



(11)

EP 1 908 868 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

04.09.2013 Bulletin 2013/36

(51) Int Cl.:
D04B 15/06 (2006.01)

(86) International application number:
PCT/JP2006/311659

(21) Application number: **06757232.1**

(22) Date of filing: **09.06.2006**

(87) International publication number:
WO 2006/132376 (14.12.2006 Gazette 2006/50)

(54) **WEFT KNITTING MACHINE WITH STITCH PRESSER AND METHOD OF CONTROLLING THE SAME**

KULIERSTRICK- ODER -WIRKMASCHINE MIT MASCHENPRESSER UND VERFAHREN ZUR
STEUERUNG DERSELBEN

METIER A MAILLES CUEILLIES AVEC PRESSEUR A POINT ET PROCEDE DE CONTROLE
CORRESPONDANT

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR**

(30) Priority: **10.06.2005 JP 2005171060**

(43) Date of publication of application:
09.04.2008 Bulletin 2008/15

(73) Proprietor: **SHIMA SEIKI MANUFACTURING
LIMITED
Wakayama-shi,
Wakayama 641-8511 (JP)**

(72) Inventors:
• **KUBO, Mitsuo,
SHIMA SEIKI MANUFACTURING LIMITED
Wakayama-shi, Wakayama 6418511 (JP)**

• **YUI, Manabu,
SHIMA SEIKI MANUFACTURING LIMITED
Wakayama-shi, Wakayama 6418511 (JP)**

(74) Representative: **Geyer, Ulrich F.
WAGNER & GEYER
Patentanwälte
Gewürzmühlstrasse 5
80538 München (DE)**

(56) References cited:
**EP-A1- 0 597 548 JP-A- 06 158 485
JP-B2- 2 627 522 JP-B2- 03 066 415
JP-B2- 62 008 542**

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

Technical Field

[0001] The present invention relates to a weft knitting machine provided with a knitted fabric presser that travels together with a carriage and that can switch a finger between a set position in which a knitted fabric is pressed and a reset position in which a knitted fabric is not pressed; and a method for controlling the same.

Background Art

[0002] Conventionally, a stitch presser 1 as shown in Fig. 8A is used for pressing a knitted fabric 2 that is being knitted at a needle bed gap of a weft knitting machine as in Fig. 8B (see Japanese Examined Patent Publication JP-B2 3-66415 (1991) and Japanese Unexamined Patent Publication JP-A 6-158485 (1994), for example). The stitch presser 1 is also referred to as a knitted fabric presser, is substantially L-shaped, and prevents the knitted fabric 2 from moving upward by pressing the knitted fabric as shown in Fig. 8B with a finger 1a that extends in the horizontal direction in Fig. 8A. An arm 1b in the vertical direction in Fig. 8A is provided on the base end side of the finger 1a.

[0003] In an industrial weft knitting machine, front and back needle beds 4a and 4b are opposed to each other in the shape of an inverted V with a needle bed gap 3 interposed therebetween as shown in Fig. 8B. Such a weft knitting machine is also referred to as a V-bed weft knitting machine. The front needle bed 4a and the back needle bed 4b extend in the direction perpendicular to the sheet of the drawing. A large number of knitting needles 5a and 5b are provided along the longitudinal direction of the needle beds such that the knitting needles 5a and 5b can move reciprocating with respect to the needle bed gap 3. Sinkers 6a and 6b are also provided between the knitting needles 5a and 5b on each of the needle beds 4a and 4b. When the knitting needles 5a and 5b move forward into the needle bed gap 3 and receive a knitting yarn at a hook on the tip end thereof, the knitting needles 5a and 5b pull the knitting yarn onto the needle bed 4a and 4b and form a needle loop of a stitch. The sinkers 6a and 6b form a sinker loop between needle loops. A needle loop and a sinker loop are alternately formed in a continuous manner to be a stitch row for each course, and thus the knitted fabric 7 is knitted in a lower portion of the needle bed gap 3.

[0004] Figs. 9A and 9B illustrate the basic configuration of the vicinity of the needle bed gap 3 in the V-bed weft knitting machine. Fig. 9A is an enlarged view of a portion above the needle bed gap. Fig. 9B is a view of the overall configuration of the vicinity of the needle bed gap 3. As shown in Fig. 9A, usually, a plurality of yarn guide rails 7a, 7b, and 7c span in the longitudinal direction of the needle beds 4a and 4b above the needle bed gap 3. Each of the yarn guide rails 7a, 7b, and 7c is provided with one

or a plurality of tracks on which one or a plurality of yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f for feeding knitting yarns for knitting the knitted fabric 2 can travel. The yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f are also referred to as yarn feeders. Yarn feeding ports 9a, 9b, 9c, 9d, 9e, and 9f for feeding knitting yarns to the knitting needles 5a and 5b are provided respectively under the yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f. As shown in Fig. 9B, the yarn feeding ports 9a, 9b, 9c, 9d, 9e, and 9f converge in the vicinity of the center of the needle bed gap 3 such that a knitting yarn can be fed to both of the knitting needles 5a and 5b that move forward from the front and the back needle beds 4a and 4b into the needle bed gap 3. Herein, the yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f that travel on mutually different tracks are positioned such that the yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f of the respective tracks are not brought into contact with each other, in order to avoid an obstacle in travel caused by interference between the yarn feeding ports 9a, 9b, 9c, 9d, 9e, and 9f.

[0005] Carriages 10a and 10b reciprocatingly travel in the longitudinal direction respectively on the front and the back needle beds 4a and 4b. A needle selecting mechanism and a cam mechanism for selectively driving the knitting needles 5a and 5b for reciprocating movement with respect to the needle bed gap 3 are mounted on the carriages 10a and 10b. In many cases, a plurality of pairs of needle selecting mechanisms and cam mechanisms are mounted as systems for selectively driving the knitting needles 5a and 5b. The carriages 10a and 10b on the front and the back needle beds 4a and 4b are coupled via a bridge 11 straddling the yarn guide rails 7a, 7b, and 7c, and reciprocatingly travel in a range including the knitting width of the knitted fabric 2. The bridge 11 is provided with a mechanism for selectively bringing the yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f. In an industrial weft knitting machine, the carriages 10a and 10b and the knitting needles 5a and 5b operate automatically, based on preset knitting data. A weft knitting machine also has been proposed that optimizes the stroke in which the carriages 10a and 10b travel, based on knitting data or the like (see Japanese Examined Patent Publication JP-B2 2627522, for example).

[0006] The stitch presser 1 is mounted on either one of the carriages 10a and 10b. The finger 1a of the stitch presser 1 presses the knitted fabric 2 formed between the knitting needles 5a and 5b on the front and the back needle beds 4a and 4b as shown in Fig. 8B in the needle bed gap 3 below the yarn feeding ports 9a, 9b, 9c, 9d, 9e, and 9f. The carriages 10a and 10b are provided with a drive mechanism for the stitch presser 1. The drive mechanism switches the position of the finger 1a by driving the arm 1b. The finger 1a provided in the stitch presser 1 presses the knitted fabric 2 at a portion in which the system mounted on the carriages 10a and 10b selectively drives the knitting needles 5a and 5b for a knitting operation or the vicinity thereof, and thus the stitch presser 1 is provided for each system. The systems are mounted on mutually corresponding front and back positions of

the carriages 10a and 10b that travel on the front and the back needle beds 4a and 4b. Thus, it is sufficient that the stitch presser 1 is mounted on either one of the front and the back carriages 10a and 10b. It should be noted that the stitch presser 1 as shown in Fig. 8A has directionality. The tip end of the finger 1a, which is on the right in Fig. 8A, needs to be on the rear side in travel, and the arm 1b needs to be on the front side in travel. Accordingly, in order to enable the stitch presser 1 to be used in both of forward travel and backward travel of the carriages 10a and 10b, stitch pressers 1 for different directions need to be mounted on the front and the back carriages 10a and 10b. It should be noted that in JP-A 6-158485, a stitch presser for forward travel and a stitch presser for backward travel are mounted on one carriage.

[0007] The stitch presser 1 as shown in JP-B2 3-66415 and JP-A 6-158485 can be moved at any timing between a set position in which the knitted fabric 2 is pressed and a reset position in which the knitted fabric 2 is not pressed, by providing a driving source such as a motor in the drive mechanism that is mounted on the carriages 10a and 10b. The stitch presser 1 for an inverse direction is kept at the reset position. The stitch presser 1 for a forward direction can be used for pressing the knitted fabric 2, by being kept at the set position. The stitch presser 1 for the forward direction may be not used, by being kept at the reset position. However, in a case where the stitch presser 1 is used by being kept at the set position, the stitch presser 1 needs to be withdrawn to the reset position when the direction in which the carriages 10a and 10b travel is inverted to the inverse direction. Furthermore, in a case where the stitch presser 1 is to be used when the carriages 10a and 10b travel in the inverse direction, the stitch presser 1 for the inverse direction that has been kept at the reset position needs to be moved to the set position. The stitch presser 1 is switched in this manner between the set position and the reset position, when the carriages 10a and 10b pass to the outside of the knitting width of the knitted fabric 2 and the traveling direction is inverted.

[0008] Fig. 10 illustrates loci of movement of two stitch pressers, which is shown in Fig. 13 in JP-A 6-158485. For the sake of convenience of this description, the reference numerals are changed and a centerline 3a of the needle bed gap 3 is additionally shown. A locus of the finger 1a of the stitch presser for one direction is indicated by 12a, 12b, 12c, 12d, and 12e, and a locus of the finger 1a of the stitch presser 1 for the other direction is indicated by 13a, 13b, 13c, 13d, and 13e. The set positions 12e and 13e of the fingers 1a are the same when the two stitch pressers 1 press the knitted fabric 2 inside the needle bed gap 3, but the reset positions 12a and 13a are different from each other. The loci of movement of the fingers 1a are set so as not to interfere with each other. Furthermore, the loci of movement are set so as not to be brought into contact with the sinkers 6a and 6b on the needle beds 4a and 4b. Furthermore, the arms 1b in the set positions and the reset positions are set so as not to

be brought into contact with the yarn feeding ports 9a, 9b, 9c, 9d, 9e, and 9f shown in Figs. 9A and 9B. In a case where the stitch pressers 1 for mutually different directions are respectively mounted on a pair of carriages 10a and 10b, the loci of movement are substantially symmetric with respect to the centerline 3a of the needle bed gap 3a. Since the loci of movement are significantly different from each other, interference can be avoided by making the timings for movement different from each other. It should be noted that although the centerline 3a is inclined for the sake of convenience of this description, the centerline 3a is basically in the vertical direction in an actual weft knitting machine.

