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(54) **set-up method of knitted fabric and knitted fabric**

(57) To provide a set-up method of a knitted fabric capable of knitting a set-up portion without looseness using a flat knitting machine including a compound needle having a needle body and slider with two blades. When setting up a knitted fabric, forming a split stitch (2) as a new stitch following a target stitch (1), which is one of the stitches of a basal end course formed on either the front or back needle bed (BB) while transferring the target stitch (1) of the basal end course to a knitting needle (FB) of the other opposing needle bed is repeated from one

side to the other side in a longitudinal direction of the needle bed. In this case, each split stitch (2) is knitted while moving a yarn feeder (8) in a direction (right direction in the plane of drawing) opposite to a forming direction, the forming direction being a direction (left direction in the plane of drawing) in which the split stitches (2) are sequentially formed in the longitudinal direction of the needle bed.

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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a set-up method of a knitted fabric for knitting a set-up portion of a knitted fabric without looseness using a flat knitting machine including a compound needle having a needle body and a slider with two blades, and a knitted fabric knitted by applying the set-up method.

Description of the Related Art

[0002] A method of setting up a knitted fabric using a flat knitting machine having at least a pair of front and back needle beds is conventionally known. A method of knitting the set-up portion of the knitted fabric by feeding a knitting yarn alternately to the front and back needle beds is known as the simplest set-up method. In this method, however, a cross-over yarn between the front and back needle beds tends to become long, and the set-up portion may become loose. Knitting the set-up portion using a method called "split knitting" has been proposed to solve this problem (e.g., refer to Patent Document 1).

[0003] In order to knit the set-up portion using the "split knitting", a basal end course to become the basal end is first knitted on either the front or back needle bed. Transferring a stitch of the basal end course to the knitting needle of the other opposing needle bed while forming a split stitch on the knitting needle of the one needle bed (knitting needle on which the transferred stitch was originally held) so as to be drawn out from the transferred stitch is carried out from one end side to the other end side in a knitting width direction. The set-up portion knitted in such a manner becomes the set-up portion where the sinker loops of the stitches held on the front and back needle beds are entangled with each other, as shown in Fig. 3. In the set-up portion, the yarn length between the stitches does not become needlessly long, and thus a tight set-up portion can be obtained.

[0004] Patent Document 1 JP-A-04-73245

SUMMARY OF THE INVENTION

[0005] The set-up method using the "split knitting" disclosed in Patent Document 1 is an effective method if the knitting needles of the flat knitting machine are latch needles, but is an unsuitable method if the knitting needles of the flat knitting machine are compound needles having a needle body and a slider with two blades that open and close the hook of the needle body (e.g., refer to Japanese Patent No. 2917146). If the set-up method of Patent Document 1 is carried out with the flat knitting machine including the compound needle, the stitches of the basal end course and the split stitches do not become entan-

gled, as shown in Fig. 4, and thus the set-up portion same as Fig. 3 cannot be knitted. It should be recognized that the set-up portion same as that in Fig. 3 simply cannot be formed with the compound needle according to the procedure same as that of Patent Document 1, but this does not mean that the knitted fabric cannot be set up with the compound needle.

[0006] The above problem arises because the structure for transferring the stitches between the opposing needle beds differs between the latch needle and the compound needle. In the case of the latch needle, a clip at the side surface of the latch needle is used when transferring the stitches, and thus the latch needles of the opposing needle beds are positioned slightly away from each other in the longitudinal direction of the needle bed. In the case of the compound needle having the slider with two blades, on the other hand, the hooks of the compound needles of the opposing needle beds are not positioned away from each other in the longitudinal direction of the needle bed since a configuration in which the stitch held by a tongue at the distal end on the needle bed gap side of the blade is picked up with the hook of the opposing compound needle is adopted.

[0007] As described above, a completely new idea is desired to knit the set-up portion formed by entangling the knitting yarn, which connects the stitches held on the front needle bed, and the knitting yarn, which connects the stitches held on the back needle bed, with the flat knitting machine that uses the compound needle including the slider with two blades having a structure different from the latch needle.

[0008] In light of the above circumstances, an object of the present invention is to provide a set-up method of a knitted fabric capable of knitting a set-up portion without looseness using a flat knitting machine including a compound needle having a needle body and a slider with two blades, and a knitted fabric including a portion knitted by applying the method.

