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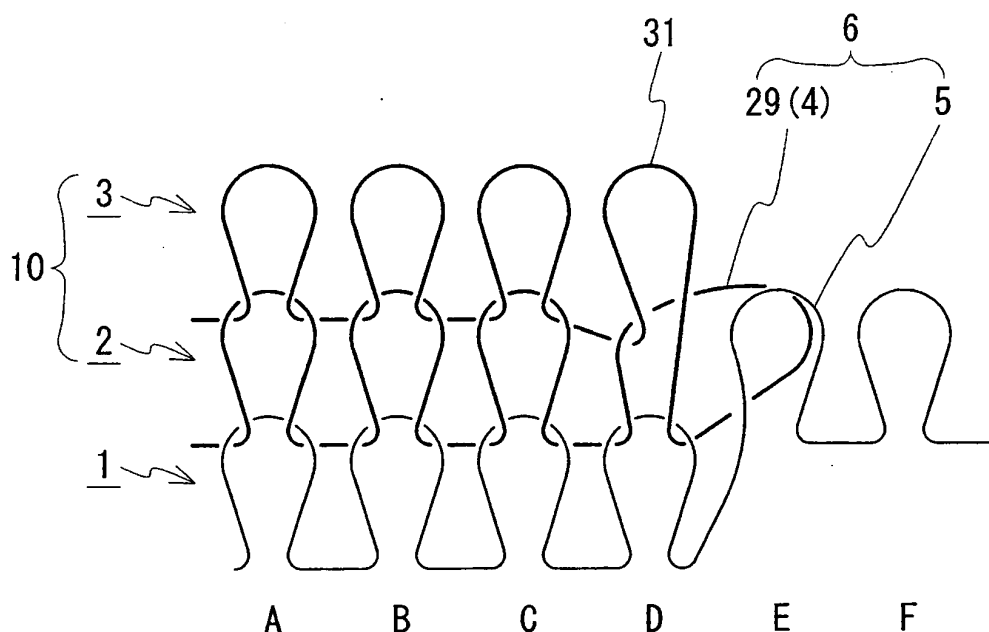
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(54) **Flechage knitting method, and knitted fabric**

(57) To provide a flechage knitting method in which the number of times to carry out flechage can be increased compared to the flechage knitting method using tuck and in which a hole is less likely to form at a position of a flechage end. A flechage knitting including a forward knitting and a backward knitting, which knitting width is shorter than a base stitch row 1, is carried out following

in a wale direction of the base stitch row 1 held on needle beds. In this case, split knitting is carried out at least one of when knitting a termination stitch 29 of the forward knitting and when knitting a starting end stitch 31 of the backward knitting, and a widening stitch 4 formed by the split knitting is overlapped with a returning point stitch 5, which is a stitch in a forming direction side of the forward knitting of the widening stitch 4.

**Fig. 3**



## Description

### BACKGROUND OF THE INVENTION

#### Field of the Invention

**[0001]** The present invention relates to a flechage knitting method of carrying out flechage knitting including a forward knitting and a backward knitting, and a knitted fabric having a portion knitted by the flechage knitting method.

#### Description of the Related Art

**[0002]** Conventionally, in knitting a knitted fabric using a flat knitting machine, a flechage knitting including a forward knitting and a backward knitting, which knitting width is narrower than a base stitch row, is sometimes carried out following in a wale direction of the base stitch row held on knitting needles. For instance, in a knitwear 100 including a front body 20 and a back body 30 shown in Fig. 1, the flechage knitting may be applied to form a neckline portion 41.

**[0003]** In the most typical flechage knitting, tuck is carried out so that a hole does not form in the knitted fabric at a position of a flechage end when transitioning from the forward knitting to the backward knitting (see e.g., Patent Document 1). However, in the flechage knitting method using the tuck, the knitting becomes difficult with increase in the number of times the flechage knitting is carried out, and hence the number of times the flechage knitting can be carried out is limited. This is because the portion which has been tucked inhibits a knitted fabric portion newly knitted by the flechage knitting from lowering towards a lower side of a needle bed gap.

**[0004]** The applicant proposed a flechage knitting method of winding a knitting yarn connecting a termination stitch of the forward knitting and a starting end stitch of the backward knitting around a root of a stitch of the base stitch row when carrying out the flechage knitting including the forward knitting and the backward knitting (see Patent Document 2). Since the tuck is not used in the flechage knitting method, the number of times to carry out the flechage knitting can be increased compared to the flechage knitting method using the tuck.

