

12

EUROPEAN PATENT APPLICATION

21 Application number: 89500086.7

51 Int. Cl.⁵: D 04 B 1/06

22 Date of filing: 23.08.89

30 Priority: 14.09.88 ES 8802792

43 Date of publication of application:
21.03.90 Bulletin 90/12

84 Designated Contracting States:
BE DE FR GB IT NL

71 Applicant: CETRIKO, S.A.
C. Balmes, 262
E-08006 Barcelona (ES)

72 Inventor: Piera Casellas, Antonio
C. Doctor Roux, 135
E-08017 Barcelona (ES)

74 Representative: Ponti Grau, Ignasi
Pg. de Gracia, 33
E-08007 Barcelona (ES)

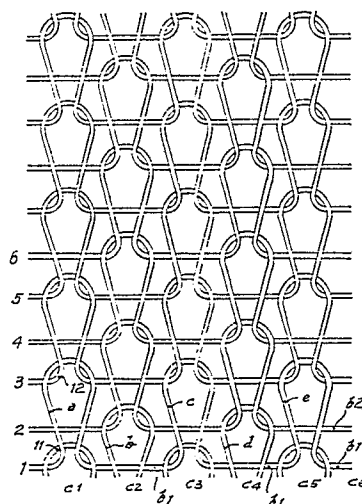
54 Double base knitted fabric.

57 In a knitted fabric of the type comprising mesh courses bound with the meshes of adjacent courses, and mesh columns separated by intermediate channels, the channels of between the columns (c1,c3,c5,...) of a first knitted fabric are occupied by mesh columns (c2,c4,c6,...) of a second knitted fabric, the meshes (1a,1c,...2b,2d,...) and the tackings (b1,b2) of both fabrics being bound with one another such that the ensemble forms a single fabric structure.

The method consist in selecting a first series of needles distributed along a font such that they take yarn at a working set and are driven along a knitting cycle while the needles of at least another series are held out of work, and finally left to a height out of work, this cycle being repeated with a following needle series in a subsequent stage of the method.

The obtained fabric is more resistant and regular.

FIG. 1



Description

DOUBLE FACED KNITTED FABRIC

The present invention relates to a new knitted fabric of the kind comprising horizontal mesh courses in which the meshes of the successive courses are aligned forming mesh columns separated by intermediate channels.

BACKGROUND OF THE INVENTION

The knitted fabrics of this kind are well known and are at the background of the weft knitted fabrics known for a long time; thus, it is deemed unnecessary to describe fully them.

Their use in several fields, as well as their good properties are also known, though they show some intrinsic drawbacks, such as:

The easiness with which they become unraveled, that is to say, when the yarn forming one of the meshes breaks, the ends of the broken yarn slip out from the previous mesh of the same column and this latter becomes loose, thus forming a free loop that in turn slides itself from the preceding mesh in the same column under the fabric tension, and this phenomenon progresses along this column of meshes thus forming the so called "ladders", consisting in the substitution of the implied column of meshes by a corresponding series of wide tackings thus forming a quite wide and noticeable channel;

owing to their own structure made of columns of meshes alternated with channels at one of their faces, and plain tackings predominant at the opposite face, internal stresses originate in the ensemble of the fabric tending to curl up the fabric borders; this very structure makes that the fabric shows tensions or elongations very different according to which fabric direction is considered: the direction of the meshes of one and the same course, or the direction of the mesh columns;

the mesh columns appear quite markedly on one of the fabric faces, generally used as the right side, which is not suitable or desirable in some tailoring applications in which the knitted fabric is used.

These drawbacks are generally tolerated and balanced in the appraisal of the fabric by the other good properties of the knitted fabrics, though they may give raise to specific problems in the applications in which one or several of the above drawbacks can represent an important inconvenience such as, for example, for obtaining a knitted fabric with a balanced structure and as smooth as possible in both their faces.

DESCRIPTION OF THE INVENTION

The subject of the present invention is a new knitted fabric of the general type as referred to at the beginning, in which the described disadvantages have been substantially overcome.