[0009] A set-up method of a knitted fabric according to the present invention is a set-up method of a knitted fabric in which when setting up a knitted fabric using a flat knitting machine, having at least a pair of front and back needle beds and in which stitches are transferrable between the front and back needle beds, forming a split stitch as a new stitch following a target stitch, which is one of the stitches in a basal end course formed on either the front or back needle bed while transferring the target stitch of the basal end course to a knitting needle of the other opposing needle bed is repeated from one side to the other side in a longitudinal direction of the needle bed. In the set-up method of the knitted fabric according to the present invention, each split stitch is knitted while moving a yarn feeder in a direction opposite to a forming direction, the forming direction being a direction in which the split stitches are sequentially formed in the longitudinal direction of the needle bed. The knitting needle arranged in the needle bed of the flat knitting machine used for the set-up method of the knitted fabric according to

the present invention is a compound needle having a needle body and a slider with two blades.

[0010] In one aspect of the set-up method of the knitted fabric according to the present invention, the split stitches may be sequentially knitted with respect to each stitch configuring the basal end course after knitting the entire basal end course.

[0011] In another aspect of the set-up method of the knitted fabric according to the present invention, the split stitch may be knitted with respect to a stitch every time one stitch of the basal end course is knitted.

[0012] A knitted fabric according to the present invention is a knitted fabric including a set-up portion knitted using a flat knitting machine having at least a pair of front and back needle beds in which a plurality of compound needles, each including a needle body and a slider with two blades, is arranged in a row, and in which stitches can be transferred between the front and back needle beds. The set-up portion includes a basal end course and a split knitting course in which the directions of needle loops are directed in opposite directions to each other. In the knitted fabric according to the present invention, one part of a knitting yarn extending from the split stitch of the split knitting course and reaching another split stitch adjoining the split stitch in a knitting width direction is wound around a root of a stitch of the basal end course.

[0013] According to the set-up method of the knitted fabric of the present invention, a knitted fabric according to the present invention including a set-up portion knitted without looseness even with a flat knitting machine including a compound needle having a slider with two blades can be knitted.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

Fig. 1 is a knitting process diagram showing knitting processes according to a set-up method of a knitted fabric of a first embodiment using a flat knitting machine including a compound needle;

Fig. 2 is a knitting process diagram showing knitting processes according to a set-up method of a knitted fabric of a second embodiment using a flat knitting machine including a compound needle;

Fig. 3 is a loop diagram of a set-up portion knitted with the conventional split knitting method using a flat knitting machine including a latch needle; and

Fig. 4 is a loop diagram of a set-up portion knitted with the conventional split knitting method using a flat knitting machine including a compound needle.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0015] Hereinafter, embodiments of the present invention will be described with reference to the drawings. For all the knitting described in the embodiments, a descrip-

tion will be given of a knitting example using a two-bed flat knitting machine having at least a pair of needle beds, namely a front needle bed (hereinafter, FB) and a back needle bed (hereinafter, BB) and in which stitches can be transferred between the front and back needle beds. The knitting needle arranged in the needle bed is a compound needle having a needle body with a hook and a slider with two blades for opening and closing the hook. The flat knitting machine to use may be a two-bed flat knitting machine equipped with a transfer jack bed or a four-bed flat knitting machine. The yarn feeder of the flat knitting machine may be a type that follows the carriage or may be a self-propelling type.

15 First Embodiment

[0016] In the present embodiment, with reference to Fig. 1, a description will be given of an example in which the set-up method of the present invention is applied to a case where a stitch is formed on the BB with a knitting yarn, which is a draw thread, and then the knitted fabric following the stitch of the draw thread is set up.

[0017] Fig. 1 is a knitting process diagram for setting up a knitted fabric with a knitting yarn from a yarn feeder 8 indicated with a symbol ∇. The "alphabet + number" in the figure indicates the number of the knitting process, a short black bar indicates the knitting needle arranged in the FB and the BB, A to D indicate positions of the knitting needles of the needle beds, and a thick line indicates the knitting yarn portion to actually carry out a knitting operation. In some of the illustrated knitting processes, there are areas where the knitting needles, that are actually of the same needle bed, are displayed shifted in the up and down direction in the plane of drawing for the sake of convenience of explanation, (e.g., knitting needle D of BB in S2, knitting needle C of BB in S4).

