



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
11.04.2018 Bulletin 2018/15

(51) Int Cl.:
A43B 23/02 (2006.01) **A43B 23/04** (2006.01)
A43B 23/26 (2006.01) **D04B 1/22** (2006.01)

(21) Application number: **16802994.0**

(86) International application number:
PCT/JP2016/063865

(22) Date of filing: **10.05.2016**

(87) International publication number:
WO 2016/194557 (08.12.2016 Gazette 2016/49)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(72) Inventors:
• **TERAI, Kenta**
Wakayama-shi, Wakayama 641-0003 (JP)
• **IKENAKA, Masamitsu**
Wakayama-shi, Wakayama 641-0003 (JP)

(74) Representative: **Emde, Eric**
Wagner & Geyer
Gewürzmühlstrasse 5
80538 München (DE)

(30) Priority: **29.05.2015 JP 2015109553**

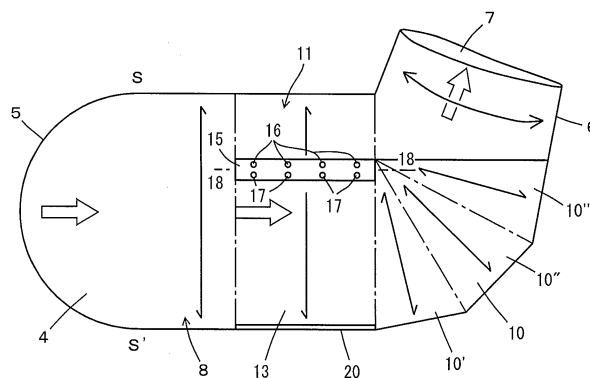
(71) Applicant: **SHIMA SEIKI MFG., LTD.**
Wakayama 641-0003 (JP)

(54) **SHOE UPPER AND KNITTING METHOD FOR SAME**

(57) The shoe upper is tubular and has a toe, a body between the toe and the heel and including a tongue, heel, and a top line. The body includes the tongue covering the central part of instep, the right portion at the right side of the tongue covering the right side of instep and the right half of the sole, and the left portion at the left side of the tongue covering the left side of instep and the left half of the sole. The tongue and the right portion are connected by the right plating area 14 having a knitting width of two or more stitches knitted by plating-knit-

ting where knitting yarns for the tongue and the right portion are overlapped with a constant relation of the front and the rear and made into stitches. The tongue and the left portion are connected by the left plating area 15 having a knitting width of two or more stitches knitted by plating-knit where knitting yarns for the tongue and the left portion are overlapped with a constant relation of the front and the rear and made into stitches. The tongue and the right and left portions may be connected firmly on a knitting machine.

FIG. 1



Description

Field of the Invention

[0001] The present invention relates to a shoe upper and a knitting method for the same.

Background of the Invention

[0002] Shoe uppers knitted on knitting machines have been known. When knitting shoe uppers, various knitting yarns suitable for respective portions of the shoe upper are used for changing the stretchability, strength, permeability, and so on, of the shoe upper. Therefore, as was proposed in Patent Document 1 (US6931762B), intarsia-knitting has been applied to shoe uppers, and the boundaries between the portions are made as the boundaries in intarsia-knitting. Further, in intarsia-knitting, the portions are connected by tuck stitches.

[0003] Other pieces of prior art are described. Patent Document 2 (JPS54-21464B) and Patent Document 3 (JPH09-111619A) describe plating-knitting. In the plating-knitting, two overlapping knitting yarns from two yarn feeders are used to knit stitch rows; one of the knitting yarns appears on the front surface of the knitted fabric, and the other appears on the rear surface. Patent Document 2 has proposed to express patterns in the knitted fabric by plating-knitting. Patent Document 3 has proposed to knit intarsia patterns while changing the knitting yarns appearing on the front surface and not changing the knitting yarn appearing on the rear surface.

Prior Technical Documents

Patent Documents

[0004]

Patent Document 1: US6931762B

Patent Document 2: JP54-21464B

Patent Document 3: JPH09-111619A

Summary of the Invention

Problems to be Solved by the Invention

[0005] When portions of shoe uppers are joined by tuck stitches as taught by Patent Document 1, at the resultant joining positions, tuck stitches are overlapped on basic stitches so as to form double stitches. When the tongue and its both side portions, or the like, are joined by tuck stitches, since they are often subjected to forces, the tuck portions may be subjected to strong forces, and the knitting yarns may be broken. Further, when shoe laces are passed through the both side portions of the tongue, the holes through which the shoe lace passes may enlarge

due to strong forces applied by the shoe lace. Further, when these forces are applied to the tuck portions, the knitting yarns may break easily. While the joining portions may be reinforced by adhesive tapes, heat treatment, or the like, in addition to the knitting, the productivity is reduced. Therefore, it is necessary to join firmly the tongue and its both side portions on a knitting machine.

[0006] The object of the invention is to provide shoe uppers and a knitting method for it, where the tongue and its both side portions are firmly joined on a knitting machine.

