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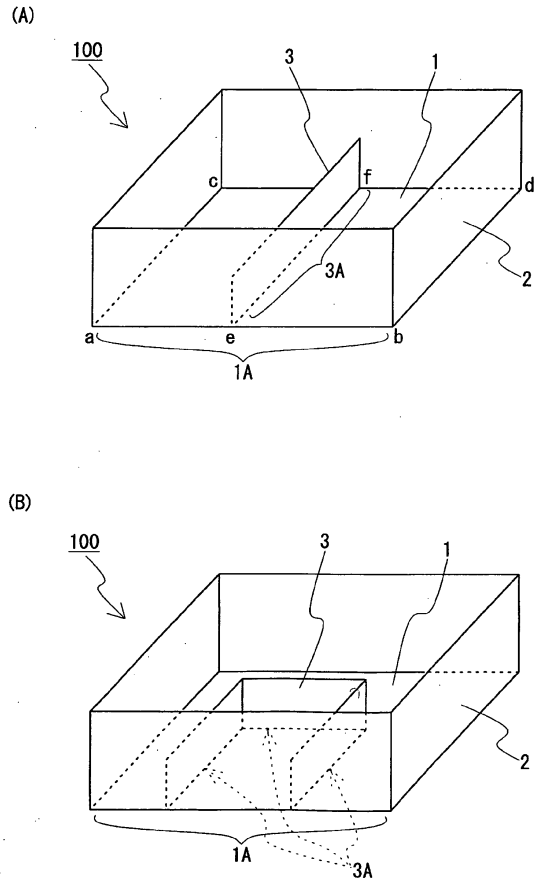
(54) Knitting method of tubular knitted fabric, and tubular knitted fabric

(57) Provided is a knitting method of a tubular knitted fabric capable of forming a partitioning section up to a distal end of a closed tubular knitted fabric. A plurality of stitches are formed on a front needle bed (FB) and a back needle bed (BB), and a first setup portion (1A) comprising such stitches is formed. A base surface (1) in which outer peripheral sides are all held on the front and back needle beds is formed with the first setup portion (1A) (position of side ab) as a starting line, and a second setup portion (3A) comprising a plurality of pick up stitches connecting to a plane of the base surface (1) is formed. A partitioning section is knitted following the second setup portion (3A) (position of side ef) while knitting a main body section (2) following the outer peripheral sides abdc of the base surface (1).

Fig. 1



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Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a knitting method of a tubular knitted fabric for knitting a seamless tubular knitted fabric including a main body section knitted to a tubular shape and a partitioning section formed inside the main body section, and a tubular knitted fabric obtained by such a knitting method.

Description of the Related Art

[0002] A sock (tubular knitted fabric) having a plurality of tubular toe portions is widely hitting the market in recent years. However, some people distance themselves from such a sock due to its appearance. Proposal has been made to form a partitioning section inside a toe portion of the sock. In order to knit such a sock in a seamless manner with a flat knitting machine, a knitting method of starting the knitting of the sock to a tubular shape from a top portion, and forming the partitioning section inside a tube held on a needle bed at the start of the knitting of the toe portion is required. For example, Patent Document 1 discloses a knitting method of forming the partitioning section in a traversable manner.

PRIOR ART DOCUMENT

PATENT DOCUMENT

[0003] [Patent Document 1] Japanese Unexamined Patent Publication No. 2007-113150

[0004] However, if the partitioning section is arranged inside the sock, the partitioning section cannot be formed to the distal end of the toe portion of the sock. This is because the partitioning section cannot be satisfactorily coupled to the toe portion when closing the toe portion and completing the sock. Thus, if the sock in which the partitioning section is not formed to the distal end of the toe portion is worn, the ends of the adjoining toes touch each other. Some people feel this unpleasant, and hence improvement is desired.

SUMMARY OF THE INVENTION

[0005] In view of the above situations, it is an object of the present invention to provide a knitting method of a tubular knitted fabric capable of forming a partitioning section up to a distal end of a closed side in a tubular knitted fabric in which one end is closed, as represented by a sock, and a tubular knitted fabric knitted by such a knitting method.

[0006] The inventors of the present invention have changed the way of thinking in the process of variously reviewing the above mentioned problem and solved the problem by setting up the tubular knitted fabric from a distal end of the closed side. Hereinafter, a knitting method of a tubular knitted fabric of the present invention and a tubular knitted fabric knitted with the knitting method will be described.

[0007] A knitting method of a tubular knitted fabric of the present invention is a knitting method of a tubular knitted fabric for knitting, in a seamless manner, a tubular knitted fabric including a main body section, which is knitted to a tubular shape, and a partitioning section, which is formed inside a tube of the main body section to partition the inside of the tube, using a flat knitting machine having at least a front needle bed and a back needle bed, a stitch held on a knitting needle of the needle beds being transferrable to another knitting needle; the knitting method of the tubular knitted fabric including the following steps.

(Step α) a step of forming a plurality of stitches on the front and back needle beds, and forming a first setup portion comprising the stitches.

(Step β) a step of forming a base surface in which outer peripheral sides are all held on the front and back needle beds with the first setup portion as a starting line, and forming a second setup portion comprising a plurality of pick up stitches connecting to a plane of the base surface.

