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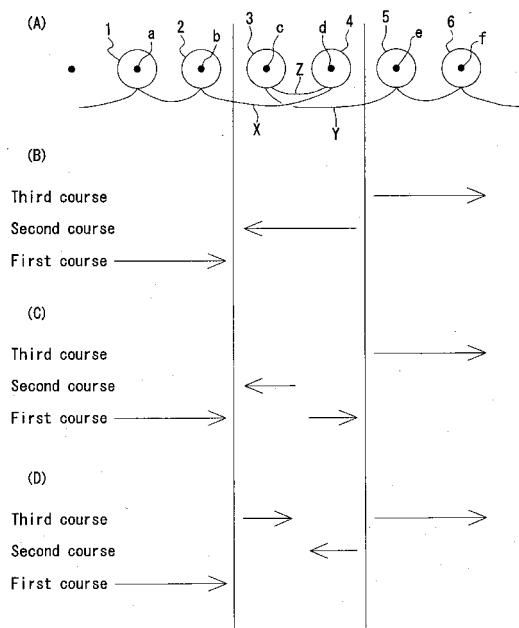
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(54) **METHOD FOR KNITTING KNITTED FABRIC WITH OVERLAPPED STITCHES, AND KNITTED FABRIC**

(57) To provide a knitted fabric with double stitches such that the knitted fabric is not divided at the position of the double stitch, and a knitting method thereof. A knitted fabric with a double stitch formed by overlapping one stitch 2 over another stitch 3 of the two stitches 2, 3 adjacent in a knitting width direction is knitted using a flat knitting machine, capable of transferring stitches to between front and back needle beds. In this case, the other stitch 3 is knitted after continuously knitting the one stitch 2 and a stitch 4 (adjacent stitch) adjacent on a side opposite to the one stitch 2 with respect to the other stitch 3. The double stitch is formed by overlapping the one stitch 2 and the other stitch 3. Through such knitting, the adjacent stitch 4 is directly connected, through a sinker loop X, to the one stitch 2 forming the double stitch, whereby the sinker loop X does not appear as if stretched, and the knitted fabric is less likely to be divided.

Fig. 1



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Description

TECHNICAL FIELD

[0001] The present invention relates to a knitting method of a knitted fabric with double stitches, and a knitted fabric knitted by such a knitting method.

BACKGROUND ART

[0002] When knitting a knitted fabric of a sweater and the like, double stitches are conventionally formed by overlapping stitches adjacent in a knitting width direction. The knitting of forming the double stitch includes formation of a gore to give fullness at a side part, formation of an armhole part, and formation of a shoulder line part, which are carried out when joining a sleeve and a body of the sweater, as described in Patent Document 1. In addition, formation of a structure pattern (e.g., leaf pattern) in the knitted fabric, and the like are also given as examples.

[0003] Fig. 6 is a view showing one example of a procedure for forming a double stitch, where (A) shows a state before overlapping stitches and (B) shows a state after overlapping the stitches. A black point in Fig. 6 indicates a knitting needle, and an arrow in (A) indicates to which knitting needle to transfer the stitches held on the knitting needle (same in Fig. 2 to be described later). In the example of Fig. 6, the stitches are drawn and overlapped from both sides with respect to the stitches 3, 4 of the stitches 1 to 6, which are held on the knitting needles a to f, to form a double stitch 100 in which the stitch 2 is overlapped on the stitch 3 and a double stitch 200 in which the stitch 5 is overlapped on the stitch 4.

[0004]

Patent document 1: Japanese Patent Laid-open Publication No. H09-273051

DISCLOSURE OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0005] However, in the knitted fabric with the double stitches formed through the conventional knitting method, a gap between the double stitch and the stitch adjacent to the double stitch, for example, a gap between the double stitch 100 and the double stitch 200 in Fig. 6(B) tends to easily widen when pulled in the knitting width direction of the knitted fabric. This is because when the knitted fabric is pulled in the knitting width direction, the double stitches 100 and 200 contract and the knitting yarn worth the contracted amount is led out to a sinker loop Z that connects the stitch 3 and the stitch 4. Thus, when such a knitted fabric is worn, the knitted fabric appears as if divided between the double stitch and the stitch adjacent to the double stitch, and the quality of the knitted fabric may be degraded.

[0006] The present invention has been made in view of the foregoing circumstance, and an object of the present invention is to provide a knitted fabric with double stitches such that the knitted fabric is not divided between the double stitch and the stitch adjacent to the double stitch, and a knitting method thereof.

MEANS FOR SOLVING THE PROBLEMS

[0007] The knitting method of a knitted fabric with double stitches of the present invention relates to a knitting method for knitting a knitted fabric with double stitches formed by overlapping one stitch over the other stitch of two stitches adjacent in a knitting width direction using a flat knitting machine including at least a pair of front and back needle beds, capable of transferring stitches between the front and back needle beds. The knitting method of a knitted fabric with double stitches of the present invention comprises the following steps.

20 A step of continuously knitting the one stitch and an adjacent stitch adjacent on a side opposite to the one stitch with respect to the other stitch.

A step of knitting the other stitch.

25 A step of forming the double stitch by overlapping the knitted one stitch with the other stitch.

[0008] In the step of continuous knitting (continuous knitting step), the knitting of the one stitch may be carried out first or the knitting of the adjacent stitch may be carried out first. The step of knitting the other stitch is carried out after the continuous knitting step if the knitting of the one stitch is carried out first, and the step of knitting the other stitch is carried out before the continuous knitting step if the knitting of the adjacent stitch is carried out first. For instance, as shown in an example to be hereinafter described with reference to Fig. 1, when forming the double stitch by overlapping the stitch 2 (one stitch) over the stitch 3 (other stitch) from the state in which the stitches 1 to 6 are lined in order from the left side of a paper plane (see Fig. 1(A)), the adjacent stitch (stitch 4) is knitted following the one stitch (stitch 2), and the other stitch (stitch 3) is knitted thereafter. When forming the double stitch by overlapping the stitch 5 (one stitch) over the stitch 4 (other stitch), the adjacent stitch (stitch 3) is knitted following the other stitch (stitch 4), and the one stitch (stitch 5) is knitted thereafter. In either case, the knitting of the adjacent stitch is carried out between the knitting of the one stitch and the knitting of the other stitch.