#### PRIOR ART DOCUMENTS

#### PATENT DOCUMENTS

#### [0005]

[Patent Document 1] Japanese Unexamined Patent Publication No. 2006-111996

[Patent Document 2] International Publication WO 2009/147815

## SUMMARY OF THE INVENTION

**[0006]** In the flechage knitting method of Patent Document 2, a hole may appear to be formed at the position of the flechage end in the knitted fabric when the knitted fabric is knitted using a knitting yarn thinner than an appropriate yarn count number. Furthermore, a hole may appear to be formed at the position of the flechage end in the knitted fabric depending on a type of knitting structure configuring the knitted fabric.

**[0007]** In light of the foregoing, it is an object of the present invention to provide a flechage knitting method in which the number of times to carry out the flechage knitting can be increased compared to the flechage knitting method using the tuck and in which a hole is less likely to form at the position of the flechage end, and a knitted fabric having a portion knitted using the flechage knitting method.

**[0008]** A flechage knitting method of the present invention is a flechage knitting method for carrying out flechage knitting including a forward knitting and a backward knitting, which knitting width is shorter than a base stitch row, following in a wale direction of the base stitch row held on knitting needles using a flat knitting machine including at least a front and a back needle bed, stitches being transferrable between the front and back needle beds. The flechage knitting method of the present invention is characterized by performing split knitting at least one of when knitting a termination stitch of the forward knitting and when knitting a starting end stitch of the backward knitting; and overlapping a widening stitch formed by the split knitting with a returning point stitch, which is a stitch in a forming direction side of the forward knitting of the widening stitch.

**[0009]** The "split knitting" refers to the knitting of increasing the number of stitches by transferring an existing stitch held on one of the front and back needle beds to the opposing other needle bed while forming a new stitch following in a wale direction of the existing stitch to be transferred (see e.g., Japanese Patent No. 2604653). In the present specification, the existing stitch transferred from one needle bed to the other needle bed by performing the split knitting is referred to as "widening stitch".

**[0010]** Furthermore, the "returning point stitch" in the flechage knitting method of the present invention may be the stitch of the base stitch row or may be the stitch knitted by the forward knitting. For instance, in S3, S4 of Fig. 2 of the first embodiment to be described later, the widening stitch 4 is overlapped with the returning point stitch 5, the returning point stitch 5 being the stitch of the base stitch row 1 (stitch of the knitting needle E of the front needle bed FB). In S6, S7 of Fig. 2, the widening stitch 4 is overlapped with the returning point stitch 5, the returning point stitch 5 being the stitch knitted by the forward knitting (stitch formed on the knitting needle D of the FB in S5).

**[0011]** According to one aspect of the flechage knitting method of the present invention, the split knitting is carried out when knitting the starting end stitch of the back-

ward knitting, and the split knitting is not carried out when knitting the termination stitch of the forward knitting.

[0012] According to another aspect of the flechage knitting method of the present invention, a portion to perform the flechage knitting is a neckline portion of a knitwear.

[0013] A knitted fabric of the present invention is a knitted fabric having a flechage knitting portion including a forward knitting stitch row formed following in a wale direction of a base stitch row and a backward knitting stitch row formed following in a wale direction of the forward knitting stitch row, the knitted fabric knitted using a flat knitting machine including at least a front and a back needle bed, stitches being transferrable between the front and back needle beds. The knitted fabric of the present invention is **characterized in that** at least one of a termination stitch of the forward knitting stitch row and a starting end stitch of the backward knitting stitch row is formed by split knitting; and a widening stitch formed by the split knitting is overlapped with a returning point stitch, which is a stitch in a forming direction side of the forward knitting stitch row of the widening stitch.

[0014] In the flechage knitting method of the present invention, the split knitting is performed at the termination of the forward knitting or the starting end of the backward knitting, and the widening stitch formed by the split knitting is used in place of the tuck of the flechage knitting of the prior art. As described earlier, the split knitting includes transferring the existing stitch held on the needle bed to the opposing needle bed while forming a new stitch following the existing stitch, where the existing stitch to become the widening stitch is held on the needle bed. Thus, a sufficient yarn length can be ensured enabling movement between the widening stitch (existing stitch) and the new stitch following thereto, so that the widening stitch is less likely to inhibit the flechage knitting even when the widening stitch is overlapped with the returning point stitch at the portion transitioning from the forward knitting to the backward knitting. Thus, according to the flechage knitting method of the present invention, the number of times to perform the flechage knitting can be increased compared to the flechage knitting using tuck.