(Step γ) a step of knitting the partitioning section following the second setup portion while knitting the main body section following the outer peripheral sides of the base surface.

In this case, the formation of the base surface in the step P is carried out by repeating knitting of a base surface stitch row, moving the base surface stitch row to one side in a knitting width direction, and forming a pick up stitch on a knitting needle, which became an empty needle by the movement, and on an empty needle substantially facing an end in a moving direction of the moved base surface stitch row. The formation of the second setup portion in the step β is carried out by forming at least one pick up stitch on an empty needle within a knitting width of the base surface stitch row in the middle of knitting of the base surface stitch row.

[0008] According to one aspect of the knitting method of the tubular knitted fabric of the present invention, two or more second setup portions may be formed in the step β. For example, when knitting a sock with the knitting method of the tubular knitted fabric of the present invention, as shown in a second embodiment, which will be described later, a plurality of partitioning sections are formed inside the sock to form toe inserting sections for inserting respective toes of a wearer.

[0009] According to one aspect of the knitting method of the tubular knitted fabric of the present invention, the knitting of the base surface stitch row in the step β is preferably carried out with either of the front or back needle bed.

[0010] The first setup portion formed in the step α can be divided to a portion held on the front needle bed and a portion held on the back needle bed. Of these, the base

surface stitch row may be increased in the wale direction only on one needle bed so that the formed state of the stitches configuring the entire base surface is aligned. Needless to say, the base surface may be formed by increasing the base surface stitch row in the wale direction on the front needle bed and increasing the base surface stitch row in the wale direction also on the back needle bed.

[0011] A tubular knitted fabric of the present invention is a tubular knitted fabric, including a main body section, which is knitted to a tubular shape, and a partitioning section, which is formed inside a tube of the main body section to partition the inside of the tube, the tubular knitted fabric being knitted in a seamless manner using a flat knitting machine having at least a front needle bed and a back needle bed, a stitch held on a knitting needle of the needle beds being transferrable to another knitting needle. The tubular knitted fabric of the present invention includes a base surface for enabling a distal end portion of the main body section to be three-dimensional, where the partitioning section is set out from a plane on an interior side of the main body section of the base surface.

[0012] According to the knitting method of the tubular knitted fabric of the present invention, a tubular knitted fabric of the present invention including a base surface and a tubular main body section set out from outer peripheral sides of the base surface, the tubular knitted fabric of the present invention including a partitioning section set out from a plane of the base surface can be knitted. Examples of the tubular knitted fabric of the present invention include a sock, a bag, and the like. For example, if the sock is knitted by the knitting method of the tubular knitted fabric of the present invention, a sock in which a partitioning section is formed inside a tube of the sock and in which the partitioning section reaches up to a portion on the most distal end of the toe portion of the sock can be knitted. This sock prevents contact between the toes when worn, and thus is very comfortable to wear.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013]

Fig. 1A is a schematic view of a tubular knitted fabric including a partitioning section shown in a first embodiment, and Fig. 1B is a schematic view of the tubular knitted fabric including a partitioning section different from Fig. 1A;

Fig. 2 is a knitting step diagram showing knitting steps of the tubular knitted fabric of the first embodiment;

Figs. 3A to 3D are image diagrams showing a held state of the stitches in the knitting process of the tubular knitted fabric of the first embodiment, where Fig. 3A shows a state in which pick up stitches are formed on front and back needle beds, Fig. 3B shows a state in which a tubular knitting is carried out on the pick up stitches, Fig. 3C shows a state in the middle of knitting a base surface, and Fig. 3D shows a state immediately before the base surface is completed; and

Fig. 4A is a schematic view of a sock including a partitioning section shown in a second embodiment, and Fig. 4B is a partially enlarged view of Fig. 4A.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] Hereinafter, embodiments of the present invention will be described based on the drawings. In all the knitting described in the embodiments, there will be described a knitting example using a two-bed flat knitting machine having a front and a back needle bed extending in a transverse direction and disposed opposite to each other in a cross direction, stitches capable of being transferred between the front and back needle beds. The flat knitting machine to use may, of course, be a flat knitting machine having a transfer dedicated bed, a flat knitting machine including knitting needles for temporarily holding stitches, or a four-bed flat knitting machine, where the knitting of the present embodiment can be more efficiently carried out by using them.

<First embodiment>

[0015] A tubular knitted fabric 100 of the present embodiment shown in Fig. 1A includes a main body section 2 knitted to a tubular shape, a planar base surface 1 for closing one end side (lower side in plane of drawing) of the main body section 2, and a partitioning section 3 formed inside the main body section 2 to connect an inner peripheral surface of the main body section 2 and the base surface 1. The other end side (upper side in plane of drawing) of the main body section 2 is opened, and the partitioning section 3 is formed up to the middle in the axial direction of the main body section 2. The most characteristic feature of the tubular knitted fabric 100 of the present embodiment is that the shape on the one end side of the main body section 2 is closed in a form of matching the shape of the outer peripheral side of the planar base surface 1, so that the main body section 2 has a three-dimensional shape and that the partitioning section 3 formed inside the main body section 2 is set up from the base surface 1.

