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EUROPEAN PATENT APPLICATION

⑰ Application number: **82108571.9**

⑤① Int. Cl.³: **D 03 D 11/02**
D 03 D 3/02

⑳ Date of filing: **17.09.82**

③① Priority: **01.10.81 IT 4165681**

④③ Date of publication of application:
13.04.83 Bulletin 83/15

⑧④ Designated Contracting States:
AT BE CH DE FR GB LI LU NL SE

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⑤④ **Method for weaving tubular Jacquard fabrics on looms.**

⑤⑦ A weaving method for producing tubular jacquard fabric, by means of looms, in which wording and/or patterns appear, in positive, on the outer faces of both sides of the tubular fabric. According to the invention, the warp threads (1,3,5,7,9) having odd positional orders and the warp threads (2,4,6,8,10) having even positional orders are interwoven with the weft threads (13,14) of a first and a second order of insertion respectively, inserted alternately to each other, making the respective weft threads appear on the outer faces of the two sides of the tubular fabric, in positions defining wording and/or patterns according to a pre-established jacquard weaving programme.

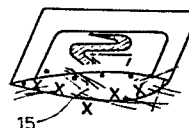


Fig. 4

Method for weaving tubular Jacquard fabrics on looms

The invention concerns a weaving method for producing tubular jacquard fabrics on looms, as well as tubular jacquard fabrics
5 thus obtained, for example, for weaving pieces of cloth, labels, in the form of webs or ribbons having various widths, and/or with patterns visible on the outer faces of both sides.

As is known, fabric consists substantially of a close interlace-
10 ment of lengthwise or warp threads, and of crosswise or weft threads, obtained by alternately raising warp threads having odd positional orders and warp threads having even positional orders, and by picking or inserting a weft thread between them, at each raising or opening of the shed. In textile looms fitted
15 with a jacquard mechanism, the interlacement of the threads changes at each weft picking, according to a pre-established programme, so as to make weft threads of the same colour and/or of different colours appear on the upper surface of the fabric, in prefixed positions of the warp threads. In this way, word-
20 ing and/or patterns appear in "positive" on the upper side of the fabric, whilst on the rear or bottom side of the fabric appear the so-called floating threads and a reversed or "negative" representation of the aforesaid wording and/or patterns.

25 Weaving procedures are also known, by which it is possible to obtain a flat, tubular fabric, on a loom, which consist in weaving together all the warp threads, for example, having odd positional orders, with the weft threads having odd insertion orders, and respectively, in weaving together all the warp
30 threads having even positions, with corresponding weft threads having even insertion orders.

The aim of this invention is to provide a weaving method for producing a jacquard fabric, in tubular form, in which the jacquard weaving technique is combined, in a new and original manner, with the tubular fabric technique on a loom, in order
5 to obtain a completely new textile product which presents either identical or different wording and/or patterns on both outer faces of the tubular fabric thus produced. This product differs substantially from tubular fabrics obtainable with conventional techniques, applying the conventional jacquard weaving method,
10 as this would cause the interweaving of the two sides of the tubular fabric in correspondence with the wordings or patterns, and produce a "positive" image of the wordings or patterns only on the upper face of the fabric.

15 Hence, the scope of this invention is to provide a weaving method, in which the fabric keeps its tubular conformation even in correspondence with jacquard wording and/or patterns, and in which differing wordings and/or patterns, may be produced independently on the outer faces of both sides of the tubular fabric.

20 According to one aspect of the invention, a weaving method is provided, for producing tubular jacquard fabric, on a loom, according to which the warp threads having odd positional order and warp threads having even positional order, interweave with
25 weft threads having a first order of insertion and respectively with weft threads having a second order of insertion, inserted alternately to the first, causing respective weft threads to appear on the outer faces of both sides of the tubular fabric, in positions of the warp threads defining wording and/or patterns
30 erns according to a pre-established jacquard weaving programme.