Means for Solving the Problems

[0007] The tubular shoe upper according to the invention comprises a toe, a heel, a body between the toe and the heel and having a tongue, and a top line and is characterized in

that the body includes the tongue covering a central portion of an instep of a wearer, a right portion at a right side of the tongue along a perpendicular direction to a longitudinal direction of the instep and covering a right side of the instep and the right half portion of a sole of the wearer, and a left portion at a left side of the tongue and covering a left side of the instep and the left half portion of the sole,

that the tongue and the right portion is connected by a right plating area extending along a boundary between the tongue and the right portion and having, along a peripheral direction of the shoe upper, at least two continuous stitches formed from a knitting yarn of the tongue and a knitting yarn of the right portion which are overlapped and have a constant relationship of face and rear, and

that the tongue and the left portion is connected by a left plating area extending along a boundary between the tongue and the left portion, and having, along the peripheral direction of the shoe upper, at least two continuous stitches formed from the knitting yarn of the tongue and a knitting yarn of the left portion which are overlapped and have a constant relationship of face and rear.

[0008] According to the invention, the tongue and the right portion of the tongue are connected by the plating area, not by tuck stitches. Further, the plating area comprises stitches formed by the knitting yarn of the tongue and the knitting yarn of the right portion, overlapped with a constant relation of the face and the rear, and the plating area has a width of two or more stitches along the peripheral direction of the shoe upper. Therefore, the tongue and the right portion are connected by an area, namely the plating area, not by a row of tuck stitches, and the stronger connection is achieved.

[0009] Preferably, a lace hole row for passing a shoe lace is provided in the right plating area, another lace hole row, facing the lace hole row in the right plating area, is provided in the right plating area, the tongue, or the right portion, a lace hole row for passing the shoe lace is provided in

the left plating area, and another lace hole row, facing the lace hole row in the left plating area, is provided in the left plating area, the tongue, or the left portion.

[0010] When the plating areas are folded at a center line between the two lace hole rows, the two facing lace hole rows overlap with each other, and therefore the shoe lace may be passed through them. Since two lace holes are overlapped and pass the shoe lace, the lace holes are protected from being enlarged, and the plating areas support the strong forces applied to the shoe lace.

[0011] The method according to the invention knits a tubular shoe upper on a flat knitting machine having at least a front needle bed and at least a rear needle bed. The method is characterized by starting knitting of the shoe upper from a toe or a top line, and knitting the toe, a body between the toe and a heel and having a tongue, the heel, and the top line, knitting in knitting the body:

the tongue covering a central portion of an instep of a wearer;

a right portion at a right side of the tongue along a perpendicular direction to a longitudinal direction of the instep and covering a right side of the instep and the right half portion of a sole of the wearer;

a left portion at a left side of the tongue and covering a left side of the instep and the left half portion of the sole;

a right plating area extending along a boundary between the tongue and the right portion and having, along a peripheral direction of the shoe upper, at least two continuous stitches formed from a knitting yarn of the tongue and a knitting yarn of the right portion overlapped with a constant relationship of face and rear; and

a left plating area extending along a boundary between the tongue and the left portion, and having, along the peripheral direction of the shoe upper, at least two continuous stitches formed from the knitting yarn of the tongue and a knitting yarn of the left portion overlapped with a constant relationship of face and rear,

and in that

a step for knitting the right portion, plating-knitting the right plating area, knitting the tongue, plating-knitting the left plating area, and knitting the left portion in this order; and

a step for knitting the left portion, plating-knitting the left plating area, knitting the tongue, plating-knitting the right plating area, and knitting the right portion in this order; are repeated alternately in knitting the body.

[0012] Thus, the shoe upper where the tongue and the right and left portions are connected by the plating areas may be knitted. Further, this shoe upper has an improved connection strength between the tongue and the right and left portions.

[0013] Preferably, a lace hole row for passing a shoe lace in the right plating area is formed on the flat knitting machine, and another lace hole row, facing the lace row formed in the right plating area, in the right plating area, the tongue, or the right portion is formed on the flat knitting machine. Further, a lace hole row for passing the shoe lace in the left plating area is formed on the flat knitting machine, and another lace hole row, facing the lace hole row formed in the left plating area, in the left plating area, the tongue, or the left portion is formed on the flat knitting machine. These steps make it possible to knit on the flat knitting machine the plating areas and the strong lace holes enduring the forces applied by the shoe lace.

[0014] According to the invention, the body comprising the tongue and its peripheral portions are knitted by C-knitting in a shape of C letter with an opening in the C letter in the sole part. Preferably, the opening in the C letter is closed by double stitches, tuck stitches, and so on, and the right portion and the left portion of the body are joined on the flat knitting machine.

[0015] On the needle beds of the flat knitting machine, the portions of the shoe upper are arranged as:

- the right portion and the left portion face each other on the front and the rear needle beds;
- the right plating area and the left plating area face each other on the front and the rear needle beds; and
- the right half and the left half of the tongue face with each other on the front and the rear needle beds.

Further, the leftmost stitches of the right half of the tongue and the rightmost stitches of the left half of the tongue are connected during the knitting.

[0016] For example, the tongue, the right portion, and the left portion are knitted with separate knitting yarns. Since C-knitting is performed, at least three yarn feeders, one for the tongue, one for the right portion, and one for the left portion are necessary. The center of the tongue may be at one end of the knitting width, the center of the sole part may be at the other end. Then, the arrangement of the yarn feeders changes alternately between

- arrangement A where the yarn feeder for the right portion is at the other end of the knitting width and the yarn feeders for the left portion and the tongue are near to the boundaries between the right and left portions and the right and left plating areas; and
- arrangement B where the yarn feeder for the left portion is at the other end of the knitting width and the yarn feeders for the right portion and the tongue are near to the boundaries between the right and left portions and the right and left plating areas.