[0016] In order to knit the tubular knitted fabric 100 of Fig. 1A, a first setup portion 1A (position of side ab) for knitting the base surface 1 is first formed, and the base surface 1 is knitted with the first setup portion 1A as the starting line. In this case, a second setup portion 3A (position of side ef) for knitting the partitioning section 3 is formed in a plane of the base surface 1 at the same time as forming the base surface 1. The partitioning section 3 is knitted following the second setup portion 3A while knitting the main body section 2 following the outer peripheral sides of the base surface 1. The partitioning section 3 may have the end thereof subjected to a bind-off

process or the like after being knitted to a desired height. The main body section 2 may also have the end thereof subjected to a bind-off process or the like after being knitted to a desired height (normally height of higher than or equal to height of partitioning section 3). The tubular knitted fabric 100 is completed through such series of knitting. The height of the partitioning section 3 may be higher than the height of the main body section 2. In this case, a portion in the partitioning section 3 that projects out than the main body section 2 may be folded so as to cover one of the two openings of the main body section 2 partitioned by the partitioning section 3 and held with a button or the like, so that such a projecting portion can be used as a cover of the one opening.

[0017] Next, one example of a specific knitting step of the tubular knitted fabric 100 will be described with reference to a knitting step diagram of Fig. 2 and an image diagram of Fig. 3. In the knitting step diagram of Fig. 2, "S + number" on the left column indicates a step number. A to X in the middle column in the figure indicate the positions of the knitting needles of the front needle bed (hereinafter referred to as FB) and the back needle bed (hereinafter referred to as BB), O indicates an old stitch, • indicates a new stitch knitted in each step, V-letter indicates a pick up stitch or a tuck stitch, and a portion where the knitting operation is actually carried out in each knitting step is shown with a thick line. The positions of a to f in the middle column coincide with the positions of a to f in Fig. 1. Furthermore, arrow + "K" in a left and right direction in the right column in the figure means carrying out knitting while moving a yarn feeder in the direction of the arrow, an arrow in an up and down direction means carrying out transfer in the direction of the arrow, and the operation on the left side in the plane of drawing is carried out first. The description will be made with the number of knitting needles fewer than the number used in the actual knitting to facilitate the explanation, and the racking in the transfer is omitted.

[0018] First, in S0 of Fig. 2, pick up stitches are alternately formed on the knitting needles A, C, E, G, I, K, M, O, Q of the FB and the knitting needles B, D, F, H, J, L, N, P, R of the BB (see also Fig. 3A).

[0019] In S1, a stitch row following a plurality of the pick up stitches formed on the knitting needles of the BB in S0 is formed while moving the yarn feeder in the left direction in the plane of drawing, and in S2, a new stitch row following a plurality of the pick up stitches formed on the knitting needles of the FB in S0 is formed while moving the yarn feeder in the right direction in the plane of drawing. The knitting of S1, S2 is a so-called tubular knitting, where the first setup portion 1A for setting up the base surface 1 is formed by such tubular knitting (see also Fig. 3B).

[0020] In S3, a pick up stitch is formed on the knitting needle S of the FB and then a new stitch row following the stitch row knitted in S1 is formed while moving the yarn feeder in the left direction in the plane of drawing.

[0021] In S4, the stitch row formed on the knitting needles B, D, F, H, J, L, N, P, R of the BB in S3 is transferred to the knitting needles D, F, H, J, L, N, P, R, T of the BB through the knitting needles of the FB. Furthermore, in S4, a pick up stitch is formed on the knitting needle B of the BB, which became an empty needle by the movement of the stitches, and then stitches are formed on the knitting needles D, F, H of the BB, a pick up stitch is formed on the knitting needle H of the FB, and stitches are formed on the knitting needles J, L, N, P, R, T of the BB.

[0022] According to S3 and S4, as shown in Fig. 3C, a base surface stitch row, which is a new stitch row, following the stitch row held on the BB, of the first setup portion 1A is knitted, and such a base surface stitch row is moved to one side (right direction in plane of drawing) in the knitting width direction. The pick up stitches are formed on the knitting needle (position of V-letter mark on left side in plane of drawing in BB), which became an empty needle by the relevant movement, and on the empty needle (position of V-letter mark on the right side in the plane of drawing in FB) substantially facing an end in a moving direction of the moved base surface stitch row. The knitting (see S5 to S8, last half of S10) similar to S3 and S4 is repeated to knit the base surface 1.

[0023] In S5, a pick up stitch is formed on the knitting needle U, which is an empty needle substantially facing an end in the moving direction of the stitch row moved in S4, and then a new stitch row following the stitch row (knitting needles T, R, P, N, L, J, H, F, D of BB) formed in S4 is formed.