[0009] As described above, when forming the one stitch, the other stitch and the adjacent stitch, in particular, the other stitch and the adjacent stitch are preferably formed continuously in the same knitting direction.

[0010] When forming two double stitches adjacent in the knitting width direction in the knitting method of the present invention, the knitting is preferably carried out in the following manner assuming a stitch adjacent on a side opposite to the other stitch with respect to the adjacent stitch is a fourth stitch.

First, a step of knitting the other stitch is carried out after

the step of continuously knitting the one stitch and the adjacent stitch.

Then, a step of knitting the fourth stitch in continuation to the knitting of the other stitch, and a step of forming the double stitch by overlapping the fourth stitch and the adjacent stitch are carried out.

[0011] Describing the method for forming two adjacent double stitches with reference to Fig. 1, the stitch 2 corresponds to the one stitch, the stitch 3 corresponds to the other stitch, the stitch 4 corresponds to the adjacent stitch, and the stitch 5 corresponds to the fourth stitch. That is, the stitch 2 and the stitch 3 are overlapped and the stitch 4 and the stitch 5 are overlapped after knitting the stitches 2, 4, 3, 5 in order, so that a first double stitch including the stitch 2 and the stitch 3 and a second double stitch including the stitch 4 and the stitch 5 are adjacently formed.

[0012] A knitted fabric with doubles stitches of the present invention relates to a knitted fabric with double stitches, in which one stitch and the other stitch adjacent in a knitting width direction are overlapped, knitted using a flat knitting machine including at least a pair of front and back needle beds, capable of transferring stitches between the front and back needle beds. In the knitted fabric of the present invention, the one stitch to be overlapped with the other stitch and an adjacent stitch adjacent on a side opposite to the one stitch with respect to the other stitch are directly connected through a sinker loop.

EFFECTS OF THE INVENTION

[0013] According to the knitting method of a knitted fabric with double stitches of the present invention, a knitted fabric can be knitted in a state the one stitch to be overlapped with the other stitch and the adjacent stitch adjacent in the knitting width direction with respect to the other stitch are directly connected through a sinker loop at the double stitch, where the one stitch and the other stitch adjacent in the knitting width direction are overlapped. With the knitted fabric including such connection of stitches, the one stitch forming the double stitch pulls the adjacent stitch in the direction same as the direction the double stitch is pulled through the sinker loop when the double stitch is pulled in the knitting width direction. Thus, the knitted fabric with double stitches of the present invention is a knitted fabric in which the gap between the double stitch including the one stitch and the other stitch, and the adjacent stitch adjacent to the double stitch is less likely to widen and in which the knitted fabric is less likely to be divided.

[0014] The size of the other stitch and the adjacent stitch can be uniformed by continuously knitting the other stitch and the adjacent stitch in the same knitting direction.

The uniformly sized stitches make the knitted fabric high in quality, and thus are preferable. Furthermore, transfer can be easily carried out when forming the double stitch

if the size of the stitches is uniform.

[0015] By limiting the knitting order of the stitches when knitting the knitted fabric with two adjacent double stitches, the one stitch and the adjacent stitch are connected with the sinker loop and the other stitch and the fourth stitch are connected with the sinker loop, while sinker loops cross each other. The other stitch and the adjacent stitch are brought close if the sinker loops cross each other, and hence the first double stitch including the one stitch and the other stitch and the second double stitch including the adjacent stitch and the fourth stitch are brought close. Furthermore, the knitting yarn is less likely to be led out between the two adjacent double stitches due to the friction between the sinker loops that cross each other in the state the first double stitch and the second double stitch are formed. As a result, a knitted fabric can be obtained in which the first double stitch and the second double stitch, which are adjacent to each other, are less likely to be divided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

In Fig. 1, (A) is a view showing a parallel state of the stitches when the stitch 2 is overlapped on the stitch 3 and the stitch 5 is overlapped on the stitch 4 of the stitches 1 to 6, which are held by stitches a to f; and (B) to (D) are views showing the knitting step of three patterns for realizing the parallel state of (A) with an arrow indicating a moving direction of a carriage.

In Fig. 2, (A) is a view showing a connecting state of the stitches when knitted with the pattern of Fig. 1 (B); and (B) is a view showing a state in which a double stitch is formed from the state of (A).

Fig. 3 is a knitting step for knitting a knitted fabric with double stitches described in the example.

Fig. 4 is a knitting step diagram following Fig. 3.

Fig. 5 is a knitting step diagram following Fig. 4.

In Fig. 6, (A) is a view showing a parallel state of stitches before forming double stitches of a background art; and (B) is a view showing a state in which double stitches are formed from the state of (A).

DESCRIPTION OF SYMBOLS

[0017]

1 to 6	stitch
10, 20, 100, 200	double stitch
X, Y, Z	sinker loop
a to f, A to Q	knitting needle

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] In a knitted fabric with double stitches of the present invention, the knitting of one stitch and the knit-

ting of an adjacent stitch adjacent on the side opposite to the one stitch with respect to the other stitch are continuously carried out, and the knitting of the other stitch is carried out separate from such a continuous knitting step when forming the double stitch by overlapping the one stitch and the other stitch adjacent in a knitting width direction. The order of the knitting of the one stitch and the knitting of the adjacent stitch may be interchanged, as specifically described in the description in the next paragraph and thereafter with reference to Figs. 1 and 2. Specifically, if the one stitch, the other stitch and the adjacent stitch are lined in order towards the moving direction of the carriage, the step of knitting the other stitch is carried out after the continuous knitting step of knitting the adjacent stitch following the knitting of the one stitch. If the adjacent stitch, the other stitch and the one stitch are lined in order towards the moving direction of the carriage, the continuous knitting step of knitting the one stitch following the knitting of the adjacent stitch is carried out after the step of knitting the other stitch. After the knitting of the one stitch, the other stitch and the adjacent stitch is finished, the one stitch is transferred to the knitting needle on which the other stitch is held, thereby forming the double stitch in which the one stitch is overlapped with the other stitch.