[0017] Further,

- the feeding area from the yarn feeder for the right portion is the right portion of the body and the right plating area;

- the feeding area from the yarn feeder for the left portion is the left portion of the body and the left plating area; and
- the feeding area from the yarn feeder for the tongue is the tongue and the right and left plating areas.

Brief Description of the Drawings

[0018]

[Fig. 1] A side view of the shoe upper according to the embodiment

[Fig. 2] A plan view of the shoe upper according to the embodiment

[Fig. 3] An enlarged plan view of the plating areas

[Fig. 4] A diagram showing yarn feeding areas for respective carriers used in the embodiment

[Fig. 5] A knitting process diagram for knitting the body of the shoe upper according to the embodiment

[Fig. 6] A diagram schematically showing the knitting of a shoe upper according to a modification

Detailed Description of the preferred embodiment

[0019] The best embodiment for carrying out the invention will be described.

Embodiment

[0020] Fig. 1 to Fig. 6 show the embodiment and a modification: Fig. 1 shows a flatly folded shoe upper, and Fig. 2 shows the shoe upper in a spread state. Denoted by 4 is the toe, by 6 the top line, and by 8 the body covering an instep, both side portions of instep, and the sole of a wearer. The toe 4, the body 8, and the top line 6 are all tubular. Denoted by 10 is the heel between the top line 6 and the body 8 and it is knitted by flechage. The bottom of the shoe upper 2 is configured to be attached with an unshown outsole.

[0021] Denoted by 5 is the knitting start line for starting the knitting, and S, S' denote the both ends of the start line. As shown by white arrows in Fig.1 and Fig. 2, the shoe upper is knitted from the toe 4 to the top line 6; however, it may be knitted from the top line 6 to the toe 4. The top line 6 is tubular and is provided with an opening 7. The heel 10 comprises, for example, three areas 10', 10'', and 10''', and after the body 8 is knitted, the three areas 10', 10'', and, 10''' are knitted by flechage-knitting so that their wale directions change. Further, the black arrows in Fig. 1 represent the course directions, and the white arrows the wale directions.

[0022] The body 8 includes the tongue 11 covering the center portion of the instep, a right portion 12 covering the right half of the sole and the right side of the instep, a left portion 13 covering the left half of the sole and the left side of the instep, and right and left plating areas 14, 15 between the tongue 11 and the right and left portions 12, 13. The tongue 11, the right and left plating areas 14,

15, and the right and left portions 12, 13 are knitted on a flat knitting machine in a shape of C letter, and the opening in the C letter is in the sole part between the right and left portions 12, 13. Further, at the joining portion 20, the stitches at the both sides over the opening in the C letter are joined so that the right and left portions 12, 13 are seamlessly joined. The joining is performed by, for example, double stitches or tuck stitches, however, the joining method is arbitrary. Further, not on the flat knitting machine but out of the flat knitting machine, they may be joined by an adhesive, sewing, or the like. The shoe upper is knitted, for example, seamlessly.

[0023] When worn, in accordance with the movement of a foot, the shoe upper 2 is subjected to peripheral tensile forces. Further, when lace holes for a shoe lace are provided around the tongue, the influence of shoe lace movement enlarges the lace holes. For overcoming these effects, plating-knitting is performed with usage of both the knitting yarn for the tongue 11 and the knitting yarns for the right and left portions 12, 13. Then, on the two surfaces, namely on the right and left plating areas 14, 15, the tongue 11 is joined to the right and left portions 12, 13, and as a result, the strength of the joining portions is improved. Therefore, the stretching and deformation of the knitted fabric are reduced, the breakage of the knitting yarns is prevented, and the lace holes are prevented from enlarging. In plating-knitting, two species of knitting yarns are overlapped and knitted into knit stitches, while the face and rear relation between the yarns is kept constant. For this purpose, two yarn feeders are synchronously moved on the needle beds, and the front and rear relation between the two yarn feeders relative to the needle beds determines the knitting yarn appearing on the face and the knitting yarn appearing on the rear.

[0024] As shown in Fig. 3, the right and left plating areas 14, 15 are, for example, both rectangular and have a knitting width of two or more stitches, for example, 10 stitches in the embodiment. The right and left plating areas 14, 15 have two lace hole rows 16, 17 respectively along their longitudinal directions, the lace hole rows 16, 17 are symmetrically provided about the symmetrical axis 18, and, when the plating areas 14, 15 are folded at the symmetrical axis 18, the lace hole rows 16, 17 overlap with each other. At least, one of the lace hole rows 16, 17 is provided in each of the right and left plating areas 14, 15, and preferably, both the two lace hole rows 16, 17 are provided in each of the right and left plating areas 14, 15, for improved strength. In case that the two lace hole rows 16, 17 do not have an enough strength, the knitting width of the plating areas 14, 15 is enlarged, four lace hole rows are provided in each plating area so that the plating areas 14, 15 are folded and made into a four layer structure with the resultant reinforced lace hole rows.