[0024] In S6, the stitch row formed on the knitting needles D, F, H, J, L, N, P, R, T of the BB in S5 is transferred to the knitting needles F, H, J, L, N, P, R, T, V of the BB through the knitting needles of the FB. In S6, a pick up stitch is formed on the knitting needle D of the BB, which became an empty needle by the movement of the stitch row, and then a stitch row is formed on the knitting needles F, H, J of the BB, a pick up stitch is formed on the knitting needle J of the FB, and a stitch row is formed on the knitting needles L, N, P, R, T, V of the BB. The pick up stitch to form on the knitting needle J of the FB in S6 is formed on the adjacent empty needle in the moving direction of the stitch row with respect to the pick up stitch formed on the knitting needle H of the FB in S4. The transfer of stitches in S6 can be carried out in a plurality of times as there is no empty needle near the knitting needle H of the FB. For example, the transfer may be carried out first from the stitch where an empty needle exists at the opposing position, and the remaining stitches may be transferred after racking the needle bed so that load is not imposed on the knitting yarn. In a flat knitting machine including an empty needle for transfer such as the four-bed flat knitting machine, the transfer of S6 does not need to be divided into a plurality of times, and thus the knitting that is more efficient and in which load is not imposed on the knitting yarn compared to the two-bed flat knitting machine can be carried out. When forming three or more pick up stitches shown in the embodiment, it can be carried out by adopting the divided

transfer or a different type of flat knitting machine mentioned above.

[0025] In S7, a pick up stitch is formed on the knitting needle W, which is an empty needle substantially facing an end in the moving direction of the stitch row moved in S6, and then a new stitch row following the stitch row (knitting needles V, T, R, P, N, L, J, H, F of BB) formed in S6 is formed.

[0026] In S8, the stitch row formed on the knitting needles F, H, J, L, N, P, R, T, V of the BB in S7 is transferred to the knitting needles H, J, L, N, P, R, T, V, X of the BB through the knitting needles of the FB (this transfer also can be divided to a plurality of times similar to S6). Thereafter, a pick up stitch is formed on the knitting needle F of the BB, which became an empty needle by the movement of the stitch row, and then a stitch row is formed on the knitting needles H, J, L of the BB and a pick up stitch is formed on the knitting needle L of the FB. The pick up stitch of the knitting needle L of the FB is formed on an adjacent empty needle in the moving direction of the stitch row with respect to the pick up stitch formed on the knitting needle J of the FB in S6.

[0027] According to S1 to S8 described above, most of the base surface 1, and the second setup portion 3A comprising the pick up stitches to become a starting point for knitting the partitioning section 3 are formed (see Fig. 3D). The second setup portion 3A is connected to the plane of the base surface 1, so that the partitioning section 3 connecting to the base surface 1 can be obtained by knitting the partitioning section 3 following the second setup portion 3A. In the present embodiment, the formation of the pick up stitches to become the partitioning section 3 is carried out once every two courses, but may be carried out for every course or once every four courses. Furthermore, in the present embodiment, each pick up stitch to become the partitioning section 3 is formed at a position of every other needle (knitting needles H, J, L), but the interval of each pick up stitch may be greater (e.g., knitting needles H, L, P). In this case, the interval of the pick up stitches becomes greater than the movement amount of the base surface stitch row configuring the base surface 1, and hence the partitioning section 3 that diagonally partitions the base surface 1 can be formed. Note that the base surface 1 is not yet completed at this point, and is completed by finishing the knitting in S10, which will be described later.

[0028] In S9 and thereafter, the main body section 2 is knitted from the outer peripheral sides of the base surface 1 while increasing the knitting courses of the partitioning section 3. One example of such knitting is shown in S9 to S12.

[0029] In S9, a new stitch row following a pick up stitch row of the second setup portion 3A held on the knitting needles H, J, L of the FB is formed, and then a tuck stitch is formed on the knitting needle G of the FB. According to S9, the partitioning section 3 is knitted for one course.

[0030] In the following S10, a new stitch row following the stitch row held on the knitting needles H, J, L, of the FB is formed, and then a new stitch row following the stitch row held on the knitting needles N, P, R, T, V, X of the BB is formed. According to S10, the partitioning section 3 is knitted for one course, and the base surface 1 is completed.

[0031] In S11, the stitch row of the partitioning section 3 held on the knitting needles H, J, L of the FB is transferred to an empty needle (any knitting needle; knitting needles I, K, M of BB herein) of the opposing BB, and then a new stitch row following the pick up stitch row held on the knitting needles W, U, S of the FB and the stitch row held on the knitting needles Q, O, M, K, I, G, E, C, A of the FB is formed.

[0032] In S12, the stitch row transferred to the knitting needles I, K, M of the BB in S11 is transferred to an empty needle (any knitting needle; knitting needles H, J, L of FB herein) of the opposing FB, and then a new stitch row following the pick up stitch row held on the knitting needles B, D, F of the BB and the stitch row of the knitting needles H, J, L, N, P, R, T, V, X of the BB is formed. According to S11 and S12, the main body section 2 is knitted for one course to a tubular shape. Furthermore, according to S11 and S12, both ends in the knitting width direction of the partitioning section 3 are joined to the main body section 2.

[0033] Thereafter, the main body section 2 and the partitioning section 3 are knitted in parallel until the partitioning section 3 of a desired length is completed, and then the stitches of the partitioning section 3 are subjected to the bind-off process and the main body section 2 is knitted to a tubular shape. The known bind-off process (e.g., WO 2011/018929A1) may be used in this case.

[0034] According to the knitting method described above, the three-dimensional tubular knitted fabric 100 including the base surface 1 and the tubular main body section 2 set up from the outer peripheral sides of the base surface 1, as shown in Fig. 1A, can be knitted. For example, a bag having a partitioning section on the inside can be knitted by further continuing the knitting of the main body section 2 from the state of Fig. 1A to knit the main body section 2 to a depth of a certain extent. With such a bag, the movement of small objects accommodated in the bag with the partitioning section 3 therebetween can be suppressed.

