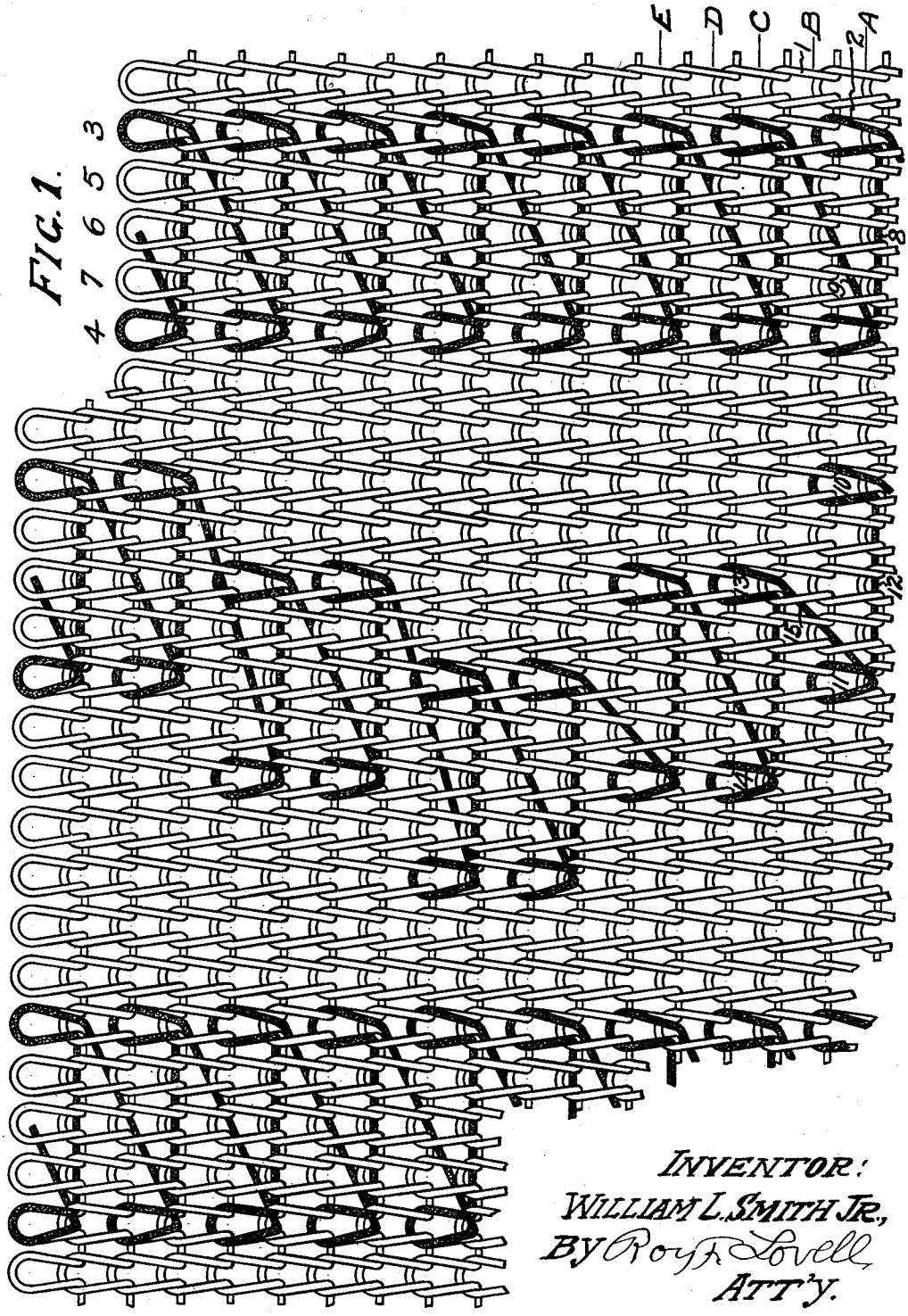
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KNITTED FABRIC AND METHOD
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FIG. 1.



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FIG. 3.

