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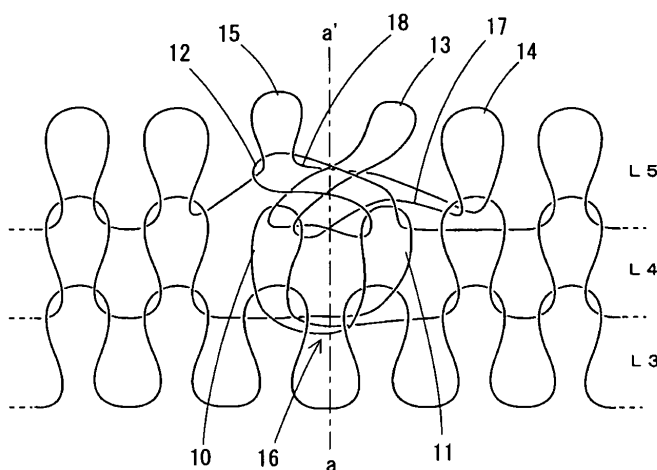
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(54) **METHOD FOR KNITTING KNITWEAR WITH COLLAR HAVING V-NECK POINT AND KNITTED FABRIC**

(57) A knitting method by which two adjacent stitches with a branch center line of a V-neck point interposed therebetween are prevented from being separated outward from each other and the strength of the branch portion is improved, and a knitted fabric knitted with such knitting method are provided. The method includes, regarding two adjacent stitches with a branch center line

of the V-neck point interposed therebetween, changing a travel direction of a carriage from one to the other, and forming a miss stitch on a front side of the two adjacent stitches with respect to the traveling direction of the carriage and a knit stitch on the back side with respect to the traveling direction of the carriage; and interchanging and crossing positions of at least one of the two adjacent stitches and a stitch adjacent to the stitch.

Fig.2



Description

TECHNICAL FIELD

5 **[0001]** The present invention relates to a knitting method by which stitches at a branch portion are prevented from being separated from each other and the branch portion is strengthened at a V-neck point of a knitwear, and a knitted fabric formed with such knitting method.

BACKGROUND ART

10 **[0002]** The knitwear with collar includes a crew neck set-in sweater, where a knitting method of forming left and right necklines with the front body branched to the left front body and the right front body, knitting the back body in accordance therewith, and then joining the shoulders to form a shape of a sweater, and thereafter, joining only the neckline is disclosed. (See document 1). Similarly, the knitwear with collar also includes a vest, a sweater, and the like with a V-neck point (see Fig. 3).

15 **[0003]** In the vest having the V-neck point, the front and back body portions are first knitted, and then a neckline portion (3) is knitted thereafter similar to document 1. The neckline portion (3) is circling knitted, where the knitting yarn can be different from that of the body portions and the direction of the stitches also can be in a direction different from the first knitted stitches, such as in a substantially perpendicular direction, thus enhancing the commodity value. However, the
20 V-neck point has an acute angle with respect to a crew neck, and overlapping of stitches needs to be carried out near a branch center line (a-a') to connect the stitches on both sides of the branch portion of the V-neck point. As shown in Fig. 4, the adjacent stitches with the branch center line (a-a') interposed therebetween are pulled outward from the branch center line (a-a') as different stitches are respectively overlapped and the adjacent stitches are separated from
25 each other. Furthermore, excessive tension tends to apply on the branch portion when wearing, and yarn stretching or yarn breakage may occur.

PRIOR ART DOCUMENT

PATENT DOCUMENT

30 **[0004]**

[Patent document 1] Japanese Patent Publication No. 3863018

35 DISCLOSURE OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

40 **[0005]** It is an object of the present invention to provide a knitting method by which two adjacent stitches with the branch center line of a V-neck point interposed therebetween are prevented from being separated outward from each other and the strength of the branch portion is improved, and a knitted fabric knitted with such knitting method.