[0009] In the weft knitting machine, the plurality of yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f are used in order to enable different knitting yarns to be switched. In a configuration in which a selecting mechanism provided on the bridge 11 selects the yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f that are to be used, even when the yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f that are to be used are put on standby outside the knitting width of the knitted fabric 2, the yarn carriers are preferably as close as possible thereto in order to shorten the stroke in which the carriages 10a and 10b travel. The reason for this is that a longer stroke in which the carriages 10a and 10b travel takes a longer time and lowers productivity.

[0010] As disclosed in JP-B2 3-66415, the stitch presser 1 for the forward direction with respect to the direction in which the carriages 10a and 10b travel can be moved to the set position before entering a knitting end, and can be kept at the set position, according to the systems of the carriages 10a and 10b used for knitting a knitted fabric. In a case where the carriages 10a and 10b successively travel reciprocatingly for knitting the knitted fabric 2, when the carriages 10a and 10b pass by a knitting end, a reset operation of moving the stitch presser 1 at the set position to the reset position is started without considering the positions at which the yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f stop at the knitting end. After the reset operation, a set operation of moving the stitch presser 1 at the reset position to the set position is started. Thus, when the direction in which the carriages 10a and 10b travel is inverted, and the carriages 10a and 10b travel again from the knitting end into the knitting width of the knitted fabric 2, the stitch presser 1 is kept at the set position.

[0011] The locus of movement of the stitch presser 1 as shown in Fig. 10 is inevitably overlapped with or brought close to the position of, for example, the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f of the yarn carrier 8a, 8b, 8c, 8d, 8e, or 8f, between the set positions 12e and 13e and the reset positions 12a and 13a. In a case where the yarn feeding ports 9a, 9b, 9c, 9d, 9e, and 9f and the like are away from each other in the direction along the yarn guide rails 7a, 7b, and 7c, mechanical interference is not caused. However, in a case where the yarn feeding ports 9a, 9b, 9c, 9d, 9e, and 9f are on standby at a knitting end of the knitted fabric 2, when the set

operation or the reset operation of the stitch presser 1 is performed, the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f of the yarn carrier 8a, 8b, 8c, 8d, 8e, or 8f may be in a locus of movement of the finger 1a, and the finger 1a may be hooked on the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f. Compared with a case in which a single yarn carrier 8a, 8b, 8c, 8d, 8e, or 8f is disposed, in a case where a plurality of yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f are arranged close to each other, it is highly likely that the yarn feeding ports 9a, 9b, 9c, 9d, 9e, and 9f of the yarn carriers are abut against each other, and thus the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f of the yarn carrier 8a, 8b, 8c, 8d, 8e, or 8f is in a locus of movement of the finger 1a. Thus, in a state where the finger 1a is still hooked on the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f, the direction in which the carriages 10a and 10b travel may be inverted. In a case where the finger 1a of the stitch presser 1 after the reset operation is hooked on the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f or the like even after the direction in which the carriages 10a and 10b travel has been inverted, the stitch presser 1 may be broken, or the finger 1a may be deformed even when the stitch presser 1 is not broken.

[0012] A state in which a large number of yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f are on standby at a knitting end of the knitted fabric 2 often occurs in intarsia knitting or the like using a large number of yarn carriers 8a, 8b, 8c, 8d, 8e, and 8f. Whether or not the finger 1a of the stitch presser 1 is hooked on the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f can be detected by providing a sensor for detecting deformation of the finger 1a. For example, in the case of a fine gauge in which the knitting needles 5a and 5b of the weft knitting machine are arranged at a small pitch, the finger 1a of the stitch presser 1 that is used is thin and elastically warped easily. In this case, even when it is detected by a sensor that the reset operation of the stitch presser 1 has ended, the finger 1a actually may be hooked on, for example, the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f of the yarn carrier 8a, 8b, 8c, 8d, 8e, or 8f. Even when the finger 1a is not hooked, when the thin finger 1a is brought into contact with the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f, the finger 1a may be deformed. When the finger 1a is deformed or broken, the function of pressing the knitted fabric 2 cannot be fulfilled, the knitted fabric 2 or a knitting yarn is damaged, and the knitting is interrupted. Furthermore, even when the finger 1a is not brought into contact with the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f, in a state where there is a crossing yarn from the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f to a point in the knitted fabric 2, the finger 1a may be caught by the crossing yarn.

[0013] In order to avoid breakage and the like caused by mechanical interference between the stitch presser 1 and the yarn carrier 8a, 8b, 8c, 8d, 8e, or 8f, or a crossing yarn, there is a method by which the stroke of the carriages 10a and 10b is corrected by modifying knitting data. In this method, the stroke is extended by a predetermined amount over the position at which the carriages

are usually turned. Thus, even when the finger 1a of the stitch presser 1 is hooked on the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f of the yarn carrier 8a, 8b, 8c, 8d, 8e, or 8f in the reset operation, the direction is inverted after the carriages 10a and 10b travel to the position at which the finger 1a is reliably released, and thus the finger 1a that has been hooked on the yarn feeding port 9a, 9b, 9c, 9d, 9e, or 9f can be returned to the reset position. However, in a case where the stroke in which the carriages 10a and 10b travel is extended every time the direction is inverted, efficiency in knitting is lowered.

Disclosure of Invention

[0014] An object of the invention is to provide a weft knitting machine provided with a knitted fabric presser in which at the time of switching the knitted fabric presser between a set position and a reset position, only when interference is caused with a yarn feeding member, a crossing yarn, or the like, the interference can be avoided to prevent knitting from being interrupted; and a method for controlling the same.

[0015] The invention provides a weft knitting machine provided with a knitted fabric presser that is mounted on a carriage for selectively causing knitting needles to perform a knitting operation while reciprocatingly traveling along a needle bed, and can switch a finger capable of pressing a knitted fabric that is being knitted, between a set position in which the knitted fabric is pressed and a reset position in which the knitted fabric is not pressed, during travel of the carriage, comprising:

judgment means for judging a possibility that interference is caused with movement of the finger of the knitted fabric presser at least from the set position to the reset position; and

control means for controlling reciprocating travel of the carriage based on knitting data of the knitted fabric, wherein in a case where the judgment means judges that there is a possibility of interference with movement of the finger, at a time of switching the finger of the knitted fabric presser between the set position and the reset position when the carriage passes to an outside of a knitting width of the knitted fabric, the control means controls the carriage so as to avoid the interference, by extending a stroke in which the carriage travels.

[0016] Furthermore, in the invention it is preferable that the control means performs an operation of switching the finger of the knitted fabric presser between the set position and the reset position, after the judgment means judges that a possibility of interference has been eliminated, and

controls the carriage so as to extend the stroke in which the carriage travels, until the operation ends.

[0017] Furthermore, in the invention it is preferable that the control means performs an operation of switching the

finger of the knitted fabric presser between the set position and the reset position, at a position where the stitch presser passes to an outside of a knitting width of the knitted fabric, and

controls the carriage so as to extend the stroke in which the carriage travels, until the judgment means judges that a possibility of interference has been eliminated.

[0018] Furthermore, in the invention it is preferable that a member that is judged by the judgment means as to whether or not interference is caused therewith is a yarn carrier that can be selectively brought by the carriage, and that feeds a knitting yarn from a yarn feeding port to a knitting needle performing a knitting operation when being brought by the carriage.

[0019] Furthermore, in the invention it is preferable that a plurality of yarn carriers are used, and among the plurality of yarn carriers, the yarn carrier having the yarn feeding port that is within the range of a predetermined distance from the yarn feeding port of another yarn carrier is judged by the judgment means as to whether or not interference is caused therewith.

[0020] Moreover, the invention provides a method for controlling a weft knitting machine provided with a knitted fabric presser that is mounted on a carriage for selectively causing knitting needles to perform a knitting operation while reciprocatingly traveling along a needle bed, and can switch a finger capable of pressing a knitted fabric that is being knitted, between a set position in which the knitted fabric is pressed and a reset position in which the knitted fabric is not pressed, during travel of the carriage, comprising:

judging a possibility that interference is caused at a time of moving the finger of the knitted fabric presser at least from the set position to the reset position when the carriage passes to an outside of a knitting width of the knitted fabric, based on knitting data of the knitted fabric; and

controlling the carriage so as to avoid interference, by extending a stroke in which the carriage travels for switching the position of the knitted fabric presser in a case where it is judged that interference is to be caused.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] Other and further objects, features, and advantages of the invention will be more explicit from the following detailed description taken with reference to the drawings wherein:

Fig. 1 is a front view illustrating the schematic configuration of a weft knitting machine 20 provided with a knitted fabric presser according to an embodiment of the invention;

Fig. 2 is a view illustrating the details of a zone in which the position of, for example, a yarn carrier that may be interfered with is searched for during travel

of the stitch presser 21 in Fig. 1;

Fig. 3 is a view illustrating the conditions of a yarn carrier 28 that may be interfered with in Fig. 1;

Fig. 4 is a view illustrating a manner in which when there is a possibility of interference between the reset operation of the stitch presser 21 and the yarn carrier 28 in Fig. 1, the interference is avoided;

Fig. 5 is a flowchart schematically illustrating the procedure in which the control apparatus 35 performs control of the carriage 25, including avoidance of interference as in Fig. 4;

Fig. 6 is a view illustrating a manner in which interference is avoided in another embodiment of the invention;

Fig. 7 is a flowchart schematically illustrating the procedure in which the control apparatus 35 performs control of the carriage 25, including avoidance of interference as in Fig. 6;

Fig. 8A is a front view of a conventional stitch presser 1, and Fig. 8B is a cross-sectional side view illustrating a state in which the stitch presser 1 is used;

Figs. 9A and 9B are cross-sectional side views illustrating the basic configuration of the vicinity of the needle bed gap 3 in the conventional V-bed weft knitting machine; and

Fig. 10 is a partial cross-sectional side view illustrating an example of loci of movement of the stitch pressers 1.

DETAILED DESCRIPTION

[0022] Now referring to the drawings, preferred embodiments of the invention are described below.

[0023] Fig. 1 illustrates the schematic configuration of a weft knitting machine 20 provided with a knitted fabric presser according to an embodiment of the invention. A stitch presser 21, which is a knitted fabric presser, is set at a set position, and presses a knitted fabric 22 when the knitted fabric 22 is knitted in a lower portion of a needle bed gap 23, thereby preventing the knitted fabric 22 from moving upward. The knitted fabric 22 is knitted by causing carriages 25 to reciprocatingly travel in the longitudinal direction on front and back needle beds 24 that are opposed to each other at the needle bed gap 23. A system 26 such as a cam mechanism for selectively driving knitting needles on the needle bed 24 is mounted on the carriage 25. A plurality of yarn guide rails 27 span above the needle bed gap 23. One or a plurality of yarn carriers 28a and 28b can be brought by the carriage 25 and travel along each of the yarn guide rails 27. Each of the yarn carriers 28a and 28b is provided with a yarn feeding port 29, and feed knitting yarns 30a and 30b are fed to knitting needles that are selectively driven by the system 26 for a knitting operation. The yarn carriers 28a and 28b are selected by a selecting mechanism provided at a bridge 31 coupling between the carriages 25 that are respectively provided on the front and the back needle beds 24. The knitting yarns 30a and 30b are fed to the yarn carriers

28a and 28b, from a cone 32 via an upper spring mechanism 33 and a side tension mechanism 34. The knitting yarns 30a and 30b are selected by determining which one of the yarn carriers 28a and 28b guiding the knitting yarns 30a and 30b is to be brought by the carriage 25. The yarn carriers 28a and 28b are selected by the carriage 25 based on knitting data that is given to a control apparatus 35. The knitting data is stored in a storage portion 36 inside the control apparatus 35.