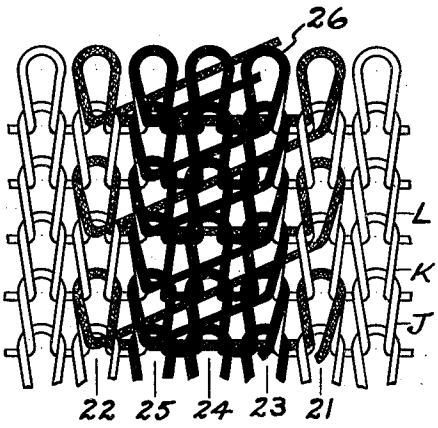


FIG. 2.

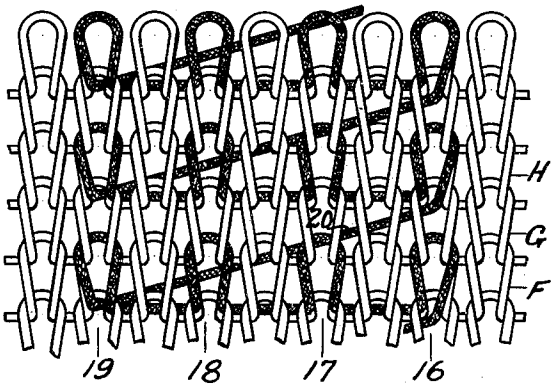


FIG. 4.

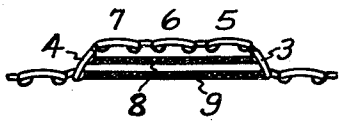
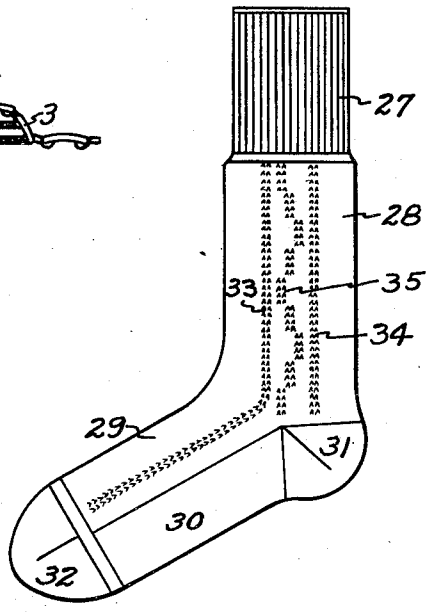


FIG. 5.



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Patented Feb. 17, 1942 2,273,230

UNITED STATES PATENT OFFICE

2,273,230

KNITTED FABRIC AND METHOD

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Application May 25, 1939, Serial No. 275,710

16 Claims. (Cl. 66—201)

This case involves a new method of ornamenting knitted fabrics wherein elastic yarn is employed, said elastic yarn being incorporated according to the method generally known as wrapping.

In the figures of drawings:

Fig. 1 is a conventional showing of part of a section of knitted fabric having an elastic yarn wrapped in predetermined areas thereof according to one form of the invention;

Fig. 2 is a section of fabric similarly shown wherein an elastic yarn is wrapped according to another method to produce slightly different effects;

Fig. 3 is a similar view showing still another form of the invention wherein an elastic yarn has been wrapped and in conjunction therewith a plain yarn of contrasting color to the base fabric wrapped within the area enclosed by the elastic wrapping to produce still a different effect;

Fig. 4 is a detail showing a section of fabric knitted in accordance with the method employed in Fig. 1 showing the manner in which the fabric is distorted; and

Fig. 5 is a conventional illustration of a stocking showing one pattern which might be knitted in accordance with the invention herein described.

In ornamentation of knitted fabrics by the method known as needle wrapping, sometimes termed true wrapping, yarns are fed to predetermined needles or groups of needles to be taken by a needle or needles and in such a manner as to plate at the front of the fabric, that is, over a yarn or yarns which are knitted throughout the entire fabric. In all of such wrapped patterns to this time, the ornamentation has been a result of a contrasting yarn, commonly contrasting in color, so that patterned areas were knitted wherein the wrap yarn appears as plated or slightly raised from the surface of the base fabric, such ornamentation normally being different from ordinary all-over patterns of plating in that feature, namely, the fact that the patterned area stood out slightly from the face of the fabric.

