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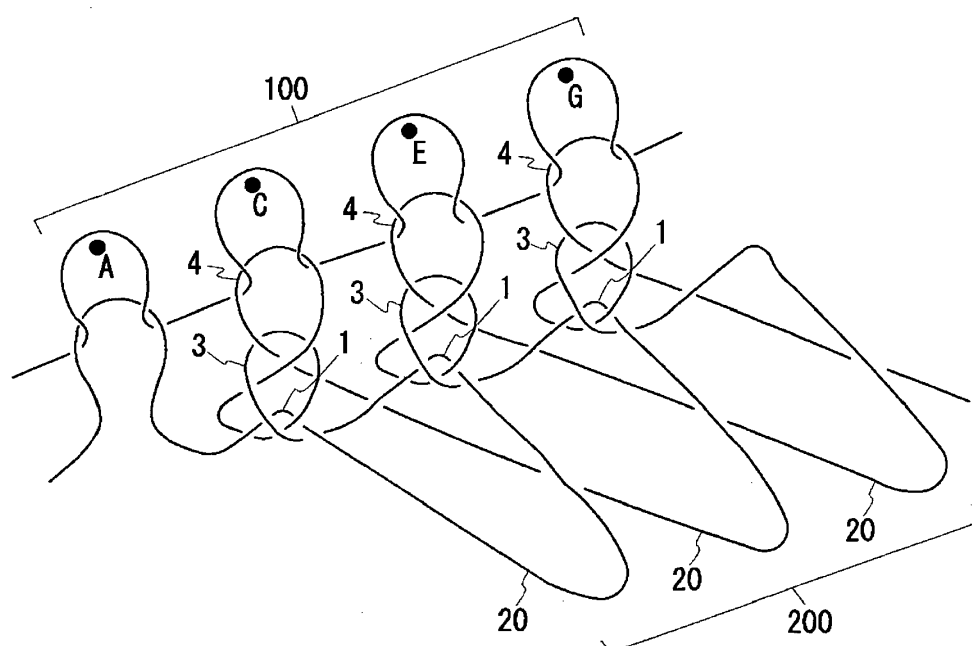
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(54) **Knitting method of knitted fabric with fringe**

(57) Provided is a knitting method of a knitted fabric with fringe capable of knitting the fringe in which a root of the fringe is fixed more securely than in the related art. Steps α to γ are repeated using a flat knitting machine to knit a fringe 20. In the step α , a starting stitch 1, which becomes a starting point of the fringe 20 is formed. In the step β carried out after the step α , a yarn feeder 9 is

moved in a direction away from the starting stitch 1 and then the yarn feeder 9 is moved in a direction toward the starting stitch 1. A temporary held stitch 2 is formed in the reciprocating movement to form the fringe 20. In the step γ carried out after the step β , a retaining stitch 3 in form of a twisted stitch following the starting stitch 1 formed in the step α is formed to fix a root of the fringe 20 formed in the step β .

Fig. 3



Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a knitting method of a knitted fabric with fringe having a fringe at an arbitrary position in a wale direction.

Description of the Related Art

[0002] A fringe is knitted on a muffler, cushion, as well as a hood, a collar, and the like of knitwear using a flat knitting machine. For example, Patent Document 1 discloses a knitting method of a knitted fabric with fringe capable of fixing the root of the fringe while knitting the fringe.

PRIOR ART DOCUMENT

PATENT DOCUMENT

[0003] [Patent Document 1] Japanese Unexamined Patent Publication No. 2006-161241

SUMMARY OF THE INVENTION

[0004] In the conventional knitting method, however, if the fringe is formed using a knitting yarn having a smooth surface, a thin knitting yarn, and the like, for example, the fringe may be pulled out if the fringe is pulled strongly. Thus, the knitting method of the knitted fabric with fringe capable of fixing the root of the fringe stronger than in the related art is desired.

[0005] The present invention has been made in view of the above circumstances, and an object of the present invention is to provide a knitting method of a knitted fabric with fringe capable of knitting the fringe in which the root of the fringe is fixed stronger than in the related art.

[0006] The present invention relates to a knitting method of a knitted fabric with fringe for knitting a knitted fabric including a base knitted fabric portion and a plurality of fringes arranged in a knitting width direction of the base knitted fabric portion using a flat knitting machine including at least a pair of a front and a back needle bed and a yarn feeder for supplying a knitting yarn to knitting needles of the needle beds and in which stitches are transferable between the front and back needle beds, where the method repeats the following steps α to γ .

[Step α] ... a step of knitting a starting stitch which becomes a starting point of the fringe.

[Step β] ... a step, carried out after the step α , of moving the yarn feeder in a direction away from the starting stitch and then moving the yarn feeder in a direction toward the starting stitch, and knitting a temporary held stitch on a knitting needle excluding the knitting needles holding the base knitted fabric portion in the reciprocating move-

ment of the yarn feeder to form the fringe.