MEANS FOR SOLVING THE PROBLEMS

45 **[0006]** The present invention relates to a method for knitting a knitwear with collar having a V-neck point using a flat knitting machine having a pair of front and back needle beds and in which loops can be transferred between the front and back needle beds, the method including the steps of, regarding two adjacent stitches with a branch center line of the V-neck point interposed therebetween, changing a travel direction of a carriage from one to the other, and forming a miss stitch on a front side of the two adjacent stitches with respect to the traveling direction of the carriage and a knit
50 stitch on the back side with respect to the traveling direction of the carriage; and interchanging and crossing positions of at least one of the two adjacent stitches and a stitch adjacent to the stitch.

[0007] According to the present invention, the step of interchanging and crossing the positions of the stitches includes forming a new stitch on at least one of the stitches before the interchanging of the positions is completed.

55 **[0008]** Furthermore, according to the present invention, a new stitch is formed, including at least one of the two adjacent stitches following the step of interchanging and crossing the positions of the stitches.

[0009] According to a knitwear with collar of the present invention, regarding two adjacent stitches with a branch center line of a V-neck point interposed therebetween, a travel direction of a carriage is changed from one to the other, and a miss stitch is formed on a front side of the two adjacent stitches with respect to the traveling direction of the carriage

and a knit stitch is formed on the back side with respect to the traveling direction of the carriage; and positions of at least one of the two adjacent stitches and a stitch adjacent to the stitch are interchanged and crossed to form a crossing portion including a plurality of knitting yarns between the two adjacent stitches.

EFFECTS OF THE INVENTION

[0010] According to the method for knitting a knitwear with collar of the present invention, regarding two adjacent stitches with a branch center line interposed therebetween, a travel direction of a carriage is changed from one to the other, and a miss stitch is formed on a front side of the two adjacent stitches with respect to the traveling direction of the carriage and a knit stitch is formed on the back side with respect to the traveling direction of the carriage; a plurality of knitting yarns is formed between the two adjacent stitches, and the positions of at least one of the two adjacent stitches and a stitch adjacent to the stitch are interchanged and crossed, so that a plurality of different knitting yarns is arranged between the adjacent stitches with the branch center line interposed therebetween, whereby the two adjacent stitches with the branch center line interposed therebetween at the V-neck point are prevented from being separated from each other and the strength of the branch portion can be improved.

[0011] According to the method for knitting the knitwear with collar of the present invention, a new stitch is formed on at least one of the stitches before the interchanging of the positions is completed in the step of interchanging the positions of the stitches so that additional yarn length is obtained thus giving margin to the knitting yarn, the conditions at the time of transfer become satisfactory, and thus the positions of the stitches can be reliably interchanged.

[0012] In the method for knitting the knitwear with collar of the present invention, a new stitch is formed with respect to at least one of the two adjacent stitches after performing the step of interchanging the positions of the stitches so that a plurality of knitting yarns is further added, thus enhancing the strength.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

Fig. 1 is a knitting process diagram temporally describing a knitting method of a V-neck point described in an example.

Fig. 2 is an image loop diagram of the V-neck point after the present invention is adapted.

Fig. 3 is an image diagram of a vest, which is a knitwear with collar.

Fig. 4 is an image loop diagram of a conventional V-neck point (vertex).

MODE FOR CARRYING OUT THE INVENTION

EXAMPLE

[0014] An example in which a knitting method of the present invention is adapted to stitch rows (L3 to L5 of Fig. 4) including two adjacent stitches with a branch center line (a - a') interposed therebetween will be described using a V-neck point 2 of a vest 1. In this example, description will be made using a two-bed flat knitting machine having a pair of front and back needle beds extending in a transverse direction and disposed opposite to each other in a cross direction, where the loops can be transferred between the front and back needle beds. Hereinafter, the front needle bed arranged in the flat knitting machine is indicated as FB and the back needle bed is indicated as BB. Although not illustrated, the flat knitting machine includes a carriage for moving a yarn feeder by reciprocating on the bed, and for moving the knitting needles forward and backward with a cam arranged inside.

[0015] Fig. 1 shows a knitting process diagram, and Fig. 2 shows one part of the V-neck point 2 after the present invention is applied in a loop diagram. According to the V-neck point, diagonally directed stitches are formed towards the two adjacent stitches with the branch center line (a - a') interposed therebetween from both outer sides as shown in Fig. 4, but the description will be made on the stitches connecting straightly in the wale direction for the sake of convenience of the explanation.