To this end, according to the invention, in a knitted

fabric of the type comprising transverse courses of weft yarns forming successive horizontal rows of meshes, in which the meshes of the successive courses are bound with the meshes of adjacent courses, and aligned vertically to form mesh columns separated by intermediate channels, there is incorporated the essential feature consisting in that the channels of between the mesh columns of a first knitted fabric formed of one or several continuous wefts, are occupied by mesh columns of a second knitted fabric formed of one or several continuous wefts distinct from the previous wefts, the meshes and the tackings of the knitted fabrics formed of the two independent wefts, or groups of wefts, being bound with one another such that the ensemble forms a single fabric structure.

Accordingly, as the channels of between the mesh columns of one of the structures are mainly occupied by the mesh columns of the other structure, a fabric structure originate which is exempt of channels and essentially flat in both its faces, with more balanced internal stresses owing to the absence of the channels, and of a greater resistance to unraveling in view of the greater friction that any broken yarn encounters through the remainder of the columns and meshes of the more compact fabric thus obtained.

Binding of the two different knitted fabric structures can be performed in various different modes. According to a preferred embodiment of the invention, one of the fabric structures is offset as regards the other in the direction of the mesh columns, such that the meshes of the second structure are superimposed on the tackings, or channel bottoms, of the first structure, and the tackings of the second structure pass behind the meshes of the first structure.

As the meshes of whatever knitted fabric form a sort of bridges between the successive wefts, the above mentioned embodiment constitutes the most generic feature for the passing of the tackings of the second fabric structure behind the meshes of the first fabric structure. However, as the bases of the meshes tend to locate themselves in a more external position, as regards the ensemble of the fabric, that the free ends of these meshes joining to the following meshes of the same column, another not the least feature of the present invention provides the feasibility that the tackings of the second fabric structure pass under the meshes of the first fabric structure in a position adjacent or close to the apex of the first fabric structure meshes. This contributes further to the feature of planarity of both faces of the resulting fabric.

Another object of the present invention resides on a method for the obtention of a knitted fabric according to the above definitions, in which the latch needles of a needle font are, in general terms, driven in succession according to a knitting cycle, such that the needles are first raised up to a feed height in which they take the weft yarn within its hook, then

the needles are lowered down to a casting height drawing the taken yarn through the meshes previously held by the needle stems and forming the new meshes while the previous ones are released, and finally the needles are raised up to a discharge position in which the new, held meshes are passed to behind the needle latches, this cycle being repeated until attaining the desired fabric length.

According to the invention, in a first stage of the method, a first series of needles, or group of needles, distributed along the font, are selected such that they come to a working or yarn taking height at the position of a corresponding weft yarn feeder, and thereafter the needles, or groups of needles, are driving along the knitting cycle while the needles, or groups of needles, of at least another needle series are held at a height out of work, these needles being finally left at a discharge or out of work height, this cycle being repeated in the subsequent stage of the method with a following needle series until reaching the desired fabric length.

In a preferred embodiment of the invention, in the first stage of the method, alternate needles of the font are selected to a working or feeding height, and at the second stage of the method, the remainder alternate needles of the font are selected to a working or feeding height.

BRIEF DESCRIPTION OF THE DRAWINGS

The enclosed drawings show a preferred embodiment of the invention as a diagrammatic example which is to be understood as non restrictive of the scope of the said invention. In the said drawings:

Figure 1 is a diagrammatic and very enlarged view of a fabric according to the invention, and

Figure 2 is an equivalent showing of the same fabric as seen by its rear face.

DESCRIPTION OF PREFERRED EMBODIMENTS

In the Figures, a fragment of a fabric according to the invention has been shown.

As it may be seen, the fabric is formed of a series of successive weft courses 1,2,3,4,... taken in the direction from below to above in the drawing, each said courses comprising, as considered in the direction from left to right in the drawing, successive meshes or loops a,b,c,... . Every mesh of the odd order wefts 1,3,5,... is bound in a known manner (in the Example forming a plain knitted fabric) with the homologous mesh of the following weft, in the considered numeric order, forming the odd mesh columns c1,c3,c5,..., and each mesh of the even order wefts 2,4,6,... are bound in a known manner (in the Example forming a plain knitted fabric) with the homologous mesh of the following weft in the considered numeric order, forming the even mesh columns c2,c4,c6,... . In other terms, the meshes 1a,1c,1e, are bound in stitch forming relation with the meshes 3a,3c,3e,... and these latter are bound in the same manner with the meshes 5a,5c,5e, and so on,

forming the odd order mesh columns c1,c3,c5,... . In a similar manner, the meshes 2b,2d,2f,... are bound in stitch forming relation with the meshes 4b,4d,4f,... and these latter are bound in the same manner with the meshes 6b,6d,6f,... and so on, forming the even order mesh columns c2,c4,c6,... .