[0025] The lace holes of the lace hole rows 16, 17 are made on a flat knitting machine. For example, when each lace hole has a width of two stitches along the course direction (the up and down direction in Fig. 3), one of the

two stitches initially in the lace hole is moved upwards, the other downwards, and thus, the lace hole with the two stitch width is produced.

[0026] Fig. 4 and Fig. 5 show the knitting of the tongue 11, the right and left plating areas 14, 15, the right portion 12, and the left portion 13. A flat knitting machine having at least a front needle bed FB and a rear needle bed BB and plural yarn feeders 30 for feeding knitting yarns is used for the knitting. For example, the left portion 13 and the left plating area 15 are knitted on the front needle bed FB, and the right portion 12 and the right plating area 14 are knitted on the rear needle bed BB; however, the allocation of the front and rear needle beds may be reversed. The flat knitting machine has a carriage provided with entraining pins, and the yarn feeders 30 are entrained by the entraining pins of the carriage for desired sections. As the yarn feeders 30, ordinary yarn feeders or yarn feeders for intarsia-knitting capable of swinging with usage of a spring, and so on, may be used. Further, self-running yarn feeders may be used in place of the entrained yarn feeders.

[0027] At least three knitting yarns, one for the tongue 11, one for the right portion 12, and one for the left portion 13 are used, and the right and left plating areas 14, 15 are knitted with two knitting yarns respectively. Further, for example, a same kind of knitting yarns are used for both the right portion 12 and the left portion 13. During the plating-knitting, the two knitting yarns are aligned and knitted so that one of them appears on the face of the shoe upper 2 and that the other hides in the inner face. Further, during the plating-knitting, the two yarn feeders are moved synchronously.

[0028] Fig. 4 shows the allocation of the yarn feeders 30 for the knitting width W, a yarn feeder No. 1 is allocated for the left portion 13, a yarn feeder No. 3 for the right portion 12, and a yarn feeder No. 2 for the tongue 11. Fig. 4 further shows respective knitting areas for the three yarn feeders; the yarn feeders reciprocate within the respective knitting areas. The knitting is performed by C-knitting where the tubular fabric is knitted reciprocally not circularly, and the opening in the C letter is closed at the joining portion 20. Further, in the right plating area 14, the yarns are fed from two yarn feeders No. 3 and No. 2, and in the left plating area 15, the yarns are fed from two yarn feeders No. 1 and No. 2.

[0029] Fig. 5 shows the knitting process for the body; the knitting is performed from 1) at the bottom to 11) at the top. 1) shows the initial arrangement of the three yarn feeders 30; the yarn feeder No. 1 is at a position for feeding to the joining portion 20, and the yarn feeders No. 2 and No. 3 are at positions for feeding to the right and left plating areas 14, 15. At 2), the left portion 13 of the body is knitted with the yarn feeder No. 1. Then, at 3), the left plating area 15 is plating-knitted with synchronous movement of the yarn feeders No. 1 and No. 2. In the plating-knitting, two yarns from two yarn feeders are aligned vertically and converted to a stitch row, and therefore, the two yarn feeders are moved synchronously. Further, in

this step, to prevent the yarns of the yarn feeders No. 2 and No. 3 from being caught by needles for the left portion 13, and also to prevent the yarn from the yarn feeders No. 3 from being caught by needles for the plating area 15, kick back of the yarn feeders or similar known process is performed. In case of self-running yarn feeders, the yarn feeders are retracted so that the yarns are not unnecessarily caught by the needles at an undesirable position.

[0030] After knitting the plating area 15, the yarn feeder No. 1 is separated from the knitting, at 4) the left portion 11L of the tongue 11 is knitted with the yarn feeder No. 2, and at 5) in Fig. 5 the right portion 11R of the tongue 11 is knitted with the yarn feeder No. 2. Further, the right portion 11R and the left portion 11L are connected at the right end of the knitting width in Fig. 5.

[0031] At 6) in Fig. 5, the right plating area 14 is plating-knitted with the yarn feeders No. 2 and No. 3. At this step, the yarn feeder No. 1 is kicked back or treated by a similar process so that the knitting yarn from this yarn feeder is separated from the knitting. At 7) in Fig. 5, the yarn feeder No. 2 is separated from the knitting, and the right portion 12 of the body is knitted with the yarn feeder No. 3.

[0032] When the process 7) in Fig. 5 is finished, the arrangement of the yarn feeders 30 is one where the yarn feeder No. 1 and the yarn feeder No. 3 is swapped from the initial arrangement at 1). Therefore, further knitting is performed from the state of 7) to the state of 1), in the reversed order from the previous order of 2) to 7) with the knitting directions being reversed. Then, the arrangement of the yarn feeders 30 will return to the initial arrangement, and the shoe upper has been knitted for one front course and one rear course. Therefore, one of the two arrangements of yarn feeders 30 at 1) and 7) may be the initial arrangement, the other the final arrangement, and the arrangement of yarn feeders 30 changes between these two arrangements.

[0033] Some of knitting steps for returning from the state of 7) in Fig. 5 to the state of 1) will be described. At 8) in Fig. 5, the lace holes are formed in the right and left plating areas 14, 15, the left portion 13 and the right portion 12 of the body are connected, and the opening in the C letter is closed at the joining portion 20. The lace holes are formed, for example, by transferring stitches initially in the holes left and right on other stitches so as to overlap them.