According to the invention herein described entirely different ornamental effects are produced in that elastic yarn is employed in the wrapping of predetermined needles which may constitute a relatively narrow group of needles or much wider groups. The effect obtained is, briefly, a very marked embossed effect which may or may not be of contrasting color to that of the base fabric. This embossed effect is so pronounced as to present an entirely different appearance from that of ordinary wrapping with non-elastic yarns wherein the extent to which the wrapped area stands above the face of the base fabric is no more, and in most instances considerably less, than the thickness of the yarn employed for wrapping.

In the wrapping of areas as herein described, there is combined with the highly embossed ornamental appearance a degree of utility, a feature not present in wrapped goods wherein non-elastic yarns are used. Ordinarily wrapping detracts from the inherent elasticity of the fabric. Such is not the case when wrapping with elastic yarns although the fabric is drawn together to a certain degree, that being desirable for raising the wrapped areas away from the fabric to obtain the extreme degree of elevation of the wrapped areas with respect to non-wrapped areas. Patterns may be knitted by selection just as in wrapping of fabric with non-elastic yarns. These patterns will at the same time be accompanied by an inherent elasticity which will make the stocking or other knitted article fit better, eliminating the tendency to wrinkle or to bulge sometimes experienced.

It is within the purview of the invention to employ the wrapping mainly for elastic purposes to the extent of rendering the entire fabric elastic such as for various body fabrics of a restraining nature, or for bathing suits or goods employed in outerwear. The tops of stockings or hosiery may be wrapped at such frequent intervals as to present a highly ribbed appearance and at the same time to serve as a garter since a great number of individually wrapped segments will impart to the entire stocking top a considerable degree of elasticity sufficient to serve as a supporter.

In the knitting of certain patterns pleasing effects are obtained by knitting areas in which an elastic yarn is wrapped over the terminal needles of a panel and intermediate those needles, a plain yarn of contrasting color to that of the base fabric will be wrapped, the elastic yarn being of the same color as the base fabric, or alternatively, of contrasting color to that yarn but of similar color to the plain wrapping yarn, or possibly of different color from both.

The effect of this is that a contrasting color will be knitted at the face of the wrapped panel which will stand out away from the fabric many times as far as it would if wrapped alone, that is, without any elastic wrapping thread to contract the panel thereby to cause it to stand out in relief. This is in effect a method of wrapping

according to the so-called "color within color" scheme, but the elastic may or may not be of a contrasting color.

Now referring to the figures of drawings and especially Fig. 1, a section of fabric is shown wherein a plain yarn 1 such as cotton, silk or artificial filaments is knitted to form a base fabric. This plain yarn is herein shown as knitted on all needles and in each course thus producing what is generally known as plain or jersey fabric. It may be that other fabrics are to serve as a base fabric, for example, fabrics having a plurality of yarns knitted in which plating and reverse plating may add an ornamental effect to that herein described. Likewise various forms of tuck stitches or other stitches of unusual character may be knitted in addition to the wrapped areas, that merely depending upon the ultimate desires of the knitter and the type of fabric which is eventually to be produced. Plain fabric is herein illustrated but the invention is equally applicable to rib work wherein wrapping might be confined to needles knitting face wales only.

An elastic yarn 2 has been wrapped in the course designated at A, being knitted in wales 3 and 4 in the panel wrapped at the extreme right hand side of the figure. There are three wales in between these numbered by numerals 5, 6 and 7 which are not wrapped. The elastic floats as shown at 8 from the stitch knitted in wale 3 to that eventually knitted in wale 4. The panel thus wrapped is five needles wide, but it is to be understood that panels may be wrapped anywhere from three needles in width up to whatever width may be conveniently wrapped by a single wrapping yarn. In practice of the invention various wrapping machines adapted to wrap panels of needles in contrast to single needles only, may be used. One example of a well-known knitting machine desirable for the purpose is a Banner wrap machine such as illustrated in United States Patent #1,702,608. It is to be understood that if terminal needles are wrapped in a panel such as that described at present, the wider the panel, the larger will be the embossed rib which will stand away from the fabric. The elastic is wrapped under some tension, that tension being variable according to the desires of the knitter for the purpose of drawing these terminal wales together more or less as it is desired to have the wrapped area project varying degrees from the surface of the fabric.

