

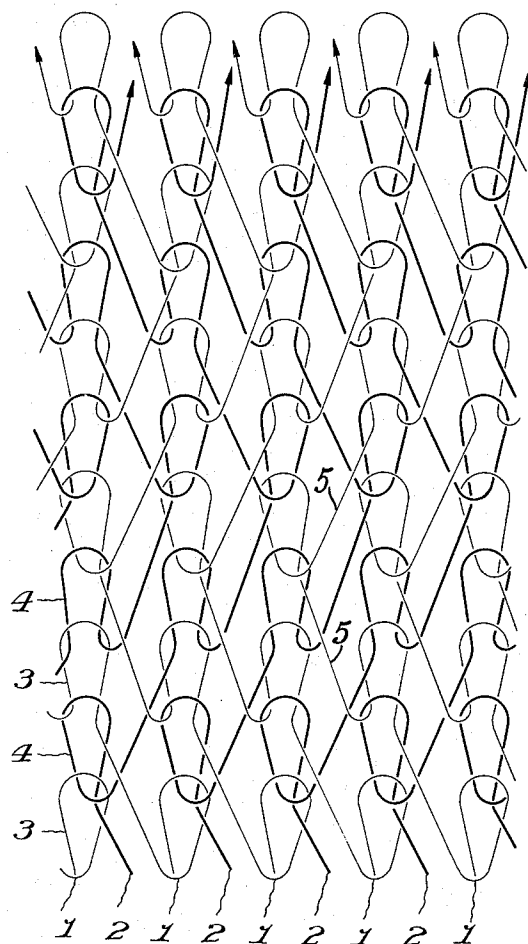
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WARP FABRIC WITH ELASTIC YARN KNITTED THEREINTO

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1 Claim. (Cl. 66—195)

This invention relates to a new warp fabric completely freed from various disadvantages inherent in the conventional rubber-inserted warp fabrics.

It is an essential object of this invention to provide a new and improved warp fabric with interknitted rubber threads.

Specifically, it is an object of this invention to prevent the rubber threads from getting detached from cut edges or sewn parts thereof, and also to enable the fabric to stretch and/or contract freely and elastically in any direction in conformance with the movement of the human body or other object to which it is applied.

The aforesaid objects and advantages have been attained by knitting the warp fabric in such a manner that looping courses of textile yarn and looping courses of elastic yarn are alternately aligned whereas each wale consists of alternately arranged stitch loops of textile and elastic yarns. The textile yarn useful for the purposes of the present invention is preferably a yarn which has resilience, i.e., stretchable and contractable property, or a high degree of bulkiness is effective in bettering the stretchable and contractable property of the fabric, e.g., bulky nylon yarn comprising two 50-denier yarn strands twisted together. With regard to the elastic yarn, a covered rubber yarn is preferable, e.g., that known in the trade as No. 90 round (section) rubber filament, covered with 50-denier nylon yarn adapted to restrict the stretch of the rubber filament to about 500 percent.

The single figure of the drawing shows the construction of a fabric according to the invention.

The warp fabric of this invention may be knitted by warp looms like a Raschel machine, operated in such a manner as illustrated below:

Textile yarn 1 is passed through all the needle eyes of the front thread guide, and the elastic yarn 2 is passed through all the needle eyes of the back thread guide. The machine is operated in such a manner that when the front guide forms a needle loop 3 with textile yarn 1, the back guide stays idle without forming a loop, and when the back guide makes a needle loop 4 with elastic yarn 2 the front guide remains idle, not forming any loops in the course, and knitting is accomplished by the repetition of these operational steps.

The course indicated as 5 in the attached chart shows the textile yarn in suspension wherein it makes no loops. Accordingly, each knitting wale is formed by the alternate arrangement of needle loops of textile yarn 1 and elastic yarn 2. The elastic yarn is knitted in alternate courses and floated past the intervening courses. For knitting this new warp fabric, several textile yarn guides may be employed. Instead of rubber yarn, any chemical fiber with elasticity similar to rubber may be used to obtain the desired result.

