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METHODS FOR OBTAINING THE EFFECT OF LONGITUDINAL STRIPES IN FABRIC

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Abstract: *The fabrics with longitudinal stripes have become more common both by their structure and diversity of appearance, and also the products made of them, this being the reason they occupy an important place in fabrics production. Associating links with equal or different average float produces a profound change in the internal fabric structure, giving it a permanent and stable character in stripe appearance. The stripe effect obtained by weaving technology provides stripping stability to the stripes, both in the humid-thermal finishing processes and in the current maintenance, in the wearing process (repeated washings).*
Also due to their structure, striped fabrics obtained by weaving technology can not be replaced by other fabrics whose stripes are obtained by other methods and technologies.
This is the reason why, in most cases, striped fabrics obtained by weaving technology are preferred, and not striped fabrics obtained by other processes, such as printing. From the point of view of the structure, the particularities of striped fabrics obtained by the weaving technology, consist in the way the basic parameters - the connection, the density and the fineness of the yarns, as well as the auxiliary parameters - the curling degree, the dimensional change of the threads by integrating it into the fabric, influence their internal structure.
The relationship of the longitudinal strip line depends on the fundamental diagonal link ratio, if it is the even or odd number, and the number of ***(Xi)*** *lines in the stripe with weft and warp effect.*

Key words: *texture ratio , warp, weft, yarns, weave, fineness of yarns.*

1. INTRODUCTION

The stripe effect obtained by weaving technology provides stripping stability to the stripes, both in the humid-thermal finishing processes and in the current maintenance, in the wearing process (repeated washings). The fabrics with longitudinal stripes have become more common both by their structure and diversity of appearance, and also the products made of them, this being the reason they occupy an important place in fabrics production. Associating textures with equal or different average float produces a profound change in the internal fabric structure, giving it a permanent and stable character in stripe appearance. [1]

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view of the structure, the particularities of striped fabrics obtained by the weaving technology, consist in the way the basic parameters - the texture, the density and the fineness of the yarns, as well as the auxiliary parameters - the curling degree, the dimensional change of the threads by integrating it into the fabric, influence their internal structure.

Only methods of obtaining longitudinally striped fabrics from single-woven fabrics, consisting of a warp yarn and a weft yarn system, will be disclosed. [2]

2. GENERAL INFORMATION

2.1 Longitudinal stripes obtained with ground textures

One of the characteristics of the ground textures is that within the texture ratio all yarns contain a single pair of texture segments, one of which has unitary value. [3]

The effect of stripes can be obtained only with ground texture with the opposite effect of the two yarn systems, warp and weft within the texture ratio.

The degree of issuance of the two yarn systems on the surface of the fabric must be done so that one side of the fabric must be the negative of the other.

The cloth is the only one that gives the fabric identical sides and can not be used alone to obtain the striped effect.

The other ground diagonal textures in which the texture ratio of $R \geq 3$ or regular atlas to which the ratio of the texture is $R \geq 5$, the difference between the front and back of the fabric is obviously different. The contrast between the two sides of the fabric increases as the texture ratio increases, due to the different issuance degree of the effect of the two yarn systems on the two sides of the fabric.

For any ground texture, due to the fact that the ratio in warp Ru is equal to the weft ratio Rb, ie Ru = Rb = R, the number of binding points within a texture ratio is R2. In the case of a fabric with a ground texture with ratio R and a dominant weft, the number of warp binding points will be R, and those with the weft effect R2 - R or R (R - 1). [4]

The difference between the front and the back of the fabric regarding the effects of the system is:

$$c = \frac{R^2 - R}{R} = R - 1 \quad \textbf{(1)}$$

where:

- c is a coefficient that shows how many times the number of binding points of a system is greater than the other system on the same side of the fabric.

For the cloth where R = 2, c = 1, the number of binding points on both sides of the fabric is equal for the two yarn systems, the fabric has identical fronts.

For the texture with R = 3, c = 2, the number of binding points of a system (weft) is twice as big as the other (warp). [5]

The ground texture with an $R \geq 3$ ratio shows differences between the two sides of the fabric, front and back, by the issuance of a dominant system.

The higher the ratio of the texture R, the more the number of binding points in a system increases to the detriment of the number of binding points of the opposite system. The contrast between the two sides of the fabric is more and more obvious due to the system of yarns with dominant points. The stripes effect with ground texture is based precisely on the number of points of a yarn system, dominant on one side or another of the fabric.

The analysis of the two sides highlights the fact that they represent the negative and the positive effect of the dominant system.