[0018] First, in S1, a state is shown in which the stitches of the basal end course to become the basal end of the set-up are formed following the stitches of the draw thread held on the knitting needles A to D of the BB while moving the yarn feeder 8 in the right direction in the plane of drawing. In the subsequent knitting process, the split stitches are formed toward the left direction in the plane of drawing from such a state. That is, the left direction in the plane of drawing is the "forming direction" of the split stitch. In S1, the yarn feeder 8 is once moved up to a position beyond the knitting needle D in the left direction in the plane of drawing after forming the basal end course as a preparation for knitting the split stitch.

[0019] Then, in S2, while inverting the yarn feeder 8 and moving the same in the right direction in the plane of drawing (direction opposite to "forming direction" described above), a new stitch (split stitch 2) following the stitch (target stitch 1) of the basal end course held on the knitting needle D of the BB is formed, and the target stitch 1 is transferred to the knitting needle D of the FB at a position facing the knitting needle D of the BB on which the target stitch 1 is held (see arrow).

[0020] On the basis of the same idea, the yarn feeder 8 is moved up to the position beyond the knitting needle C in the left direction in the plane of drawing in S3, and the target stitch 1 is transferred to the knitting needle C of the FB while knitting the split stitch 2 following the target stitch 1 of the basal end course in S4. These are repeated toward the left direction in the plane of drawing, so that the set-up portion is formed on the FB and the BB, as shown in S5.

[0021] Looking at the set-up portion shown in S5, one part of the knitting yarn extending from the split stitch 2 held on the BB to another split stitch 2 next to the relevant split stitch 2 is wound around the root of the target stitch 1 of the basal end course held on the FB. Thus, in the set-up portion shown in S5, the needlessly long knitting yarn does not cross between the FB and the BB, and the set-up portion becomes a set-up portion without looseness.

Second Embodiment

[0022] In a second embodiment, with reference to Fig. 2, a description will be given of a set-up method of a knitted fabric according to the present invention for forming a set-up portion by repeating the knitting of one stitch of the basal end course and the knitting of the split stitch on the relevant stitch (target stitch) each time. The way of looking at Fig. 2 is similar to Fig. 1 of the first embodiment described above.

[0023] First, in T1 of Fig. 2, a state is shown in which the yarn feeder 8 is moved in the left direction in the plane of drawing to knit one stitch of the basal end course on the knitting needle D of the BB. In the subsequent knitting processes, the target stitch 1 of the basal end course is increased toward the left direction in the plane of drawing ("forming direction" of split stitch 2) from such a state, and the split stitch 2 is also increased therewith.

[0024] In T2, a new stitch (split stitch 2) following the stitch (target stitch 1) of the basal end course formed in T1 is knitted and the target stitch 1 is transferred to the knitting needle D of the FB while moving the yarn feeder 8 in the right direction in the plane of drawing (direction opposite to "forming direction" described above).

[0025] Thereafter, on the basis of the same idea, while moving the yarn feeder 8 in the left direction in the plane of drawing in T3, the target stitch 1 of the basal end course is knitted and the target stitch 1 is transferred to the knitting needle C of the FB while knitting a new split stitch 2 following the target stitch 1 in T4. These are repeated toward the left direction in the plane of drawing to form the set-up portion on the FB and the BB, as shown in T5.

[0026] Similar to the knitted fabric knitted by the knitting process of the first embodiment, the set-up portion without looseness is formed in the knitted fabric knitted by the knitting process of the second embodiment described above. This is because the knitting yarn connecting the split stitches 2, 2 adjoining formed on the BB is wound around the root of the target stitch 1 of the basal end

course. For instance, one part of the knitting yarn extending from the split stitch 2 of the knitting needle D of the BB, forming the target stitch 1 of the knitting needle C of the FB and reaching the split stitch 2 of the knitting needle C of the BB is wound around the root of the target stitch 1 formed on the knitting needle D of the FB.

[0027] The embodiments of the present invention are not limited to the embodiments described above, and can be appropriately modified within a scope not deviating from the gist of the present invention. For instance, in the first embodiment, the basal end course may be knitted in smooth knitting, or the stitches of the basal end course may be formed with twisted stitches.