Some illustrative examples of pattern chain arrangements which are most stable for obtaining the above-described warp fabric are given hereafter. From the

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order of the number of the pattern chain, the shift direction and shift distance of the front guide and the back guide and the differentiation between a cotton lap (open stitch) and a silk lap (closed stitch) of a loop can be deciphered. Generally, the method of indicating the composition of a warp knit fabric is by means of the pattern chain arrangement number. This number designates the height of the pattern chain link and the height of the pattern chain link corresponds to the gauge of the machine used, there being ordinarily with zero as datum, successively from 1 to about 25. Thus, an 18 gauge per inch machine is one which has 18 needles embedded in the space of one inch. The spacing from one needle to the adjacent or $\frac{1}{18}$ inch becomes the 1 of the pattern chain number. Accordingly, a shift of pattern chain number 1 represents the shifting by one stitch. "23" means the formation of a loop as the guide shifts from needle 2 to needle 3. "22," "33" means that shifting does not take place at the points of 2 or 3, i.e., the guide is idle and does not make a loop. In practice, "21" may be arranged in reverse order as "12" and may be either a silk lap or a cotton lap. (Prof. Ing. A. Weigkrecht, "Bindungslehre der Kettenwitkerei," Verlag Melland Textilberichte, Heidelberg.)

Example 1

Front guide.—Textile yarn is passed through all the guide needle eyes, and the pattern chain is arranged in the following manner 21, 22, 23, 33, 34, 33, 23, 22.

Back guide.—Elastic yarn is passed through all the guide needle eyes, and the pattern chain is arranged in the following manner 33, 34, 33, 23, 22, 21, 22, 23.

Example 2

Front guide.—Textile yarn is passed through all the guide needle eyes and the pattern chain is arranged in the following manner 21, 22, 23, 22.

Back guide.—Elastic yarn is passed through all the guide needle eyes and the pattern chain is arranged in the following manner 22, 21, 22, 23.

Since the conventional types of rubber-inserted warp fabric have rubber threads inserted only in the direction of the wales, they can stretch and contract only in the direction of the wales. If the conventional warp fabrics are used for such articles as panties and corsets, they cause a restrictive and uncomfortable force on the human body. Without such disadvantages, the fabric of this invention, with loops knitted with elastic yarn, is freed from the defects of fraying and/or slip-in at the cut edges and sewn parts thereof. Moreover, the method of knitting of this invention provides a unique advantage in that the textile yarn will not prevent the elastic yarn from expanding in all directions.

If the fabric is stretched in the direction of wale, the elastic yarn expands in the same direction, while if the fabric is pulled in the direction of course, the elastic yarn will expand in the direction of course without any restriction. Consequently, this warp fabric has not only the advantage of producing unrestrictive wearing comfort and flexibility as the human body moves in all directions, but also provides economy of raw materials for the manufacture of various articles of apparel as a result of its greater stretchability. The ability of expanding in all directions not only makes this fabric suitable for the

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manufacture of clothing but also enables it to be used profitably in upholstering purposes such as bedding, hammock and many other similar applications.

While I have described particular embodiments of my invention, it will, of course, be understood that I do not wish my invention to be limited thereto, since many modifications may be made and I, therefore, contemplate by the appended claim to cover all such modifications as fall within the true spirit and scope of my invention.

What I claim is:

A warp knit fabric with elastic yarn so knitted thereinto that each of the resulting wales is composed of needle loops of textile yarn alternating with needle loops

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of the said elastic yarn, said two kinds of needle loops being aligned walewise in alternate arrangement, and the resulting courses are composed alternately of needle loops of textile yarn only and needle loops of elastic yarn only, the elastic yarn extending past and forming no loops in the courses wherein the textile yarn forms needle loops, and the textile yarn extending past and forming no loops in the courses wherein the elastic yarn forms needle loops.

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