It is possible to wrap in consecutive courses, although for a pattern such as will be made by any of the schemes illustrated in Fig. 1, quite satisfactory effects are obtained by wrapping at every other course. This saves elastic and prevents a slight contraction or drawing up of the fabric walewise as might result if elastic were to be wrapped in consecutive courses in which stitches having elastic yarn are to be drawn through other stitches having elastic yarn. Thus in course B no elastic is wrapped, the yarn 2 merely floating from course A to B in the float designated at 9. In course C the same elastic yarn is again taken by selected needles knitting in wales 3 and 4, thus duplicating what was done in course A. This continues throughout the entire panel illustrated at the right hand side of Fig. 1. The yarn 2 is shown in contrast to the yarn 1 in this figure, and in fact, in all Figs. 1, 2 and 3, however, it is to be understood that this is merely for purposes of identifying the particular yarns in these conventional showings and depending upon the result desired, yarn 2 may be of the same color as yarn 1 or may contrast therewith. The fabric illustrated in Fig. 1 is shown as though the elastic were not under tension, that is, not contracted in the areas or panels wherein wrapping has occurred. It is to be understood that the tension in elastic will draw the wales 3 and 4 together so that wales 5, 6 and 7 will stand out away from the face of the fabric, floats 8 and 9 of the elastic under tension being responsible for this contraction and for the highly embossed effect with respect to wales 5, 6 and 7. Wales 3 and 4 actually are inclined to the normal face of the fabric.

The panel wrapped at the left hand side of Fig. 1 is the same as that at the right hand side, but the central panel is the same in that for each individual course the elastic is wrapped on spaced needles floating over three intermediate needles. However, the needles on which the elastic is wrapping are stepped over according to a predetermined pattern so that the general line of the panel is first stepped in one direction laterally of the fabric and then in the other. In course A the elastic is wrapped in wales 10 and 11 floating over the three intermediate wales in a float 12, then in course C is wrapped in wales 13 and 14. A diagonal float 15 extends from course A to course C, skipping course B in which no wrapping has been done. The wrapping skips the next course D and then a second wrapping in wales 13 and 14 occurs in course E so that in courses C and E the elastic appears in the same wales and floats as it would in the panel at the right hand side. The panel is then stepped over as illustrated in the next pair of wrapped courses whereupon it then starts to step back as the pattern progresses toward the top of the fabric until it reaches the original wales 10 and 11. This is merely illustrative of one sort of pattern effect wherein the panels at the right and left of Fig. 1 would appear as raised or embossed ribs vertically of the fabric and the panel at the center would constitute a similar rib running back and forth or on a zig-zag line.

In Fig. 1 the wrapping has been spaced so that the elastic floats over three needles or three wales. It also occurs in every other course, but this may be varied wherein in certain instances the elastic may be spaced a greater number of courses and the effect may still be obtained depending upon the width of panel being wrapped. Also, as before stated, this wrapping on terminal needles of a panel may vary over any width practicable so far as the wrapping is concerned, from a mechanical point of view, and so far as practical embossed effects in the fabric are to be obtained.

In Fig. 2 a slightly different effect would result in that the elastic, instead of being wrapped on terminal needles of a panel, is wrapped throughout the panel at every other needle. In the wrapping of elastic it has been found that results obtained by wrapping each needle in a group are unsatisfactory both from effect in the fabric and from difficulties experienced in the actual mechanics of wrapping the yarn on adjacent needles. The embossed effect will be lost and further, there will be a tightness and tendency to draw the fabric up or pucker it in an undesirable manner. The elastic is quite easily wrapped on alternate needles as in Fig. 2 or on needles spaced more widely. In Fig. 2 in course

F the elastic is wrapped to knit in wales **16**, **17**, **18** and **19** floating over a single intermediate wale in each instance. Then it floats in one elongated float **20** up to course H skipping course G. At that course wrapping occurs on the same needles. The elastic thus is wrapped on every other needle of a panel and will draw the alternate wales together, also will tend to emboss or make one large rib of the entire panel. This gives a different effect from that of Fig. 1. It is also possible to wrap in each course according to the scheme of Fig. 2 although that is not necessary in most instances. Probably slightly better results are obtained in skipping a course between each course in which a wrap yarn appears. The pattern may also be stepped laterally, or if desired, may diverge or converge to form figures in contrast to panels or lines of unchanging width.