[0034] The knitting direction is reversed at 9) from the direction at 7) in Fig. 5, reversed at 10) from the direction at 6), and reversed at 11) in Fig. 5 from the direction at 5). Then similarly, the knitting steps at 4), 3), and 2) in Fig. 5 are performed in this order but with the reversed knitting directions, and the arrangement of the yarn feeders will return to the state of 1) in Fig. 5. Before the knitting in Fig. 4 and Fig. 5, tubular knitting is performed from the start line 5 toward just before the tongue 11 with one of the yarn feeders No. 1 and No. 3, for example. After knitting in Fig. 4 and Fig. 5, the heel 10 and the top line 6 are knitted with one of the yarn feeders No. 1 and No. 3,

for example.

[0035] Fig. 6 shows the knitting of the body according to a modification. According to the modification, the right and left plating areas 14 and 15 are respectively divided into two plating areas 14, 14' and 15, 15', and they are knitted with five yarn feeders 30. The allocation of knitting areas to respective yarn feeders is shown in Fig. 6, and the knitting is performed such that the arrangement of the yarn feeders reciprocates between the arrangement at the bottom of Fig. 6 and the arrangement at the top. When the thickness or strength of the knitting yarns is changed gradually during knitting, or when the colors of them are changed during knitting, shoe uppers with various designs may be knitted.

[0036]

2	shoe upper
4	toe
5	start line
6	top line
7	opening
8	body
10	heel
11	tongue
12	right portion
13	left portion
14, 15	plating area
16, 17	lace hole row
18	symmetrical axis
20	joining portion
30	yarn feeder
FB	front needle bed
BB	back needle bed
W	knitting width

Claims

1. A tubular shoe upper comprising a toe, a heel, a body between the toe and the heel and having a tongue, and a top line, being **characterized in that** the body includes the tongue covering a central portion of an instep of a wearer, a right portion at a right side of the tongue along a perpendicular direction to a longitudinal direction of the instep and covering a right side of the instep and the right half portion of a sole of the wearer, and a left portion at a left side of the tongue and covering a left side of the instep and the left half portion of the sole, **that** the tongue and the right portion is connected by a right plating area extending along a boundary between the tongue and the right portion and having, along a peripheral direction of the shoe upper, at least two continuous stitches formed from a knitting yarn of the tongue and a knitting yarn of the right portion which are overlapped and have a constant relationship of face and rear, and **that** the tongue and the left portion is connected by

a left plating area extending along a boundary between the tongue and the left portion, and having, along the peripheral direction of the shoe upper, at least two continuous stitches formed from the knitting yarn of the tongue and a knitting yarn of the left portion which are overlapped and have a constant relationship of face and rear.

2. The shoe upper according to claim 1, being **characterized in that** a lace hole row for passing a shoe lace is provided in the right plating area, that another lace hole row, facing the lace hole row in the right plating area, is provided in the right plating area, the tongue, or the right portion, that a lace hole row for passing the shoe lace is provided in the left plating area, and that another lace hole row, facing the lace hole row in the left plating area, is provided in the left plating area, the tongue, or the left portion.
3. A method for knitting a tubular shoe upper on a flat knitting machine having at least a front needle bed and at least a rear needle bed, being **characterized by** starting knitting of the shoe upper from a toe or a top line, and knitting the toe, a body between the toe and a heel and having a tongue, the heel, and the top line, in knitting the body, knitting:

the tongue covering a central portion of an instep of a wearer;

a right portion at a right side of the tongue along a perpendicular direction to a longitudinal direction of the instep and covering a right side of the instep and the right half portion of a sole of the wearer;

a left portion at a left side of the tongue and covering a left side of the instep and the left half portion of the sole;

a right plating area extending along a boundary between the tongue and the right portion and having, along a peripheral direction of the shoe upper, at least two continuous stitches formed from a knitting yarn of the tongue and a knitting yarn of the right portion overlapped with a constant relationship of face and rear; and

a left plating area extending along a boundary between the tongue and the left portion, and having, along the peripheral direction of the shoe upper, at least two continuous stitches formed from the knitting yarn of the tongue and a knitting yarn of the left portion overlapped with a constant relationship of face and rear, and in that

a step for knitting the right portion, plating-knitting the right plating area, knitting the tongue, plating-knitting the left plating area, and knitting the left portion in this order; and

a step for knitting the left portion, plating-knitting the left plating area, knitting the tongue, plating-knitting the right plating area, and knitting the right portion in this order; are repeated alternately in knitting the body.

5

4. The method for knitting the shoe upper according to claim 3, being **characterized by** forming a lace hole row for passing a shoe lace in the right plating area on the flat knitting machine, and forming another lace hole row, facing the lace hole row formed in the right plating area, in the right plating area, the tongue, or the right portion on the flat knitting machine and forming a lace hole row for passing the shoe lace in the left plating area on the flat knitting machine, and forming another lace hole row, facing the lace hole row formed in the left plating area, in the left plating area, the tongue, or the left portion on the flat knitting machine.

