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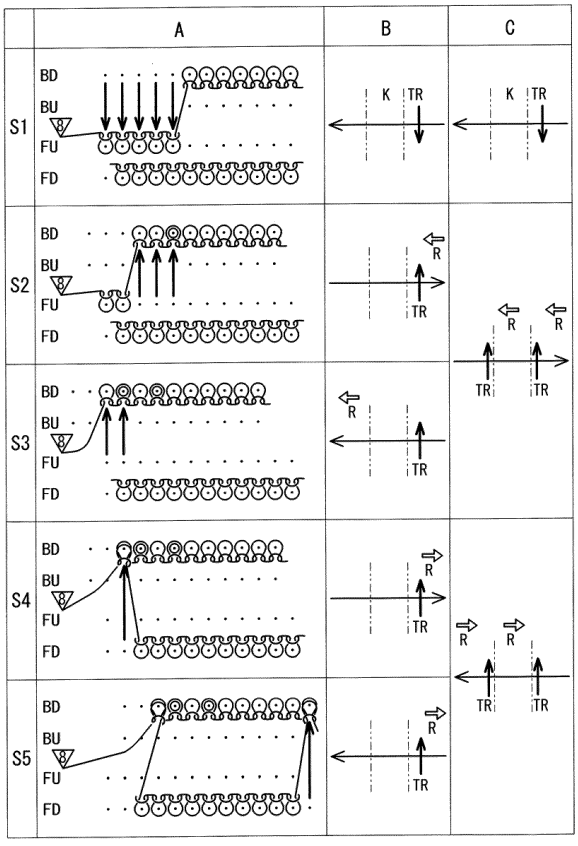
(54) KNITTED FABRIC KNITTING METHOD, KNIT DESIGNING SYSTEM, AND STORAGE MEDIUM

(57) Provided is a knitted fabric knitting method for knitting a knitted fabric by performing a plurality of knitting courses, using a flat knitting machine (5) including a first needle bed (FD, FU) and a second needle bed (BD, BU) capable of being racked relative to each other, and a carriage (6) in which at least two cam systems (&a, &b, &c) are mounted, the method being characterized in that the plurality of knitting courses include at least one specific knitting course, in each specific knitting course, a first racking step, a first transferring step, a second racking step, and a second transferring step are performed in this order while the carriage (6) moves in one direction to pass through one knitting region, and the one knitting region is a region in which a series of stitches formed continuously in a knitting width direction are held.

Fig. 2



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Description

Technical Field

[0001] The present invention relates to a knitted fabric knitting method, a knit designing system, and a storage medium.

Background Art

[0002] A flat knitting machine for knitting a knitted fabric includes a first needle bed and a second needle bed capable of being racked relative to each other, and a carriage that reciprocates along the needle beds. Cam systems that cause the needles of the needle beds to perform knitting operations are mounted in the carriage. A knitted fabric knitting method using this flat knitting machine is constituted by a plurality of knitting courses. In each knitting course, the carriage moves in one of longitudinal direction of the needle beds. In the knitting courses, a racking step, a knitting step, a transferring step, and so forth are performed while the carriage moves. The racking step is a step of shifting relative positions of the first needle bed and the second needle bed, and is, in general, performed at the timing at which the carriage is reversed. The knitting step is a step of forming stitches on the needles. The transferring step is a step of moving stitches between the opposing needle beds. The knitting courses include an empty course in which only the carriage is moved.

[0003] The flat knitting machine knits a knitted fabric according to a knitting program. The knitting program is created by a knit designing system disclosed in Patent Literature 1, for example. The knit designing system includes an input unit and a creation unit. The input unit is used for enabling a user to edit design data relating to knitting of a knitted fabric. The creation unit is used for creating, based on the design data, a knitting program that can be read by a computer included in the flat knitting machine.