[0024] Fig. 1 illustrates a state in which the carriage 25 is traveling leftward toward a knitting end 22a on the left side in the knitted fabric 22 while bringing the yarn carrier 28a. The yarn carrier 28b that was selected or that is to be selected in spite of not being selected in this course is on standby outside the knitting width of the knitted fabric 22, in the vicinity of the knitting end 22a. The position at which the yarn carrier 28b is on standby is in the vicinity of a position where the yarn carrier 28b was released after being brought by the carriage 25, and this position is stored in the storage portion 36. In a case where the yarn carrier 28b is not present, immediately after the carriage 25 passes to the outside of the knitting width over the knitting end 22a of the knitted fabric 22, the carriage 25 is decelerated while performing a reset operation of switching the stitch presser 21 from the set position to the reset position, and after the carriage 25 stops and the traveling direction thereof is inverted, the next course is knitted. In a case where the yarn carrier 28b is present in the vicinity of the knitting end 22a, there is a possibility of interference with the reset operation of the stitch presser 21. Thus, the stroke in which the carriage 25 travels until the direction is inverted is extended, so that the interference is avoided.

[0025] Fig. 2 illustrates the details of a zone in which the position of, for example, a yarn carrier that may be interfered with is searched for during travel of the stitch presser 21. The position for starting the operation is a position at which the rear end of a finger 21a of the stitch presser 21 passes by the knitting end 22a in Fig. 1. Fig. 1 shows one pair of the systems 26 mounted on the carriages 25, but two or three pairs are often mounted. The stitch presser 21 is provided on each system 26, and the position of each stitch presser 21 with respect to the center of each system 26, in particular, the positions of the finger 21a and an arm 21b, the position of the center of each system 26 on the carriage 25, and the like are stored as data in advance in the storage portion 36. The time required to perform the reset operation of the stitch presser 21 is, for example, approximately 100 ms, and the reset operation is completed in this time. A carrier searching zone from the position for starting the operation to the position for completing the operation is set assuming that the carriage 25 travels at the maximum speed during this time. It should be noted that the carrier searching zone has a length obtained by adding the length from the rear end of the finger 21a to the arm 21b of the stitch presser 21, to the zone from the position for starting the operation to the position for completing the operation.

[0026] Fig. 3 illustrates the conditions of a yarn carrier that may be interfered with. For example, in Fig. 1, in a case where a single yarn carrier 28b is merely at rest, even when the yarn carrier 28b is interfered with in a locus of movement in the reset operation of the stitch presser 21, it is highly likely that the finger 21a of the stitch presser 21 is elastically warped to avoid interference with a yarn feeding port 29b of the yarn carrier 28b, and returns to the original state after the stitch presser 21 passes by the yarn feeding port 29b. However, in a case where a yarn feeding port 29a is overlapped with the yarn feeding port 29b of the yarn carrier 28b that is at rest in the vicinity thereof, the yarn feeding port 29a or 29b of the yarn carrier 28a or 28b is more likely to be in a locus of movement of the finger 21a. At that time, the finger 21a cannot avoid the yarn feeding port 29a or 29b of the yarn carrier 28a or 28b, and thus the finger 21a is hooked on the yarn feeding port 29a or 29b, and a large reaction force may be applied to the stitch presser 21.

[0027] Thus, a range of D [mm] from the center of the yarn feeding port 29a is set as a set zone for the overlap condition, and a zone of stopping errors ΔD is set in front and rear of the set zone, where ΔD is approximately 3 mm. In a case where the yarn feeding port 29b other than the yarn feeding port 29a is at rest within the range $\pm(D + \Delta D)$ with respect to the center of the yarn feeding port 29a in the longitudinal direction of the needle bed 24, it is judged that the yarn carriers are overlapped, and there is a possibility of interference with the reset operation of the stitch presser 21.

[0028] Fig. 4 illustrates a manner in which when there is a possibility of interference between the reset operation of the stitch presser 21 and the yarn carrier 28, the interference is avoided. In a case where interference is not caused, the position for passing by an end portion of the knitting width such as the knitting end 22a in Fig. 1 is taken as the position for starting the operation. However, in a case where it is judged that the yarn carrier 28 that may be interfered with is present in a carrier searching area with respect to the position for starting the operation, the reset operation is started after the carriage 25 continuously travels to a position at which there is no possibility of interference with the yarn carrier 28. In other words, the position for starting the operation is shifted. After the carriage 25 passes by the position for starting the operation, the carriage 25 is decelerated and stopped, and then the direction thereof is inverted. This position of the inversion is at a position obtained by extending the traveling stroke compared with a case in which the position for starting the operation is at the knitting end 22a, but the control apparatus 35 can optimize the stroke, based on the deceleration curve when controlling travel of the carriage 25. The position for starting the operation is reached after a position at which there is a possibility of interference between the tip end of the finger 21a and the yarn feeding port 29 of the yarn carrier 28 that may be interfered with, and thus even when the carriage 25 travels not at the maximum speed but at low

speed and is stopped soon, the stitch presser 21 and the yarn carrier 28 do not interfere with each other.

[0029] For the reset operation, the position for starting the operation is determined in the following manner.

(a) In a carrier searching zone in the case of starting the reset operation after passing by a knitting end, in a case where a yarn carrier that may be interfered with is not present, a position for passing by the knitting end is taken as a position for starting the reset operation, and

in a case where a yarn carrier that may be interfered with is present, a position for passing by the yarn carrier that may be interfered with is taken as a new position for starting the reset operation.

(b) In a carrier searching zone in the case of starting the reset operation at the position for passing by the yarn carrier that may be interfered with,

in a case where a yarn carrier that may be interfered with is not present, the search for the position for starting the reset operation is ended, and

in a case where a yarn carrier that may be interfered with is present, a position for passing by the yarn carrier that may be interfered with is taken as a new position for starting the reset operation.

(c) (b) is repeated until there is no yarn carrier that may be interfered with.

[0030] Fig. 5 schematically illustrates the procedure in which the control apparatus 35 performs control of the carriage 25, including avoidance of interference as in Fig. 4. In step a0, the weft knitting machine 20 is started. In step a1, initial settings in each portion are performed. In step a2, knitting data of the knitted fabric 22 that is to be knitted is read. The knitting data is read into the storage portion 36, via a recording medium such as various disks, or via data communication using a LAN (local area network) or the like. In step a3, preparation is performed for a course that is to be knitted next. In a case where a plurality of systems 26 are mounted on the carriage 25, the knitted fabric 22 can be knitted for a plurality of courses, using the plurality of systems 26 in travel of the carriage 25 for one course.

[0031] In step a4, it is judged whether or not the next course is the final course. In a case where it is judged that the next course is not the final course, in step a5, it is judged based on the knitting data whether or not the stitch presser 21 is used in the current course. In a case where it is judged that the stitch presser 21 is used, in the next course, the reset operation needs to be performed for the stitch presser 21 that is being used in the current course. In a case where the stitch presser 21 is used in step a5, carrier search as shown in Fig. 2 is performed in step a6. In a case where the results of the carrier search show that there is a possibility of interference as shown in Fig. 4, it is judged in step a7 that a carrier that is to be interfered with is present. In a case where it is judged in step a7 that a carrier that is to be

interfered with is present, the position for starting the operation is shifted in step a8, and the procedure returns to step a4. Subsequently, the position for starting the operation is repeatedly shifted until the yarn carrier 28 that may be interfered with is not detected. In a case where it is judged in step a5 that the stitch presser 21 is not used, or in a case where it is judged in step a7 that there is no yarn carrier that may be interfered with, the procedure proceeds to step a9, where the position of the inversion is determined with reference to the position for starting the operation, and the procedure returns to step a4. In a case where it is judged in step a4 that the course is the final course, the procedure ends in step a10.

[0032] Fig. 6 illustrates a manner in which interference is avoided in another embodiment of the invention. In this embodiment, the position for starting the operation is set at a knitting end. In a case where the yarn carrier 28 that may be interfered with is detected in the carrier searching area with respect to the position for starting the operation, the stroke in which the carriage 25 travels is extended until the rear end of the finger 21a of the stitch presser 21 passes by the position of the yarn feeding port 29 of the yarn carrier 28 that may be interfered with. Even when the reset operation of the stitch presser 21 is started at the position for starting the operation and interference with the yarn feeding port 29 or the like is caused, the interference is cancelled when the rear end of the finger 21a is removed from the interference by extending the traveling stroke. It should be noted that in a case where the yarn carriers 28 that may be interfered with are actually overlapped as shown in Fig. 3, the stroke is extended to the position at which the rear end of the finger 21a of the stitch presser 21 passes by the position away from the center of the yarn feeding port 29b by the set zone for the interference condition. The set zone for the interference condition is, for example, the range in which the yarn feeding port 29b is present.

[0033] Fig. 7 schematically illustrates the procedure in which the control apparatus 35 performs control of the carriage 25, including avoidance of interference as in Fig. 6. Steps b0 to b10, except for step b8, are respectively similar to steps a0 to a10 in Fig. 5, except for step a8. When the stroke is extended in step b8 as shown in Fig. 6, the position of the inversion is shifted to a position obtained by extending the stroke, and then the procedure proceeds to step b9.

[0034] In Figs. 4 and 6, a case was described in which the number of the yarn carriers 28 that may be interfered with in the reset operation of the stitch presser 21 is one. However, knitting is more likely to be interrupted in a case where the plurality of yarn carriers 28a and 28b are overlapped as shown in Fig. 3. In a case where the plurality of yarn carriers 28a and 28b are overlapped, the position at which the front end of the finger 21a of the stitch presser 21 is away to the outer side, by the predetermined set zone for the interference condition, from the center of the yarn feeding port 29 of the yarn carrier 28 farthest from the position for starting the operation, is taken as the

position at which the stitch presser 21 passes.