10

15

20

25

30

35

40

45

50

55

FIG. 1

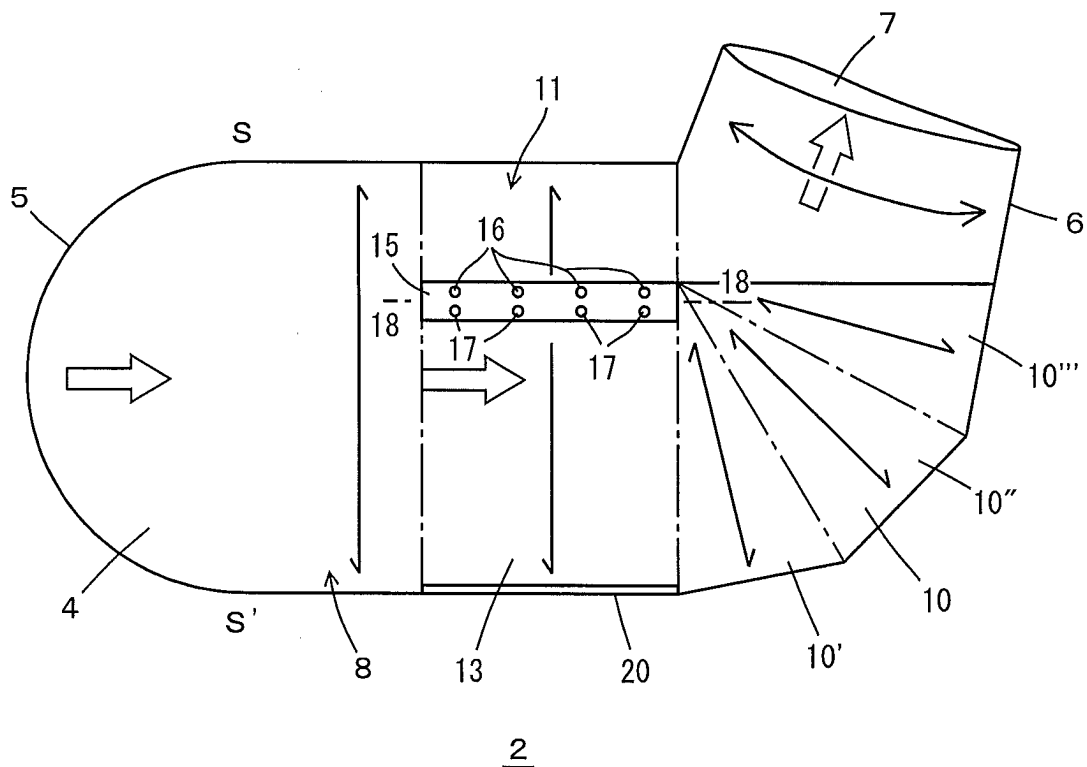


FIG. 2

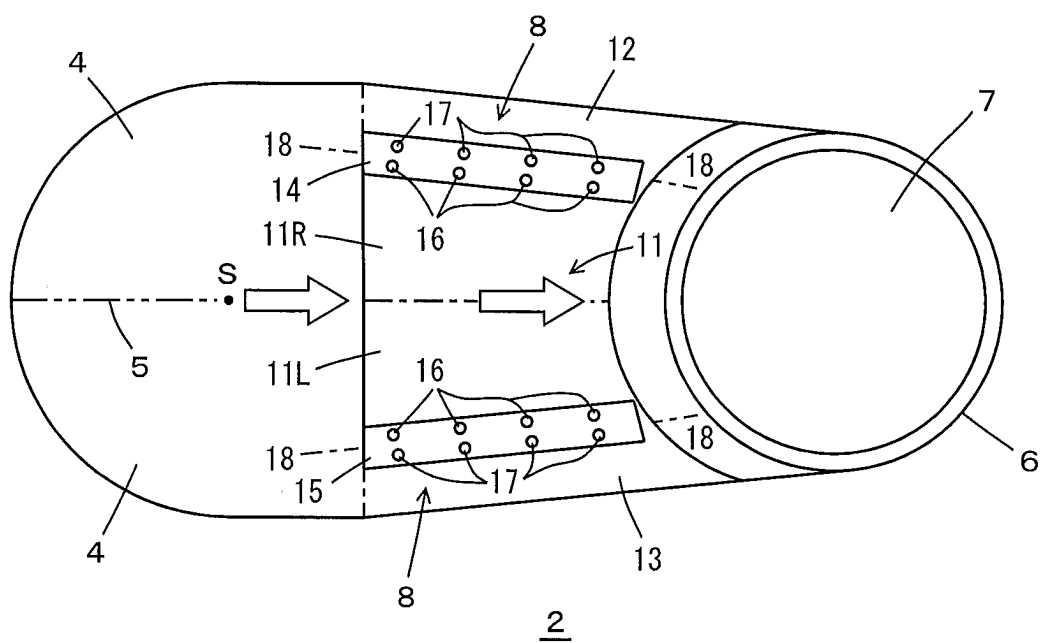


FIG. 3

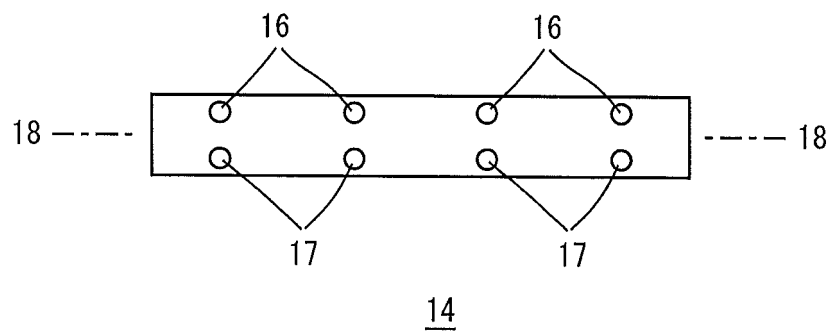


FIG. 4

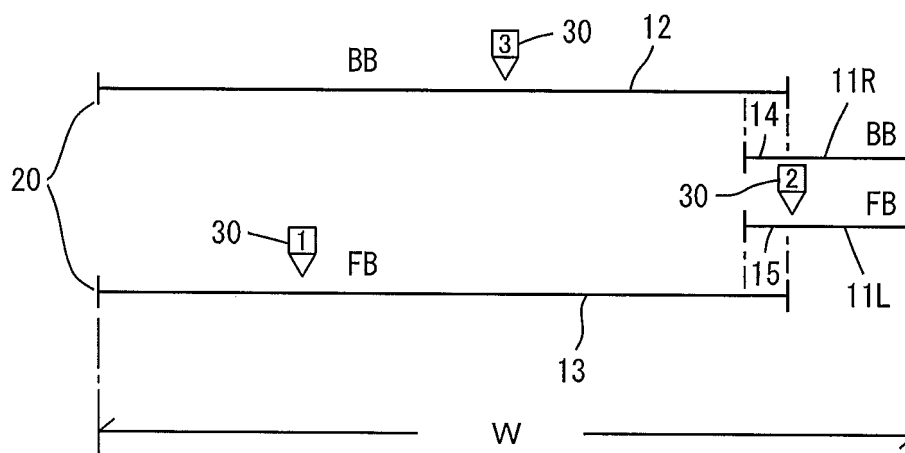


FIG. 5

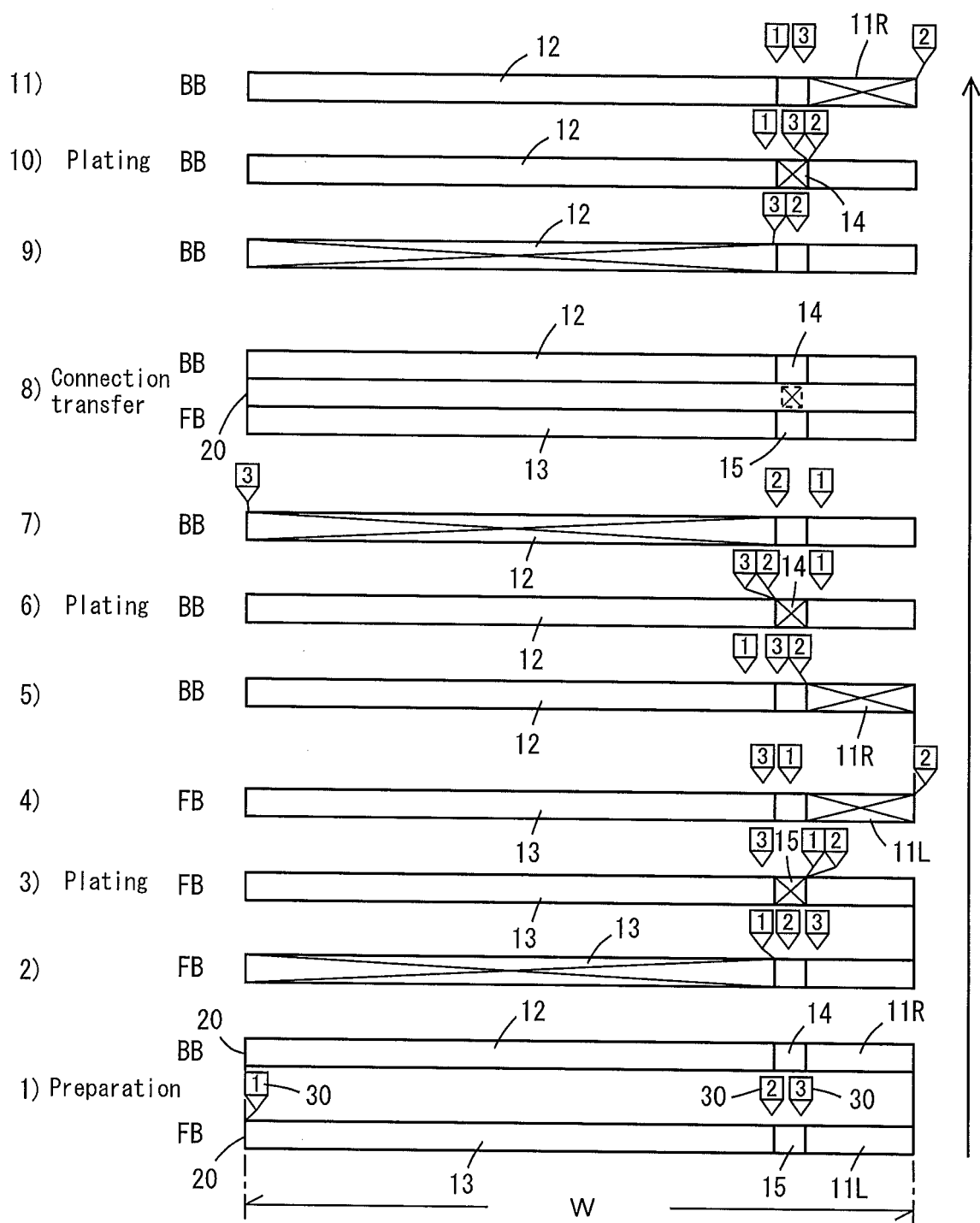
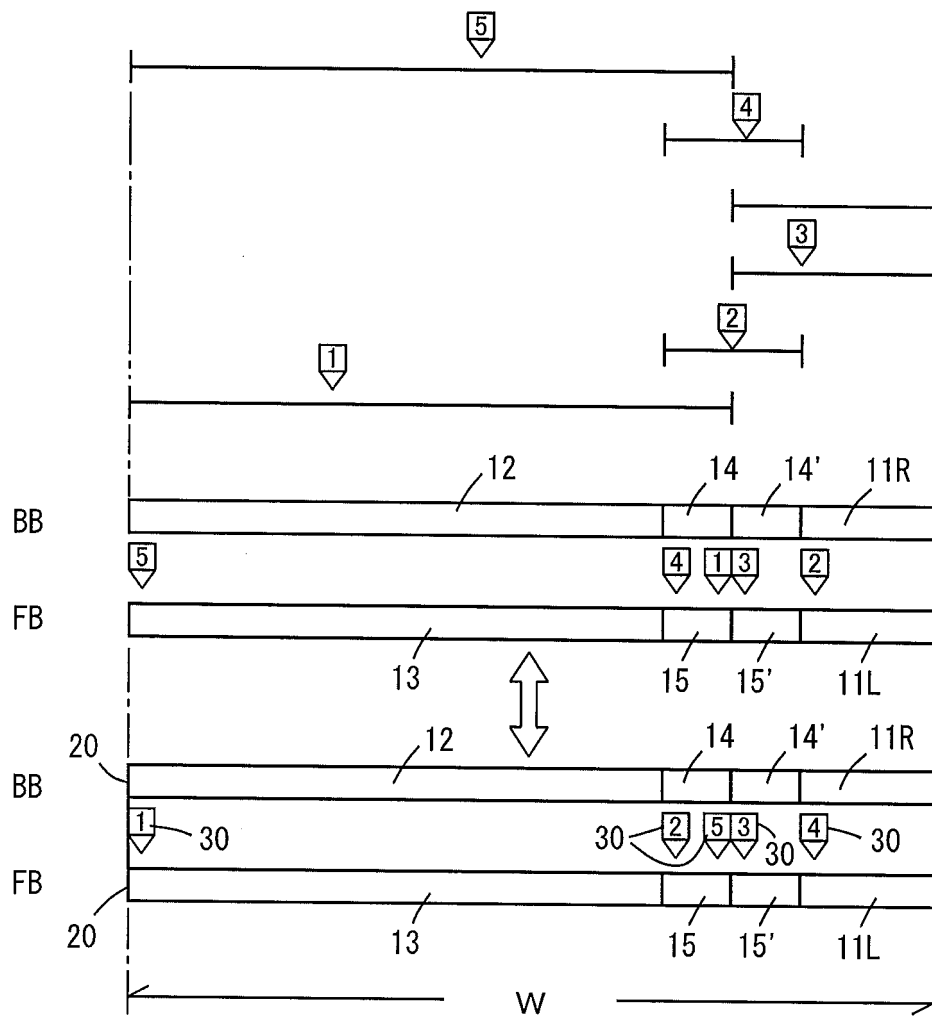


FIG. 6



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2016/063865

A. CLASSIFICATION OF SUBJECT MATTER

A43B23/02(2006.01)i, A43B23/04(2006.01)i, A43B23/26(2006.01)i, D04B1/22
(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)

A43B1/00-23/30, D04B1/22

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 1996-2016
Kokai Jitsuyo Shinan Koho 1971-2016 Toroku Jitsuyo Shinan Koho 1994-2016

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	US 2005/0115284 A1 (DUA, Bhupesh), 02 June 2005 (02.06.2005), all drawings & US 6931762 B1 & US 2006/0130359 A1	1-4
A	US 2014/0245632 A1 (NIKE, INC.), 04 September 2014 (04.09.2014), all drawings & WO 2014/137825 A1 & EP 2964043 A & CN 105163617 A	1-4
A	JP 8-280405 A (Mariko KIN), 29 October 1996 (29.10.1996), all drawings (Family: none)	1-4

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
30 June 2016 (30.06.16)

Date of mailing of the international search report
12 July 2016 (12.07.16)

Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2016/063865

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, A	WO 2015/146444 A1 (Shima Seiki Mfg., Ltd.), 01 October 2015 (01.10.2015), all drawings	1-4

Form PCT/ISA/210 (continuation of second sheet) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 6931762 B [0002] [0004]
- JP 54021464 B [0004]
- JP H09111619 A [0004]