Citation List

Patent Literature

[0004] Patent Literature 1: WO 2002/033598

Summary of Invention

Technical Problem

[0005] Increasingly diverse consumer needs have given rise to the needs of producers to efficiently knit knitted fabrics in smaller lot sizes and of high variety. To meet these needs, there is a demand for a knitted fabric knitting method that allows any kind of knitted fabric to be efficiently knitted.

[0006] An object of the present invention is to provide a knitted fabric knitting method that is excellent in terms of knitting efficiency. An object of the present invention is to provide a knit designing system for creating a knitting program that is excellent in terms of knitting efficiency. An object of the present invention is to provide a storage medium having stored therein a knitting program that is excellent in terms of knitting efficiency.

Solution to Problem

[0007] The present inventors studied all steps involved in knitting one knitted fabric, and the order in which steps are performed. As a result, it became clear that, for any kind of knitted fabric, a racking step, a transferring step, a racking step, and a transferring step are performed in this order in many locations in the process of knitting knitted fabric. Conventionally, a racking step and a transferring step are performed in one knitting course. That is, the above-described four steps are performed using two knitting courses during which the carriage is caused to reciprocate. The present inventors found that performing the four steps while the carriage moves in one direction drastically improves the overall knitting efficiency of the knitted fabric. A knitted fabric knitting method, a knit designing system, and a storage medium of the present invention are listed below.

[0008] <1> A knitted fabric knitting method according to an aspect of the present invention is a knitted fabric knitting method for knitting a knitted fabric by performing a plurality of knitting courses, using a flat knitting machine including a first needle bed and a second needle bed capable of being racked relative to each other, and a carriage in which at least two cam systems are mounted, the method being characterized in that

the plurality of knitting courses include at least one specific knitting course,
in each specific knitting course, a first racking step, a first transferring step, a second racking step, and a second transferring step are performed in this order while the carriage moves in one direction to pass through one knitting region, and
the one knitting region is a region in which a series of stitches formed continuously in a knitting width direction are held.

[0009] Here, the series of stitches in the knitting region may be formed by one knitting yarn, or may be formed by joining a plurality of stitch rows formed by different knitting yarns. The carriage moving in one direction may pass through a plurality of knitting regions. For example, in knitting of a sweater, a right sleeve, a body, and a left sleeve may be held at separate positions in the length direction of the needle beds. In this case, a knitting region for the right sleeve, a knitting region for the body, and a knitting region for the left sleeve are separated in the knitting width direction, and thus are considered as separate regions.

[0010] <2> In an embodiment of the knitted fabric knitting method according to the present invention,

the flat knitting machine includes a self-propelled yarn feeder, and,
in the specific knitting course, a knitting step is further performed after the first racking step.

[0011] <3> A knit designing system according to an aspect of the present invention is a knit designing system characterized by including:

an input unit configured to allow a user to edit design data relating to knitting of a knitted fabric; and
a creation unit configured to create, based on the design data, a knitting program readable by a computer included in a flat knitting machine,
wherein the creation unit is configured to create the knitting program configured to cause the computer to control the flat knitting machine in order to cause the flat knitting machine to perform the knitted fabric knitting method according to <1> or <2> above.

[0012] <4> A storage medium according to an aspect of the present invention is a storage medium having stored therein a knitting program readable by a computer included in a flat knitting machine, the storage medium being characterized in that
the knitting program is configured to cause the computer to control the flat knitting machine so as to cause the flat knitting machine to perform the knitted fabric knitting method according to <1> or <2> above.

Effects of the Invention

[0013] In the knitted fabric knitting method according to the present invention, two racking steps and two transferring steps are performed in one specific knitting course. Accordingly, the total number of knitting courses for completing a knitted fabric is reduced. In addition, the number of empty courses may be significantly reduced by performing the specific knitting course. Accordingly, the knitted fabric knitting method according to the present invention can drastically improve the knitting efficiency of a knitted fabric.

[0014] When the flat knitting machine includes a self-propelled yarn feeder, the specific knitting course may also include a knitting step. By further performing the knitting step in the specific knitting course, it is possible to further improve the knitting efficiency of a knitted fabric.