[Step γ] ... a step, carried out after the step β , of knitting a retaining stitch in form of a twisted stitch following in a wale direction of the starting stitch formed in the step α to fix a root of the fringe formed in the step β .

The starting stitch may be a pickup stitch formed on an empty needle, or may be a stitch following a stitch branched by split knitting from the base knitted fabric portion.

[0007] The steps α to γ are repeated in the knitting method of the knitted fabric with fringe according to the present invention, and an n th step α may be carried out any time after an n -1th step α (n is an arbitrary natural number greater than or equal to two) in the repetition. Specifically, the following repeating patterns may be performed.

[1] the n th step α is performed after an n -1th step γ
(Example) step $\alpha_1 \rightarrow$ step $\beta_1 \rightarrow$ step $\gamma_1 \rightarrow$ step $\alpha_2 \rightarrow$ step $\beta_2 \rightarrow$ step $\gamma_2 \rightarrow$ step $\alpha_3 \dots$

[2] the n th step α is performed after an n -1th step β and before the n -1th step γ
(Example) step $\alpha_1 \rightarrow$ step $\beta_1 \rightarrow$ step $\alpha_2 \rightarrow$ step $\gamma_1 \rightarrow$ step $\beta_2 \rightarrow$ step $\alpha_3 \rightarrow$ step $\gamma_2 \dots$

[3] the n th step α is performed before the n -1th step β
(Example) step $\alpha_1 \rightarrow$ step $\alpha_2 \rightarrow$ step $\beta_1 \rightarrow$ step $\gamma_1 \rightarrow$ step $\alpha_3 \rightarrow$ step $\beta_2 \rightarrow$ step $\gamma_2 \rightarrow$ step $\alpha_4 \rightarrow$ step $\beta_3 \rightarrow$ step $\gamma_3 \dots$

The repeating pattern [2] is particularly the most preferable.

[0008] In one aspect of the knitting method of the knitted fabric with fringe according to the present invention, a reinforcing stitch following in the wale direction of the retaining stitch is knitted immediately after forming the retaining stitch in the step γ . In this case, the reinforcing stitch is a twisted stitch twisted in a direction opposite to the retaining stitch.

[0009] According to the knitting method of the knitted fabric with fringe of the present invention, the root of the fringe can be fixed stronger than in the related art while forming the fringe. Thus, in the knitted fabric with fringe obtained by the knitting method of the present invention, the knitting yarn is hardly displaced at the root of the fringe even if the fringe is pulled, and drawbacks such as the fringe raveling when using the knitted fabric are less likely to occur.

[0010] In the knitting method of the present invention, the starting stitch for forming the fringe may be a pickup stitch. The pickup stitch is obtained merely by hooking the knitting

yarn to the knitting needle, and when knitting a stitch following in the wale direction of the pickup stitch in continuation to the formation of the pickup stitch, for example, the pickup stitch may follow the knitting needle when the knitting needle advances in the direction of the needle bed gap. The clearing of the pickup stitch then cannot be performed, and the stitch following the pickup stitch can-

not be knitted. On the other hand, in the knitting method of the present invention, since the steps α to γ are repeated, the retaining stitch one before is always knitted (n-1th step γ) before the knitting (nth step γ) of the retaining stitch following in the wale direction of the starting stitch. The sinker loop of the retaining stitch of the n-1th step γ is lowered to the lower side of the needle bed gap by knitting, and thus a force of lowering to the lower side of the needle bed gap is also applied to the cross-over yarn between the retaining stitch and the starting stitch of the nth step γ . Therefore, in the knitting method of the present invention, the starting stitch scarcely follows the knitting needle when it advances even if the starting stitch is a pickup stitch, and hence the retaining stitch with respect to the starting stitch can be smoothly knitted. When forming the fringe, knitting the temporary held stitch to temporarily hold the fringe in the vicinity of the needle bed gap is also a factor in enabling a new retaining stitch to be smoothly knitted with respect to the starting stitch.

[0011] According to the knitting method of the present invention of the repeating pattern [2], more satisfactory finishing of the fringe and the vicinity of the root thereof can be obtained compared to other repeating patterns. Further, according to the knitting method of the present invention of the repeating pattern [2], the retaining stitch can be more smoothly knitted with respect to the starting stitch. This is because after knitting the starting stitch of the nth step α , the retaining stitch is knitted in the n-1th step γ so that the starting stitch of the nth step α connecting to the retaining stitch can be strongly lowered to the lower side of the needle bed gap. Furthermore, another factor that enables the new retaining stitch to be easily knitted with respect to the starting stitch is that, when forming the fringe in the nth step β carried out after the n-1th step γ , the knitting yarn forming the fringe crosses the cross-over yarn extending to both sides from the starting stitch of the nth step α . This is because the knitting yarn forming the fringe holds down the cross-over yarn of the starting stitch when the knitting needle is raised to knit the new retaining stitch with respect to the starting stitch.