(Modification)

[0035] The tubular knitted fabric 100 including an inner pocket-like partitioning section 3, as shown in Fig. 1B, can be knitted by applying the knitting steps described above. In this case, for example, two pick up stitches are to be formed at positions spaced apart in the knitting width direction in S4 and S6 of Fig. 2. As a specific example, knit three stitches of base surface stitch row → form a pick up stitch → knit three stitches of base surface stitch row → form a pick up stitch → knit three stitches of base surface stitch row are carried out in S4 and S6. Needless to say, when forming a plurality of inner pocket-like par-

titioning sections 3, two pick up stitches are preferably formed for each partitioning section. Similar to the first embodiment, the height of the partitioning section 3 may be higher than, lower than, or the same as the height of the main body section 2. One part of the partitioning section 3 may be higher than other parts. For example, one of the three surfaces of the partitioning section 3 shown in Fig. 1B may be formed higher than other surfaces, and such a heightened portion may be formed as the cover of the inner pocket.

[0036] When knitting the base surface 1, the base surface stitch row may be knitted with both the FB and the BB. For example, a predetermined number of base surface stitch rows may be knitted with the FB using one yarn feeder, and then a predetermined number of base surface stitch rows may be knitted with the BB using the same yarn feeder to complete the base surface 1. The base surface 1 may be completed by knitting the base surface stitch rows with the FB and the BB using two yarn feeders.

[0037] In addition, the size in the knitting width direction of each base surface stitch row may be differed when increasing the number of knitting courses of the base surface stitch row. In this manner, the base surface 1 other than a rectangle such as a base surface having a trapezoidal shape or a race track shape can be knitted.

<Second embodiment>

[0038] A sock (tubular knitted fabric) including a toe inserting section for individually inserting a toe inside the sock can be knitted by applying the knitting method described in the first embodiment. Fig. 4A is a schematic view of the sock, and Fig. 4B is an enlarged view of a toe portion of the sock.

[0039] When knitting a sock 101 (tubular knitted fabric) of Fig. 4A, first, the base surface 1 at the distal end of a toe portion 30 is knitted and a plurality of second setup portions 3A formed in a plane of the base surface 1 is formed using the knitting method similar to the knitting method of the first embodiment. While knitting the main body section 2 from the outer peripheral sides of the base surface 1, partitioning sections 3 are knitted with the plurality of second setup portions 3A formed in the base surface 1 as the starting line. After the partitioning sections 3 are knitted to a predetermined length, the end on a top portion 10 side of each of the partitioning sections 3 is subjected to the bind-off process and the main body section 2 is knitted to a tubular shape, so that the top portion 10 having a rib structure can be knitted and the sock 101 can be completed. In this case, as shown in Fig. 4B, the base surface 1 is formed at the most distal end of the toe portion 30, the partitioning sections 3 are formed in the tube formed by the main body section 2 and the base surface 1, and the toe inserting section for inserting the toe is formed between the proximate partitioning sections 3, 3. The partitioning sections 3 are set up from the base surface 1, and thus the toes inserted to each toe inserting section do not touch each other when the sock 101 is worn, thus realizing the sock 101 that is comfortable to wear.

[0040] The present invention is not limited to the embodiments described above, and can be appropriately modified and implemented within a scope not deviating from the gist of the invention. For example, the base surface 1 and the main body section 2 may have a rib structure.

Claims

1. A knitting method of a tubular knitted fabric (100) for knitting, in a seamless manner, the tubular knitted fabric (100) including a main body section (2), which is knitted to a tubular shape, and a partitioning section (3), which is formed inside a tube of the main body section (2) to partition the inside of the tube, using a flat knitting machine having at least a front needle bed and back needle bed, a stitch held on a knitting needle of the needle beds being transferrable to another knitting needle; the method **characterized by**:

   a step α of forming a plurality of stitches on the front and back needle beds, and forming a first setup portion (1A) comprising the stitches;
   a step β of forming a base surface (1) in which outer peripheral sides are all held on the front and back needle beds with the first setup portion (1A) as a starting line, and forming a second setup portion (3A) comprising a plurality of pick up stitches connecting to a plane of the base surface (1); and
   a step γ of knitting the partitioning section (3) following the second setup portion (3A) while knitting the main body section (2) following the outer peripheral sides of the base surface (1); wherein
   the formation of the base surface (1) in the step β is carried out by repeating knitting of a base surface stitch row, moving the base surface stitch row to one side in a knitting width direction, and forming a pick up stitch on a knitting needle, which became an empty needle by the movement, and on an empty needle substantially facing an end in a moving direction of the moved base surface stitch row; and
   the formation of the second setup portion (3A) in the step β is carried out by forming at least one pick up stitch on an empty needle within a knitting width of the base surface stitch row in the middle of knitting of the base surface stitch row.