[0015] The knit designing system according to the present invention is capable of automatically creating a knitting program that allows a knitted fabric to be efficiently knitted based on design data that is input by a user. By simply inputting design data to the knit designing system, the user can obtain a knitting program that is excellent in terms of knitting efficiency, as will be described in a later-described embodiment.

[0016] By using the knitting program stored in the storage medium according to the present invention, it is possible to cause the flat knitting machine to efficiently knit a knitted fabric.

Brief Description of Drawings

[0017]

FIG. 1 is a partial schematic diagram of a flat knitting machine including a carriage in which three cam systems are mounted.
FIG. 2 is an explanatory diagram of Knitting Example 1 described in an embodiment.
FIG. 3 is an explanatory diagram of Knitting Example 2 described in an embodiment.
FIG. 4 is an explanatory diagram following FIG. 3.
FIG. 5 is a functional block diagram of a knit designing system described in an embodiment.

Description of Embodiments

[0018] A knitted fabric knitting method, a knit designing system, and a storage medium according to an embodiment will be described below with reference to the drawings.

Embodiment 1

Knitting Example 1

[0019] In the present embodiment, an example of the knitted fabric knitting method according to the present invention using a four-bed flat knitting machine will be described first with reference to the drawings. As will be described later, the knitted fabric knitting method according to the present invention can also be performed using a two-bed flat knitting machine.

[0020] The four-bed flat knitting machine includes a lower front needle bed, a lower back needle bed, an upper front needle bed, and an upper back needle bed. Hereinafter, the lower front needle bed, the lower back needle bed, the upper front needle bed, and the upper back needle bed are referred to as FD, BD, FU, and BU, respectively. In the present example, the FD and the FU correspond to the first needle beds, and the BD and the BU correspond to the second needle beds. The FD and the BD oppose each other. The FU disposed above the FD and the BU disposed above the BD oppose each other. The four-bed flat knitting machine further includes a plurality of yarn feeders and a carriage. The relationship between the needle beds, the yarn feeders, and the carriage will be described briefly with reference to the schematic diagram of FIG. 1.

[0021] FIG. 1 is a schematic diagram of a part of a flat knitting machine 5 as viewed from the FD side. The illustration of the FU has been omitted from FIG. 1. A carriage 6 included in the flat knitting machine 5 reciprocally

moves over the needle beds. The carriage 6 of the present example incudes three cam systems 6A, 6B, and 6C. A cam system is a generic term for a plurality of cams provided at positions of the carriage 6 that correspond to the FD, the FU, the BD, and the BU. Each cam system is capable of performing both a knitting step and a transferring step. For example, a cam system that has performed a knitting step in a given knitting course can also perform a transferring step in another knitting course. Two systems, namely, the cam system 6A and 6B, may be provided, or four cam systems, namely, the cam systems 6A to 6C and an additional cam system, may be provided. Yarn feeders 8 are attached so as to travel on a rail 7 disposed above the needle beds.

[0022] Referring to FIG. 2, an example is described in which two double stitches are formed at separate positions in a narrow range of within 10 stitches. Here, a part of a knitting process for forming a shoulder line for joining front and back parts of a knitted fabric of a set-in sweater is shown. Specifically, the first racking operation is performed, and thereafter the first double stitch is formed by the first transferring step. Then, the second racking step is performed in the same direction as the first racking step, and thereafter the second double stitch is formed by the second transferring step. The letter "S" followed by a numeral in the left column in FIG. 2 indicates a knitting process number. In the column A, which is the second column from the left, formation states of stitches in the knitting process are shown. The black dots in the column A indicate needles, the marks Ω indicate stitches, and the inverted triangular marks indicate a yarn feeder 8, and the straight arrows indicate transfer. The column B, which is the third column from the left, shows a knitting course for performing the knitting process shown in the column A in a conventional knitted fabric knitting method. The column C, which is the column at the right end, shows a knitting course for performing a knitting process shown in column A in the knitted fabric knitting method according to the present example. First, each of the knitting processes will be described with reference to the column A.