[0019] A specific knitting method for knitting in such a manner that the one stitch in the double stitch and the adjacent stitch are connected with a sinker loop will be described below using Figs. 1 and 2 by way of example.

[0020] Fig. 1(A) shows a parallel state of the stitches when overlapping the stitch 2 with the stitch 3, and the stitch 5 with the stitch 4, of the stitches 1 to 6 which are held by the knitting needles a to f. That is, the stitch 2 (stitch 5) corresponds to the one stitch that forms the double stitch, the stitch 3 (stitch 4) corresponds to the other stitch that forms the double stitch, and the stitch 4 (stitch 3) corresponds to the adjacent stitch. The stitch 2 (one stitch) and the stitch 4 (adjacent stitch) are directly connected by a sinker loop X, and the stitch 5 (one stitch) and the stitch 3 (adjacent stitch) are directly connected by a sinker loop Y. The sinker loop X and the sinker loop Y cross each other. The stitch 3 and the stitch 4 are connected by a sinker loop Z.

[0021] The knitting step for realizing the parallel state of the stitches in Fig. 1(A) includes the knitting steps of three patterns shown in Fig. 1(B) to (D). First, in the pattern of Fig. 1(B), the carriage is moved towards the right in the paper plane in the knitting of the first course to form the stitches 1, 2 in such order. In the knitting of the second course, the carriage is inverted towards the left in the paper plane to continuously form the stitches 4, 3. Lastly, the carriage is inverted towards the right in the paper plane to form the stitches 5, 6 in such order. The knitting may be carried out in the patterns of Fig. 1(C) or Fig. 1(D). In Fig. 1(C), the stitches 1, 2, 4 are formed in order in the knitting of the first course towards the right, the stitch 3 is formed in the second course towards the left, and the stitches 5, 6 are formed in order in the last third

course towards the right. Furthermore, in Fig. 1(D), the stitches 1, 2 are formed in order in the knitting of the first course towards the right, the stitch 4 is formed in the second course towards the left, and the stitches 3, 5, 6 are formed in order in the last third course towards the right.

[0022] One of the knitting patterns shown in Fig. 1 (B) to (D) is selected for the knitting pattern of the one stitch and the adjacent stitch even if one or more stitches that do not become the double stitch exist between the stitch 3 and the stitch 4.

[0023] The state of the stitches when knitted with the knitting pattern of Fig. 1(B) of the three patterns is shown in Fig. 2(A). As shown with the arrow, the stitch 3 is overlapped with the stitch 2 and the stitch 5 is overlapped with the stitch 4, as shown in Fig. 2(B), by drawing the stitches from both sides of the stitches 3, 4 from the above state. The overlapped stitches 2, 3 and 4, 5 are fixed by further forming stitches with respect to the stitches in the state of Fig. 2(B), thereby forming the double stitches 10 and 20 (in the drawing and the following description, a state in which two stitches are overlapped is referred to as a double stitch). Since the stitches are drawn from both sides of the stitches 3, 4, the stitches 1 and 6 respectively held on the knitting needles a and f in Fig. 2 (A) are transferred to the knitting needles b and e, respectively.

[0024] With the double stitches 10, 20 formed in such a manner, the stitch 2 (one stitch) that forms the double stitch 10 pulls the stitch 4 (adjacent stitch) that forms the double stitch 20 towards the left through the sinker loop X when the double stitch 10 is pulled towards the left. When the double stitch 20 is pulled towards the right, the stitch 5 (one stitch) that forms the double stitch 20 pulls the stitch 3 (adjacent stitch) that forms the double stitch 10 towards the right through the sinker loop Y. Furthermore, since the sinker loop X and the sinker loop Y cross each other, the stitch 3 and the stitch 4 are arranged proximate to each other, and as a result, the double stitch 10 and the double stitch 20 are arranged proximate to each other. Moreover, the knitting yarn is less likely to be led out to the sinker loop Z from the double stitch 10 and the double stitch 20, and the double stitch 10 and the double stitch 20 are less likely to separate since friction occurs between the sinker loops X, Y that cross each other. Therefore, the double stitch 10 and the double stitch 20 do not separate as if divided. Such effects can be similarly obtained even when knitted with the knitting patterns of Fig. 1(C) and (D). If the knitting pattern of Fig. 1(B) is carried out, the stitch 3 and the stitch 4 are continuously formed in the same knitting direction, and hence the size of the stitches 3, 4 becomes more or less the same, and the outer appearance of the knitted fabric becomes more satisfactory than when knitted with the knitting patterns shown in Figs. 1(C) and 1(D).

[0025] Examples of the present invention will be hereinafter described in detail with reference to the drawings.

[0026] In the present example, the knitted fabric is knit-

ted using a four-bed flat knitting machine including a lower front needle bed FD and a lower back needle bed BD extending in a transverse direction and disposed opposite to each other in a cross direction, and an upper front needle bed FU and an upper back needle bed BU, arranged above the FD and the BD, in which a great number of knitting needles are lined at the same pitch as the lower needle beds. The flat knitting machine enables the back needle beds to be racked in the transverse direction and also enables stitches to be transferred between the front and back needle beds. The flat knitting machine including a transfer jack bed in place of the upper needle beds (BU and FU), and the two-bed flat knitting machine including a pair of front and back needle beds can also be used. When using the two-bed flat knitting machine, the knitting needle of one needle bed opposing the knitting needle holding the stitches in the other needle bed is made an empty needle so that stitches can be transferred between the front and back needle beds.

[0027] The flat knitting machine used in the present example includes a plurality of cam systems in the carriage that reciprocates on the needle beds, so that the stitches can be knitted and the stitches can be transferred with one movement of the carriage in one direction.