In Fig. 3 a different effect results from the employment of both an elastic wrap yarn and a non-elastic yarn, the non-elastic yarn being wrapped on wales intermediate terminal wales in which the elastic is wrapped. The elastic is on this instance wrapped precisely as in the end panels at Fig. 1 while the non-elastic yarn is wrapped on the three intermediate needles and in each course. For example in course J the elastic is wrapped in wales **21** and **22** floating up to the course L in which it is again wrapped in those same wales. It continues on throughout the desired length of fabric to be ornamented. In wales **23**, **24** and **25** a plain yarn **26** which is preferably of contrasting color to the base fabric yarn is wrapped and will appear at the face of the fabric as a colored line running lengthwise of the fabric and since the elastic yarn will draw the wales **21** and **22** together, the intermediate wales **23**, **24** and **25** will stand out at the front of the fabric being much more prominent and appearing in relief to a far greater extent than if those wales were merely wrapped with said contrasting colored yarn without any elastic yarn as herein described. Wrapping mechanism to do this will be of any one of the types commonly employed for wrapping "color within color." It is not necessary that the elastic yarn be of a contrasting color, but preferably it will be of the same color as the yarn in the base fabric although it need not be. The term "color within color" applies more to the mechanism by means of which the effect of Fig. 3 is to be realized than to the appearance of the fabric when knitted. Of course, the panel thus wrapped in Fig. 3 may be of varying widths and need not run in the same wales, but may vary as the central panel of Fig. 1, or may be constituted as figures of desired shapes rather than as unbroken lines.

In Fig. 4 an end view of the fabric is shown wherein the stitches in wales **5**, **6** and **7** are shown standing out at the face of the fabric to constitute the embossed or ribbed panel before mentioned. Stitches in wales **3** and **4** are shown inclined as the said wales are drawn together by the floats **8** and **9** of elastic yarn.

In Fig. 5 a conventional half hose is shown having a top **27**, leg **28**, instep **29**, sole **30**, heel **31** and toe **32**. A pattern is shown being knitted down through the leg and in the instep according to what has been described with respect to Fig. 1. Each of the panels **33** and **34** are wrapped similarly to the panels at the right and left side in that figure while the central line or panel **35** is a zigzag line formed according to the central panel of Fig. 1 except for the fact that each of the panels wrapped on a particular group of wales progresses for a greater number of courses than shown in Fig. 1. In Fig. 1 in order to illustrate several changes or more steps of the pattern in a given area of fabric, only two wrappings have been made consecutively within the same group of needles.

This wrapping by means of elastic either with or without other wrap yarns such as non-elastic yarns may be almost solely for purposes of ornamentation as shown in the leg and instep of the fabric, Fig. 5, but incidentally imparts to the fabric a definite amount of elasticity in a lateral direction which does make the stocking or article fit more satisfactorily. In the top **27**, conventionally illustrated, the rib lines or the rib appearance may be obtained by wrapping in a greater number of panels so that the entire top will eventually be elastic to a desired degree. The elastic thus wrapped will impart to the top the much desired rib appearance although made on a plain machine, and will at the same time be elastic to an extent necessary to serve as a garter or supporter.

Another use for wrapped areas such as disclosed is that of making seams such as the seams at the back of ladies' hosiery, in which the raised panel will constitute both a seam and an elastic zone for the purpose of imparting a better fit, eliminating wrinkles, etc. and making the stocking more elastic generally thereby to avoid runs. While the invention has been described with respect to hosiery in the specific details expressed, it is equally applicable to body fabrics and would therein possess advantages in that a new ornamental effect could be availed of and at the same time elasticity imparted to the fabric to almost any desired degree. Combinations of the ornamentation along with other types such as tuck work or eyelet work of any nature would give ornamental raised effects in combination with open work such as might provide very satisfactory appearance with porosity. The invention is not to be limited except by the scope of the appended claims.

I claim:

1. A method of knitting including wrapping an elastic yarn in non-adjacent wales of the same course of a weft knitted fabric and of a plurality of courses thereof so that the floats from wale to wale and course to course will contract and thereby distort the fabric whereby a raised or embossed rib will be caused to appear at the face of the fabric.