The odd order mesh columns, denoted with c1,c3,c5,..., are mutually separated by channels whose bottoms are constituted by the tackings b1. As it is usual, in the knitted fabric structure and with no mechanical finish capable of modifying it, the meshes of the odd columns c1,c3,c5, are located at the level of the fabric front face, whereas the tackings b1 joining these columns are located at the level of the fabric wrong side.

Considering the fabric formed of the even over wefts 2,4,6,..., the corresponding meshes, for example the meshes 2b,2d,2e, and the tackings b2, independently of the fabric deriving in a similar manner from the odd order wefts, it will be appreciated that this second structure is another knitted fabric of the same composition as the previous one. However, according to the invention, the mesh columns c2,c4,c6,... of this second fabric are housed within the channels, whose bottoms are formed of the tackings b1, of the first fabric, such that these columns fill up the said channels and give a more continuous structure to the front face of the fabric according to the invention. The relation of both structures in constituting an indivisible ensemble within the concept of the invention, resides on the fact that both fabrics, according to a further object of the invention, as it will be described later on, are formed simultaneously and mutually interlocked during the knitting procedure, such that both fabrics cannot be separated apart the one of the other without a destruction of their ensemble or the loss of the properties of the same, constituting the advantages of the fabric as already explained.

To this end, according to this first aspect of the invention and as it can be clearly appreciated from the drawings, the second fabric even mesh columns c2, c4,c6,... are located, when looking at the fabric at its front face, within the first fabric channels and above their tackings b1, while the second fabric tackings b2 pass behind the meshes 1a,1c,1e,...-3a,3c,3e,... of the first fabric. As it may be seen, the tackings b2 of the second fabric lie closer to the apex 11 of the first fabric meshes than to the bases 12 of the same (of the following meshes within the odd wefts order), as a natural trend of the second fabric tackings to place themselves at a location where they find more room behind the first fabric meshes. It is, however, obvious that this relative situation of both fabric structures within the ensemble of the knitted fabric, could be modified as desired by acting on the working parameters of the machine used for forming it (feed tensions, etc.).

For convenience of the explanation, it is assumed that the fabric has been knitted with a circular knitting machine having a cylinder needle font with latched needles and two working sets or stations adapted to drive the latch needles and make them to perform a basin knitting cycle. In this case, one set performs the odd order courses, and the other set

the even order courses, thus giving place to the fabric structure represented in the Figures, though it will be understood that machines of two or more sets can also be used, in which case the successive sets would knit together with the needle series of the corresponding numeric order, that is to say, one set with the odd order needles, the following set with the even order needles, and so on. Under the same approach, it would also be possible to alternate needle groups in place of independent needles. At any rate, compact and flat structures, in both their faces, similar to that shown in Figures 1 and 2, would be obtained.

The described fabric is realized by means of a particular series of knitting operations on which the second object of the invention is based. Thus, considering a knitting machine as described above, comprising a latched needle cylinder and several pairs of working sets or stations, the first set of each pair selects the needles of a given numeric order to a working position, for example the odd order needles, and performs the usual knitting phases to arrive to the fabric formed of the odd order wefts 1,3,5,... However, according to the invention, the needles which have formed the meshes 1a,3a,5a,... are held at the loading height while they pass through the second set of the same pair and are maintained in inactive condition while the same work is performed in this second set with the even order needles with the wefts of the same order. In other terms, if the running of the needles through the first set of the pair has given rise to the formation of the odd meshes 1a, 1c, 1e,... which are held loaded on the needles (the fabric hangs from these needles), the running of the needles through the second working set of the same pair abuts to the formation of the meshes 2b,2d,2f,... which are left in the same loaded condition as described (both fabrics hang from all of the needles).