[0028] As one example of a knitting method for forming the double stitch in the knitted fabric using the above flat knitting machine, the step of forming the double stitch when forming a gore at a position under the side that becomes a joining part of a sleeve and a body will be described. Specifically, the sleeves and the body are respectively knitted to a tubular shape, the sleeves and the body are formed to one tube when knitted up to the side part (joining part), and the gore is formed with the knitted stitches overlapped with the stitches of the body while knitting the sleeve side. The formation of the gore will be described based on the knitting step diagrams of Figs. 3 to 5.

[0029] In the knitting step diagrams of Figs. 3 to 5, only one part of the needle beds is shown, and the number of stitches of the knitted fabric is shown to be less than the number used in the actual knitting for the sake of convenience of the explanation. The numbers at the left end column shown in the figures indicate the number of the knitting step. An arrow in the column next on the right of the left end column indicates the moving direction of the carriage in the step of the relevant number. In the step where the column second from the left is blank, the carriage is moving in the same direction as the step one before, where the knitting by the preceding cam system arranged in the carriage is carried out in the step one before, and the knitting by the following cam system arranged in the carriage is carried out in the step of the blank column. Furthermore, a white circle in the figures indicates the stitch held on the knitting needle, a black circle indicates a stitch newly formed in the relevant knitting step, a double circle indicates the double stitch, a V-shaped mark indicates a tuck, and a black triangle indicates a yarn feeder.

[0030] In step 1 shown in Fig. 3, the stitches held on the knitting needles A to G of the BD and the FD correspond to the sleeve portion, and the remaining stitches correspond to the body portion. In step 1, the sleeve and the body are joined and knitted to one tubular shape, and thereafter, the carriage is moved towards the right in the paper plane, and the yarn is fed from the yarn feeder to the BD to form stitches with the knitting needles A to F of the BD.

[0031] The carriage is then moved towards the left to form stitches with the knitting needles H, G of the BD (step 2). Furthermore, the carriage is moved towards the right to form a stitch with the knitting needle I of the BD, and then form a tuck with the knitting needle L of the BD (step 3). The stitches held on the knitting needles E, F, G, H, and I of the BD through the series of knitting operations of steps 1 to 3 correspond to the stitches 1, 2, 3, 4, and 5 in Fig. 2(A). The tuck of the knitting needle L of the BD plays a role of connection when inverting the carriage and continuing the knitting in step 9, to be described later, thereby suppressing a hole to be formed in the knitted fabric.

[0032] The stitches of the knitting needles A to I of the BD are then transferred to the knitting needles A to I of the FU (step 4). Step 3 is carried out by the preceding cam system, whereas step 4 is carried out by the following cam system. The back needle beds (BD and BU) are then racked by one pitch towards the left, and thereafter, the carriage is moved towards the left to return the stitches transferred to the knitting needles A to H of the FU to the knitting needles B to I of the BD (step 5). After the back needle beds are racked by one pitch toward the right, the stitch remaining on the knitting needle I of the FU is returned to the knitting needle I of the BD (step 6). The double stitch (correspond to double stitch 20 in Fig. 2(B)) is formed in which the stitch of the knitting needle I knitted in step 3 and the stitch of the knitting needle H knitted in step 2 are overlapped through the series of knitting operations of steps 4 to 6.

[0033] The stitches of the knitting needles B to G of the BD are transferred to the knitting needles B to G of the FU from the state of step 6 (step 7). The back needle beds are racked by one pitch towards the left, and thereafter, the stitches transferred to the knitting needles B to G of the FU are returned to the knitting needles C to H of the BD (step 8). The double stitch (correspond to double stitch 10 in Fig. 2(B)) is formed in which the stitch of the knitting needle F knitted in step 1 and the stitch of the knitting needle G knitted in step 2 are overlapped through the series of knitting operations of steps 7 and 8.

[0034] The double stitch as shown in Fig. 2(B) is formed with the formation (pre-processing knitting) of the stitches as shown in steps 1 to 3 and the overlapping (post-processing knitting) of the stitches by transfer of the stitches as shown in steps 4 to 8 described above as a basic unit. The formation of the double stitch in the FD is divided to the pre-processing knitting and the post-processing knitting, the formation of the double stitch in

the BD is also divided to the pre-processing knitting and the post-processing knitting, and the order of such four knitting is recombined to efficiently form the double stitch. The knitting after step 8 is illustrated in Figs. 4 and 5 for reference.

[0035] First, in steps 9 to 11 of Fig. 4, the carriage is moved in the order of left, right, and left to carry out the pre-processing knitting for forming the next double stitch in the BD.

[0036] In steps 12 to 14, the carriage is moved in the order of right, left, and right to carry out the pre-processing knitting for forming the first double stitch in the FD. In the following steps 15, 16 and steps 17 to 19 of Fig. 5, the post-processing knitting for forming the first double stitch in the FD is carried out.

[0037] In steps 20 to 22, the carriage is moved in the order of left, right, and left to carry out the pre-processing knitting for forming the next double stitch in the FD. The post-processing knitting following the steps 20 to 22 is carried out through a plurality of steps not shown.

[0038] Although the subsequent knitting is not particularly shown, the pre-processing knitting and the post-processing knitting are performed in combination so that the double stitches can be formed by the necessary length of the gore.

[0039] The knitted fabric in which two adjacent double stitches are less likely to be divided can be obtained by performing the knitting described above. Specifically, the two double stitches respectively formed on the knitting needle H and the knitting needle I of the BD are less likely to be divided in step 8 of Fig. 3, and the two double stitches respectively formed on the knitting needle H and the knitting needle I of the FD are less likely to be divided in step 19 of Fig. 5.

INDUSTRIAL APPLICABILITY

[0040] The knitting method of a knitted fabric with double stitches of the present invention can be suitably used in knitting the knitted fabric in which the double stitch and the stitch adjacent to the double stitch are less likely to be divided.