[0035] A knitting yarn from the yarn carrier 28 or a gripper may be continued as a crossing yarn from the knitting end 22a of the knitted fabric 22 to the end portion of the needle bed 24. Thus, even when the yarn carrier 28 or the gripper is away from the position at which interference may be caused, the stitch presser 21 may interfere with the crossing yarn. The height of the crossing yarn varies in accordance with the position, and there is a possibility of interference in a range in which the varying height matches a locus of movement of the stitch presser 21. In particular, in a case where the yarn carrier 28 is at rest after knitting in the same direction as the direction in which the carriage 25 travels, in a knitting course in which judgment is performed for interference, and the yarn guide rail 27 having this yarn carrier 28 is on the side of the carriage 25 having the stitch presser 21 with respect to the needle bed gap 23 between the needle beds 24, a crossing yarn from the yarn carrier 28 that is at rest may be hooked on and caught by the finger 21a in the reset operation of the stitch presser 21, and the carriage 25 may be turned in a state where the crossing yarn is still caught. Interference between a crossing yarn and the stitch presser 21 also can be judged based on the knitting data.

[0036] Furthermore, an end yarn inserting apparatus and the like may be arranged in the vicinity of the knitting end 22a. Interference with a component constituting the end yarn inserting apparatus and the like or with a component relating to yarn feeding such as a gripper may be caused also when the stitch presser 21 performs the set operation from the reset position to the set position. Also when these components are detected, interference can be avoided by performing an operation as in the case of the yarn carrier 28.

[0037] As described above, the knitted fabric presser that is the stitch presser 21 is mounted on the carriage 25 for selectively causing knitting needles to perform a knitting operation while reciprocatingly traveling along the needle bed 24, and can switch the finger 21a capable of pressing the knitted fabric 22 that is being knitted, between the set position in which the knitted fabric 22 is pressed and the reset position in which the knitted fabric is not pressed, during the travel of the carriage 25. The storage portion 36 functions as judgment means, and judges the possibility of mechanical interference with movement of the finger 21a of the knitted fabric presser between the set position and the reset position. The control apparatus 35 functions as control means and controls reciprocating travel of the carriage 25 based on the knitting data of the knitted fabric 22. In a case where the finger 21a of the knitted fabric presser is switched between the set position and the reset position when the carriage 25 passes to the outside of the knitting width of the knitted fabric 22, the judgment means judges the possibility of mechanical interference in a locus of movement of the finger 21a, and thus it is possible to know the possibility of mechanical interference. In a case where the

judgment means judges that there is a possibility of interference, the control means performs control so as to avoid the interference, by extending the stroke in which the carriage 25 travels. Thus, at the time of switching the knitted fabric presser between the set position and the reset position, only when interference is caused with a yarn feeding member, a crossing yarn, or the like, the interference can be avoided to prevent knitting from being interrupted. The storage portion 36 functions as the judgment means for judging whether or not there is a possibility of interference. However, the judgment may be performed, not based on stored data, but based on actually detected results, for example, by providing the carriage 25 with a sensor for ultrasonically or optically detecting whether or not there is an obstacle. Furthermore, the judgment means may judge the possibility of interference in a batch process as a simulation before knitting of the knitted fabric 22 is actually started.

[0038] Furthermore, the position at which the reset operation of the stitch presser 21 is performed is not limited to the knitting end 22a of the knitted fabric 22, and may be judged for each knitting area of each system in a knitting course of the knitted fabric 22. In a case where there is a possibility that the finger 21a will interfere with, for example, a yarn feeding component that is on standby at an end portion of the knitting area, the interference can be avoided by extending the stroke in which the carriage 25 travels.

[0039] It should be noted that when a crossing yarn is hooked on and caught by the finger 21a due to interference between the crossing yarn and the stitch presser 21, the knitting cannot be continued, but the stitch presser 21 and the like are not broken. In this case, the knitting can be resumed by releasing the crossing yarn caught by the finger 21a. The crossing yarn is more easily deformed than the finger 21a of the stitch presser 21, and thus even when interference is caused, the crossing yarn may not be caught by the finger 21a, by moving away from the finger 21a.

[0040] Thus, in the judgment of interference with the stitch presser 21, at least interference with a yarn feeding member such as the yarn carrier 28 is judged, and in a case where there is a possibility of interference, control is performed so as to avoid the interference, and thus the stitch presser 21 and the like can be prevented from being broken. Furthermore, when interference with a crossing yarn is also judged, the possibility that knitting is interrupted is comprehensively judged, and in a case where it is judged that there is a possibility of interference, control is performed so as to avoid the interference, and thus smooth knitting can be continuously performed.

[0041] The invention may be embodied in other specific forms.

[0042] The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims.

Industrial Applicability

[0043] According to the invention, in a state where a carriage is caused to reciprocatingly travel based on knitting data of a knitted fabric, even when a finger of a knitted fabric presser is switched at least from a set position to a reset position when the carriage passes to the outside of a knitting width of the knitted fabric, the stroke in which the carriage travels can be extended such that interference is not caused with the movement of the finger. At the time of switching the knitted fabric presser from the set position to the reset position, only when interference is caused with a yarn feeding member, a crossing yarn, or the like, the interference can be avoided to prevent knitting from being interrupted.

[0044] Furthermore, according to the invention, the knitted fabric presser is switched between the set position and the reset position after the possibility of interference has been eliminated, and thus interference during the switching can be reliably avoided.

[0045] Furthermore, according to the invention, after switching of the knitted fabric presser between the set position and the reset position is started at a position where the carriage passes to the outside of a knitting width of the knitted fabric, the stroke in which the carriage travels is extended until the possibility of interference has been eliminated. Thus, when the direction of the carriage is inverted, interference with the knitted fabric presser can be cancelled.

[0046] Furthermore, according to the invention, in a case where the yarn carrier is on standby in the vicinity of a knitting end of the knitted fabric, interference caused by an operation of switching the knitted fabric presser can be reliably avoided.

[0047] Furthermore, according to the invention, in a case where the yarn carriers are on standby close to each other, interference caused by an operation of switching the knitted fabric presser can be reliably avoided.

[0048] Furthermore, according to the invention, when the carriage passes to the outside of the knitting width of the knitted fabric based on the knitting data of the knitted fabric, the stroke in which the carriage travels is extended until the possibility of interference caused by movement of the knitted fabric presser is eliminated. Thus, interference can be avoided to prevent knitting of the knitted fabric from being interrupted.

Claims

1. A weft knitting machine (20) provided with a knitted fabric presser (21) that is mounted on a carriage (25) for selectively causing knitting needles to perform a knitting operation while reciprocatingly traveling along a needle bed (24), and can switch a finger (21a) capable of pressing a knitted fabric (22) that is being knitted, between a set position in which the

knitted fabric (22) is pressed and a reset position in which the knitted fabric (22) is not pressed, during travel of the carriage, **characterized by** judgment means for judging a possibility that interference is caused with movement of the finger (21a) of the knitted fabric presser (21) at least from the set position to the reset position; and

control means (35) for controlling reciprocating travel of the carriage (25) based on knitting data of the knitted fabric (22), wherein in a case where the judgment means judges that there is a possibility of interference with movement of the finger (21a), at a time of switching the finger (21a) of the knitted fabric presser (21) between the set position and the reset position when the carriage (25) passes to an outside of a knitting width of the knitted fabric, the control means (35) controls the carriage (25) so as to avoid the interference, by extending a stroke in which the carriage (25) travels.

2. The weft knitting machine (20) of claim 1, wherein the control means (35) performs an operation of switching the finger (21a) of the knitted fabric presser (21) between the set position and the reset position, after the judgment means judges that a possibility of interference has been eliminated, and controls the carriage (25) so as to extend the stroke in which the carriage (25) travels, until the operation ends.

3. The weft knitting machine (20) of claim 1, wherein the control means (35) performs an operation of switching the finger (21a) of the knitted fabric presser (21) between the set position and the reset position, at a position where the stitch presser (21) passes to an outside of a knitting width of the knitted fabric (22), and controls the carriage (25) so as to extend the stroke in which the carriage (25) travels, until the judgment means judges that a possibility of interference has been eliminated.

4. The weft knitting machine (20) of any one of claims 1 to 3, wherein an object that is judged by the judgment means as to whether or not interference is caused therewith is a yarn carrier (28a, 28b) that can be selectively brought by the carriage (25), and that feeds a knitting yarn (30a, 30b) from a yarn feeding port (29a, 29b) to a knitting needle performing a knitting operation when being brought by the carriage (25).

5. The weft knitting machine (20) of claim 4, wherein a plurality of yarn carriers (28a, 28b) are used, and among the plurality of yarn carriers (28a, 28b), the yarn carrier having the yarn feeding port (29a, 29b) that is within the range of a predetermined distance from the yarn feeding port (29a, 29b) of another yarn

carrier (28a, 28b) is judged by the judgment means as to whether or not interference is caused therewith.

6. A method for controlling a weft knitting machine (20) provided with a knitted fabric presser (21) that is mounted on a carriage (25) for selectively causing knitting needles to perform a knitting operation while reciprocatingly traveling along a needle bed (24), and can switch a finger (21a) capable of pressing a knitted fabric (22) that is being knitted, between a set position in which the knitted fabric (22) is pressed and a reset position in which the knitted fabric (22) is not pressed, during travel of the carriage (25), **characterized by** judging a possibility that interference is caused at a time of moving the finger (21a) of the knitted fabric presser (21) at least from the set position to the reset position when the carriage (25) passes to an outside of a knitting width of the knitted fabric (22), based on knitting data of the knitted fabric (22); and controlling the carriage (25) so as to avoid interference, by extending a stroke in which the carriage (25) travels for switching the position of the knitted fabric presser (21) in a case where it is judged that interference is to be caused.

Patentansprüche

1. Kulierstick- oder Wirkmaschine (20) mit einem Gestrickpresser (21), der auf einem Schlitten (25) befestigt ist, um selektiv Stricknadeln zu veranlassen, einen Strickvorgang auszuführen, während er sich entlang eines Nadelbetts (24) hin- und herbewegt, und der einen Finger (21a) zum Pressen eines zu strickenden Gestricks (22) zwischen einer Setzposition, in der das Gestrick (22) gepresst wird und einer Rücksetzposition, in der das Gestrick (22) nicht gepresst ist, während des Schlittenlaufs schalten kann, **gekennzeichnet durch** Beurteilungseinrichtungen zum Beurteilen einer Möglichkeit, dass eine Beeinträchtigung bei der Bewegung des Fingers (21 a) des Gestrickpressers (21) wenigstens von der Setzposition zur Rücksetzposition verursacht wird; und Steuereinrichtungen (35) zum Steuern der Hin- und Herbewegung des Schlittens (25) basierend auf Strickdaten des Gestricks (22), wobei dann, wenn die Beurteilungseinrichtungen beurteilen, dass eine Möglichkeit der Beeinträchtigung besteht bei Bewegung des Fingers (21 a) zu einem Zeitpunkt des Schaltens des Fingers (21 a) des Gestrickpressers (21) zwischen der Setzposition und der Rücksetzposition, wenn der Schlitten (25) einen Außenbereich einer Strickbreite des Gestricks durchläuft, die Steuereinrichtungen (35) den Schlitten (25) steuern, um eine Beeinträchtigung zu vermeiden, **durch** Ver-

längern eines Hubs, in dem sich der Schlitten (35) bewegt.