Once completed this course, which could be termed "basic course", the needles come to the zone of the second pair of working sets, where the first set of this pair selects again the odd order needles by raising them to discharge the meshes 1a,1b,1c, behind the latches of the needles and places the hook of the same to the height for taking yarn or feeding. The newly taken yarn is drawn downwards thus forming the meshes 3a,3c,3e,... which pass through the previous meshes 1a,1c,1e,... to remove these latter from the needles and become in turn again in the inactive loading position. Thereafter, when the needles come to the second set of the second pair, the working is repeated to form the following meshes 4b,4d,4f,... of the second fabric, and the working goes on by repeating itself in the same manner at the following pairs of sets, to obtain the whole fabric.

The selection of the needles can be performed by conventional means depending in every case on the constructive features of the machines used. For example, the machine cylinder could be fitted with a series of alternate needles having selection heels located at two different heights, and endowing the working sets of each pair with a selection or raising cam placed at a corresponding height to put in

working condition only the alternate needles having the heel located at this height.

The method has been described with reference to the working of a circular knitting machine with latched needle cylinder and several pairs of working sets, though it will be understood that, with the suitable detail modifications and settings easily available to the expert, it can be performed as well with different types of circular or rectilinear machines, provided that these machines are adapted to perform the selection of alternate needles to make them to work in successive working sets or stations.

In the same manner, though in view of the simplicity of the exposition the method has been described with reference to the selection of alternate needles, it would also be possible, at least for obtaining some variations of the fabric according to the invention, or to conform with some features of the machinery used for performing the same, to change the numbers of needles selected at any time, for example by selecting one needle and then two needles, or two needles and then two needles, to obtain fabrics with similar characteristics.

It will be appreciated that either the fabric according to the invention or the method used for realizing the same, comply with the proposed objects and allow the advantages described in the introduction, to be attained.

Claims

1. Double base knitted fabric, of the type comprising transverse courses of weft yarns forming successive horizontal rows of meshes, in which the meshes of the successive courses are bound with the meshes of adjacent courses, and vertically aligned forming mesh columns separated by intermediate channels, characterized in that the channels of between the adjacent mesh columns (c1-c3,c3-c5) of a first knitted fabric formed of one or several continuous wefts (1,3,5,...), are occupied by mesh columns (c2,c4,c6,...) of a second knitted fabric formed of one or several continuous wefts (2,4,6,...) distinct from the previous wefts, the meshes (1a,1c,...-2b,2d,...) and the tackings (b1,b2) of the knitted fabrics formed of the two independent wefts (1,3,5,...-2,4,6,...), or groups of wefts, being bound with one another such that the ensemble forms a single fabric structure.

2. Double base knitted fabric, according to claim 1, characterized in that one of the fabric structures is offset as regards the other in the direction of the mesh columns, such that the meshes of the second structure (2b,2d,...-4b,4d,...) are superimposed on the tackings, or channel bottoms, (b1) of the first structure, and the tackings (b2) of the second structure pass behind the meshes (1a,1c,...-3a,3c, of the second structure.

3. Double base knitted fabric, according to claims 1 and 2, characterized in that the tackings (b2) of the second fabric structure

pass under the meshes (1a, 1c,...-3a,3c,...) of the first fabric structure in a position adjacent or close to the apex (11) of the first fabric structure meshes.

4. A method for the obtention of a double base knitted fabric, according to the preceding claims, in which the latch needles of a needle font are raised up to a feed height in which they take a weft yarn, then the needles are lowered drawing the taken yarn through the meshes previously held by the needle stems and forming the new meshes while the previous ones are released, and finally the needles are raised up to a discharge position in which the new, held meshes are passed to behind the needle latches, characterized in that, in a first stage of the method, a first series of needles distributed along the font, are selected such

that they come to a working or yarn taking height at the position of a corresponding weft yarn feeder, and thereafter the needles are driven along the knitting cycle while the needles of at least another needle series are held at a height out of work, these needles being finally left at a discharge or out of work height, this cycle being repeated in the subsequent stage of the method with a following needle series until reaching the desired fabric length.

5. A method according to claim 4, characterized in that in the first stage of the method, alternate needles of the font are selected to a working or feeding height, and at the second stage of the method, the remainder alternate needles of the font are selected to a working or feeding height.