- According to a further aspect of the invention, a tubular jacquard fabric is provided, having warp threads interwoven with weft threads, in which the weft threads appear on the outer faces of both parts of the tubular fabric, in correspondence with warp threads having pre-established positions, so as to define wording and/or different patterns, and in which the floating threads of the weft remain inside the tubular fabric itself.
- 10 The invention will be described in detail hereunder, with reference to the figures in the accompanying drawings, which illustrate an embodiment of a method for weaving tubular jacquard fabrics; in the drawings
- 15 Fig. 1 shows, by means of conventional signs, the usual arrangement of the warp threads;
- Fig. 2 shows the relative positions of the warp threads, during the insertion of a weft thread, for producing a jacquard pattern or wording on the outer face of the upper part of a tubular fabric;
- 20 Fig. 3 shows the relative positions of the warp threads, during the insertion of a weft thread following that of the previous figure, for producing a jacquard pattern or wording on the outer face of the lower part of the tubular fabric;
- 25 Fig. 4 is a scrap view of a portion of a tubular fabric showing the combined arrangement of the warp and weft threads of the previous figures 2 and 3.

In figure 1, the warp threads, represented schematically by alternate dots and crosses, are numbered progressively from

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1 to 10; these warp threads can therefore be theoretically divided into warp threads having odd positions (threads 1, 3, 5, 7 and 9) and warp threads having even positions (threads 2, 4, 6, 8 and 10).

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In making tubular fabric on a linear textile loom, the usual procedure is to use, for example, the odd-numbered threads as warp for the upper part 11 of the fabric (fig. 4), and the even threads as warp for the lower part 12 of the tubular fabric.

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According to the invention, in order to obtain tubular fabrics with wording and/or patterns, on jacquard looms, on the outer faces of the two parts 11 and 12 of the tubular fabric, it is necessary to proceed as follows : the jacquard programmes of the two patterns (or wording) are prepared, and the two programmes are then combined into a single one, thus obtaining programme cards or the like, in which the first row of the combined programme, corresponding to the first weft insertion of the upper part 11 of the tubular fabric, consists of the first row of the first programme; the second row of the combined programme, corresponding to the first row of insertion of the weft in the lower part 12 of the tubular fabric, corresponds to the first row of the second programme, taking care to reverse the raising or arrangement of the warp threads in the shed, with respect to the other part 11 of the tubular fabric, so that the weft threads, in the programmed positions, always appear on the outer surface. Then the third row of the combined programme consists of the second row of the first programme, whilst the fourth row of the combined programme

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consists, in turn, of the second row of the second programme, always with reversed arrangement of the warp threads, and so on, alternately combining the rows of the two programmes until the combined jacquard loom weaving programme is completed.

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Consequently, according to the foregoing explanation, by means of a single weaving operation, a flattened tubular fabric is produced, and patterns will simultaneously appear on the outer faces of the two sides of the tubular fabric. The jacquard tubular fabric may, of course, be formed continuously, or the loom may be programmed to produce portions of tubular fabric as described, in delimited areas of the fabric, which are therefore separate from one another or enclosed between non-tubular, or traditional portions of fabric.

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In particular, the method according to this invention, can be used in manufacturing labels and braiding, however, other possible uses are not excluded.

20 A more detailed description of the weaving method can be given by reference to figures 2 and 3 of the drawings. As can be seen in figure 2, during one step of the fabric-making process, in particular for the upper part of the tubular fabric, the warp threads 2, 4, 6, 8 and 10 in even positions, that is to say, relative to the warp of the lower part 12 of the tubular fabric, are all kept lowered; likewise, the warp threads 1, 5, 7 and 9 in odd positions, that is to say, relative to the warp of the upper part 11 of the tubular fabric, are all kept lowered, except for the warp threads, such as, for example, thread 3, placed in correspondence with programmed positions in which

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weft threads 12. must not appear on the upper or outer surface.

In the next weaving step, fig. 3, that is to say, relative to the weaving of the lower part 12 of the tubular fabric, there is a reversed arrangement of the warp threads with respect to the previous situation. In other words, all the warp threads 1, 3, 5, 7 and 9, in odd positions, that is to say, relative to the warp of the upper part 11 of the tubular fabric, are raised, and simultaneously all the warp threads 2, 4, 8 and 10, in even positions and relative to the lower part 12 of the tubular fabric, are raised except for the warp threads (thread 6 in this case) in correspondence with programmed positions in which weft threads 14 must not appear on the lower outer surface. Figure 4 shows a tubular fabric, in which the arrangement of the warp threads according to the two previous figures, are schematically indicated. Any floating weft threads, that is to say, those weft threads 15 of a different colour or type which, during an insertion of a weft, are not used, remain inside the tubular fabric.