2. Kulierstrick- oder Wirkmaschine (20) nach Anspruch 1, wobei die Steuereinrichtung (35) einen Vorgang zum Schalten des Fingers (21a) des Gestrickpressers (21) zwischen der Setzposition und der Rücksetzposition ausführt, nachdem die Beurteilungseinrichtung beurteilt, dass die Möglichkeit einer Beeinträchtigung beseitigt wurde, und Steuern des Schlittens (5) derart, dass der Hub verlängert wird, in dem der Schlitten (25) läuft, bis der Vorgang beendet ist.
3. Kulierstrick- oder Wirkmaschine (20) nach Anspruch 1, wobei die Steuereinrichtung (35) einen Schaltvorgang des Fingers (21 a) des Gestrickpressers (21) zwischen der Setzposition und der Rücksetzposition an einer Position vornimmt, an der der Maschenpresser (21) zu einem Außenbereich der Gestrickbreite des Gestricks (22) läuft, und Steuern des Schlittens (25) derart, dass der Hub, in dem der Schlitten (25) läuft, verlängert wird, bis die Beurteilungseinrichtungen beurteilen, dass eine Möglichkeit der Beeinträchtigung beseitigt worden ist.
4. Kulierstrick- oder Wirkmaschine (20) nach einem der Ansprüche 1 bis 3, wobei ein Gegenstand der von den Beurteilungseinrichtungen beurteilt wurde, ob dazwischen eine Beeinträchtigung verursacht worden ist oder nicht, eine Fadenführer (28a, 28b) ist, der selektiv durch den Schlitten (25) herbeigeführt werden kann, und der ein Strickgarn (30a, 30b) von einer Fadenführeröffnung (29a, 29b) zu einer Stricknadel führt, die einen Strickvorgang ausführt, wenn sie vom Schlitten (25) herbeigeführt worden ist.
5. Kulierstrick- oder Wirkmaschine (20) nach Anspruch 4, wobei mehrere Fadenführer (28a, 28b) verwendet werden, und unter den mehreren Fadenführern (28a, 28b) der Fadenführer mit der Fadenführungsöffnung (29a, 29b), die sich innerhalb des Bereichs eines vorgegebenen Abstands von der Fadenführeröffnung (29a, 29b) eines anderen Fadenführers (28a, 28b) befindet, vom der Beurteilungseinrichtung beurteilt wurde, ob nicht dazwischen eine Beeinträchtigung verursacht wurde oder nicht.
6. Verfahren zum Steuern einer Kulierstrick- oder Wirkmaschine (20) mit einem Gestrickpresser (21), der auf einem Schlitten (25) befestigt ist, um selektiv Stricknadeln zu veranlassen, einen Strickvorgang auszuführen, während er sich entlang eines Nadelbetts (24) hin- und herbewegt, und der einen Finger (21 a) zum Pressen eines zu strickenden Gestricks (22) zwischen einer Setzposition, in der das Gestrick

(22) gepresst wird und einer Rücksetzposition, in der das Gestrick (22) nicht gepresst ist, während des Schlittenlaufs schalten kann,

gekennzeichnet durch

Beurteilen einer Möglichkeit, dass eine Beeinträchtigung zum Zeitpunkt der Bewegung des Fingers (21a) des Gestrickpressers (21) wenigstens von der Setzposition zur Rücksetzposition verursacht wird; wenn der Schlitten (25) einen Außenbereich einer gestrickten Breite des Gestricks (22) durchläuft, basierend auf den Gestrickdaten des Gestricks (22); und

Steuern des Schlittens (25) um eine Beeinträchtigung **durch** Verlängerung eines Hubs zu vermeiden, in der der Schlitten (25) läuft, um die Position des Gestrickpressers (21) dann zu schalten, wenn beurteilt wurde, dass eine Beeinträchtigung verursacht werden wird.

Revendications

1. Machine à tricoter à mailles cueillies (20) munie d'un presseur de tissu tricoté (21) qui est monté sur un chariot (25) pour amener sélectivement des aiguilles à tricoter à réaliser une opération de tricotage pendant un déplacement en va-et-vient le long d'une fonture (24), et qui peut commuter un doigt (21a) capable de presser un tissu tricoté (22) qui est en cours de tricotage, entre une position activée dans laquelle le tissu tricoté (22) est pressé et une position non activée dans laquelle le tissu tricoté (22) n'est pas pressé, pendant le déplacement du chariot, **caractérisé par :**

des moyens d'évaluation pour évaluer la possibilité qu'une interférence soient provoquée par le mouvement du doigt (21a) du presseur de tissu tricoté (21) au moins à partir de la position activée jusqu'à la position non activée ; et des moyens de commande (35) pour contrôler le déplacement en va-et-vient du chariot (25) sur la base de données de tricotage du tissu tricoté (22), dans lesquels dans le cas où les moyens d'évaluation évaluent qu'il y a une possibilité d'interférence avec le mouvement du doigt (21a), à un instant de commutation du doigt (21a) du presseur de tissu tricoté (21) entre la position activée et la position non activée lorsque le chariot (25) passe à l'extérieur de la largeur de tricotage du tissu fabriqué tricoté, les moyens de commande (35) contrôlent le chariot (25) de façon à éviter l'interférence, en allongeant la course de déplacement du chariot (25).

2. Machine à tricoter à mailles cueillies (20) selon la revendication 1, dans laquelle les moyens de commande (35) réalisent une opération de commutation

du doigt (21a) du presseur de tissu tricoté (21) entre la position activée et la position non activée, après que les moyens d'évaluation ont évalué que la possibilité d'interférence a été éliminée, et contrôlent le chariot (25) de façon à allonger la course de déplacement du chariot (25), jusqu'à ce que l'opération se termine.

3. Machine à tricoter à mailles cueillies (20) selon la revendication 1, dans laquelle les moyens de commande (35) réalisent une opération de commutation du doigt (21a) du presseur de tissu tricoté (21) entre la position activée et la position non activée, à une position où le presseur de mailles (21) passe à l'extérieur de la largeur de tricotage du tissu tricoté (22), et contrôlent le chariot (25) de façon à allonger la course de déplacement du chariot (25), jusqu'à ce que les moyens d'évaluation évaluent que la possibilité d'interférence a été éliminée.

4. Machine à tricoter à mailles cueillies (20) selon l'une quelconque des revendications 1 à 3, dans laquelle un objet qui est évalué par les moyens d'évaluation pour savoir si une interférence va avoir lieu ou pas est un porteur de fil (28a, 28b) qui peut être amené sélectivement par le chariot (25), et qui fournit un fil à tricoter (30a, 30b) à partir d'un port de fourniture de fil (29a, 29b) à une aiguille à tricoter réalisant une opération de tricotage lorsqu'il est amené par le chariot (25).

5. Machine à tricoter à mailles cueillies (20) selon la revendication 4, dans laquelle on utilise une pluralité de porteurs de fil (28a, 28b), et parmi la pluralité de porteurs de fil (28a, 28b), le porteur de fil ayant le port de fourniture de fil (29a, 29b) qui se trouve dans une plage de distance prédéterminée par rapport au port de fourniture de fil (29a, 29b) d'un autre porteur de fil (28a, 28b) est évalué par les moyens d'évaluation quant à savoir si une interférence va être provoquée par celui-ci ou pas.

6. Procédé pour contrôler une machine à tricoter à mailles cueillies (20) munie d'un presseur de tissu tricoté (21) qui est montée sur un chariot (25) pour amener sélectivement des aiguilles à tricoter à réaliser une opération de tricotage pendant un déplacement en va-et-vient le long d'une fonture (24), et qui peut commuter un doigt (21a) capable de presser un tissu tricoté (22) qui est en cours de tricotage, entre une position activée dans laquelle le tissu tricoté (22) est pressé et une position non activée dans laquelle le tissu tricoté (22) n'est pas pressé, pendant le déplacement du chariot (25), **caractérisé par** les étapes suivantes :

évaluer la possibilité qu'une interférence ait lieu

à un instant de déplacement du doigt (21a) du
presseur de tissu tricoté (21) au moins à partir
de la position activée jusqu'à la position non ac-
tivée lorsque le chariot (25) passe à l'extérieur
de la largeur de tricotage du tissu tricoté (22),
sur la base de données de tricotage du tissu
tricoté (22) ; et
contrôler le chariot (25) de façon à éviter l'inter-
férence, en étendant la course de déplacement
du chariot (25) pour commuter la position du
presseur de tissu tricoté (21) dans le cas où il a
été évalué que l'interférence va avoir lieu.