2. The knitting method of the tubular knitted fabric (100) according to claim 1, **characterized in that** two or

more second setup portions (3A) are formed in the step β

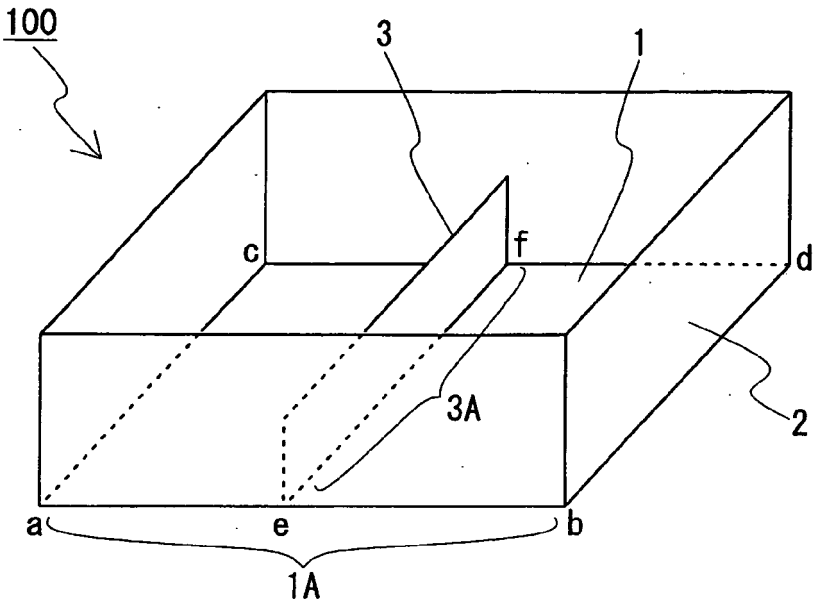
3. The knitting method of the tubular knitted fabric (100) according to claim 1 or 2, **characterized in that** the knitting of the base surface stitch row in the step β is carried out with either of the front or back needle bed.

4. A tubular knitted fabric (100), including a main body section (2), which is knitted to a tubular shape, and a partitioning section (3), which is formed inside a tube of the main body section (2) to partition the inside of the tube, the tubular knitted