[0012] According to the knitting method of the knitted fabric with fringe of the present invention in which the reinforcing stitch is knitted, the root of the fringe can be more securely fixed. For example, even if the fringe is formed using a thin knitting yarn or a knitting yarn with smooth surface, the root of the fringe can be reliably fixed. This is because the reinforcing stitch is twisted in a direction opposite to that of the retaining stitch, which is a twisted stitch, so that one of the reinforcing stitch and the retaining stitch squeezes the root of the fringe when the fringe is pulled.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

Fig. 1 is a view showing a photograph of a knitted

fabric with fringe according to an embodiment;

Fig. 2 is a knitting step diagram of the knitted fabric with fringe according to the embodiment;

Fig. 3 is a loop diagram schematically showing a state of a knitting yarn near the fringe knitted according to the knitting step of Fig. 2; and

Figs. 4A and 4B are loop diagrams schematically showing a state of the knitting yarn near the fringe knitted with the order of some of the processes in the knitting step diagram of Fig. 2 interchanged.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] Hereinafter, an embodiment of a knitting method of a knitted fabric with fringe according to the present invention will be described based on the drawings. In the knitting described in the embodiment, a two-bed flat knitting machine including a front needle bed (hereinafter referred to as FB) and a back needle bed (hereinafter referred to as BB) extending in a traverse direction and disposed opposite to each other in cross direction, and in which stitches can be transferred between the front and back needle beds is used. Needless to say, the flat knitting machine to be used is not limited to the two-bed flat knitting machine, and may be a flat knitting machine having a needle bed dedicated for transfer or a four-bed flat knitting machine.

[0015] The knitted fabric with fringe shown in Fig. 1 is a portion corresponding to the collar of the knitwear, and a fringe forming section 200 including a plurality of fringes 20 is formed at an intermediate portion in a wale direction of a base knitted fabric portion 100 forming the collar. The fringe forming section 200 is formed by arranging, in the wale direction, a plurality of fringe rows, each of which including the plurality of fringes 20 arranged in a knitting width direction. When wearing the knitwear having such a collar, the base knitted fabric portion 100 is folded back at the position of the fringe forming section 200 so that the fringe 20 is arranged on the outer side.

[0016] The knitting method of the knitted fabric with fringe will be described based on the knitting step diagram of Fig. 2. "S + number" described on the left column in Fig. 2 indicates the number of the knitting step, the arrow in the left and right direction and the arrow in the up and down direction in the middle column indicate the moving direction of the yarn feeder and the direction of transfer of the stitches, respectively. The right column indicates the knitting operation actually carried out in each knitting step, where black dot indicates a knitting needle, ● indicates a stitch to newly form, ○ indicates a stitch held on the needle bed, and V-letter indicates a pickup stitch. In the right column, the knitting operation that is actually carried out is indicated with a thick line.

[0017] In S1 of Fig. 2, a state in which the base knitted fabric portion 100 is knitted using the knitting needles Q, O, M, K, I, G, E, C, A of the FB is shown. The plurality of fringes 20 arranged in the knitting width direction are knit-

ted with the knitting in and after S2 from the state of S14.

[0018] In S2, the stitches of the base knitted fabric portion 100 excluding the stitch of the knitting needle A of the FB are transferred to the BB. This is the preparation step of moving the base knitted fabric portion 100 out from a region where the fringe 20 is to be knitted in the FB so that the fringe 20 is not knitted into the base knitted fabric portion 100.

[0019] In S3, a yarn feeder 9 is moved toward the right direction in the plane of drawing to knit a stitch 101 following in a wale direction of the stitch of the base knitted fabric portion 100 held on the knitting needle A of the FB, and then the pickup stitches are formed on the knitting needles C, F, L of the FB, which are empty needles. Among the pickup stitches formed in S3, the pickup stitch of the knitting needle C is a starting stitch 1 that becomes the starting point of the first fringe 20. The remaining pickup stitches are temporary held stitches 2 that provide a predetermined length to the fringe 20 and will be removed from the needle bed later on. The temporary held stitches 2 are formed on the knitting needles on which the stitches of the base knitted fabric portion 100 are not held in S1. The temporary held stitches 2 merely need to be held on the needle bed at least until the end of S5 of fixing the root of the fringe 20, and can be removed from the needle bed at an arbitrary timing after S5 (may be held on the needle bed until the knitting of the knitted fabric with fringe is finished). The illustration of the held state of the temporary held stitches 2 will be omitted hereinafter.