5

10

15

20

25

30

35

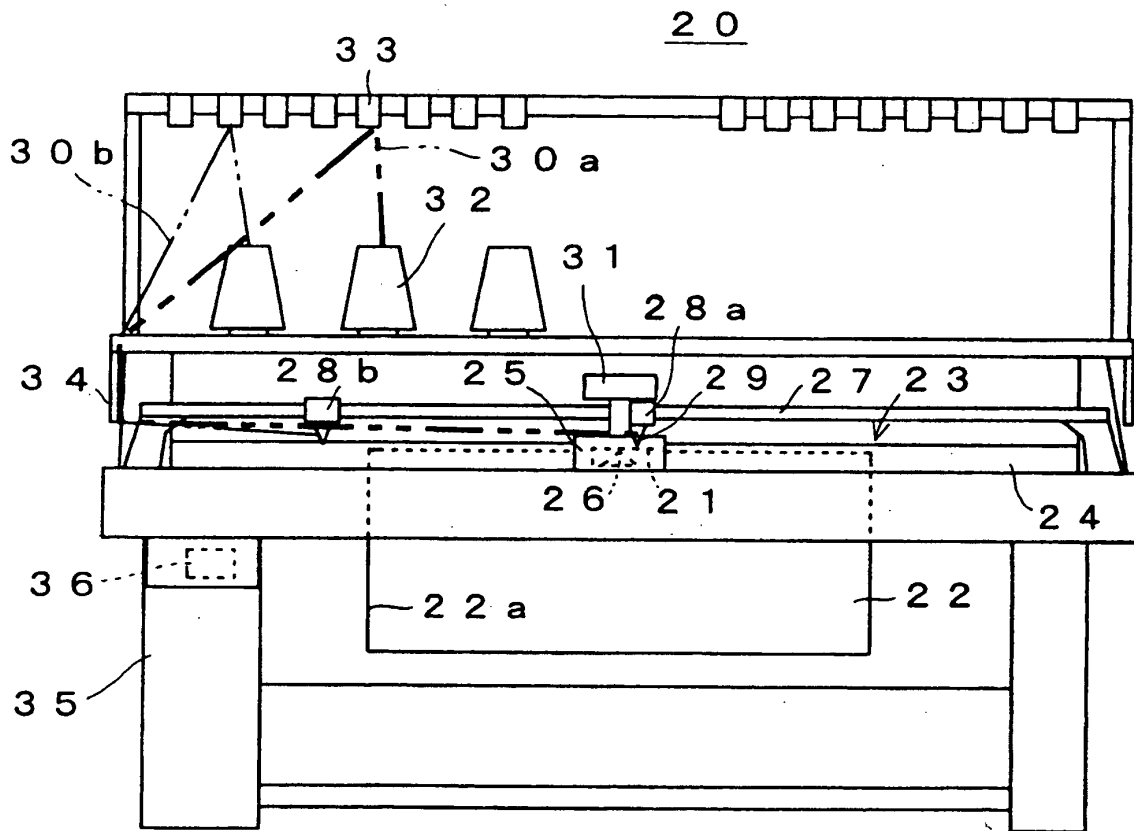
40

45

50

55

FIG. 1



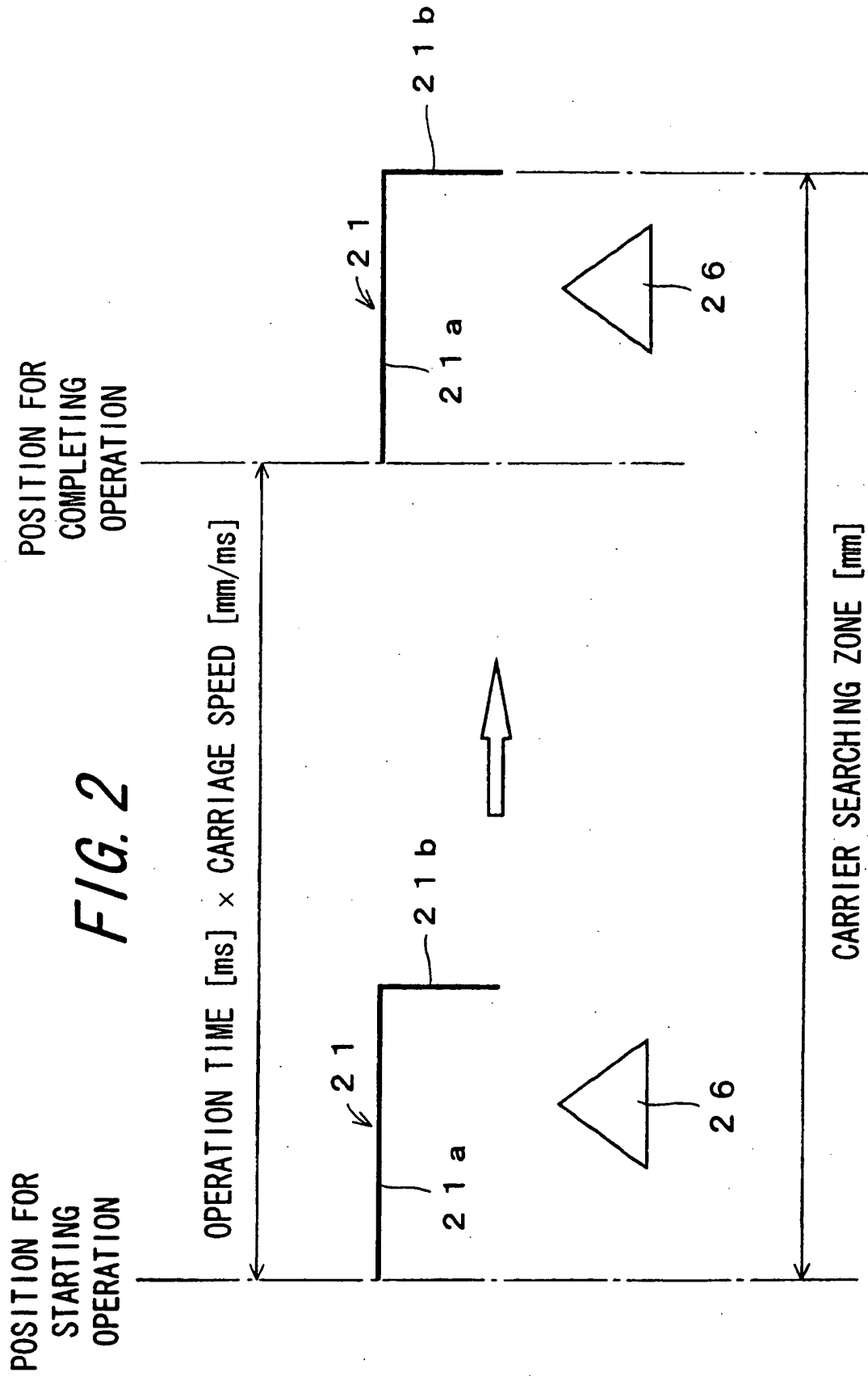


FIG. 3

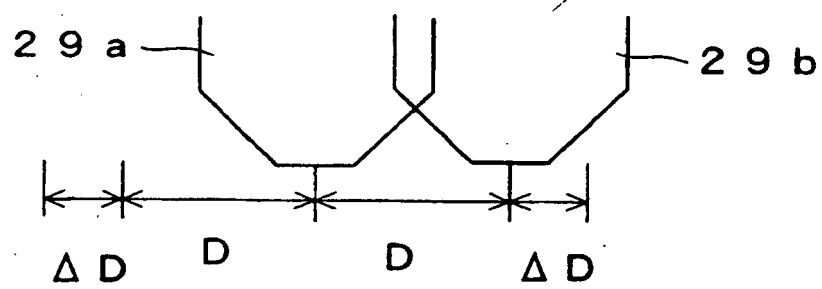


FIG. 4

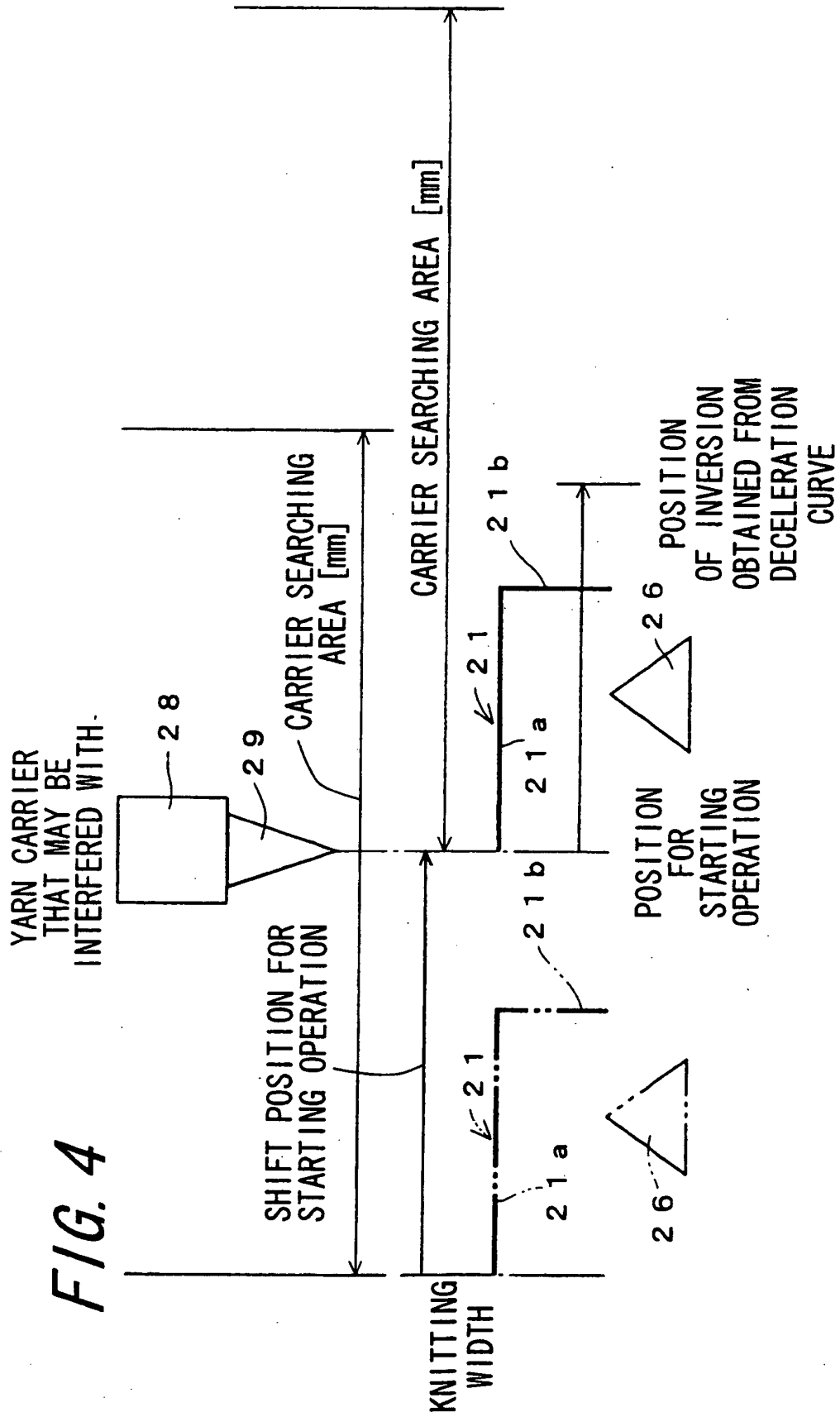
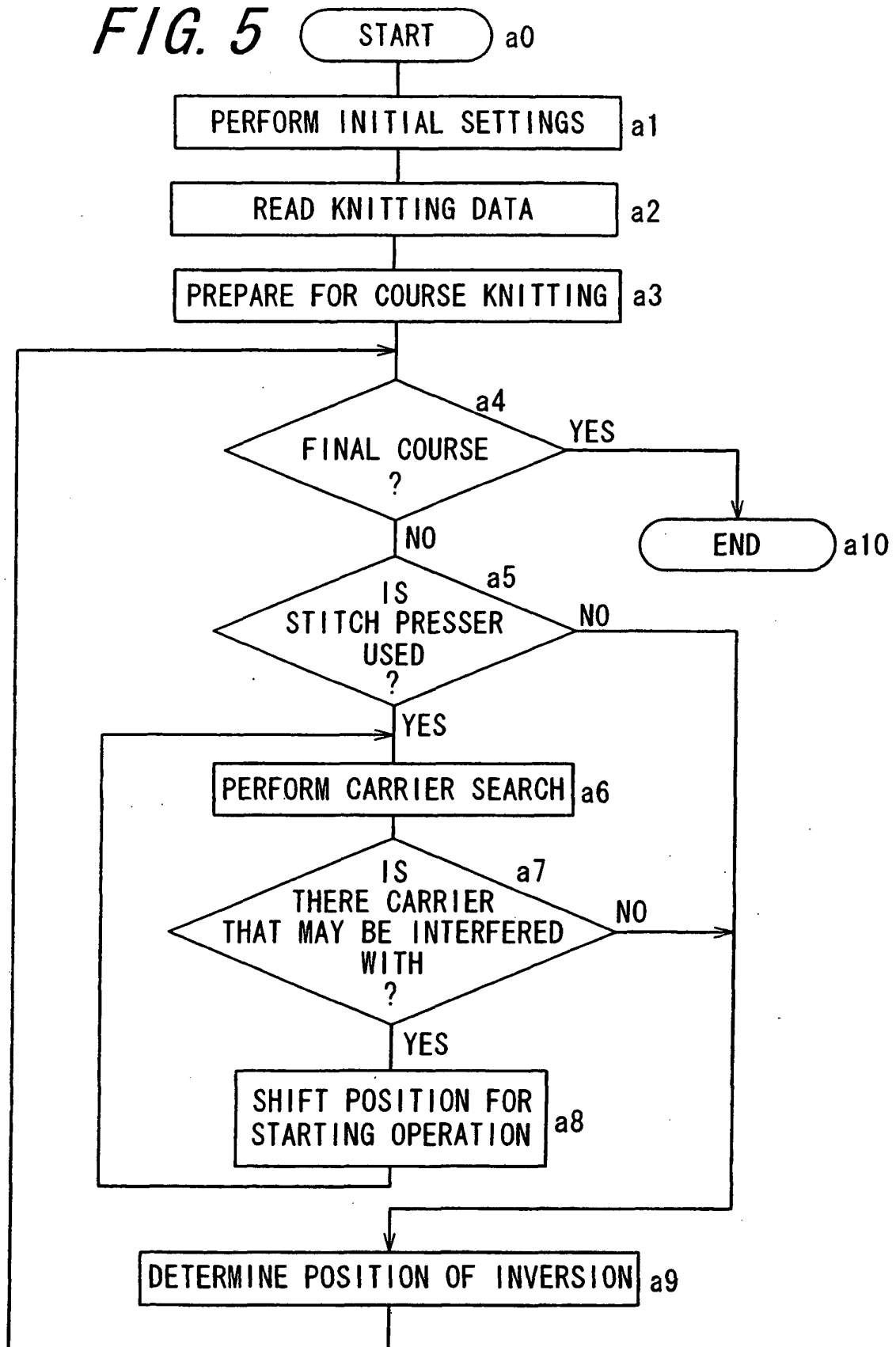


