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Effective Method for Producing Inlaid Knitted Fabrics

G Kh. Gulyaeva, M.M. Mukimov

PhD, docent, Tashkent Institute of Textile and Light Industry, Tashkent, Uzbekistan
DSc, professor, Tashkent Institute of Textile and Light Industry, Tashkent, Uzbekistan

ABSTRACT: The article discusses the methods of obtaining laid knitwear, analyzes the shortcomings of the existing methods of production and presents the results on the development of a rational structure and method for obtaining laid knit fabric. The developed method for producing laid knit fabric on the basis of rib stitch on a double bed flat knitting machine differs in that the inlay thread located along the loop row, at least through eleven looped stitches, is knitted into loops in three loop courses, which makes it possible to increase the strength of fastening of the inlay thread in structure of knitted fabric.

KEYWORDS: laid knitwear, flat knitting machine, double bed, fastening of the inlay thread .

I. INTRODUCTION

The scope of application of knitwear is expanding, competition is growing, the technological capabilities of knitting machines are improving. All these factors create the need to develop new structures and effective ways to obtain knitted fabrics with desired properties. The basic requirement for knitwear in any application is dimensional stability. As you know, jersey has a high degree of extensibility, which negatively affects its dimensional stability. The most effective way to reduce the stretchability of the knitted fabric across the width is a method where the reduction of the stretchability is achieved by introducing an inlay thread into the knitted fabric structure along the stitch row. Moreover, the introduction of an inlay thread of low elongation into the knitted fabric structure makes it possible to improve its dimensional stability by reducing the extensibility, and the introduction of an elastic inlay thread - due to an increase in reversible deformation.

II. LITERATURE REVIEW

In addition, the inlay thread affects other parameters and properties of knitwear [1-5], such as material consumption, compression properties, strength, etc.

Known methods for producing laid knitwear [6-12].

The disadvantage of these methods for producing laid knitted fabrics is the weak fixation of the inlay thread in the ground of the knitted fabric, which worsens its quality and complexity of implementation, which negatively affects the machine performance.

An urgent issue is the development of an effective method for the production of laid knitted fabrics with a strong fastening of the inlay thread in the ground of the knitwear and improving its quality.

III. METHOD USED

By researching the technological capabilities of a 14-class PROTTI (Italy) type flat knitting machine and the possibility of obtaining laid knitted fabrics on it on the basis of knitted stitches, a method has been developed for producing laid knitted fabrics based on rib stitch with a strong fastening of the inlay thread [13]. The development of experimental samples has shown that the method is simple to implement.

The problem is solved by the fact that from the inlay thread located along the stitch row, at least through eleven loops courses, are knitted in three loop courses with base thread.

In figure 1 shows the structure (a) of laid knitted fabrics and a method for its production (b).

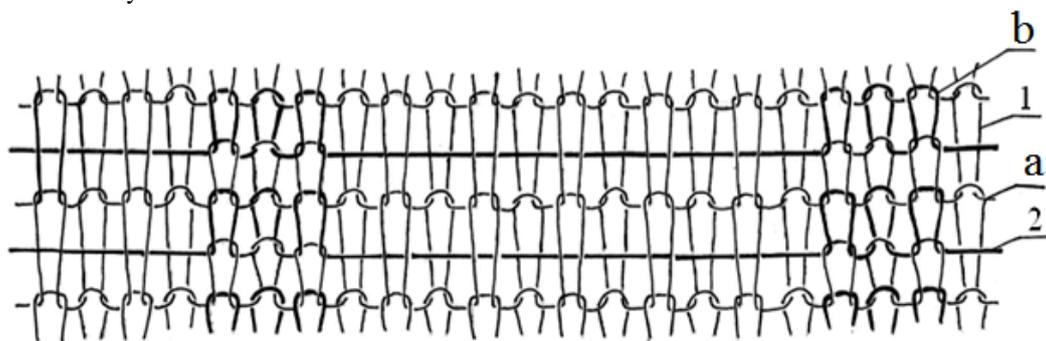
As can be seen from Fig. 1, and the developed knitted fabric consists of ground loops 1 formed from ground thread a, and inlay thread b located along the stitch row between the front and back loops of the rib 1 + 1 stitch. As can be seen from on Fig. 1 the inlay thread b is placed along the stitch row, then at least through eleven stitches from the inlay

thread loops 2 in three stitched stitches are forming. As a result, the section of the inlay thread located along the stitch row reduces the extensibility of the knitted fabric along the width, and the presence of elongated loops in the structure of the knitted fabric reduces its extensibility along the length. The formation of loops from the inlay thread on some needles increases the strength of the fastening of the inlay thread in the ground, such inlay thread is very difficult to pull out of knitwear.