[0016] Fig. 3 shows the vest 1 that is a knitwear with collar. The small lettered alphabet shown in Fig. 1 indicates the knitting needles a to 1 of the front needle bed FB, and the big lettered alphabet indicates the knitting needles A to L of the back needle bed BB. In Fig. 1, the number of knitting needles is less than the number used in the actual knitting for the sake of convenience of the explanation, and one portion of the course direction stitch row in the vicinity of the V-neck point of the vest is also shown in Fig. 2 and Fig. 3. If the notation such as L1 shown in Fig. 1 to Fig. 4 is the same, it refers to the same stitch row (course direction).

[0017] In Fig. 1, S + number on the left in the drawing indicates the process, the black circle in the drawing indicates a new stitch, a double circle indicates an overlapped stitch, a white circle indicates a held old stitch, and an arrow indicates the movement (transfer) of the stitch. The arrow on the right in the drawing indicates the moving direction of the yarn

feeder at the time of knitting. Furthermore, the stitches held on the knitting needles e, g of the front needle bed FB are described as two adjacent stitches in the knitting process diagram, where the branch center line (a - a') shown in Fig. 2 and Fig. 3 passes therebetween.

[0018] S1 indicates the stitch row of L3 in Fig. 4, but the knitting to obtain this is omitted. The stitches of the knitting needles a, c of the front needle bed FB are moved in the 2P right direction using empty needles of the back needle bed BB and the stitches are held on the knitting needles c, e, and similarly, the stitches of the knitting needles i, k of the front needle bed FB are moved in the 2P left direction using empty needles of the back needle bed BB and the stitches are held on the knitting needles i, g. A state in which two stitches are overlapped at the knitting needles e, g, and stitches are moved to the knitting needle and the knitting needle k by a knitting needle (not shown) is shown.

[0019] In S2, the yarn feeder is moved towards the left in the plane of drawing, and a knitting yarn is fed to the knitting needles k, i, e of the FB to carry out knit knitting. Assume the stitch formed by knit knitting with the knitting needle 3 is 10. In S3, the traveling direction of the carriage is changed and the yarn feeder is moved towards the right to feed the knitting yarn to the knitting needle g of the FB and carry out knit knitting, thus forming a stitch 11. Furthermore, in S4, the yarn feeder is moved in the left direction, and the knitting yarn is fed to the knitting needles c, a of the FB to carry out knit knitting. Although only one stitch is knitted on each knitting needle of the knitting needles a, c, e, g, i, k of the FB in the three processes of S2 to S4, three knitting yarns 16 (see L4 of Fig. 2) are crossed between the knitting needles e, g, which are two adjacent stitches, thus increasing the strength. In S2, S3, the knit stitch is formed on the back side with respect to the traveling direction of the carriage of the two adjacent stitches, and the miss stitch is formed on the front side. In the present example, the portion bridging between the stitches and the portion configuring the stitch are expressed as a knitting yarn regardless of which portion is connecting the adjacent stitches, for the sake of convenience.

[0020] In S5, the yarn feeder is moved in the right direction, and the knitting yarn is fed to the knitting needles B, D, F, H, J, L of the back needle bed BB to carry out knit knitting. In S6, the yarn feeder is moved in the left direction, and the knitting yarn is fed to the knitting needles k, g of the FB to carry out knit knitting. In S7, the stitches held on the knitting needles e, g of the FB are transferred to the knitting needles E, G of the back needle bed BB. In this case, the knitting yarn connecting to the stitch 12 held on the knitting needle g of the FB knit knitted in S6 is positioned on the outer side (when viewed from between front and back needle beds) of the stitch 10 moved to the knitting needle E of the back needle bed BB.