FIG. 5

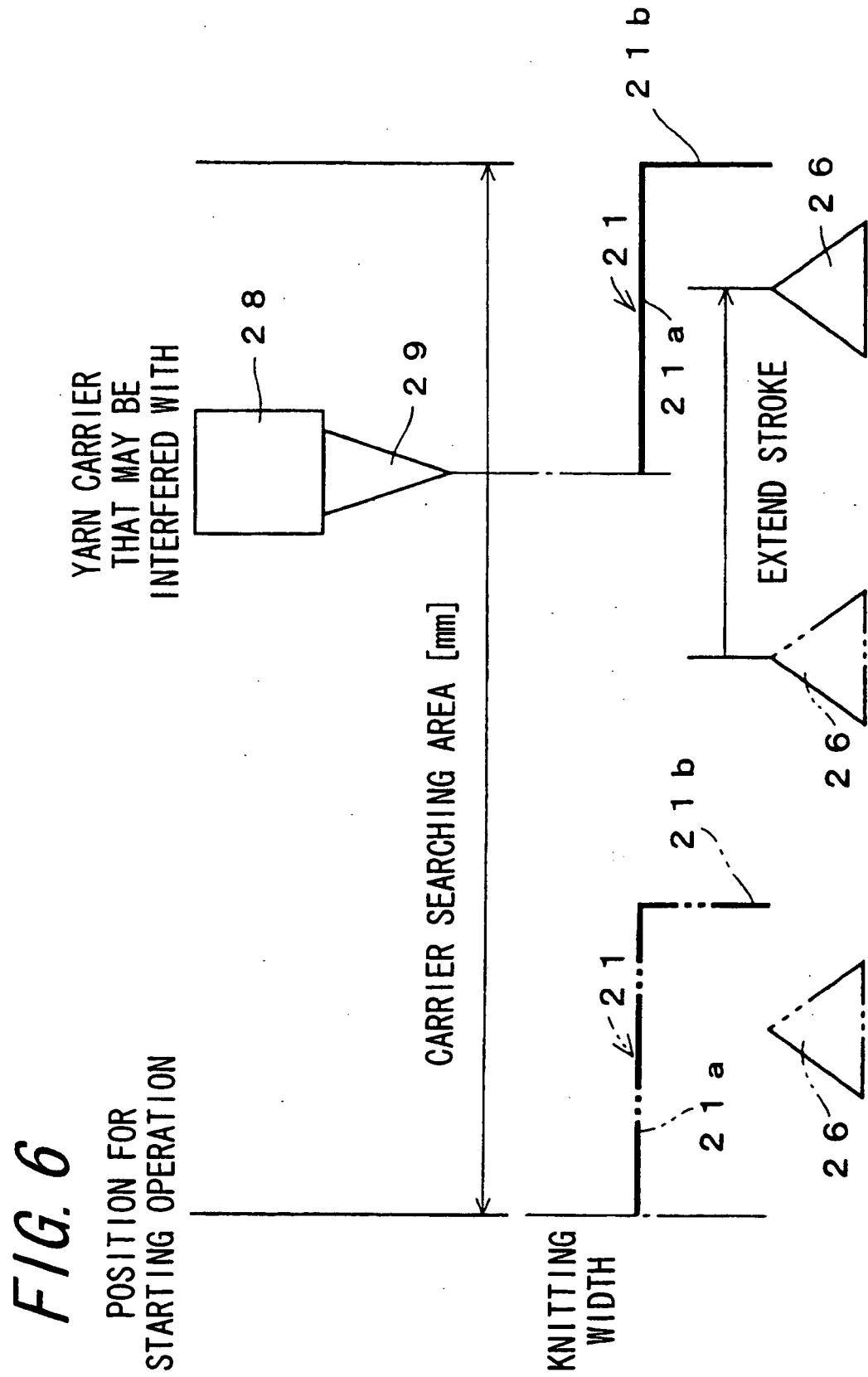


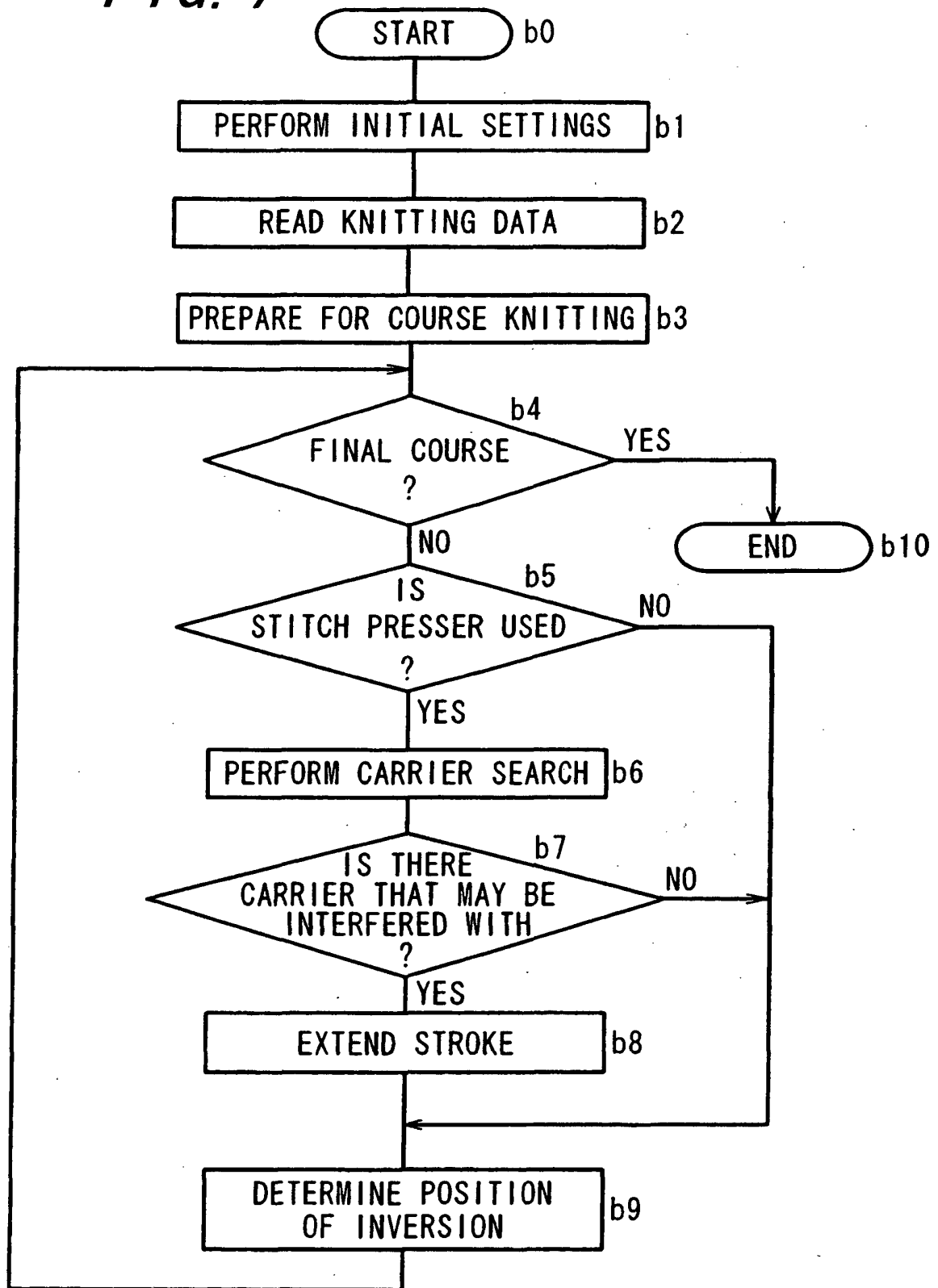
FIG. 7

FIG. 8A ¹

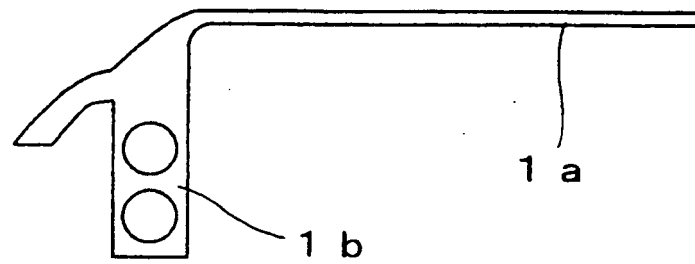


FIG. 8B

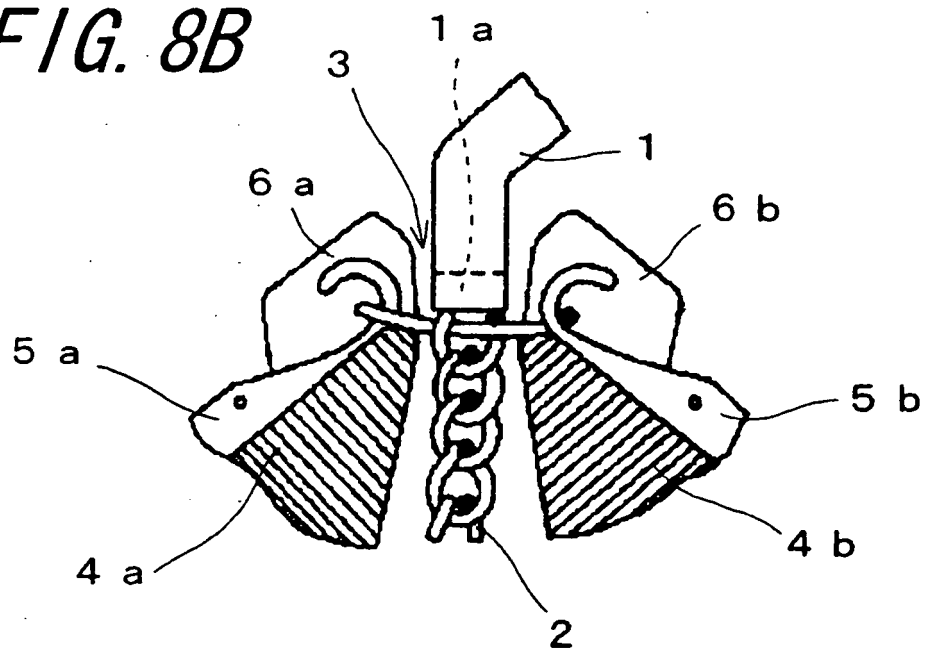


FIG. 9A

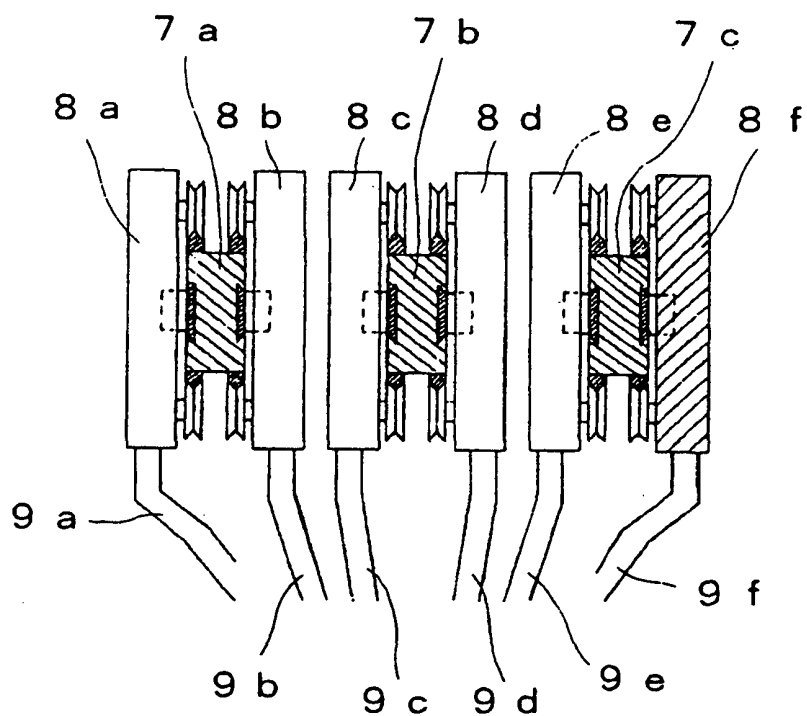