Claims

1. A set-up method of a knitted fabric in which when setting up a knitted fabric using a flat knitting machine, having at least a pair of front and back needle beds and in which stitches are transferrable between the front and back needle beds, forming a split stitch (2) as a new stitch following a target stitch (1), which is one of the stitches of a basal end course formed on either the front or back needle bed while transferring the target stitch (1) of the basal end course to a knitting needle of the other opposing needle bed is repeated from one side to the other side in a longitudinal direction of the needle bed; **characterized in that** if the knitting needle arranged in the needle bed is a compound needle having a needle body and a slider with two blades, the split stitch (2) is knitted while moving a yarn feeder (8) in a direction opposite to a forming direction, the forming direction being a direction in which the split stitches (2) are sequentially formed in the longitudinal direction of the needle bed.
2. The set-up method of the knitted fabric according to claim 1, wherein the split stitches (2) are sequentially knitted with respect to each stitch configuring the basal end course after knitting the entire basal end course.
3. The set-up method of the knitted fabric according to claim 1, wherein the split stitch (2) is knitted with respect to a stitch every time one stitch of the basal end course is knitted.
4. A knitted fabric including a set-up portion knitted using a flat knitting machine having at least a pair of front and back needle beds in which a plurality of compound needles, each including a needle body and a slider with two blades, is arranged in a row, and in which stitches are transferrable between the front and back needle beds; wherein the set-up portion includes a basal end course and

a split knitting course in which the directions of needle loops are directed in opposite directions to each other; and

one part of a knitting yarn extending from a split stitch (2) of the split knitting course and reaching another split stitch (2) adjoining the split stitch (2) in a knitting width direction is wound around a root of a stitch of the basal end course.