[0021] In S8, the back needle bed BB is racked by two needles in the left direction to transfer the stitch transferred to the knitting needle G of the BB to the knitting needle e of the FB. In S9, the back needle bed BB is racked and returned and the yarn feeder is moved in the right direction to feed the knitting yarn to the knitting needle E of the BB to carry out knit knitting and forming the stitch 13. In this case, the yarn feeder is advanced up to the position beyond the knitting needle i of the FB in view of the turn-back knitting. According to such knitting, the knitting yarn 17 continuing to the stitch 13 held on the knitting needle g of the FB newly forms the stitch 15 on the stitch 12 with the knitting needle i as the starting point, and the knitting yarn 18 is bridged cross.

[0022] In S10, the stitch 13 held on the knitting needle E of the back needle bed BB formed in S9 is transferred to the knitting needle g of the FB by racking the back needle BB by two needles in the right direction. The positions are interchanged with the knitting yarn of the adjacent stitches with the branch center line (a - a') interposed therebetween crossed by the stitch 12 and the stitch 13. The adjacent stitches are connected with four knitting yarns, i.e., two of the stitch 12 and two of the stitch 13, so that strength is improved with the knitting yarn 16 and the strength is continuously improved thereafter. The strength is further improved, so that two adjacent stitches with the branch center line interposed therebetween are prevented from being separated from each other. The crossing can be easily carried out as the yarn length increases by the stitch 13 formed in S9. The stitch 13 is formed at the back needle bed BB to further make the knitting yarn crossed between the front and back needle beds longer, but the stitch 13 may be formed at the front needle bed B although the knitting yarn length becomes smaller, and the crossing may be carried out by forming a stitch with respect to the stitch 11.

[0023] In S11, the yarn feeder is moved in the left direction to feed the knitting yarn to the knitting needles i, e, c, a of the FB including the knitting needle e of the FB that is one of the two adjacent stitches, and carry out knit knitting. In this case as well, two knitting yarns are crossed between the knitting needles i, e. In the present example, the knitting yarn is crossed between the knitting needles i, e, but is not limited thereto, and the knitting yarn may be fed to the knitting needles g, e, c, a of the FB to carry out knit knitting. Although the strength slightly lowers due to lesser knitting yarn, the appearance slightly improves as the knitting yarn does not exist.

[0024] After S11, the stitch row is knitted in the course direction so that the stitch does not loosen and then the loosening preventing process such as bind off is carried out, but the description thereof will be omitted since it is responded with the conventional knitting method. Fig. 2 is an image diagram of the loop stitches of the V-neck point, and corresponds to the knitting process diagram shown in Fig. 1.

[0025] In Fig. 2, three knitting yarns 16 exist between the stitch 10 and the stitch 11, which are two adjacent stitches, in the stitch row of L4, and four knitting yarns due to the crossing of the stitch 12 and the stitch 13 exist in the stitch row of L5. Following the step of crossing the knitting yarns, new stitch 14 and stitch 15 are formed, so that the two knitting

yarns are added with the knitting yarn 17 for the stitch 10 connecting to the stitch 14 and the knitting yarn 18 for the stitch 14 connecting to the stitch 15, thus strongly binding the two adjacent stitches.

[0026] In the knitting of S2 to S4, the knitting in reverse direction may be carried out as long as the relationship with the traveling direction is maintained for the stitches of the knitting needles e, g, which are the two adjacent stitches, and the knitting with other knitting needles may be changed. In S7 to S10, the positions are interchanged with the crossing of the stitches of the knitting needles e, g which are the two adjacent stitches, but the overlapping of stitches at the time of crossing may be reversed, and the stitches to carry out the crossing merely need to include either one of the stitches of the knitting needles e, g although the strength may lower.

[0027] Furthermore, the timing at which the stitch is formed in S9 may be shifted and may be carried out before S8. In either case, knitting can be easily carried out and the strength with respect to tension can be enhanced when feeding the knitting yarn by further forming a stitch on the stitch to be crossed.

[0028] The present invention is not limited to the examples described above, and may be appropriately changed within a scope not deviating from the gist of the invention. For instance, a four-bed flat knitting machine may be adopted.