FIG. 9B

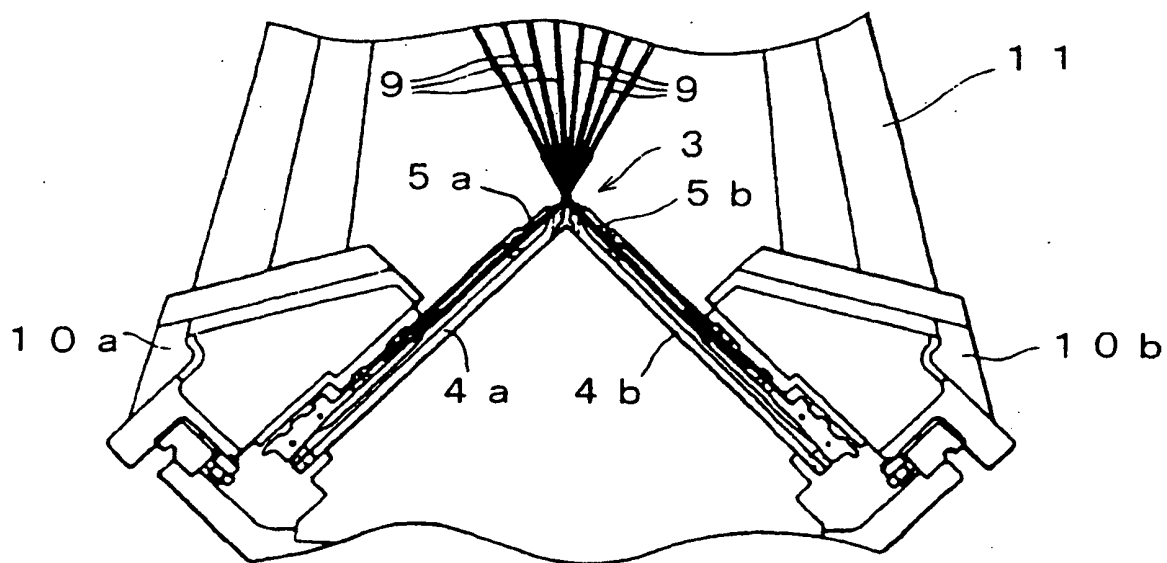
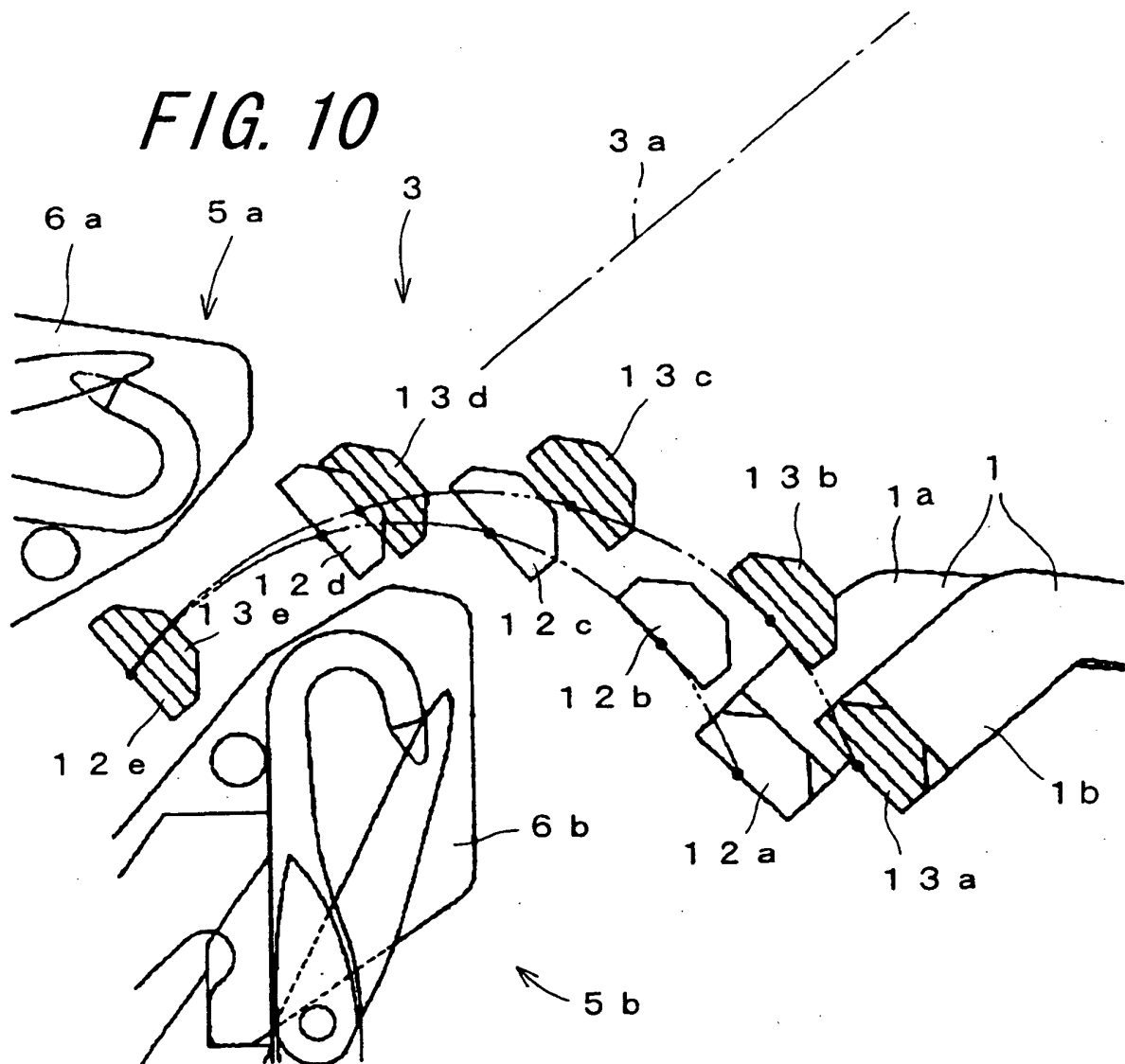


FIG. 10



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

- JP 3066415 B [0002] [0007] [0010]
- JP 6158485 A [0002] [0006] [0007] [0008]
- JP 2627522 B [0005]