[0020] In S4, the yarn feeder 9 is moved toward the left direction in the plane of drawing to knit pickup stitches on the knitting needles P, J, E of the FB, which are empty needles. The first fringe 20 is formed by S3, S4. Among the pickup stitches formed in S4, the pickup stitches of the knitting needles P, J are temporary held stitches 2 that give a predetermined length to the fringe 20. The pickup stitch of the knitting needle E is a starting stitch 1 that becomes the starting point of the second fringe 20.

[0021] In S5, the yarn feeder 9 is moved toward the right direction in the plane of drawing to knit a stitch (retaining stitch 3) following in the wale direction of the starting stitch 1 formed on the knitting needle C in S3, and then the yarn feeder 9 is moved toward the left direction in the plane of drawing. The retaining stitch 3 is a twisted stitch that has a role of fixing the root of the fringe 20 formed in S3, S4. The starting stitch 1 for newly knitting the retaining stitch 3 is a pickup stitch, but the starting stitch 1 is pulled down to the lower side of the needle bed gap by a stitch 101 of the knitting needle A. Thus, the starting stitch 1 is easily cleared and the retaining stitch 3 is easily knitted when knitting the new retaining stitch 3 on the starting stitch 1. The starting stitch 1 is pulled down to the lower side of the needle bed gap by the stitch 101 because the stitches 101, 1 are connected with a cross-over yarn and the stitch 101 is lowered to the lower side of the needle bed gap by knitting, and hence a force of lowering to the lower side of the needle bed gap is applied on the starting stitch 1.

[0022] In S6, the yarn feeder 9 is moved toward the right direction in the plane of drawing to knit a stitch (reinforcing stitch 4) following in the wale direction of the retaining stitch 3 formed in S5, and then the yarn feeder 9 is moved toward the left direction in the plane of drawing. The reinforcing stitch 4 is a twisted stitch in which the twisting direction is opposite to that of the retaining stitch 3. With the reinforcing stitch 4 twisted in the opposite direction to the retaining stitch 3, which is the twisted stitch, one of the reinforcing stitch 4 and the retaining stitch 3 is always in a state of squeezing the root of the fringe 20 when the fringe 20 is pulled. As a result, the root of the fringe 20 can be fixed securely even if a thin knitting yarn or a knitting yarn of smooth surface is used. The knitting of the reinforcing stitch 4 is not essential, and S7 to be described below may be performed without performing S6 after S5. The reinforcing stitch 4 may be knitted when the yarn feeder 9 is moved toward the left direction in the plane of drawing in S5, whereby the reinforcing stitch 4 will be a non-twisted stitch (in this case, S6 is omitted). However, the root of the fringe 20 can be securely fixed if the stitches 3, 4 are both twisted stitches.

[0023] In S7, the yarn feeder 9 is moved toward the right direction in the plane of drawing to form a temporary held stitch 2 on the knitting needles H, N of the FB, and in S8, the yarn feeder is moved toward the left direction in the plane of drawing to form the temporary held stitch 2 on the knitting needles R, L of the FB and the starting stitch 1, which becomes the starting point of the third fringe 20, on the knitting needle G.

[0024] In S9, S10, the knitting of the retaining stitch 3 and the reinforcing stitch 4 following in the wale direction of the starting stitch 1 of the knitting needle E formed in S4 is carried out to securely fix the root of the second fringe 20. Although the starting stitch 1 is a pickup stitch, the retaining stitch 3 can be easily knitted in the wale direction of the starting stitch 1. This is because the retaining stitch 3 (see S4, S5) connecting to the left side in the plane of drawing of the starting stitch 1 of the knitting needle E lowers to the lower side in the needle bed gap by knitting, so that the starting stitch 1 is strongly pulled to the lower side in the needle bed gap. In addition, the crossing of the knitting yarn of the fringe 20 formed in S7 with the cross-over yarn extending to both sides of the starting stitch 1 of the knitting needle E is another factor that causes the retaining stitch 3 to be easily knitted. This is because, when knitting the new retaining stitch 3 on the starting stitch 1 of the knitting needle E, the knitting yarn of the fringe 20 that crosses the cross-over yarn extending to both sides of the starting stitch 1 holds down the cross-over yarn.

[0025] As described above, in the knitting steps of Fig. 2, the step α , to the step γ in the knitting method of the present invention is repeated in the order of step α , (first half of S3) \rightarrow step β (second half of S3 + first half of S4) \rightarrow step α (second half of S4) \rightarrow step γ (S5 + S6) \rightarrow step β (S7 + first half of S8) \rightarrow step α (second half of S8) \rightarrow step γ (S9 + S10) ... That is, the nth step α is carried out

between the n-1th step β and step γ . After S10, the knitting similar to S7 to S10 is repeated while changing the positions of the knitting needles, thus knitting a fringe row including a plurality of fringes 20 arranged in the knitting width direction. When the number of fringes 20 increases, the FB may run short of empty needle for knitting the temporary held stitch 2, in which case, the temporary held stitch 2 of the new fringe 20 may be formed following the temporary held stitch 2 already held on the FB.