DESCRIPTION OF REFERENCE NUMERALS

[0029]

1	vest
2	V-NECK POINT
10, 11, 12, 13, 14, 15	stitch
L1, L2, L3, L4, L5	stitch row

Claims

1. A method for knitting a knitwear with collar having a V-neck point using a flat knitting machine having a pair of front and back needle beds and in which loops can be transferred between the front and back needle beds, the method comprising the steps of:

regarding two adjacent stitches with a branch center line of the V-neck point interposed therebetween, changing a travel direction of a carriage from one to the other, and forming a miss stitch on a front side of the two adjacent stitches with respect to the traveling direction of the carriage and a knit stitch on the back side with respect to the traveling direction of the carriage; and interchanging and crossing positions of at least one of the two adjacent stitches knitted in the previous step and a stitch adjacent to the stitch.

2. The method for knitting the knitwear with collar according to claim 1, wherein the step of interchanging and crossing the positions of the stitches includes forming a new stitch following at least one of the two adjacent stitches before the interchanging of the positions is completed.

3. The method for knitting the knitwear with collar according to claim 1 or 2, wherein a new stitch is formed with respect to at least one of the two adjacent stitches following the step of interchanging and crossing the positions of the stitches.

4. A knitwear with collar, wherein regarding two adjacent stitches with a branch center line of a V-neck point interposed therebetween, a travel direction of a carriage is changed from one to the other, and a miss stitch is formed on a front side of the two adjacent stitches with respect to the traveling direction of the carriage and a knit stitch is formed on the back side with respect to the traveling direction of the carriage; and positions of at least one of the two adjacent stitches knitted and a stitch adjacent to the stitch are interchanged and crossed to form a crossing portion including a plurality of knitting yarns between the two adjacent stitches.