[0023] In S1, the yarn feeder 8 is moved leftward to knit a plurality of stitches on the BD, and thereafter the five stitches on the left side of these stitches are transferred to the FU.

[0024] In S2, the BD and the BU are racked leftward by one pitch, and thereafter three stitches on the right side of the stitches held on the FU are moved to the BD. Through this transferring, a double stitch is formed on the BD.

[0025] In S3, the BD and the BU are racked leftward by one pitch, and thereafter the two stitches held on the FU are moved to the BD. Through this transferring, a double stitch is additionally formed on the BD.

[0026] In S4, the BD and the BU are racked rightward by one pitch, and thereafter the stitch at the left end of the FD is moved to the BD. Through this transferring, a double stitch is additionally formed on the BD.

[0027] In S5, the BD and the BU are racked rightward by two pitches, and thereafter the stitch at the right end of the FD is moved to the BD. Through this transferring, a double stitch is additionally formed on the BD.

[0028] Next, the configuration of knitting courses in the conventional knitted fabric knitting method shown in the column B will be described. The lateral arrows indicate the movement directions of the carriage 6 shown in FIG. 1, the upward-facing arrow indicates transferring from the front needle bed to the back needle bed, and the downward-facing arrow indicates transferring from the back needle bed to the front needle bed. The dashed double-dotted lines indicate the boundaries between the cam systems 6A, 6B, and 6C shown in FIG. 1. The cam system located on the movement direction side of the carriage 6 is a leading cam system. The letter "K" at the position corresponding to each of the cam systems indicates a knitting step, the letter "TR" indicates a transferring step, and the letter "R" indicates a racking step. The outlined arrow located above the letter "R" indicates the racking direction.

[0029] As shown in the column B, in the conventional knitted fabric knitting method, five knitting courses that are in one-to-one correspondence with the steps are performed.

[0030] Next, the configuration of knitting courses in the knitted fabric knitting method according to the embodiment shown in the column C will be described. The notations in the column C are the same as those in the column B. As shown in the column C, in the knitted fabric knitting method according to the embodiment, the knitting process shown in the column A is performed in three knitting courses. Specifically, S1 is performed in the first knitting course shown in the column C. S2 and S3 are performed in the second knitting course. S4 and S5 are performed in the third knitting course. Each of the second knitting course and the third knitting course is a specific knitting course in which two racking steps and two transferring steps are performed while the carriage 6 (see FIG. 1) is moved in one direction. More specifically, in the second knitting course, a first racking step, a first transferring step, a second racking step, and a second transferring step are performed in this order while the carriage 6 is moved rightward. In the first racking step, the BD and the BU are racked leftward. In the first transferring step, the stitch is transferred to the first cam system 6Ain the advancing direction of the carriage 6. In the second racking step, the BD and the BU are racked leftward. In the second transferring step, the stitch is transferred by the third cam system 6C. Here, the second racking step is performed at the timing at which the cam systems 6A, 6B, and 6C are not acting on the needles. The second racking step in the following description is also performed at the timing at which the cam systems 6A, 6B, and 6C are not acting on the needles.

[0031] In the third knitting course, the first racking step, the first transferring step, the second racking step, and the second transferring step are performed in this order while the carriage 6 is moved leftward. In the first racking

step, the BD and the BU are racked rightward. In the first transferring step, the stitch is transferred by the first cam system 6C in the advancing direction of the carriage 6. In the second racking step, the BD and the BU are racked rightward. In the second transferring step, the stitch is transferred by the third cam system 6A.

[0032] As described above, in the knitted fabric knitting method according to the present invention shown in the column C, the number of knitting courses for performing the knitting process shown in the column A is smaller than that in the conventional knitted fabric knitting method shown in the column B. Therefore, with the knitted fabric knitting method according to Embodiment 1, a knitted fabric can be more efficiently knitted than with the conventional knitted fabric knitting method.