[0015] According to the flechage knitting method of the present invention, a knitted fabric of the present invention in which a hole is less likely to form at the flechage end transitioning from the forward knitting to the backward knitting can be knitted. The hole is less likely to form at the flechage end in the knitted fabric of the present invention because the knitting yarn configuring the widening stitch is arranged to fill the gap of the flechage end (see Fig. 3 of the first embodiment described later).

[0016] The appearance of the portion transitioning from the forward knitting to the backward knitting can be enhanced by performing the split knitting only in the backward knitting of the flechage knitting method of the present invention.

## BRIEF DESCRIPTION OF THE DRAWINGS

### [0017]

Fig. 1 is an overall view of a knitwear having a flechage knitting portion;

Fig. 2 is a knitting step diagram of a flechage knitting according to a first embodiment; and

Fig. 3 is a loop diagram of a flechage knitting portion knitted according to the knitting steps of the first embodiment.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] An example in which a flechage knitting method of the present invention is applied to knit a neckline portion 41 of a knitwear 100 shown in Fig. 1 will be hereinafter described based on Figs. 1 to 3. A flat knitting machine used for the knitting is a two-bed flat knitting machine including a front and a back needle bed extending in a transverse direction and disposed opposite to each other in a cross direction, in which the back needle bed can be racked in the transverse direction and stitches can be transferred between the front and back needle beds. The flat knitting machine used for the knitting may, of course, be a two-bed flat knitting machine including a needle bed dedicated for transfer, or a four-bed flat knitting machine.

<First embodiment>

[0019] The knitwear 100 shown in Fig. 1 is a tubular knitted fabric including a front body 20 and a back body 30, where a neck portion 40 is formed at the neckline portion 41. When knitting the knitwear 100, the front body 20 and the back body 30 are first knitted to a position 50 at a lower end of the neck portion 40. The contour of the neckline portion 41 is then formed while knitting the front body 20 and the back body 30 by C-shaped flechage knitting, and lastly, the neck portion 40 is knitted continuing to the stitches configuring the neckline portion 41. The flechage knitting of the present invention is used to form the contour of the neckline portion 41.

[0020] Fig. 2 is a knitting step diagram for knitting the neckline portion 41 on a right side (left side in the drawing) of the front body 20 of Fig. 1. "S + number" shown in the left column of Fig. 2 indicates the number of the knitting step, an arrow in the left and right direction with "K" shown in the right column indicates performing knitting with the movement of a yarn feeder, and an arrow in a diagonal direction indicates a direction of transfer. Furthermore, o in a middle column where the actual knitting state is shown indicates a stitch held on a needle bed (front needle bed: FB, back needle bed: BB), • indicates a stitch knitted in each knitting step, and ▼ indicates a yarn feeder. In Fig. 2, a full-gauge knitting in which an empty needle is not provided between the stitches is described for the sake of convenience of the explanation, but the knitwear

100 of Fig. 1 is actually knitted with a half-gauge knitting in which an empty needle is provided between the stitches. The empty needle for transfer is necessary because the back body 30 of the knitwear 100 is held on the BB.

**[0021]** S1 of Fig. 2 shows a state in which a stitch row (base stitch row 1) configuring the front body 20 is held on knitting needles A to F of the FB. This state is a state in which the knitting of the position 50 at the lower end of the neck portion 40 in the knitwear 100 shown in Fig. 1 is finished. The flechage knitting including a forward knitting and a backward knitting is carried out from the state of S1 to form the neckline portion 41.

**[0022]** First, in S2, the yarn feeder is moved towards a right direction in a plane of drawing, and the forward knitting for forming stitches on the knitting needles A to D of the FB is carried out to knit a forward knitting stitch row 2 following in a wale direction of the base stitch row 1.

**[0023]** In S3, the yarn feeder is moved towards a left direction in the plane of drawing, and the backward knitting for forming stitches on the knitting needles D to A of the FB is carried out to knit a backward knitting stitch row 3 following in a wale direction of the forward knitting stitch row 2. When forming a starting end stitch 31 of the backward knitting, a knitting (i.e., split knitting) of transferring a termination stitch 29 of the forward knitting in S2 to the knitting needle D of the BB while forming the starting end stitch 31 following in the wale direction of the termination stitch 29 is carried out.