[0026] In S11, a state in which the plurality of fringes 20 are finished being formed and the reinforcing stitch 4 for fixing the root of the fringe 20 is held on the knitting needles C, E, G, I, K, M, O Q of the FB is shown. From the state of S11, in S12, in order to fix the fringes 20 to the base knitted fabric portion 100, the stitches of the base knitted fabric portion 100 moved to the BB are overlapped with the reinforcing stitches 4 of the FB and stitches following such double stitches are knitted. As a result, the fringe row including the plurality of fringes 20 arranged in the knitting width direction is fixed to the base knitted fabric portion 100.

[0027] The knitted fabric with fringe shown in Fig. 1 is a knitted fabric in which a plurality of fringe rows are arranged in the wale direction, and thus the knitting of the fringe row starting from S1 is further carried out after S12. After knitting the desired number of fringe rows, the base knitted fabric portion 100 is further knitted after S12 in which the last fringe row is fixed to the base knitted fabric portion 100 to complete the knitted fabric with fringe of Fig. 1. Needless to say, the base knitted fabric portion 100 may be knitted to some extent between the fringe rows.

[0028] In the knitted fabric with fringe knitted according to the knitting steps described above, the root of the fringe is securely fixed, and drawbacks such as the fringe being pulled out when using the knitted fabric are less likely to occur. The reason therefor will be explained based on the loop diagram of Fig. 3.

[0029] Fig. 3 is a loop diagram showing a state of the stitches in the vicinity of the fringe 20 at the time point when S12 in the knitting steps of Fig. 1 is finished. As shown in Fig. 3, the retaining stitch 3 and the reinforcing stitch 4 following the starting stitch 1 that becomes the root of the fringe 20 are formed, and such stitches 3, 4 are connected to the fringe 20. Therefore, if the fringe 20 is pulled, the stitches 3, 4 connecting to the fringe 20 are contracted small, thus squeezing the root of the stitch connecting in the wale direction of the respective stitches 3, 4. As a result, the root of the fringe 20 is fixed, and drawbacks such as the fringe 20 being pulled out are less likely to occur.

<Second embodiment>

[0030] According to an embodiment different from the first embodiment, for example, the nth step α , may be carried out before the n-1th step β . Specifically, the knitting of the starting stitch 1 of the knitting needle E (knitting

needle G) carried out in S4 (S8) of Fig. 2 is carried out in S3 (S7). The knitted fabric with the fringe 20 in a state shown in a loop diagram of Fig. 4A thus can be knitted. Furthermore, the nth step α may be carried out after the n-1th step γ . Specifically, the knitting of the starting stitch 1 of the knitting needle E carried out in S4 of Fig. 2 is carried out in S7, and the knitting of the starting stitch 1 of the knitting needle G carried out in S8 is carried out after S10. The knitted fabric with the fringe 20 in a state shown in a loop diagram of Fig. 4B thus can be knitted. The root of the fringe 20 can be securely fixed by such knitting.

[0031] The present invention is not limited to the embodiment described above, and modifications can be appropriately made within a scope not deviating from the gist of the invention. For example, a knitted fabric in which the fringe row is formed at the terminating end of the knitted fabric can be obtained by performing the bind-off process on the stitches held on the FB in S12 of Fig. 2. A knitted fabric having a fringe row at both ends in the wale direction such as a scarf or the like can be knitted by applying this. Specifically, a set-up portion is formed, the knitting of Fig. 2 is carried out with respect to the set-up portion, and thereafter, the base knitted fabric portion 100 that becomes the main body of the scarf is knitted. After performing the knitting of Fig. 2 on the terminating end of the base knitted fabric portion 100, the bind-off process is performed on the stitches held on the needle beds.

Claims

1. A knitting method of a knitted fabric with fringe for knitting a knitted fabric including a base knitted fabric portion (100) and a plurality of fringes (20) arranged in a knitting width direction of the base knitted fabric portion (100) using a flat knitting machine including at least a pair of a front and a back needle bed and a yarn feeder (9) for supplying a knitting yarn to knitting needles of the needle beds and in which stitches are transferable between the front and back needle beds, the method **characterized by** repeating:

a step α of knitting a starting stitch (1) which becomes a starting point of the fringe (20);

a step β , carried out after the step α , of moving the yarn feeder (9) in a direction away from the starting stitch (1) and then moving the yarn feeder (9) in a direction toward the starting stitch (1), and knitting a temporary held stitch (2) on a knitting needle excluding the knitting needles holding the base knitted fabric portion (100) in the reciprocating movement of the yarn feeder to form the fringe (20); and

a step γ , carried out after the step β , of knitting a retaining stitch (3) in form of a twisted stitch following in a wale direction of the starting stitch

- (1) formed in the step α to fix a root of the fringe
(20) formed in the step β .