Obtaining the effect of longitudinal stripes on fabrics with ground textures is based precisely on the contrast between the dominating system on one side and on the other of the fabric

2.2. Textures with longitudinal stripes obtained from the ground diagonal texture

The ground diagonal texture is characterized by the size of the Ru = Rb = R≥3 ratio and the displacement of the binding points S ± 1. [6]

Due to the size of the R-ratio, variants with a great diversity of aspect can be obtained, whereby if the shift sign ± of displacement is added to obtain the change in the direction of the diagonal lines on which the bonding points are located, then it can be stated that the diagonal textures is situated first, with regard to the possibilities of diversifying the aspect of fabrics. [7]

Due to the difference between the dominant yarn system on the two sides of the fabric, **the negative bias method is used to obtain the stripe effect**.

The negative bias method contains the following sequences:

- **Establish the ratio R of ground diagonal texture.** The ratio of the texture is established so that the positional stability of the yarns ensures a good behavior of the fabric in the wearing process. To do this, big flotation will be avoided. They depend on the fineness and density of the yarns. Flotation can grow together with the density until there is no possibility to easily snag the fabric.
- **Establish the number of stripes .** It is recommended that the number of yarns in a strip be equal to the ratio of R or a multiple of R:

$$Nu=X\text{-}R, \qquad X \in N^* \qquad \textbf{(2)}$$

The yarns of a stripe have to be put end to end in a whole number of blade of shears. It follows that the boundary yarns between two consecutive strips with contrasting textures are separated by blade.

The number of stripe yarns can be equal or different, obtaining fabrics with equal or non-uniform stripes. **Negative bias can also be done by changing the direction of the diagonal lines or maintaining it.** [8]

Bindings with equal longitudinal stripes

To obtain e**qual longitudinal stripes by the negative bias method,** it is necessary to establish: **the ratio R of ground diagonal texture, the number of yarns in a strip and the direction of the diagonal lines after the negative bias.** [9]

The R ratio of the ground diagonal texture is chosen so that the texture segments (flotation) have values that eliminate or improve the possibility of snagging in the wearing process.

The higher the density of the yarns, the higher the R ratio texture can be adopted, which implicitly has larger flotation of the yarns.

The number of stripes is chosen depending on the width of the stripes, the yarn density and the ratio R of the ground texture. [10]

Passing in the reed will be done so that boundary yarns of two consecutive stripes that bind in opposition are separated by a blade.

a. Textures with equal longitudinal stripes with changing the direction of the diagonal line. In figure 1 is represented the programming scheme for an equal longitudinal stripe fabric obtained by negating a ground diagonal texture with an odd ratio

$D\frac{1}{4}$, *R=5* with a number of yarns on stripes *Nu = 2R = 2 • 5 = 10 yarns.*

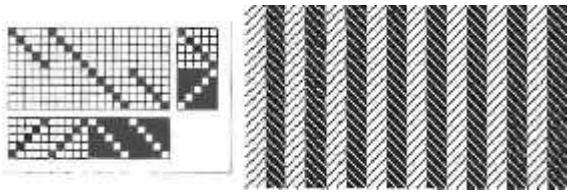

***Fig. 1**. Representing the programming scheme that includes: texture drawing, drawing in the leaves, and the drawing file*

The diagonal lines on consecutive stripe with effect in opposition, weft-warp (B-U), are opposite to right-left (Z-S).

The stripe effect is well highlighted and is maintained over time by the fact that the yarns adjacent to the consecutive stripes bind in opposition so that their positional stability is assured. In figure 1 is shown the programming scheme which contains: the texture drawing, the drawing in the leaves and the drawing file (the card). Each diagram is accompanied by a drawing in which the stripes are shown by simulation.

The texture ratio of the longitudinal strip line with the change of diagonal line is:

$$Ru_1=\Sigma Nu_i \quad where\ Nu_i=R\cdot\Sigma\ X_i - Rbl=R \qquad \textbf{(3)}$$

where:

Ru_1, Rb_1 is the ratio in warp and weft respectively of the texture with longitudinal stripes;

Nu_i – number of yarns in a pair of consecutive stripes with weft-warp effect (B-U);

Xi – number of ratio from the ground texture contained in a pair of consecutive stripes with weft and warp effect.

Example of calculus:

- for texture in figure 1

Number of yarns from the pair of stripes: $Nu_i=R\cdot\Sigma\ X_i=5(2+2)=20yarns$

Texture ratio with longitudinal stripes: $Ru_1 = Nu_i = 20\ yarns$

$Rb_1 = R = 5\ yarns$

α. **Textures with equal longitudinal stripes while maintaining the sense of the line diagonally.**

The negative bias in the consecutive stripes are made in such a way that bordering yarns of consecutive stripes with the opposite effect to bind in opposition. This makes the ratio of the texture with longitudinal stripes to be dependent on the ratio of the ground texture and the number of stripe yarns.