**[0024]** In S4, a widening stitch 4 (termination stitch 29 of the forward knitting performed in S2) formed on the knitting needle D of the BB in S3 is overlapped with a returning point stitch 5, which is a stitch of the base stitch row 1 held on the knitting needle E of the FB, to form a double stitch 6 on the knitting needle E. The returning point stitch 5 is not particularly limited as long as it is a stitch in a forming direction of the forward knitting stitch row 2 (right direction in the plane of drawing) of the widening stitch 4, and for example, may be a stitch held on the knitting needle F of the FB. In the present example, the widening stitch 4 is overlapped on a back side (inner side of the knitwear 100) of the returning point stitch 5 so that the double stitch 6 does not stand out, but the widening stitch 4 may be overlapped on the front side of the returning point stitch 5 on purpose. The line of the neckline portion 41 then may stand out in terms of design.

**[0025]** After S4, the flechage knitting including split knitting is further carried out similar to S2 to S4. In this case, the position to perform the split knitting is shifted towards the left side in the plane of drawing.

**[0026]** In S5, the six stitches held on the knitting needles A to F of the FB in S4 are assumed as the base stitch row 1, the yarn feeder is moved in the right direction in the plane of drawing, and the forward knitting for forming the stitches on the knitting needles A to D of the FB is carried out to knit the forward knitting stitch row 2. The position to form the termination stitch 29 of the forward knitting is the position of the knitting needle D of the FB, so that a new stitch is not formed following the double

stitch 6 held on the knitting needle E of the FB, and the double stitch 6 is not fixed to the new stitch. If the double stitch 6 is fixed, the movement of the knitting yarn forming the double stitch 6 is restricted, and hence the stitch rows 2, 3 knitted in S5 and the following S6 are less likely to lower to the lower side of the needle bed gap.

**[0027]** In S6, the yarn feeder is moved in the left direction in the plane of drawing to carry out split knitting with the knitting needle C of the FB, and the backward knitting for forming stitches on the knitting needles B, A of the FB is carried out to knit the backward knitting stitch row 3.

**[0028]** In S7, the widening stitch 4 formed in S6 (stitch 28 formed on the knitting needle C of the FB in the forward knitting in S5 and transferred to the knitting needle C of the BB in the split knitting in S6) is overlapped with the stitch of the knitting needle D of the FB to form the double stitch 6 on the knitting needle D.

**[0029]** In S8, the next forward knitting is carried out. The position to form the termination stitch 29 of the forward knitting is the position of the knitting needle C of the FB so that the double stitch 6 formed in S7 is not fixed to the new stitch. After S8, the knitting similar to S3 to S8 is repeated to form the contour of the neckline portion 41 while knitting the bodies 20, 30 shown in Fig. 1.

**[0030]** A loop diagram of the portion (flechage knitting portion 10) knitted by the flechage knitting described above is shown in Fig. 3. Fig. 3 is a loop diagram of the flechage knitting portion 10 at a time point when S4 of Fig. 2 is terminated.

**[0031]** As shown in Fig. 3, the flechage knitting portion 10 includes the forward knitting stitch row 2 formed following in the wale direction of the base stitch row 1, and the backward knitting stitch row 3 formed following in the wale direction of the forward knitting stitch row 2. The starting end stitch 31 of the backward knitting stitch row 3 is knitted by split knitting targeting on the termination stitch 29 of the forward knitting stitch row 2, where the widening stitch 4 (termination stitch 29 of the forward knitting stitch row 2 herein) formed by the split knitting is overlapped with the returning point stitch 5, which is the stitch in the forming direction side of the forward knitting stitch row 2 • of the widening stitch 4.

**[0032]** The widening stitch 4 overlapped with the returning point stitch 5 is lowered to the lower side of the needle bed gap (correspond to the lower side in the plane of drawing) by the starting end stitch 31, and a sufficient yarn length is ensured between the widening stitch 4 and the starting end stitch 31. Thus, even when the widening stitch 4 is overlapped with the returning point stitch 5, the widening stitch 4 is less likely to inhibit the subsequent flechage knitting. Specifically, in the case where the forward knitting is carried out with the knitting needles A to D of the FB as shown in S5 of Fig. 2, the knitted fabric portion held on the knitting needles A to D of Fig. 3 is lowered to the lower side of the needle bed gap. In this case, the knitting yarn is fed from the widening stitch 4 towards the starting end stitch 31, and hence the forward knitting will not be inhibited. Since the flechage knitting

is less likely to be inhibited, the number of times to perform the flechage knitting can be increased compared to the prior art (flechage knitting using tuck), and the knitwear 100 with deep neckline portion 41 can be knitted.