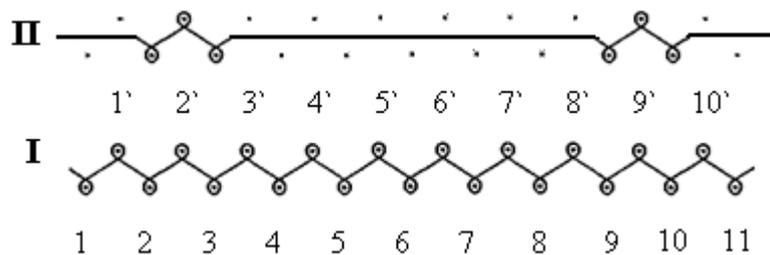
The introduction of inlay thread into the structure of rib jersey with its strong fixing in the ground increases form stability and such jersey has high heat-shielding properties.

Laid knitted fabrics produced according to the recommended method on a flat knitting machine of the 14th class of the PROTTI type is obtained as follows (Fig. 1, b).

When making an laid rib stitch is not difficult, since in this case there are two knitting beds and two rows of loops, between which the inlay thread is laid.



a



b

Fig. 1 The structure and graphic record of the laid knitted fabrics with a strong fastening of the inlay thread in the ground of the knitted fabric

In the production of rib stitch on round machines, the process of giving the inlay thread is particularly simple: to do this, it is enough to install the yarn feeder with the inlay thread at the back or in front of the main yarn feeder.

Thus, the laid jersey contains additional threads in the ground that are not knitted into loops; these additional threads are tied between the loop legs and broaches. When making knitted laid stitch, some systems of threads are laid on the needles and form base stitch loops, while others are tied into the ground without laying them on the needles.

When knitting double laid knitted fabrics on flat knitting machines, the position of the yarn guide with the inlay thread relative to the ground yarn guide should be kept unchanged with the right and left carriage moving. For this, the thread guides of the ground and inlay thread guides of flat knitting machines, as in the production of plated knitted fabrics, have notches of different sizes.

When the knitting system of the flat knitting machine moves from left to right, a ground thread is laid on the needles of the front and rear needle bed and one rib stitch row is knitted (Fig. 2). When the knitting system of the machine moves from right to left, with the help of an additional thread guide, the inlay thread is inserted into the gap between the needle bars and the inlay thread section on the needles 9, 10, 3, 2 of the front and on the needles 9' and 2' of the rear needle beds.



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To do this, when the second row is formed, the needles 3, 10, 3, 2 of the front and needles 9 'and 2' of the back needle bar are raised fully, the inlay thread is laid on them and the old loops formed from the ground are dropped onto the new loops formed from the inlay thread threads.

When the knitting system moves from left to right, all the needles of the front and backneedle bars are raised to the confinement level for laying the ground thread, from which the loop is formed.

IV.RESULT AND DISCUSSION

In the proposed method for the production of laid knitted fabrics for the formation of one knitted repeat, two moves of the loop-forming system are required on a flat knitting machine.

The method is simple in implementation, does not require any changes in the design of the machine. To produce this knitted fabric, it is enough to install an additional yarn guide on the flat knitting machine for laying the inlay thread.

Due to the simplicity of the proposed method, the productivity of the machine practically does not decrease, the technological capabilities of the flat-knit machine due to the production of laid knitted stitch are expanded.

Comparison of the proposed method for the production of laid knitted fabrics with the known strength of fastening the inlay yarn in the ground of knitwear showed that the strength of fastening the inlay yarn in the ground of knitwear by the proposed method increases 5-7 times compared to the known methods of production of laid knitted fabrics.

V. SUMMARY

The proposed method allows to obtain laid knitted stitch with a strong fastening of the inlay thread in the ground of the knitted fabric, which significantly expands the scope of its application;

- the presence of a inlay thread in the structure of knitted fabrics allows to obtain knitted fabrics with high dimensional stability by reducing the elasticity of knitted fabrics in width;
- using colored threads or threads of high linear density as inlay thread, it allows to form a patterned effect on the fabric;
- the use of Lycra-type threads as inlay yarn allows to obtain laid knitted fabrics with a high proportion of reversible deformation, which makes the knitwear more comfortable and of high quality;
- developed knitwear can be successfully used for the manufacture of products requiring increased dimensional stability.

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