Claims

1. A knitting method of a knitted fabric with double stitches formed by overlapping one stitch over the other stitch of two stitches adjacent in a knitting width direction using a flat knitting machine including at least a pair of front and back needle beds, capable of transferring stitches between the front and back needle beds; the knitting method comprising the steps of:

continuously knitting the one stitch and an adjacent stitch adjacent on a side opposite to the one stitch with respect to the other stitch;

knitting the other stitch; and
forming the double stitch by overlapping the knitted one stitch and the other stitch.

2. The knitting method of a knitted fabric with double stitches according to claim 1, wherein the other stitch and the adjacent stitch are continuously knitted in a same knitting direction.

3. The knitting method of a knitted fabric with double stitches according to claim 1 or 2, wherein assuming a stitch adjacent on a side opposite to the other stitch with respect to the adjacent stitch is a fourth stitch,

the step of knitting the other stitch is performed after the step of continuously knitting the one stitch and the adjacent stitch; and
the knitting method further includes the steps of:

knitting the fourth stitch in continuation to the knitting of the other stitch, and
forming the double stitch by overlapping the fourth stitch and the adjacent stitch.

4. A knitted fabric with double stitches, in which one stitch and the other stitch adjacent in a knitting width direction are overlapped, knitted using a flat knitting machine including at least a pair of front and back needle beds, capable of transferring stitches between the front and back needle beds; wherein the one stitch to be overlapped with the other stitch and an adjacent stitch adjacent on a side opposite to the one stitch with respect to the other stitch are directly connected through a sinker loop.

Fig. 1

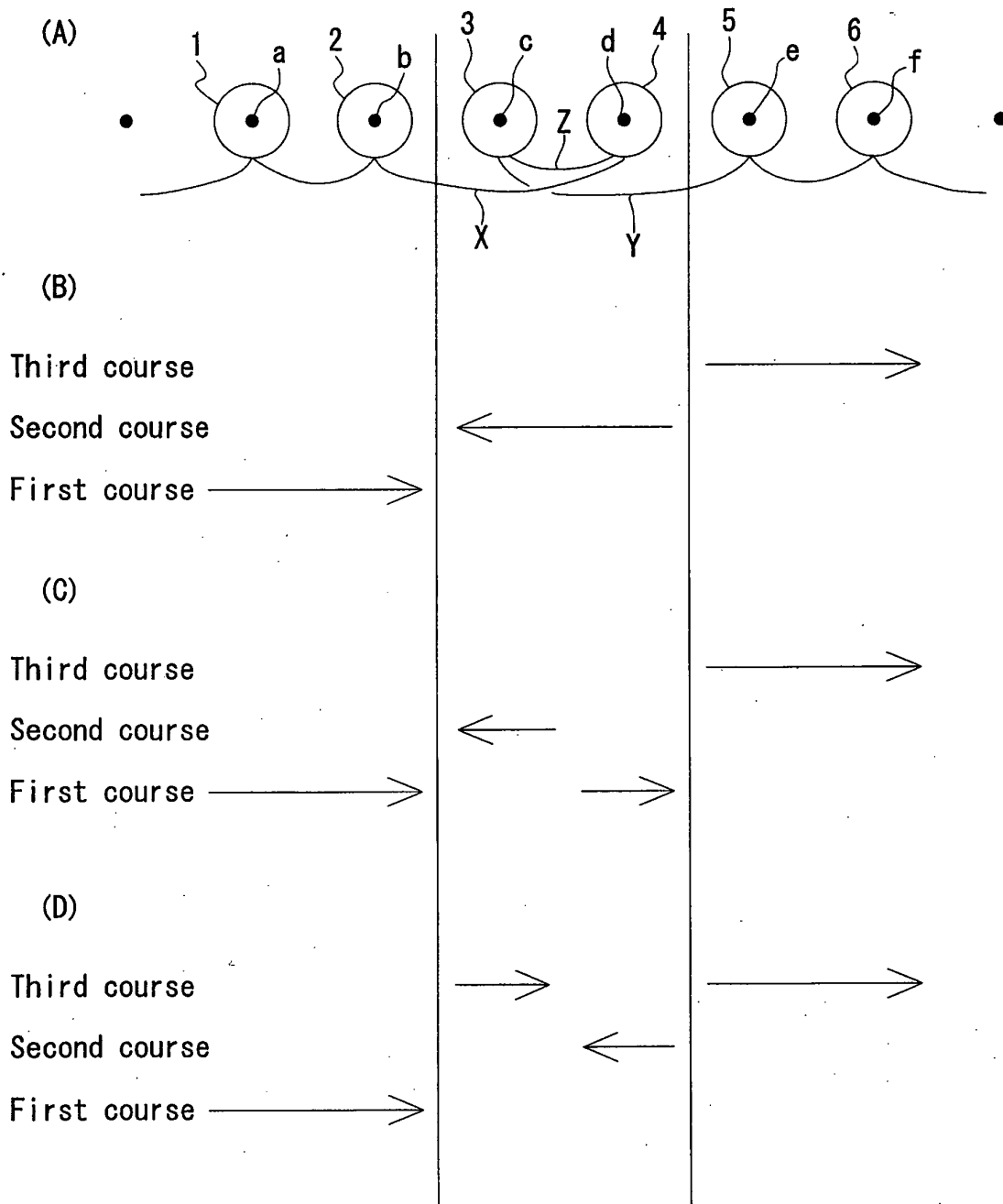
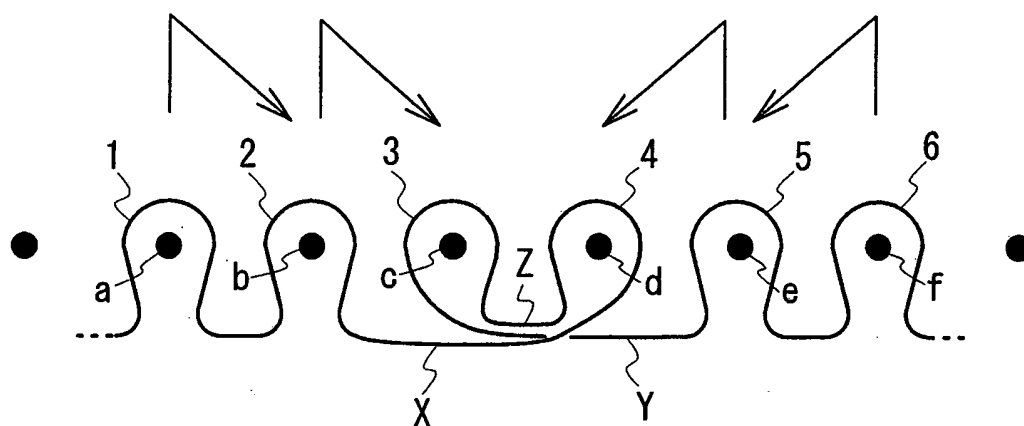