There are two cases:

Case 1. Ground diagonal texture with even ratio

In figure 2 is represented the programming scheme for a fabric with equal longitudinal stripes longitudinal stripes equal to maintaining the diagonal line, obtained by negating a ground diagonal texture $D\ \frac{1}{5}$, *R=6, Nu=2R=2-6=12 yarns.*

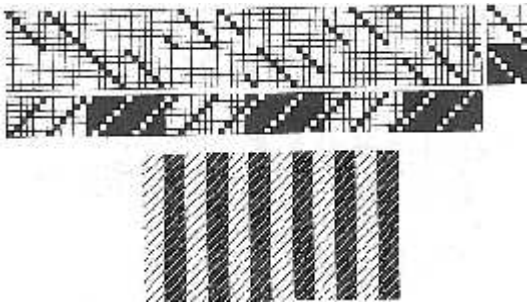

Fig. 2. *Programming scheme for a fabric with equal longitudinal stripes while maintaining the direction of the diagonal line*

The ratio of the texture with longitudinal stripes for the case where the ratio of the ground texture is even is calculated by the following algorithm:

$$Ru_1 = \frac{R}{2} \sum Nu_1 \text{ where } Nu_i = R \cdot \Sigma X_i - Rb_1 = R \quad \textbf{(4)}$$

Example of calculus:

- for texture in figure 2

Number of yarns in the pairs of stripes: $Nu_1 = R \cdot \Sigma X_i = 6(2+2) = 24$ *yarns*

Texture ratio of longitudinal stripes :

$$Ru_1 = \frac{R}{2} Nu_1 = \frac{6}{2} 24 = 72 \text{ yarns}$$

$Rb_1 = R = 5$ *yarns*

Case 2. Ground diagonal texture with odd ratio

In figure 3 is presented the programming scheme for a fabric with equal longitudinal stripes, obtained by negating a texture $D\ \frac{1}{4}$, R=5, Nu=2R=2-5=10 yarns, while maintaining the sense of the diagonal line.

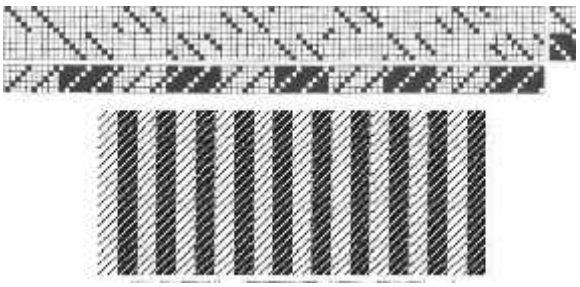

Fig.3 *Programming scheme for a fabric with equal longitudinal stripes, obtained by negating a texture*

The ratio of the texture with longitudinal stripes for the case where the ratio of the ground texture is odd is calculated like this:

$Ru_1=R\cdot Nu_i$ *where* $Nu_i=R\cdot\Sigma X_i$ $-Rb_1=R$ **(5)**

Example of calculus:
- for texture in figure 3:

Number of yarns in the pair of stripes: $Nu_i=R\cdot\Sigma X_i=5(2+2)=20$ *yarns*
Texture ratio with longitudinal stripes: $Ru_1=R\cdot Nu_i=5\cdot 20=100$ *yarns*
$Rb_1 = R = 5$ *yarns*

3.CONCLUSIONS

The texture ratio with longitudinal stripe line depends on the ground diagonal texture, if it is the even or odd number of ratio **(Xi)** in the stripe line with weft and warp effect.

The number of pairs of warp-weft stripes included in a texture ratio with equal longitudinal stripes, in the case of maintaining the diagonal line direction, is R/2 for even ratio and R ratio for the odd ratio of the ground texture. The reason is that, when negating the bordering yarns of consecutive stripes with the opposite effect must bind in opposition. This results in the ratio with longitudinal stripes to be terminated after R/2 pairs of stripes with weft-warp effect when the ground texture has an odd ratio, and after R striped pairs with a weft-warp effect when the fundamental bond has an odd ratio. Laying of yarns in the case of fabrics with longitudinal stripes obtained by negating a ground texture is done in two groups of loom blades each having an equal number of blades with R. It is recommended that the texture drawing of the longitudinal stripe obtained by the method of negating a ground texture begins with the weft effect stripe. The reasoning is that if the laying of yarns in the loom starts as normal with the first warp yarn in loom blade 1, etc., then the laying criterion will be applied implicitly according to the buckling yarns frequency in the joint formation for a weft ratio.

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