[0033] As shown in the loop diagram of Fig. 3, the knitting yarn configuring the widening stitch 4 is arranged to fill the gap of the flechage end transitioning from the forward knitting to the backward knitting, so that a hole is less likely to form at the flechage end even when the knitted fabric portion of the loop diagram is pulled in the knitting width direction (left and right direction in the plane of drawing).

<Second embodiment>

[0034] In the embodiment referencing the drawing, the split knitting is carried out in the backward knitting, but the split knitting may be carried out in the forward knitting. For instance, in S2 of Fig. 2, the split knitting may be carried out with the knitting needle D of the FB, and the widening stitch (stitch held on the knitting needle D of the FB in S1) formed then may be overlapped with the stitch of the knitting needle E of the FB.

[0035] Furthermore, the split knitting may be carried out in both the forward knitting and the backward knitting. For instance, when carrying out the forward knitting in S2, the split knitting may be carried out with the knitting needle D of the FB, the widening stitch (stitch held on the knitting needle D of the FB in S1) may be overlapped with the stitch of the knitting needle E of the FB, and then the backward knitting having the position of the knitting needle C of the FB as the starting end may be carried out. The widening stitch (stitch formed on the knitting needle C of the FB in the forward knitting) formed in the backward knitting may be overlapped with the stitch of the knitting needle D of the FB. According to this configuration, the neckline portion 41 can be inclined every time the stitch row for one course lined in the knitting width direction is knitted, and the line of inclination can be beautifully finished.

[0036] The flechage knitting method of the present invention can be applied as long as it is a knitted fabric with a portion to perform the flechage knitting, and thus the target of application is not limited to the tubular knitted fabric. For instance, the knitted fabric to apply the flechage knitting of the present invention may be a piece of non-tubular knitted fabric. Furthermore, the portion to apply the flechage knitting is not limited to the neckline portion, and may be, for instance, a gore portion or a shoulder line portion. Furthermore, the portion to apply the flechage knitting may be a structure pattern such as a rib structure (e.g., rib structure of 1 x 1, 2 x 2, 3 x 2) and the like.

## Claims

1. A flechage knitting method for carrying out flechage

knitting including a forward knitting and a backward knitting, which knitting width is shorter than a base stitch row (1), following in a wale direction of the base stitch row (1) held on knitting needles using a flat knitting machine including at least a front and a back needle bed, stitches being transferrable between the front and back needle beds, the method **characterized by:**

performing split knitting at least one of when knitting a termination stitch (29) of the forward knitting and when knitting a starting end stitch (31) of the backward knitting; and overlapping a widening stitch (4) formed by the split knitting with a returning point stitch (5), which is a stitch in a forming direction side of the forward knitting of the widening stitch (4).

2. The flechage knitting method according to claim 1, **characterized in that** the split knitting is carried out when knitting the starting end stitch (31) of the backward knitting, and the split knitting is not carried out when knitting the termination stitch (29) of the forward knitting.

3. The flechage knitting method according to claim 1 or 2, **characterized in that** a portion to perform the flechage knitting is a neckline portion (41) of a knitwear (100).

4. A knitted fabric (100) having a flechage knitting portion (10) including a forward knitting stitch row (2) formed following in a wale direction of a base stitch row (1) and a return knitting stitch row (3) formed following in a wale direction of the forward knitting stitch row (2), the knitted fabric (100) knitted using a flat knitting machine including at least a front and a back needle bed, stitches being transferrable between the front and back needle beds, the knitted fabric **characterized in that:**

at least one of a termination stitch (29) of the forward knitting stitch row (2) and a starting end stitch (31) of the backward knitting stitch row (3) is formed by split knitting; and a widening stitch (4) formed by the split knitting is overlapped with a returning point stitch (5), which is a stitch in a forming direction side of the forward knitting stitch row (2) of the widening stitch (4).

