This invention relates to warp knitted or tricot fabrics and methods of making them, and is concerned with the production of a fabric structure which can subsequently be ripped or split at predetermined wales into narrow strips or bands, such as tapes, ribbons, bandages and the like.

By the construction of the present invention, a single machine may be used to produce a broad fabric which can subsequently be split into narrow bands of predetermined width and of unsplittable non-raveling characteristics. In this manner an economical manufacturing system for such narrow fabrics is provided.

In accordance with the present invention, a warp knitting machine having two or more guide bars is so threaded up as to produce a fabric of two or more warps which are interlaced to prevent splitting in predetermined areas but a splittable or separable wale is provided between adjacent areas of such fabric, so that after production of the broad width of fabric, it may be divided along the splittable wales into bands of predetermined narrow width corresponding to the width of the areas in which the two or more warp threads are interlocked. Various ways of accomplishing this purpose are illustrated in the accompanying drawings in which:

Figures 1 to 6 illustrate in conventional diagrammatic fashion the basic patterns of some of the single warps which can be combined to interlock the stitches in predetermined areas of the fabric while leaving splittable warps separating such areas, and

Figures 9 to 16 inclusive illustrate some of the combinations of warp patterns which can be used to accomplish the purposes of the invention.

Figure 1 shows a chain stitch in which a thread is provided for every needle. This stitch will not produce a complete fabric by itself, but can be combined as an interlocking system with another form of warp to build a multiple warp interlocked fabric. Figure 2 shows a chain stitch similar to Figure 1, in which, however, a thread is provided only for every other needle.

Figure 3 shows a stitch pattern of 1-0, 1-2, sometimes referred to as “under 1 over 1,” and in which a thread is provided for every needle.

Figure 4 illustrates a stitch pattern of 1-0, 2-3 (under 2 over 1) using a thread in every other guide.

Figures 8 to 7 show modifications of the stitch pattern of Figure 4.

While only sufficient of the needles or guides are threaded in the patterns of Figures 4 to 7 to assure the formation of connected adjacent wales, the effect may be varied by inserting additional threads, and if desired every guide may be provided with a thread as illustrated in Figure 5, which shows the pattern of Figure 4, except that a thread is provided for every guide or needle.

Figures 9 and 9a show a simple combination involving the use of the pattern of Figure 4 as the back warp and the use of a thread in every intervening guide of the other guide bar to interlock the threads of the back warp and form a fabric which is splittable at every other wale indicated at s.

Figure 9a shows in much enlarged form the appearance of the interlocked threads. Each stitch in the separable or splittable wale s consists of a loop extending from the preceding course and a loop extending therethrough from the strip of the fabric on the side opposite to that of the first loop. It will be seen that the splittable wale consists of a series of loops, alternate ones of which extend from the strips of fabric on the opposite sides of the splittable wale and each loop extends through the eye of each preceding loop in the wale. By applying tension across the splittable wale at the end of the fabric shown at the top of the figures in the drawing, each loop of the splittable wale s pulls through the eye of each preceding loop in succession, and the fabric is split into strips whose adjacent edges are composed of the free loops which are non-raveling.

If desired, the last course of the fabric from which splitting must be started may be provided with a transverse thread passed through the last loop in each wale. This prevents splitting of the fabric even where the structure is open and loose.

In order to split the fabric so constructed at any particular wale, it is only necessary to break this thread at the edge of the fabric. In any event, splitting is easily performed, and it is unnecessary to pull a complete thread through the whole length of a wale in order to divide the fabric. The chain stitch prevents any running or raveling of the fabric beyond the splittable wale, while this embodiment illustrates a single chain wale between adjacent splittable wales, and splitting at every other wale produces a fabric strip composed of a single wale, variations in the number of wales between adjacent splittable wales can be made. For example, in Figure 10 the splittable wales are separated by three wales comprising the interlocked front and back wales. Of course, any larger number of interlocked wales may be selected to give the desired width of narrow fabric.

Figure 11 illustrates a modification in which the chain stitch of Figure 1 is combined with the front warp with the stitch pattern of Figure 3 as the back warp, but at predetermined intervals a chain stitch is omitted from the front warp to provide a splittable wale in the back warp.

