleling a locking zone margin and having another fabric piece inserted at and seamed along the cut edge with a plurality of the locking zone wales lying between the seam and the base fabric.

2. A garment according to claim 1 in which the fabric insert is a gusset such as for a panty girdle.

3. A weft knit rib fabric comprising a base fabric made up of stitches formed from relatively inelastic yarn and having an elastic yarn free from friction-producing windings incorporated along with the inelastic yarn in the stitches forming wales of but one face of the fabric and in spaced courses thereof whereby said stitches containing the elastic yarn tend to unknit, said fabric containing one or more locking zones having a walewise extent over a plurality of such spaced courses and having a substantial coursewise extent, each such zone having a stitch structure identical to that of the base fabric and additionally having said elastic yarn incorporated in all of the stitches of said spaced courses along with the inelastic yarn thereby to prevent said elastic yarn from unknitting.

4. A weft knit rib fabric comprising a base fabric made up of stitches formed from relatively inelastic yarn and having an elastic yarn free from friction-producing windings incorporated along with the inelastic yarn in the stitches forming wales of but one face of the fabric and in spaced courses thereof whereby said stitches containing the elastic yarn tend to unknit, said fabric containing one or more locking zones having a walewise extent over a plurality of such spaced courses and having a substantial coursewise extent, each such zone having a stitch structure identical to that of the base fabric and additionally having said elastic yarn incorporated in all of the stitches of said spaced courses along with the inelastic yarn thereby to prevent said elastic yarn from unknitting, each such locking zone being separated from the base fabric by a wale containing modified stitches of a type wherein the stitches in the courses containing elastic do not have yarns drawn through previously formed stitches.

5. A rib knitted fabric according to claim 4 in which the stitch modification comprises tuck stitches.

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