fabric (100) being knitted in a seamless manner using a flat knitting machine having at least a front needle bed and a back needle bed, a stitch held on a knitting needle of the needle beds being transferrable to another knitting needle; the tubular knitted fabric (100) **characterized by** comprising:

a base surface (1) for enabling a distal end portion of the main body section (2) to be three-dimensional; wherein
the partitioning section (3) is set out from a plane on an interior side of the main body section (2) of the base surface (1).

Fig. 1

(A)



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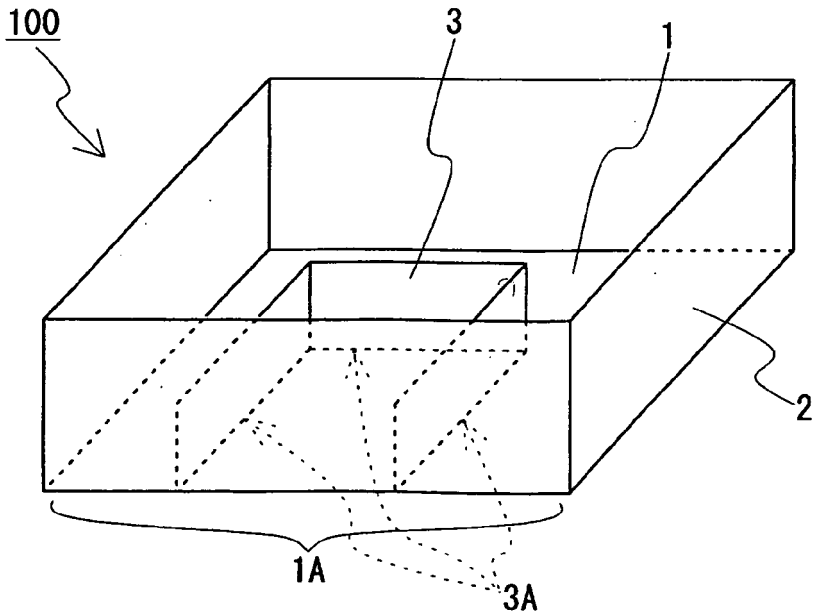
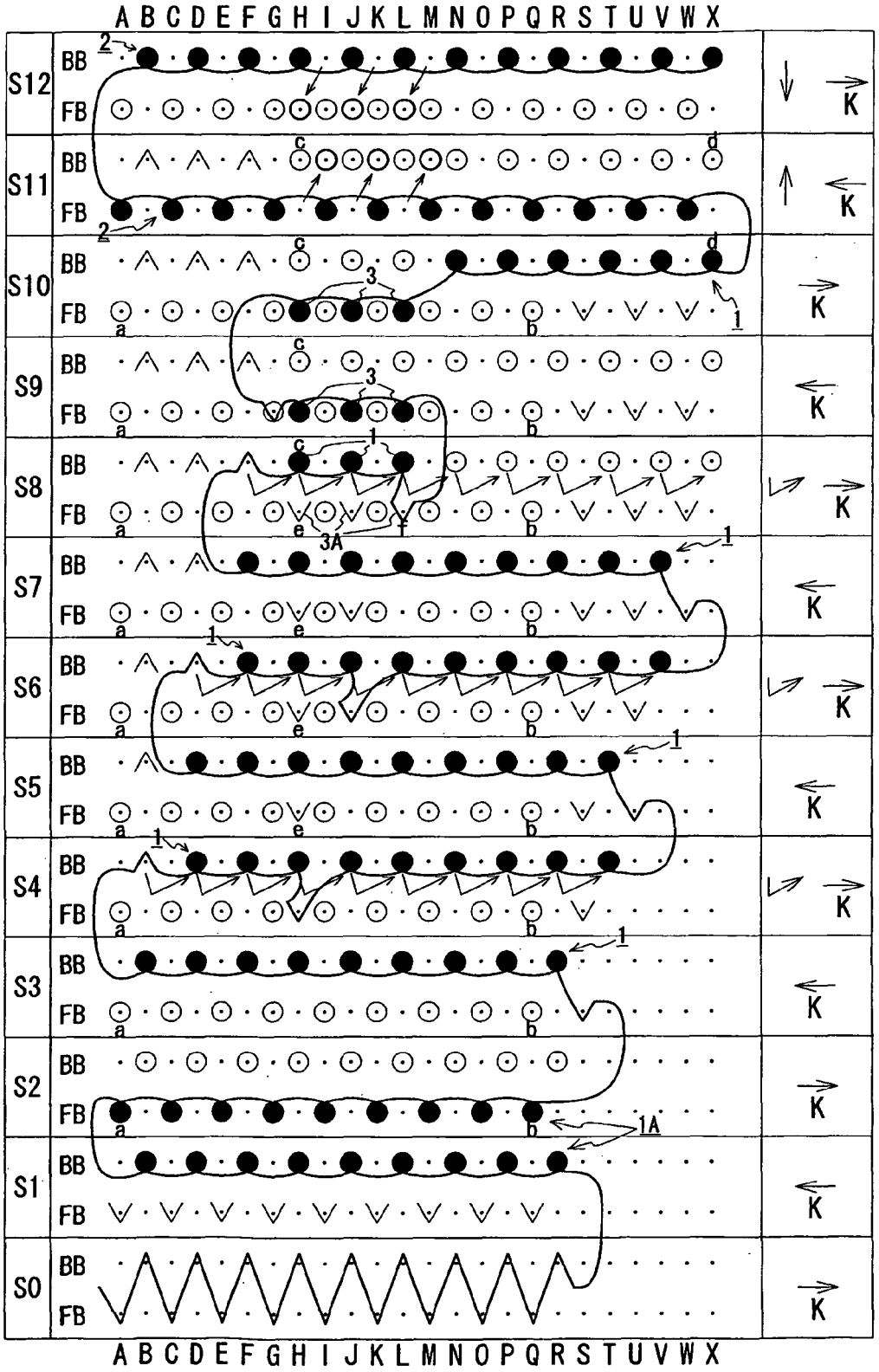