20

25

30

35

40

45

50

55

60

65

FIG. 1

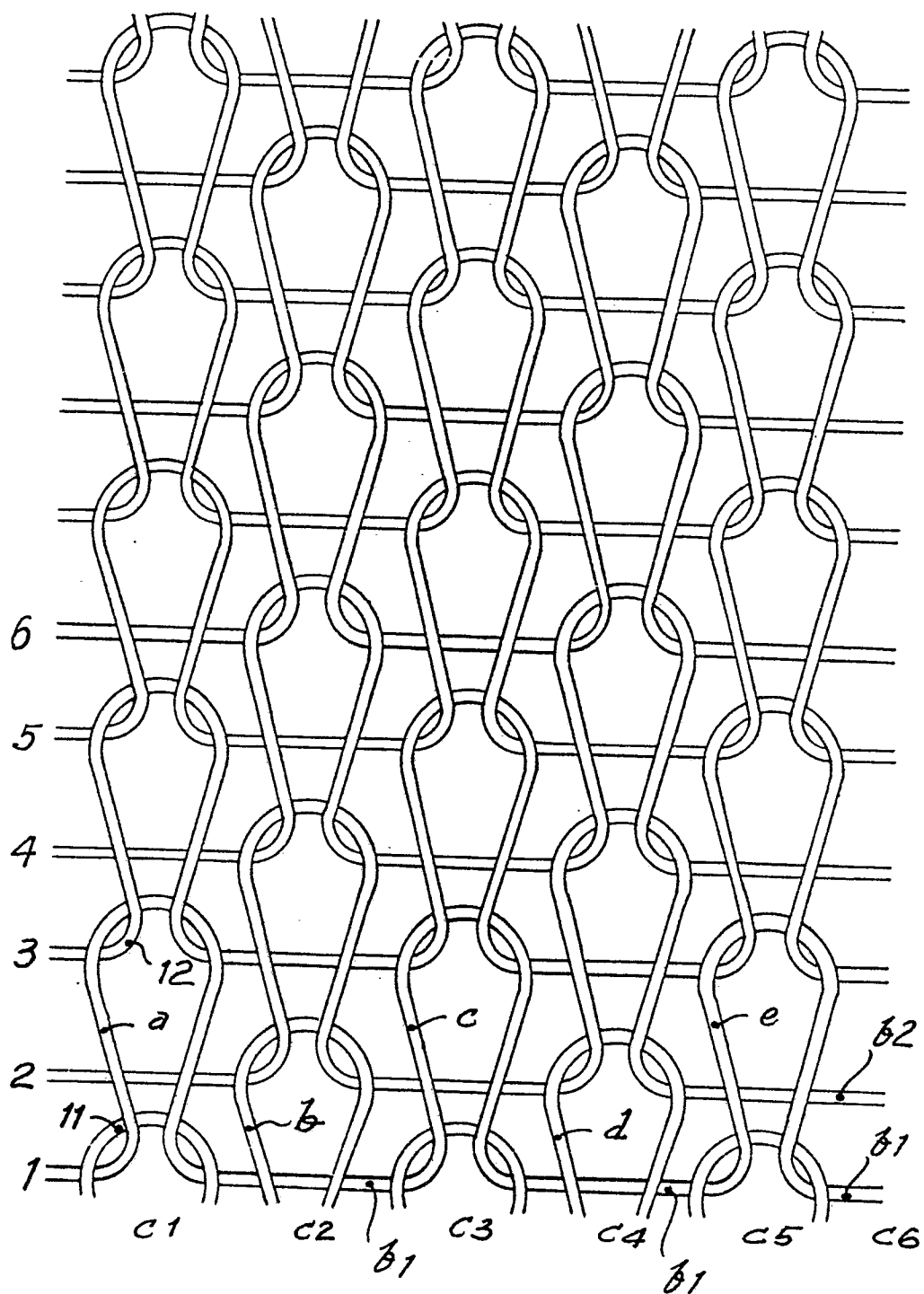
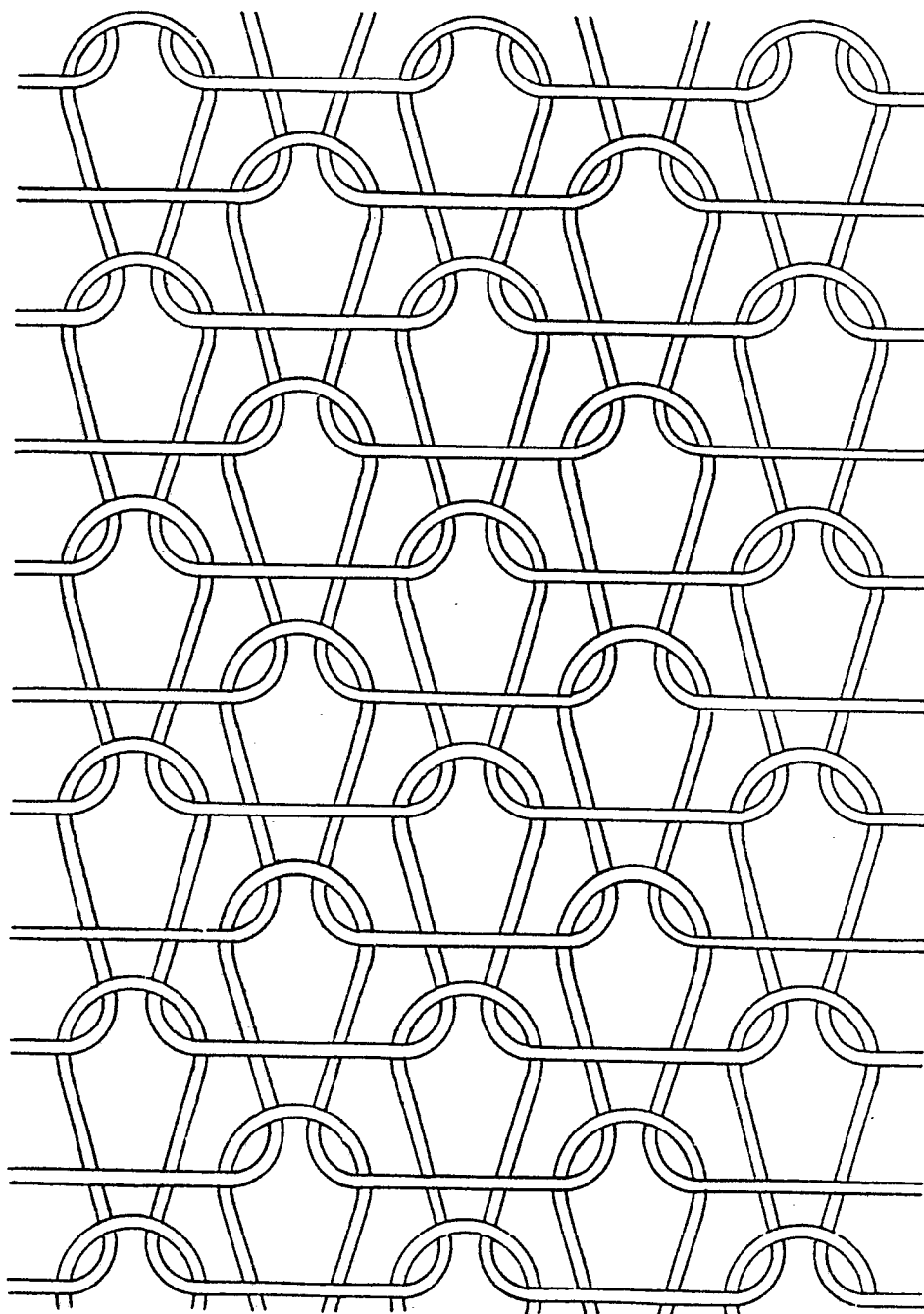


FIG.2





EP 89 50 0086

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.5)
X	FR-A-1296161 (COLROY) * page 2, left-hand column, line 38 - right-hand column, line 8; figure 3 *	1-5	D04B1/06
X	FR-A-1354403 (VAN RAALTE COMPANY, INC.) * page 4, left-hand column, line 56 - page 5, right-hand column, line 33; figure 1 *	1-5	
A	FR-A-750891 (EMERY)		
A	CH-A-165792 (NEBEL)		
A	DE-C-645190 (NEBEL)		
A	FR-A-2570935 (VYZKUMNY USTAV PLETARSKY)		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D04B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19 DECEMBER 1989	Examiner VAN GELDER P. A.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone V : 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 I : document cited for other reasons & : member of the same patent family, corresponding document			