It is clear, from the foregoing description and accompanying drawings, that the invention mainly concerns a new method of weaving tubular jacquard fabric, on looms, in which the conventional tubular weaving procedures are combined in a new and original manner, by means of the integration of two jacquard weaving programmes, in which one programme is used for producing the upper part of the tubular fabric, with "positive" wording and patterns facing outwards, whereas the other programme is used for producing the lower part of the tubular fabric, also with "positive" wording and/or patterns on the outer face; the

invention also concerns tubular fabric, such as braiding, pieces of fabric and the like, with external wording on both faces of portions thereof, obtained according to the described weaving method. It is understood that what has been described and shown

5 by reference to the accompanying drawings, is given merely by way of example and is in no way restrictive; with the described arrangement, in fact, a tubular fabric is formed in a lengthwise direction, however it is obvious that by inverting the function of warp and weft threads, and the weaving system, it is possible

10 to produce portions of tubular fabric, with jacquard patterns, crosswise over the width of the fabric.

Claims

1 - A weaving method for producing tubular jacquard fabrics, on a loom, characterized in that warp threads (1, 3, 5, 7, 9) having
5 odd positional order and warp threads (2, 4, 6, 8, 10) having even positional order are woven together with weft threads (13, 14) having a first insertion order and respectively with weft threads having a second insertion order, inserted alternately to the first, thus making respective weft threads (13, 14)
10 appear on the outer faces of both sides of the tubular fabric, in positions of warp threads defining wording and/or patterns according to a pre-established jacquard weaving programme.

2 - A weaving method as claimed in claim 1, characterized in
15 that said tubular jacquard fabric is continuously formed along the fabric itself.

3 - A weaving method as claimed in claim 1, characterized in
20 that the tubular jacquard fabric is formed in delimited portions encircled or spaced apart by traditional fabric.

4 - A weaving method as claimed in claim 1, comprising alternate steps of insertion of the weft threads between warp threads, characterized in that, during one weaving step of the upper
25 side of the tubular fabric, all the warp threads (2, 4, 6, 8, 10) relative to the other side of the tubular fabric are kept lowered, as well as the warp threads of the upper side itself, except for those warp threads (3) in programmed positions in which the weft threads must not appear on the surface; whereas,
30 during the subsequent weaving step of the lower side of the

tubular fabric, all the warp threads (1, 3, 5, 7, 9) relative to the other side of the tubular fabric are raised, as well as the warp threads of the lower side itself, except for those warp threads (6) in programmed positions, in which the weft threads must not appear on the surface.

5 - A weaving method as claimed in claim 1, characterized in that said tubular fabric is formed crosswise or in the sense of the width of the fabric itself, by inverting the traditional functions and weaving system for warp and weft threads.

6 - A tubular jacquard fabric, comprising warp and weft threads defining an upper and a lower side of the tubular fabric, with wording and/or patterns due to the weft threads being made to appear in pre-established positions, both on the outer surface of the upper side of the fabric, and on the outer surface of the lower side of the fabric, obtained according to the claimed method.

7 - A tubular fabric as claimed in claim 6, characterized in that said tubular jacquard fabric is formed at least in correspondence with a portion of the fabric.

8 - A fabric as claimed in claim 7, characterized in that said tubular jacquard fabric is surrounded and delimited by portions of non-tubular fabric.

9 - A fabric as claimed in claim 8, characterized in that said fabric is in the form of a set of labels.

10 - A fabric as claimed in claim 7, characterized in that said fabric is in the form of braiding.

11 - A fabric as claimed in claim 6, characterized in that said
5 fabric is in the form of a piece.

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12345678910
•X•X•X•X•X

Fig. 1

13
•X X•X•X•X

Fig. 2

14
•X•X• X•X
X

Fig. 3

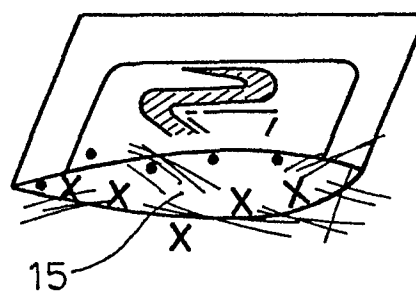


Fig. 4



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Y	--- BE-A- 655 727 (OTTO) *The whole document*	1-11	D 03 D 11/02 D 03 D 3/02
Y	--- FR-A-2 355 105 (BOPP) *The whole document*	1-3, 5, 7, 8	

			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			D 03 D D 03 C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 06-01-1983	Examiner BOULEGIER C.H.H.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	