Figure 12 and 12a show the combination of the stitch pattern of Figure 3 in both the front warps but the motions of the guide bars are controlled to interlock the two warps instead of superposing them. In order to form a splittable wale, threads are omitted from two adjacent
guides of the back guide bar at the predetermined intervals.

Figure 13 shows the combination of the stitch pattern of Figure 5 as the back warp with a chain stitch as the front warp, a thread being omitted from one of the guides of the front warp guide bar at intervals to form a splittable wale.

Figure 14 shows a combination of the stitch pattern of Figure 3 as the front warp, with a variation of the stitch pattern of Figure 5, in which all guides are provided with threads forming the back warp. However, where a splittable wale is desired, threads are omitted from two adjacent thread guides of the back guide bar and from two adjacent thread guides of the front guide bar. Figure 15 shows the combination of the stitch pattern of Figure 4 as the front warp with the stitch pattern of Figure 6 (except that each guide is provided with a thread) as the back warp. Where the splittable wale is desired, threads are omitted from three adjacent guides of the front guide bar and from three adjacent guides of the back guide bar.

Figure 16 illustrates the combination of the stitch pattern of Figure 7 as the back warp with the chain stitch of Figure 1 as the front warp. As shown, the wales between the splittable wales are formed primarily of the chain stitches of the front warp and the wales of the splittable wales are formed exclusively of the back warp. However, where the narrow fabric widths are desired to be greater than the span between adjacent wales of the back warp, a chain stitch wale may be superimposed to interlock the intervening wales of the back warp.

From the description hereinafore, it is apparent that a broad fabric knitted upon a single wide machine can be split into narrow fabrics of any desired predetermined width and consisting of various patterns of two or more wales interlocked throughout the width of the narrow fabric to prevent rumpling or raveling. The fabric is sufficiently resistant to splitting even at the splittable wales to permit such after treatments as bleaching, dyeing, scouring and the like in the full width piece. After completion of the fabric, when it is ready to be distributed as thin widths, it may be split. The yarns of which the two or more wales in the fabric are made, may be of any material whatsoever, and may be of either spun or continuous filament character. Preferably, the yarns which are united to form the splittable wales are of a continuous filament composition, especially when the stitch is tight, since much less force is required and there is less danger of injury to the fabric when splitting a wale made up of smooth yarns.

It is to be understood that changes and variations may be made in the invention without departing from the spirit and scope thereof as set forth in the appended claims.

I claim:

1. The method of producing warp knit fabrics comprising the steps of simultaneously knitting together two sets of warp threads to interlock them in each course into a permanently stable fabric structure in predetermined longitudinal areas of the fabric and separably joining adjacent areas during the knitting thereof by forming as the sole interconnection between said adjacent areas a wale consisting of a series of loops extending laterally and alternately from the adjacent interlocked areas and formed by passing each loop through the eye of the preceding loop from the other adjacent area, thereby forming a splittable wale between the adjacent interlocked areas.

2. The method of producing warp knit fabrics comprising the steps of simultaneously knitting together two sets of warp threads to interlock them in each course into a permanently stable fabric structure in predetermined longitudinal areas of the fabric and separably joining adjacent areas during the knitting thereof by forming as the sole interconnection between said adjacent areas a wale consisting of a series of loops extending laterally and alternately from the adjacent interlocked areas and formed by passing each loop through the eye of the preceding loop from the other adjacent area, thereby forming a splittable wale between the adjacent interlocked areas, processing the unitary fabric and subsequently dividing it into narrower strips along at least one splittable wale.

3. A warp knit fabric comprising a plurality of longitudinal areas having at least two waps knitted into permanently interlocked relationship in each course of the area and a splittable wale separably connecting the adjacent interlocked areas said splittable wale being the sole connection between the adjacent interlocked areas.

4. A warp knit fabric comprising a plurality of longitudinal areas having at least two waps knitted into permanently interlocked relationship in each course of the area and a splittable wale formed only of the threads of one warp separately connecting the adjacent interlocked areas, said splittable wale being the sole connection between the adjacent interlocked areas.

5. A warp knit fabric comprising a plurality of longitudinal areas having at least two waps knitted into permanently interlocked relationship in each course of the area and a splittable wale forming only of the threads of one warp separately connecting the adjacent interlocked areas, said splittable wale extending laterally and alternately from the adjacent interlocked areas, each loop extending through the eye of the preceding loop from the other adjacent area.

THOMAS H. JOHNSON.

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