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Fig. 1

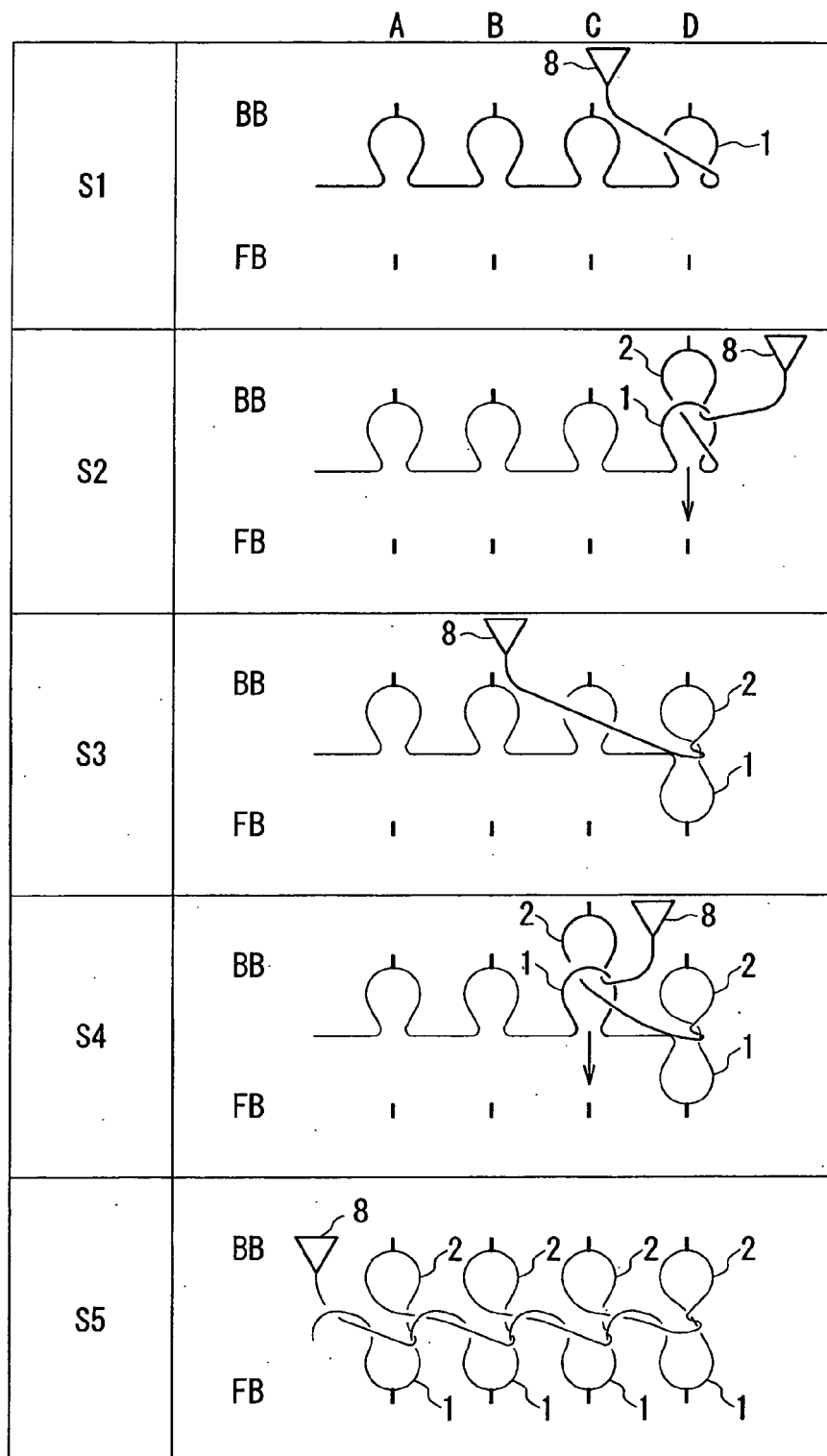


Fig. 2

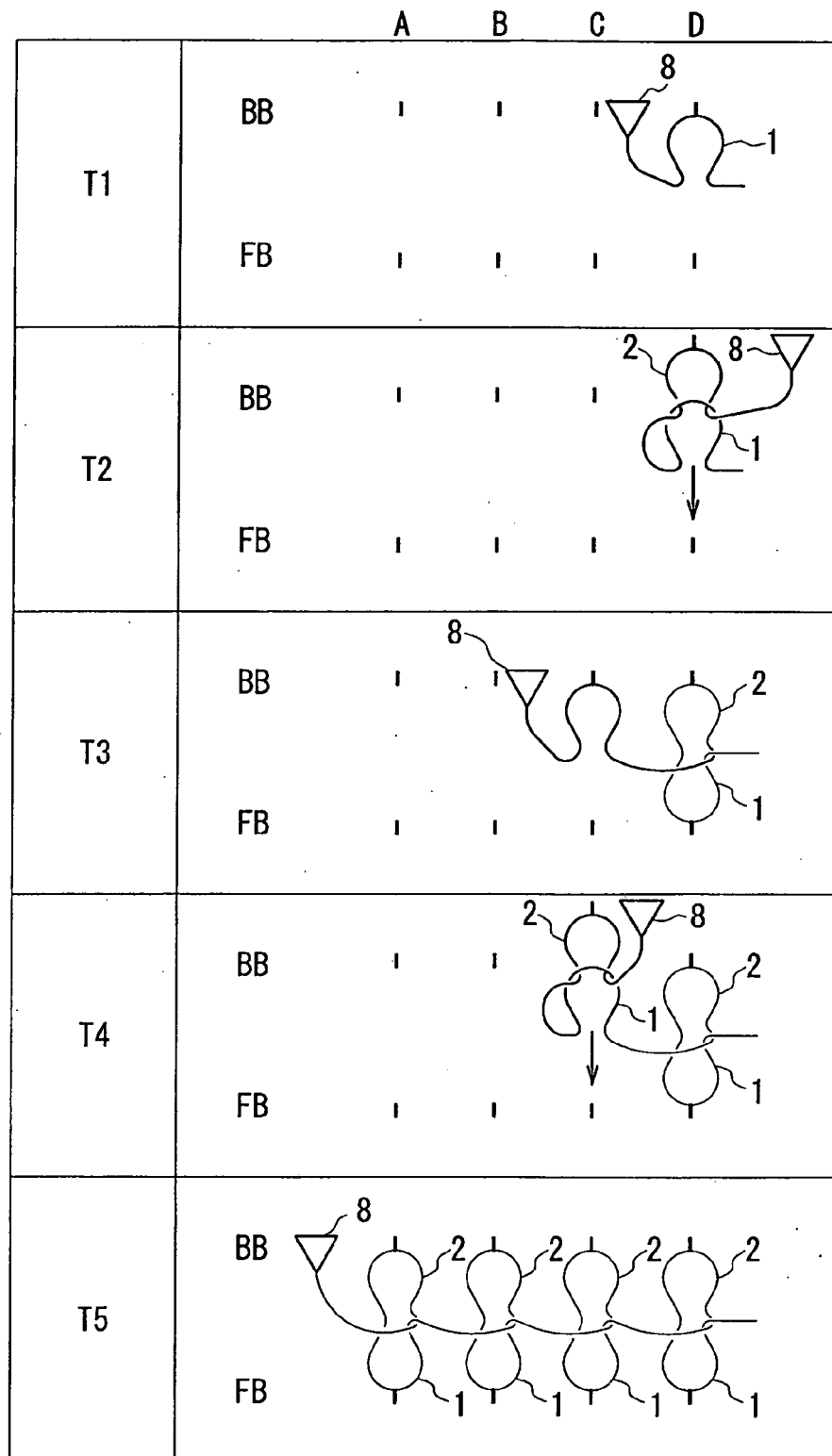


Fig. 3

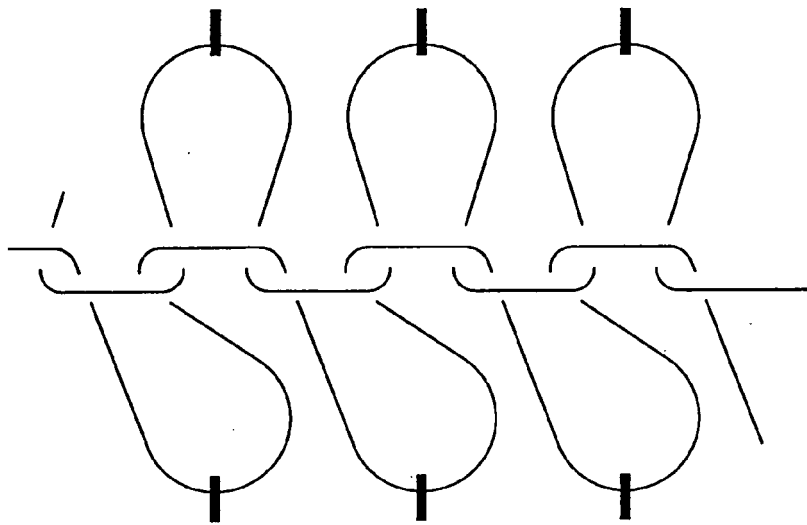
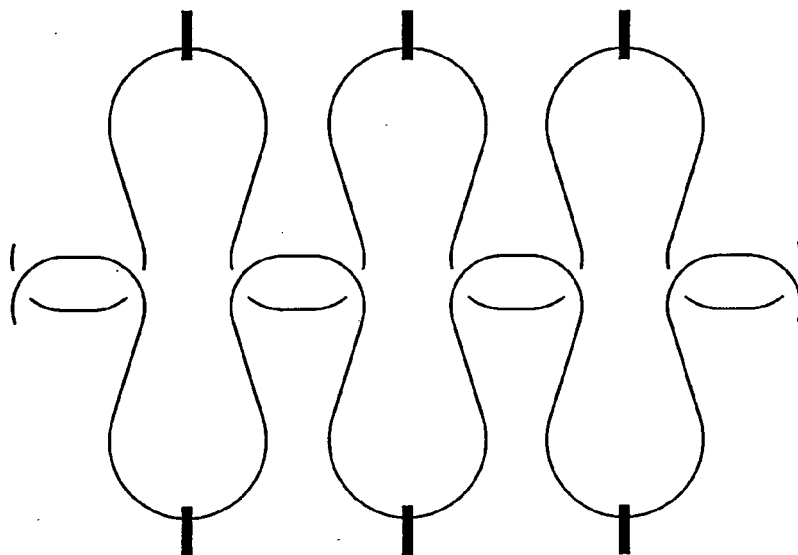


Fig. 4





EUROPEAN SEARCH REPORT

Application Number
EP 11 00 8760

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			D04B
Place of search		Date of completion of the search	Examiner
Munich		12 April 2012	Zirkler, Stefanie
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			

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EPO FORM 1503 03/02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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