Fig. 2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S10
S9
S8
S7
S6
S5
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Fig. 3

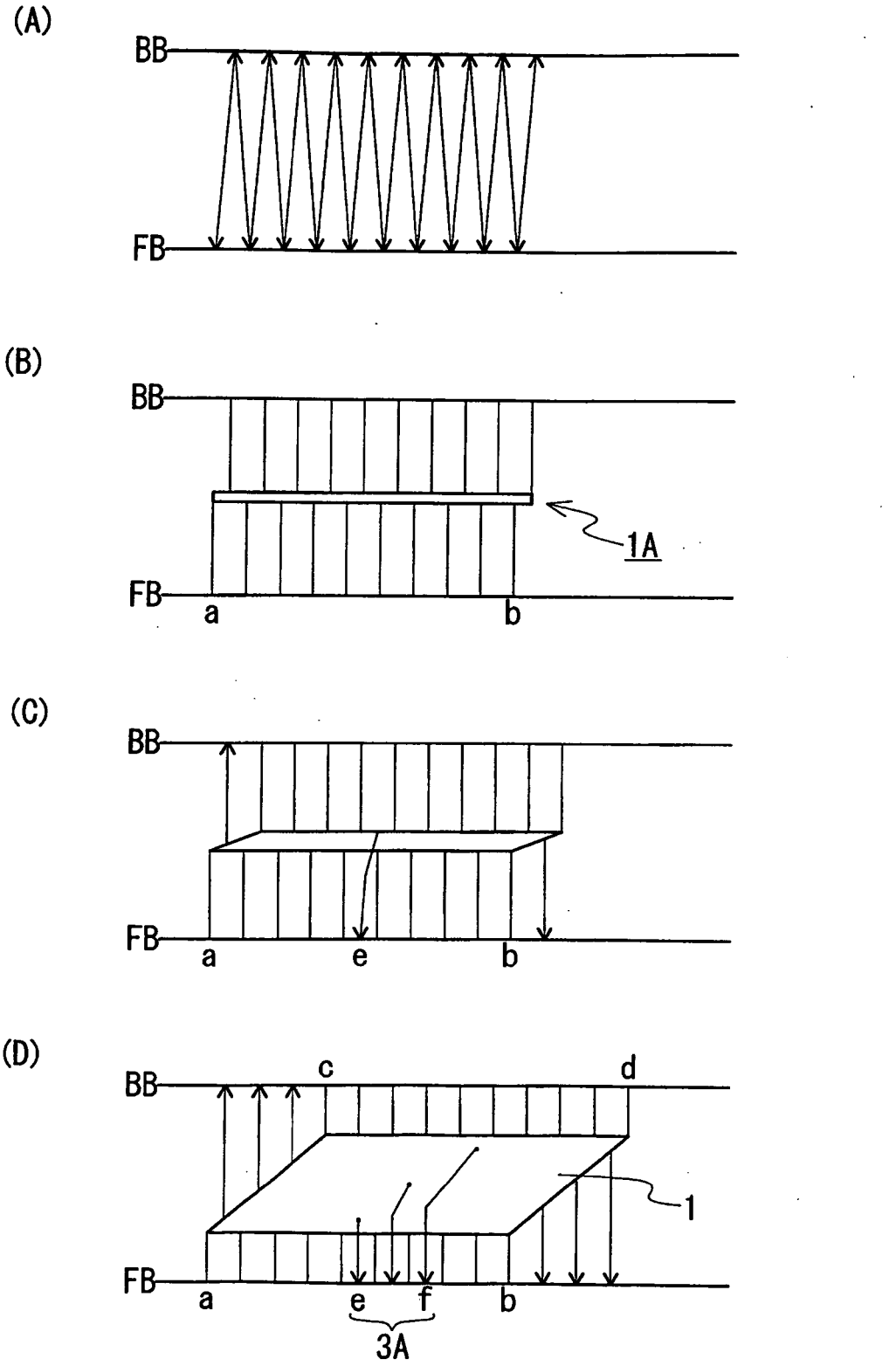
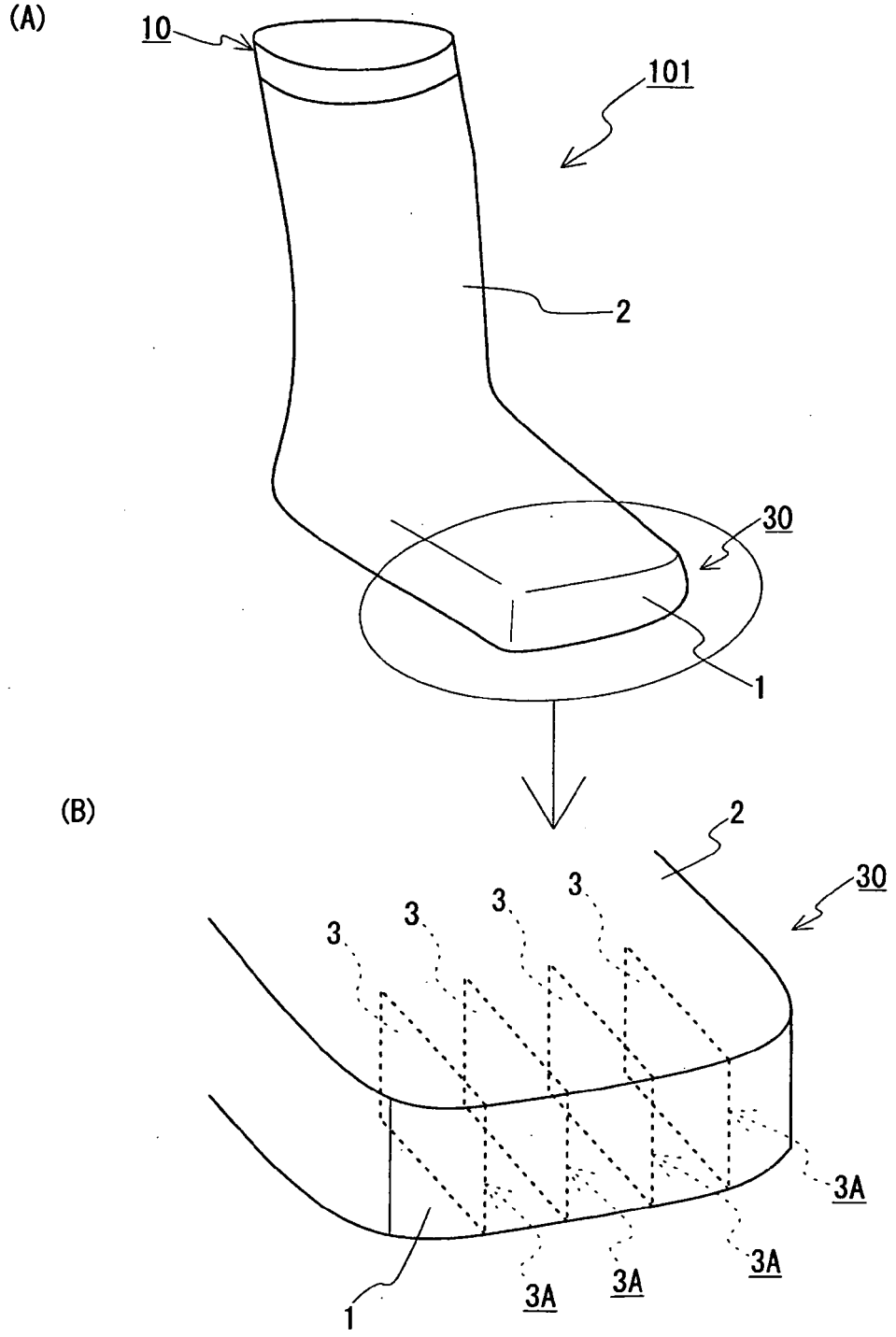


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

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