2. A method of knitting including the wrapping of an elastic yarn in non-adjacent wales of the same course of a weft knitted fabric and floating said elastic yarn over a wale or wales between said non-adjacent wrapped wales and from a course in which said yarn is wrapped to a subsequent course in which it is again wrapped.

3. A method of knitting including the wrapping of an elastic yarn in a weft knitted fabric and on terminal wales of a panel including at least three wales of the same course and floating said elastic between said terminal wales and from a course in which it is wrapped to a subsequent course in which it is again wrapped.

4. A method of knitting including the wrapping of an elastic yarn in a weft knitted fabric and on terminal wales of a panel including at least three wales of the same course and floating said elastic between said terminal wales and from a course in which it is wrapped to a subsequent course in which it is again wrapped, and

varying the wales in which said elastic yarn is wrapped.

5. A method of knitting including the wrapping of an elastic yarn on non-adjacent wales of the same course of a knitted weft fabric and in a plurality of courses and varying the wales and courses wherein said yarn is wrapped in accordance with a predetermined pattern thereby to produce patterned, embossed effects at the face of the fabric for ornamental purposes.

6. A method of knitting including the wrapping of an elastic yarn on the terminal wales of a panel including three or more wales and on the wale or wales intermediate said terminal wales, wrapping another yarn, said elastic yarn being wrapped under sufficient tension to draw the terminal wales together thereby to project said intermediate wrapped wales outwardly from the face of the fabric.

7. A method of knitting including the wrapping of an elastic yarn in a plurality of courses in a knitted fabric and on the terminal wales of a panel including three or more wales, and simultaneously wrapping a contrasting non-elastic yarn on said wales intermediate said terminal wales, said elastic yarn being wrapped under tension so that floats thereof will draw the said terminal wales together thereby projecting said intermediate wales wrapped with a contrasting non-elastic yarn outwardly from the normal face of the fabric.

8. A weft knitted fabric having therein panels wrapped with an elastic yarn, said elastic yarn being wrapped under tension in non-adjacent wales in the same course and serving to draw the fabric together thereby to produce an embossed or rib-like effect.

9. A weft knitted fabric having therein panels wrapped with an elastic yarn, said elastic yarn being wrapped under tension in non-adjacent wales of the same course and serving to draw terminal wales of a panel together thereby to produce an embossed or rib-like effect.

10. A weft knitted fabric having therein panels wrapped with an elastic yarn, said elastic yarn being wrapped under tension and on terminal wales only of a plurality of wales three or more in number of the same course, said elastic yarn floating between terminal stitches in a course in which it is knitted and from course to course, said float serving to draw the terminal wales of panels together thereby to produce an embossed or rib-like effect.

11. A weft knitted fabric having therein predetermined areas in which an elastic yarn has been wrapped in non-adjacent wales of the same course under tension so that the fabric will be drawn together by floats extending between wrapped wales and other floats extending from one course in which the elastic yarn is wrapped to the next course wherein it is again wrapped.

12. A knitted fabric having therein an area wrapped with an elastic yarn, said elastic yarn being wrapped on terminal wales at either side of the area, and intermediate wales in the said area having wrapped thereon a non-elastic yarn.

13. A knitted fabric having therein an area wrapped with an elastic yarn, said elastic yarn being wrapped on terminal wales at either side of the area and intermediate wales in the said area having wrapped thereon a non-elastic yarn, said non-elastic yarn contrasting with the yarn from which the fabric is knitted.

14. A knitted fabric having therein patterned areas of predetermined shape and extent wherein an elastic yarn is wrapped in wales determining the lateral extent of said areas and under tension sufficient to draw those wales together, wales intermediate those first mentioned having wrapped thereon a non-elastic yarn of contrasting color to the yarn from which the fabric is knitted.

15. A method of ornamenting knitted fabrics including the steps of wrapping an elastic yarn in terminal wales of a panel and under tension to draw said terminal wales together and wrapping a contrasting, non-elastic yarn on intervening wales of said panel.

16. A weft knitted fabric having therein areas wrapped with an elastic yarn, said areas including non-adjacent stitches in the same course which are wrapped with said elastic yarn, the said areas also including a plurality of courses in which the elastic yarn is wrapped and in which it is wrapped over varying non-adjacent needles from course to course.

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