Fig.1

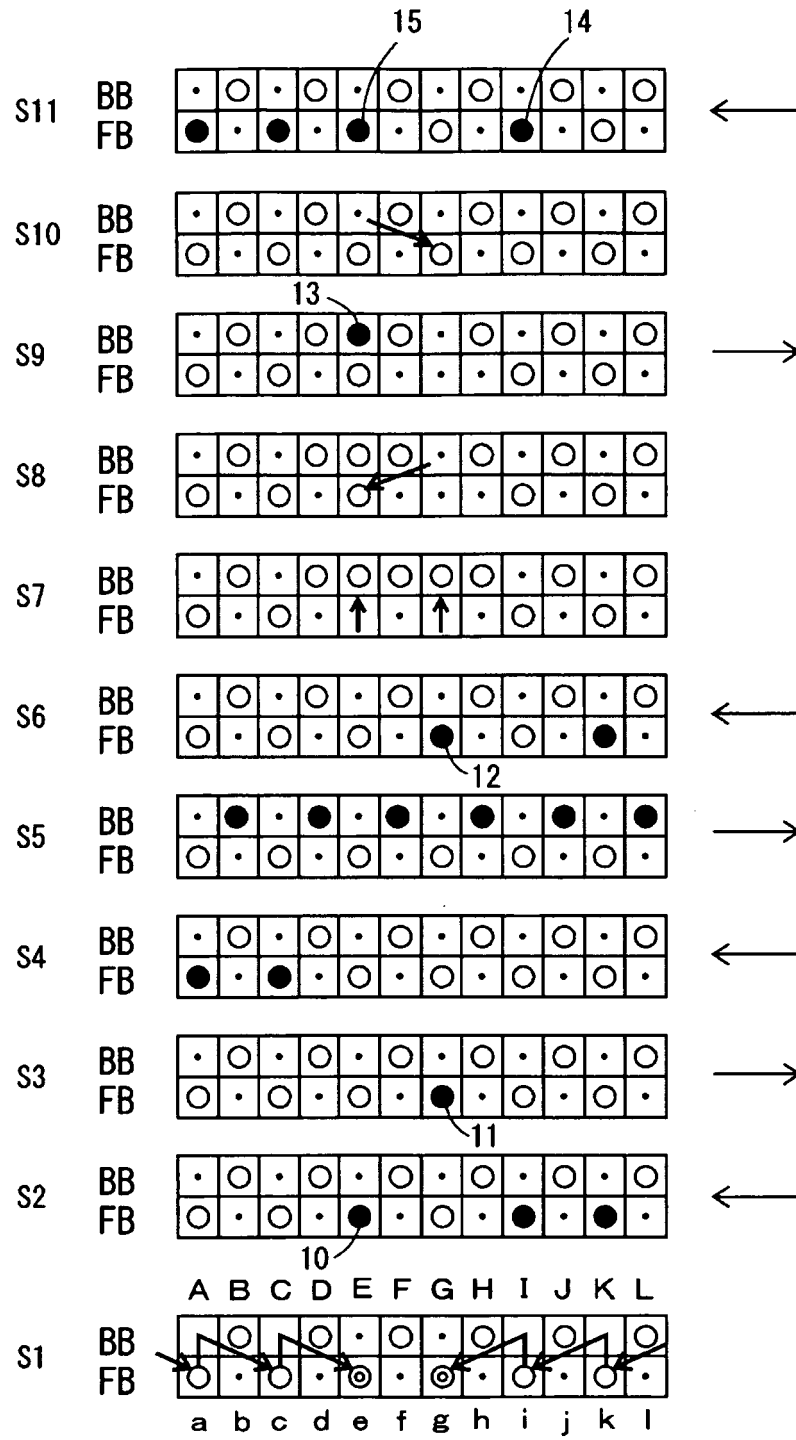


Fig.2

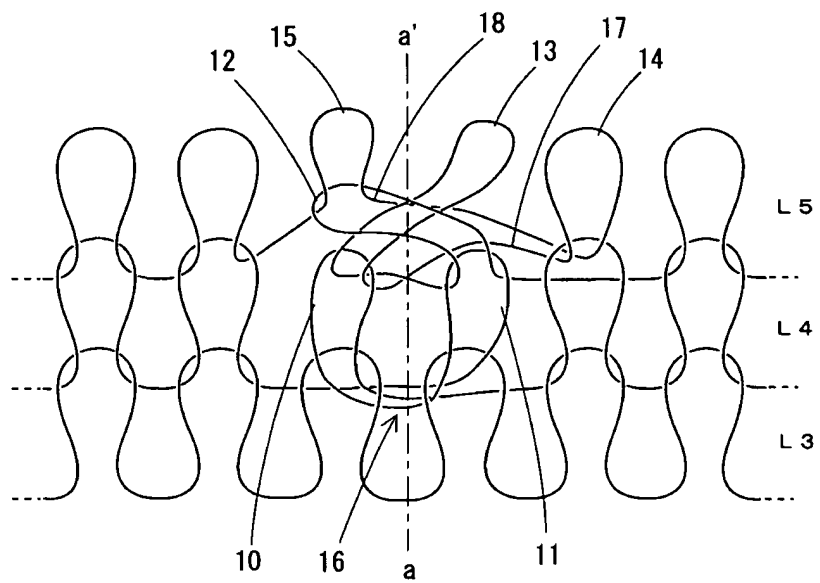


Fig.3

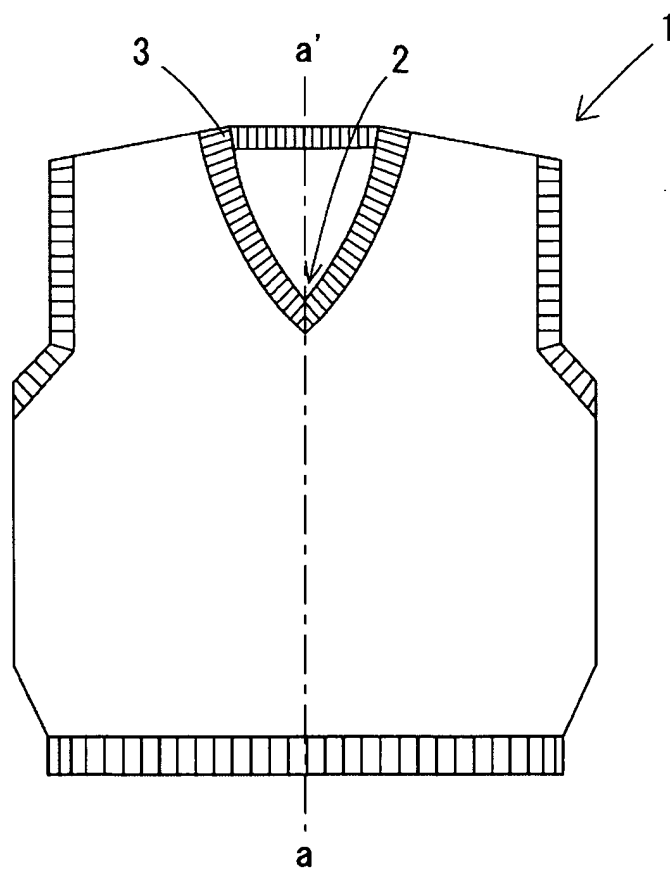
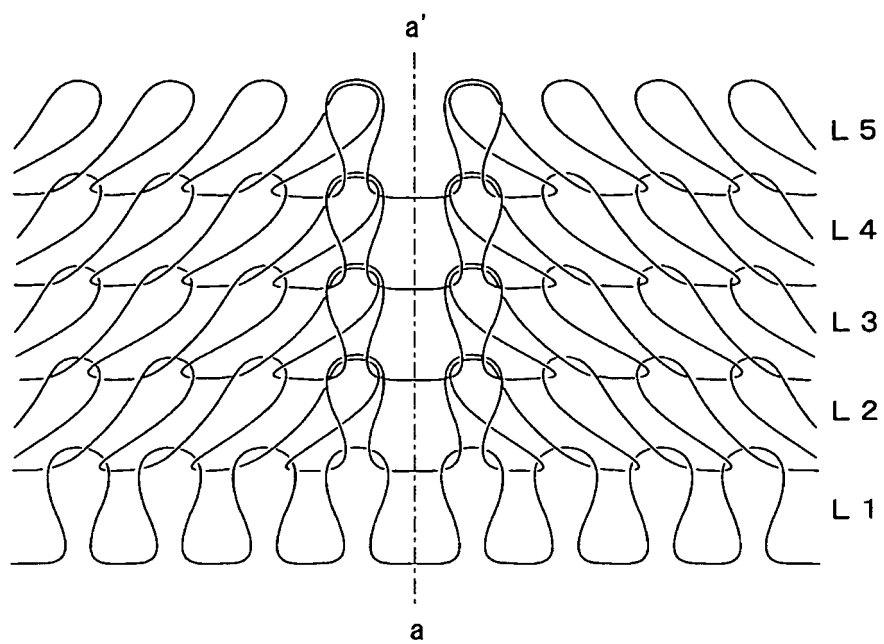


Fig.4



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/070871

A. CLASSIFICATION OF SUBJECT MATTER

D04B1/24(2006.01)i, A41D1/04(2006.01)i, A41D27/18(2006.01)i, D04B1/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
D04B1/00-39/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2010
Kokai Jitsuyo Shinan Koho	1971-2010	Toroku Jitsuyo Shinan Koho	1994-2010

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2007/029695 A1 (Shima Seiki Mfg., Ltd.), 15 March 2007 (15.03.2007), entire text & EP 1942215 A1 & CN 101263251 A	1-4
A	JP 2002-004155 A (Shima Seiki Mfg., Ltd.), 09 January 2002 (09.01.2002), entire text (Family: none)	1-4
A	JP 3863018 B2 (Shima Seiki Mfg., Ltd.), 27 December 2006 (27.12.2006), entire text & US 2003/0010067 A1 & EP 1270782 A1 & WO 2001/055491 A1 & CN 1396967 A	1-4

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

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Date of the actual completion of the international search
19 February, 2010 (19.02.10)Date of mailing of the international search report
09 March, 2010 (09.03.10)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/070871

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2006-111996 A (Shima Seiki Mfg., Ltd.), 27 April 2006 (27.04.2006), entire text & WO 2006/040952 A1	1-4

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 3863018 B [0004]