Fig. 1

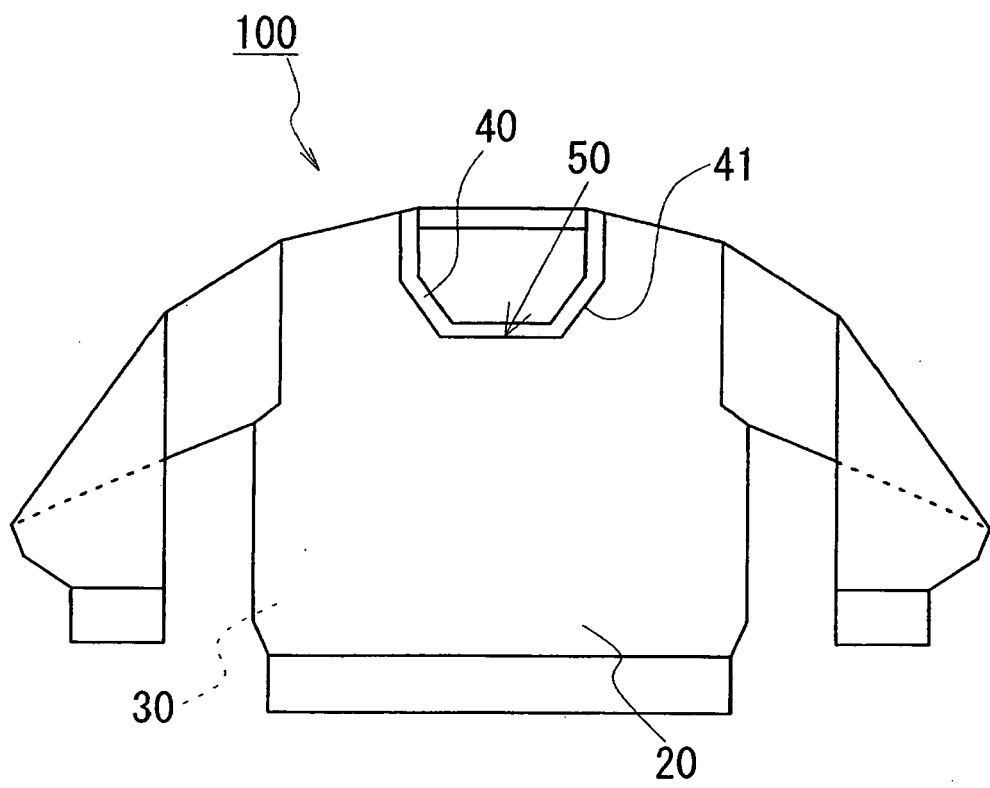


Fig. 2

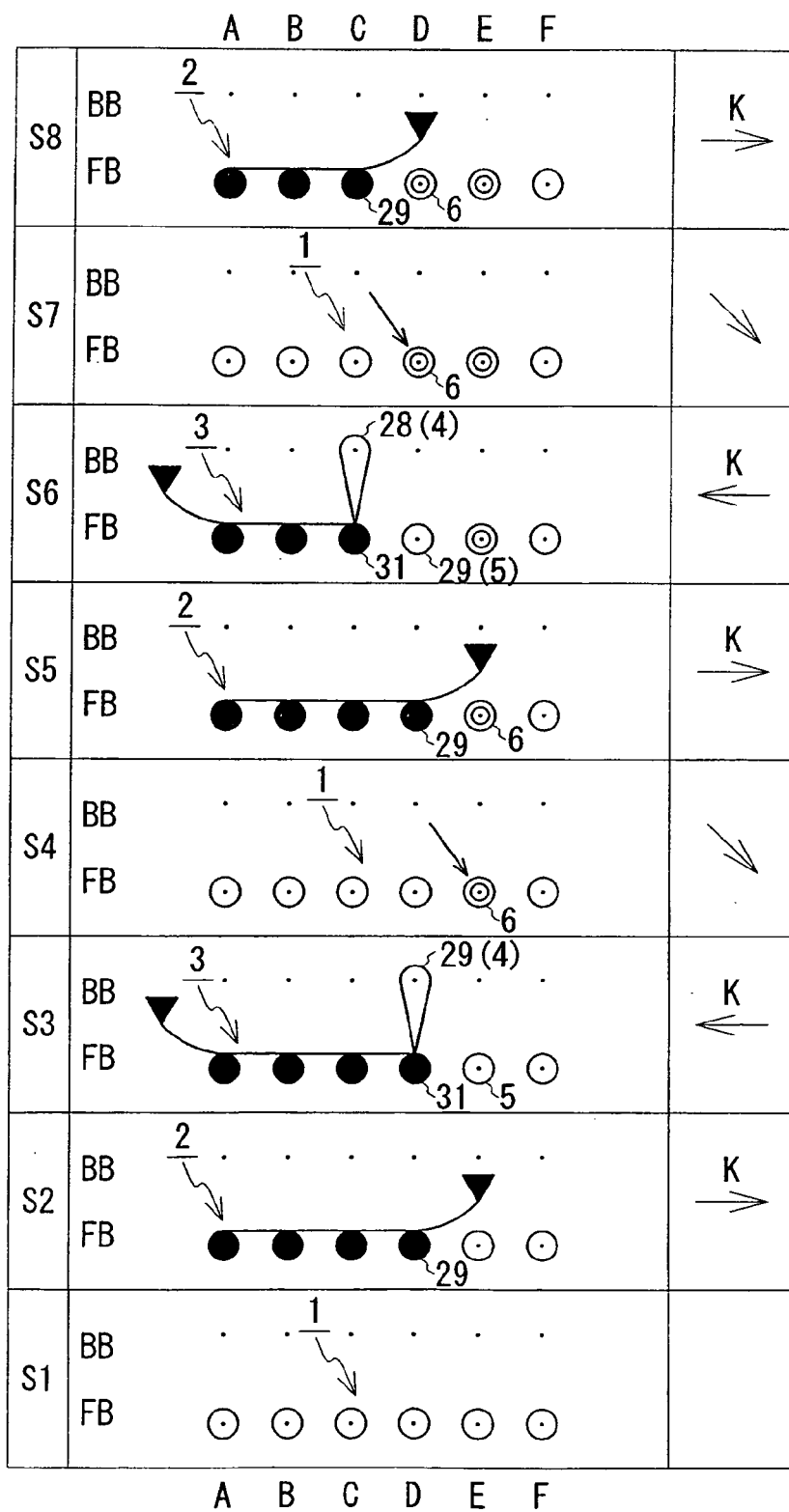
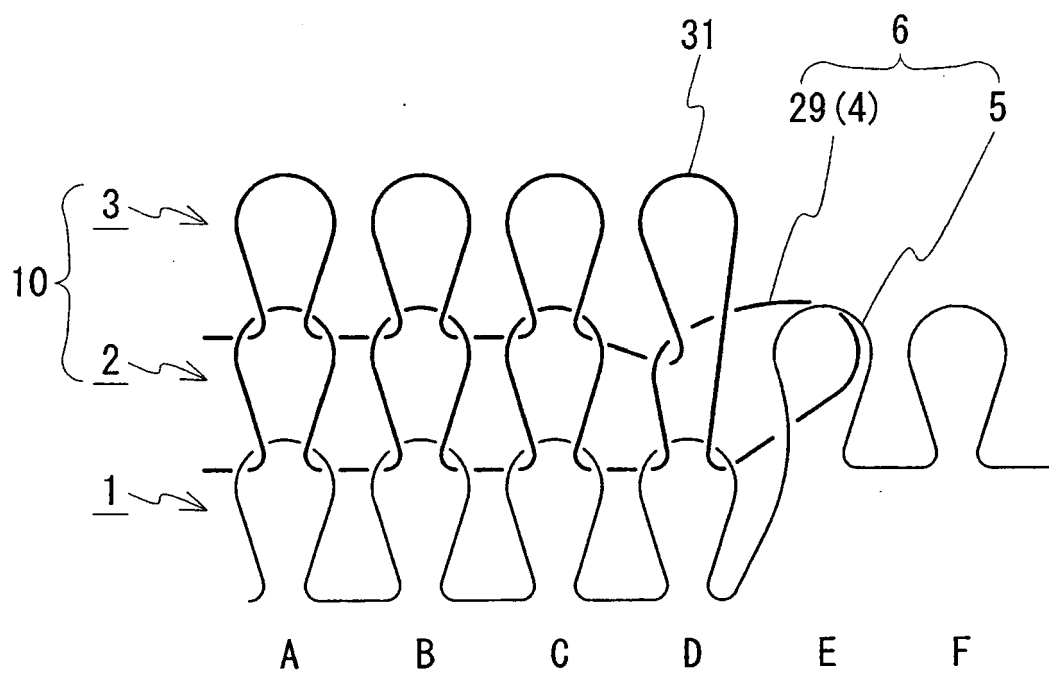


Fig. 3





**REFERENCES CITED IN THE DESCRIPTION**

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