Fig. 2

(A)



(B)

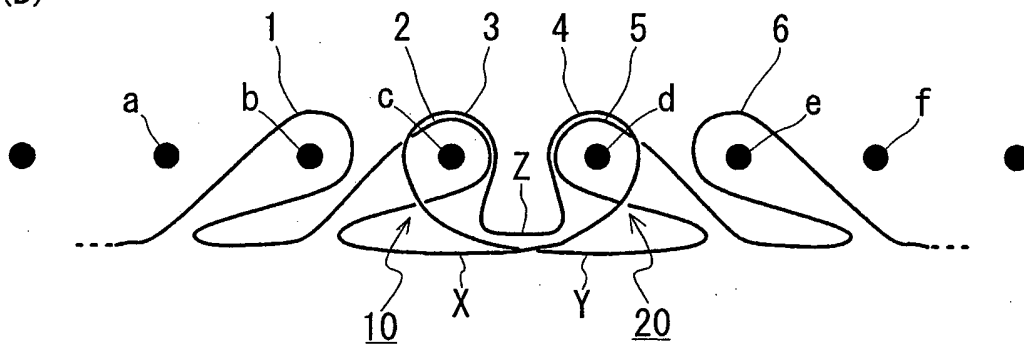


Fig. 3

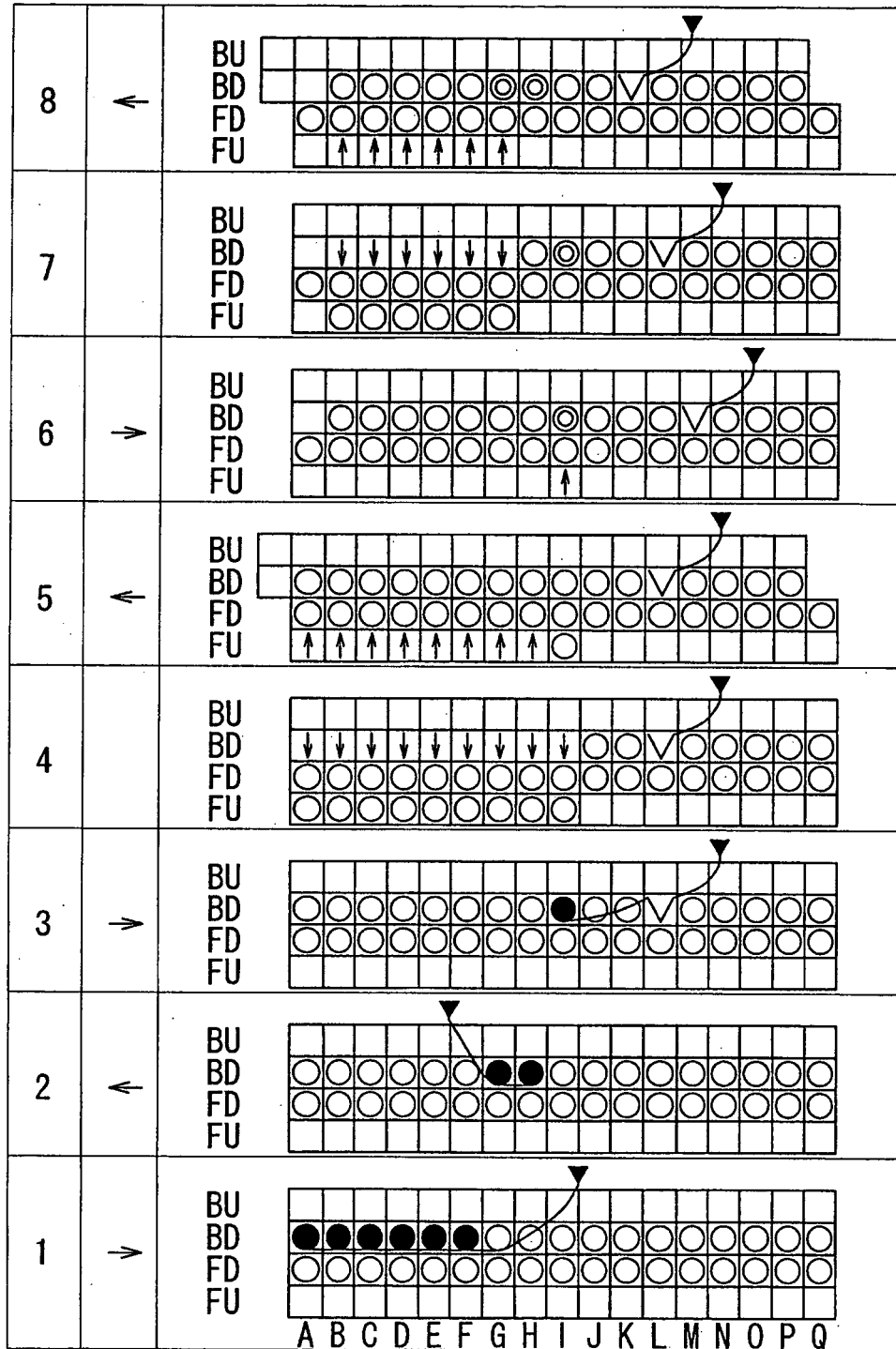


Fig. 4

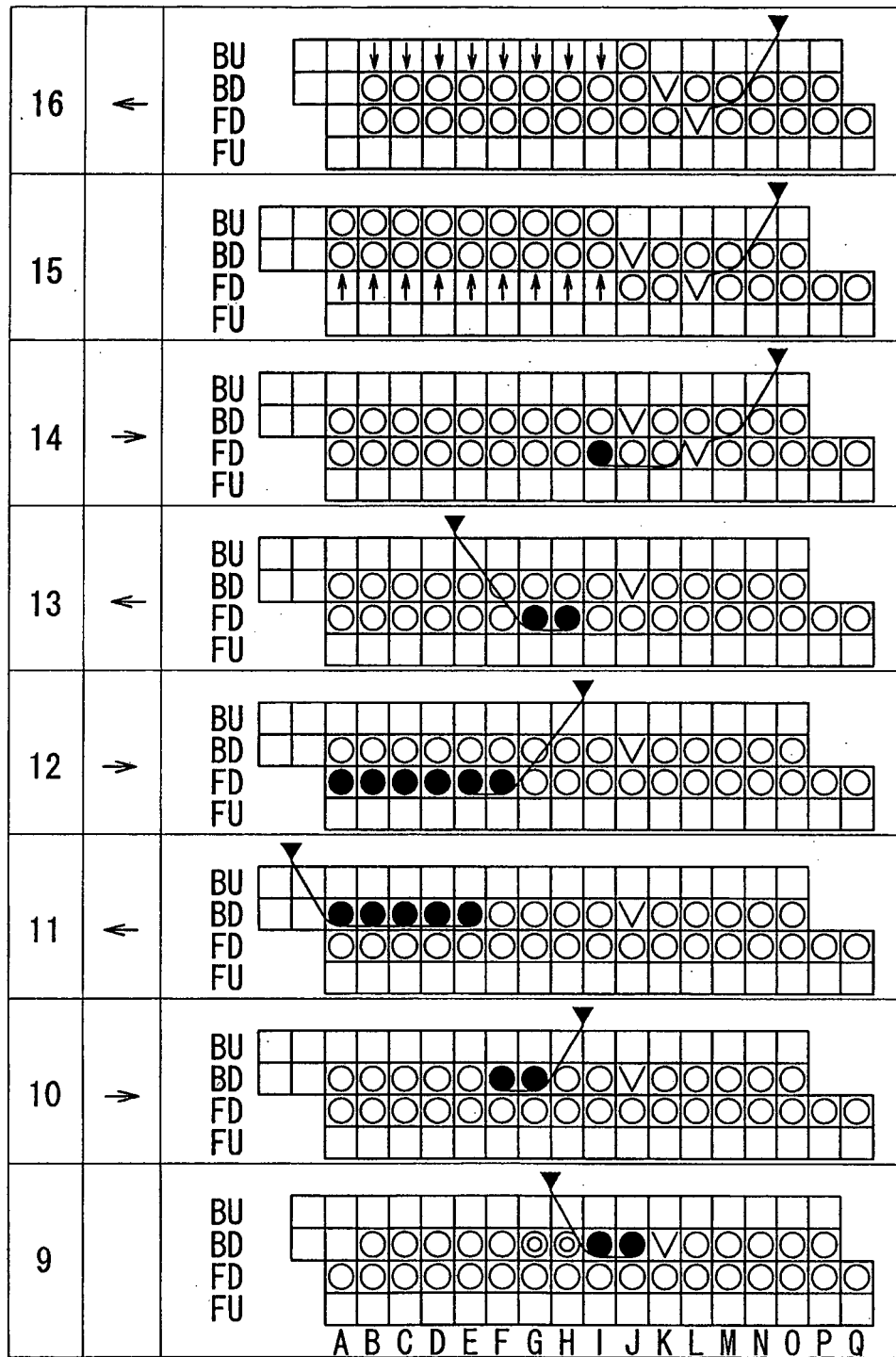


Fig. 5

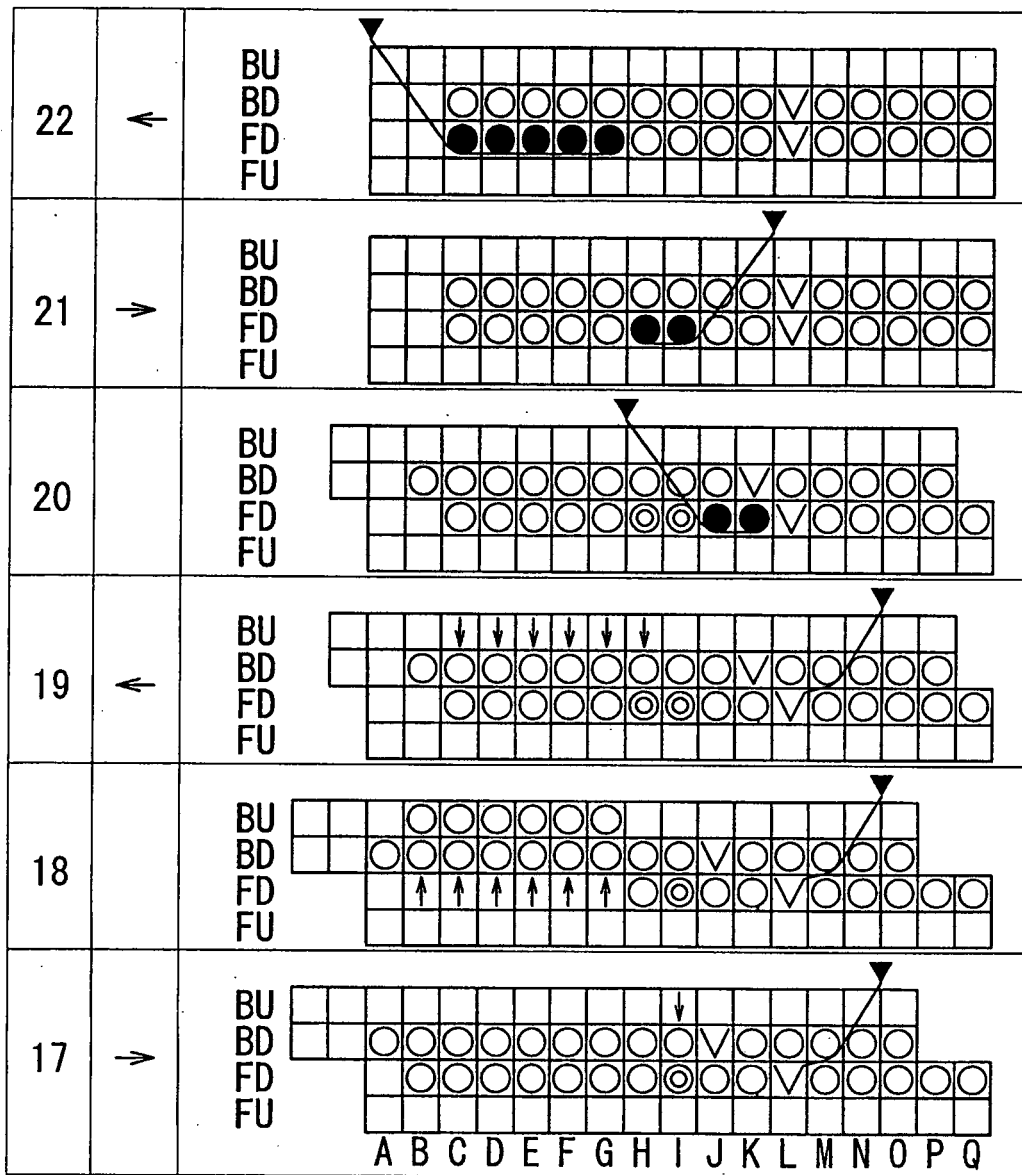
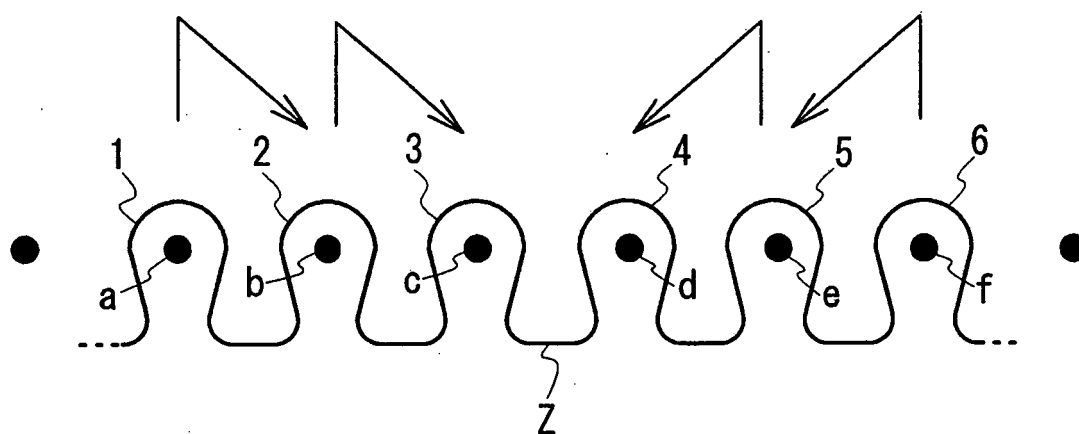
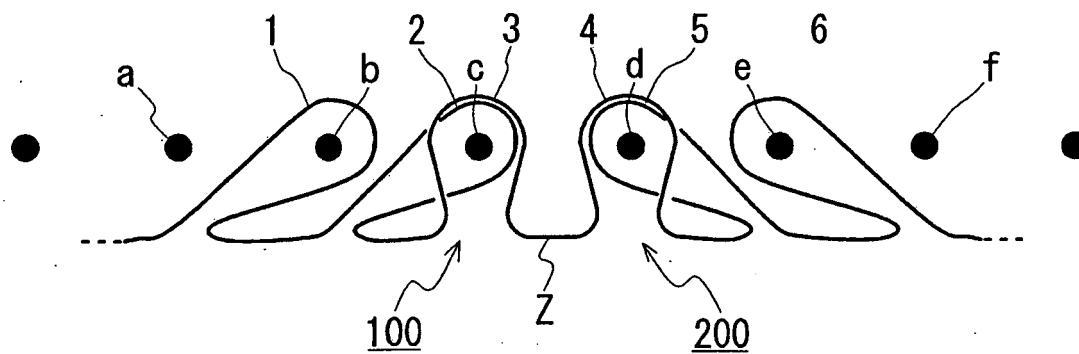


Fig. 6

(A)



(B)



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/001433

A. CLASSIFICATION OF SUBJECT MATTER <i>D04B1/00 (2006.01) i, D04B7/00 (2006.01) n</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) <i>D04B1/00-1/28, D04B21/00-21/20, D04B3/00-19/00, D04B23/00-39/08</i>		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched <i>Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2009</i> <i>Kokai Jitsuyo Shinan Koho 1971-2009 Toroku Jitsuyo Shinan Koho 1994-2009</i>		
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	JP 9-273051 A (Shima Seiki Mfg., Ltd.), 21 October, 1997 (21.10.97), Claim 3; Par. No. [0002] & US 5826445 A & GB 2309981 A & CN 1160785 A	1-4
A	JP 2006-111996 A (Shima Seiki Mfg., Ltd.), 27 April, 2006 (27.04.06), Par. Nos. [0021], [0022], [0025] & WO 2006/040952 A1	1-4
A	JP 4-15301 B2 (Shima Seiki Mfg., Ltd.), 17 March, 1992 (17.03.92), Claim 1 (Family: none)	1-4
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
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Date of the actual completion of the international search 18 June, 2009 (18.06.09)		Date of mailing of the international search report 30 June, 2009 (30.06.09)
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2002/70800 A1 (Shima Seiki Mfg., Ltd.), 12 September, 2002 (12.09.02), Claim 1; example 4; Par. No. [0018] (Family: none)	1-4

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Patent documents cited in the description

- JP H09273051 B [0004]