2. The knitting method of the knitted fabric with fringe according to claim 1, **characterized in that** 5
an n th step α is carried out after an $n-1$ th step β and before an $n-1$ th step γ , n being an arbitrary natural number greater than or equal to two.
3. The knitting method of the knitted fabric with fringe 10
according to claim 1 or 2, **characterized in that**
in the step γ , a reinforcing stitch (4), which is a twisted stitch, following in the wale direction of the retaining stitch (3) and twisted in a direction opposite to the retaining stitch (3) is knitted immediately after forming the retaining stitch (3). 15

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Fig. 1

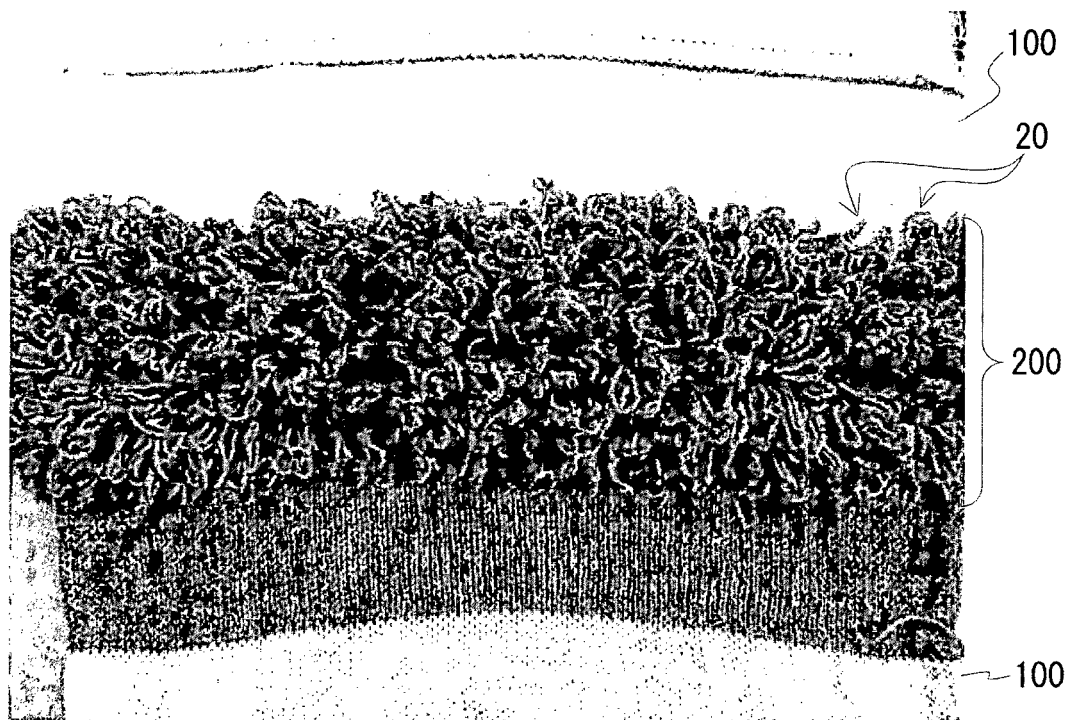


Fig. 2

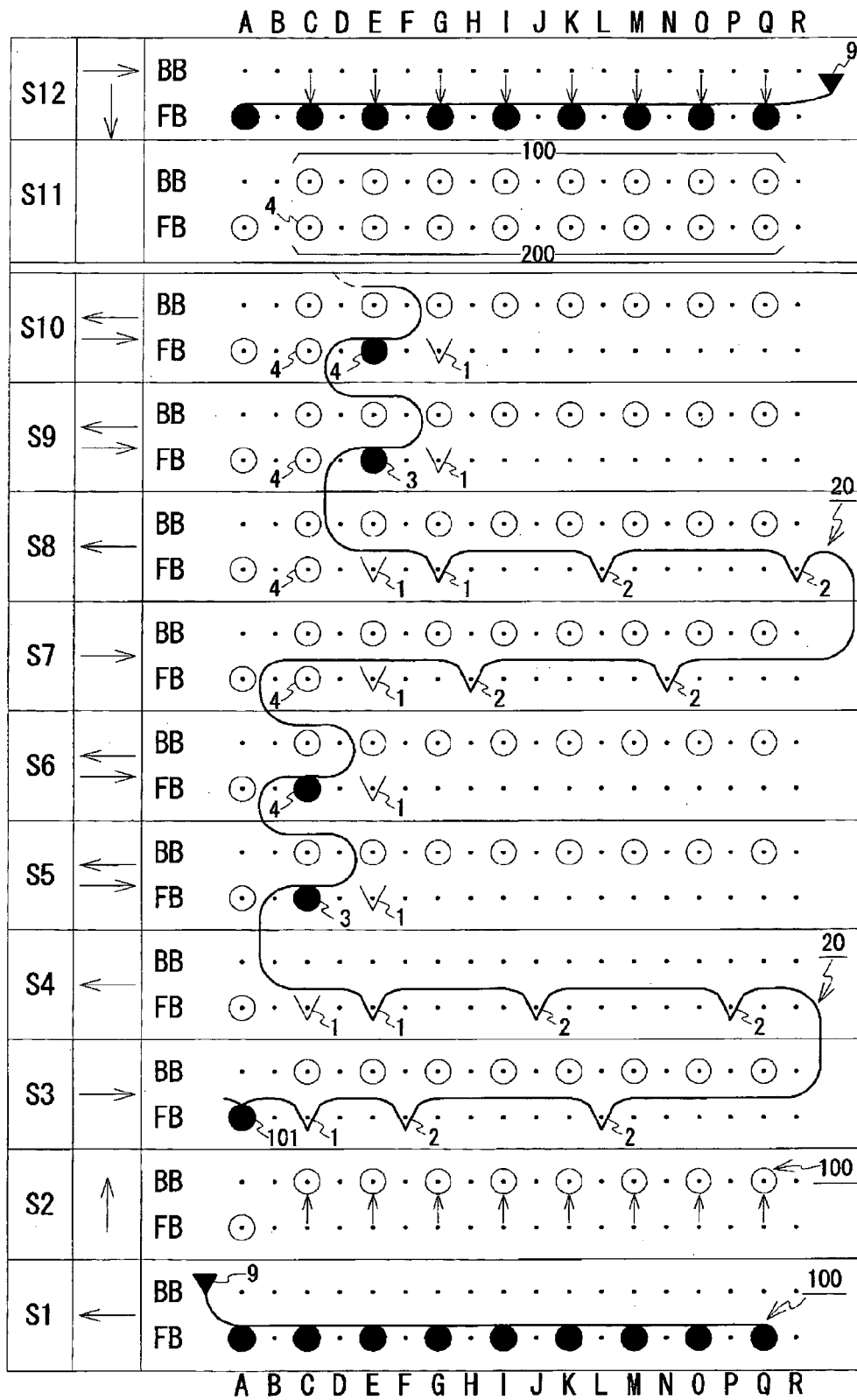


Fig. 3

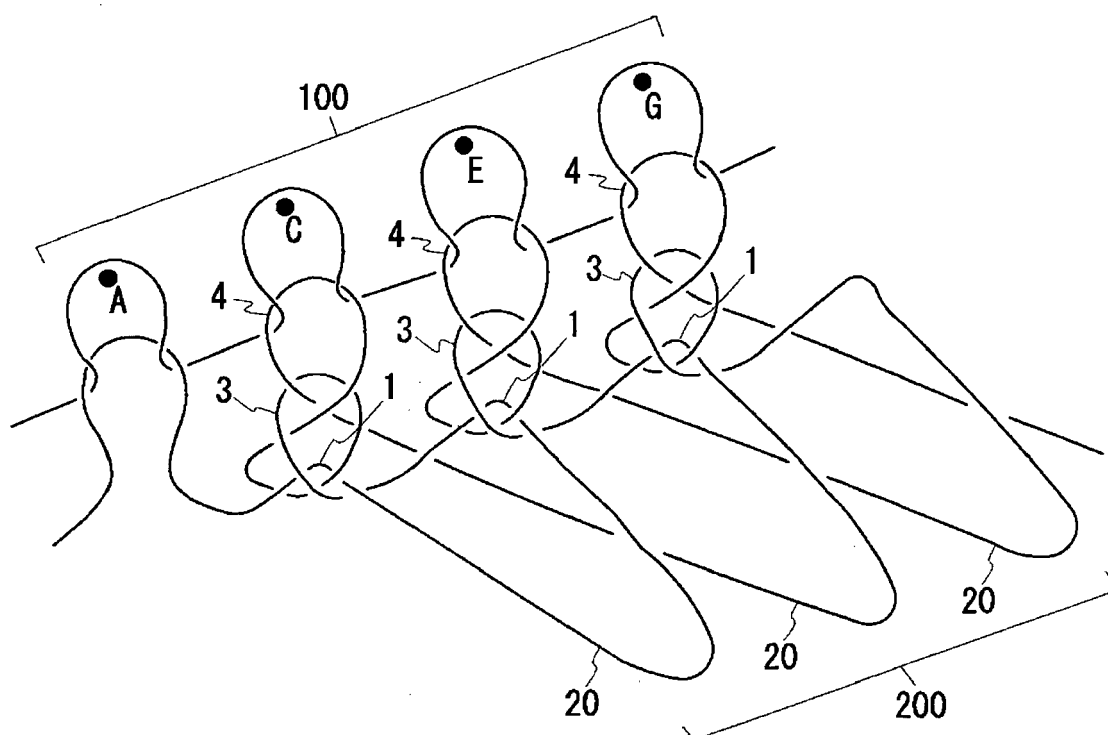
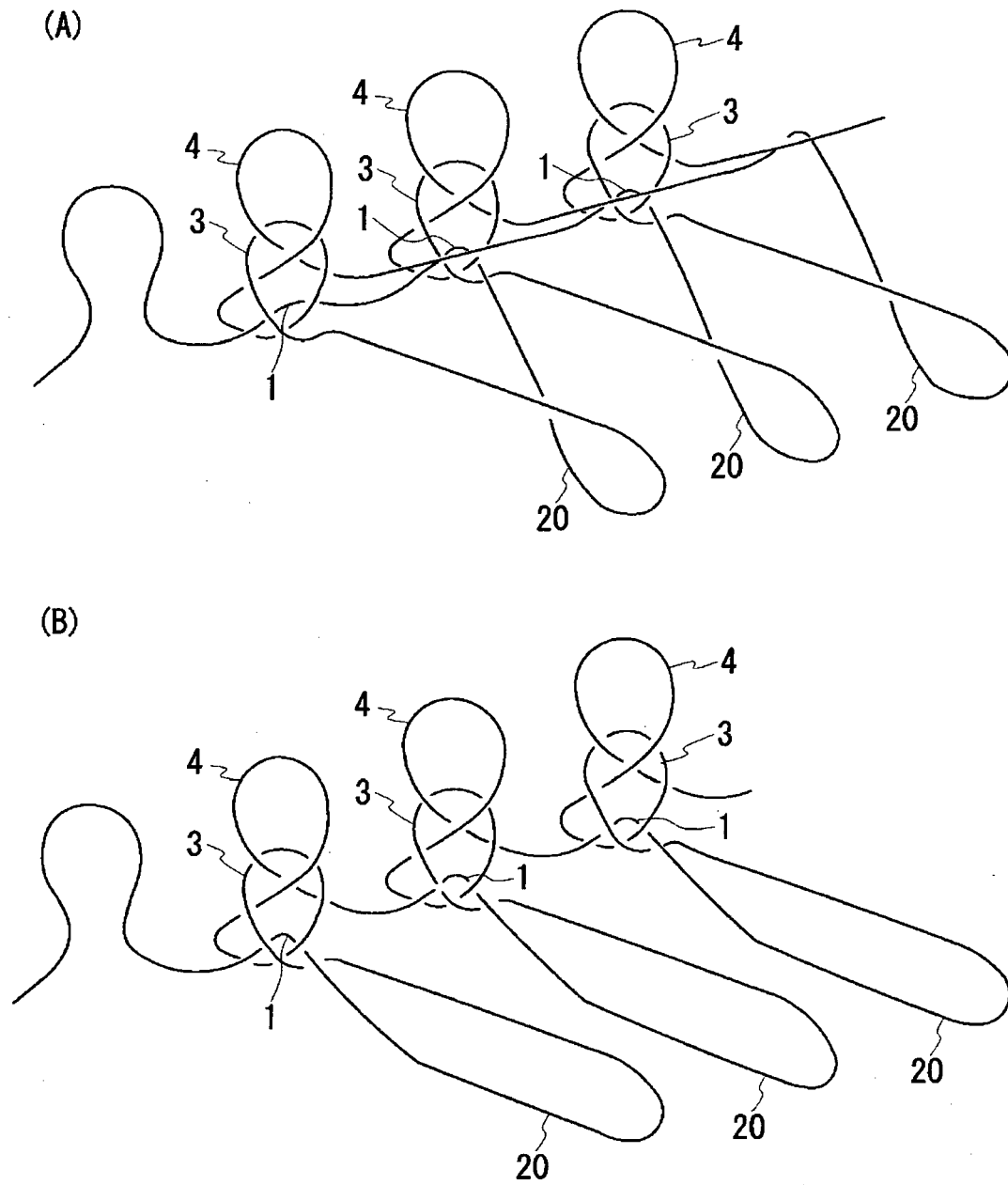


Fig. 4





EUROPEAN SEARCH REPORT

Application Number
EP 13 00 0988

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	JP 2006 161241 A (SHIMA SEIKI MFG) 22 June 2006 (2006-06-22) * abstract; figures 2, 3 *	1-3	INV. D04B1/02
A	EP 2 157 219 A1 (SHIMA SEIKI MFG [JP]) 24 February 2010 (2010-02-24) * paragraph [0068] - paragraph [0103]; figures 9-13 *	1-3	
			TECHNICAL FIELDS SEARCHED (IPC)
			D04B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 10 July 2013	Examiner 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 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 00 0988

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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10-07-2013

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EP 2157219 A1	24-02-2010	CN 101663428 A	03-03-2010
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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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