Knitting Example 2

[0033] In Knitting Example 2, a part of a knitting process of a bind-off process will be described with reference to FIGS. 3 and 4. A bind-off process is the process of repeatedly performing, in a narrow range of within three stitches, the formation of a double stitch through transferring and the knitting of a new stitch on the double stitch. The bind-off process is performed at a high frequency for any kind of knitted fabric. The bind-off process shown in FIGS. 3 and 4 is a bind-off process that prevents a termination portion, such as a collar, of a knitted fabric from unravelling. In the bind-off process, a first racking direction and a second racking direction are different. The notations in FIGS. 3 and 4 are the same as those in FIG. 2. In Knitting Example 2, a knitting example is shown in which the yarn feeder 8 of the flat knitting machine 5 shown in FIG. 1 is a self-propelled yarn feeder. The self-propelled yarn feeder 8 is a yarn feeder 8 that can move independent of the carriage 6. In FIGS. 3 and 4, the movement directions of the yarn feeder 8 are indicated by the filled arrows.

[0034] In S1 shown in the column A of FIG. 3, the yarn feeder 8 is moved rightward to knit a stitch at the left end of the BD. In S2, the stitch at the left end of the BD is transferred to the FU. In S3, the BD and the BU are racked leftward by one pitch, and thereafter the stitch on the FU is overlapped with the stitch at left end of the BD. In S4, the yarn feeder 8 is moved leftward. In S5, the BD and the BU are racked rightward by one pitch, and thereafter the yarn feeder 8 is moved rightward to knit a stitch following the double stitch in the wale direction. Through the operations of S1 to S5, the first bind-off process is completed.

[0035] In S6, the stitch knitted in S5 is transferred from the BD to the FU. In S7 of FIG. 4, the BD and the BU are racked leftward by one pitch, and thereafter the stitch on the FU is overlapped with the stitch at the left end of the BD. In S8, the yarn feeder 8 is moved leftward. In S9, the BD and the BU are racked rightward by one pitch, and thereafter the yarn feeder 8 is moved rightward to knit a stitch following the double stitch on the BD in the wale direction. Through the operations of S6 to S9, the second bind-off process is completed. After S9, the same knitting operations as those of S2 to S5 are performed. In S10, the initial step of the third bind-off process is shown.

[0036] In the conventional knitted fabric knitting method shown in the column B, five knitting courses are performed in order to perform the knitting process shown in the column A. Specifically, in the conventional knitted fabric knitting method, two steps are performed in each of the knitting courses.

[0037] Next, in the knitting method according to the present invention shown in the column C, the knitting process shown in the column A is performed by three knitting courses. Specifically, in the first knitting course shown in the column C of FIG. 3, S1 and S2 are performed. In the second knitting course, S3 to S6 are performed. In the third knitting course shown in the column C of FIG. 4, S7 to S10 are performed. Each of the second knitting course shown in the column C of FIG. 3 and the third knitting course shown in the column C of FIG. 4 is a specific knitting course in which two racking steps, two transferring steps, and one knitting step are performed while the carriage is moved in one direction. More specifically, in the second knitting course shown in the column C of FIG. 3, a first racking step, a first transferring step, a second racking step, a knitting step, and a second transferring step are performed in this order while the carriage 6 is moved leftward. In the case of the present knitting example, the order of the second racking step and the knitting step can be interchanged. In the first racking step, the BD and the BU are racked leftward. In the first transferring step, the stitch is transferred by the first cam system 6C. In the second racking step, the BD and the BU are racked rightward. In the knitting step, the stitch is knitted by the second cam system 6B. In the second knitting course of the present example, prior to the knitting step, the yarn feeder 8 is moved in the same direction as the advancing direction of the carriage 6. The movement of the yarn feeder 8 corresponds to S4, and is a preparation step for moving the yarn feeder 8 rightward to perform the knitting step in S5. The knitting step is performed by moving the yarn feeder 8 in a direction opposite to the advancing direction of the carriage 6. In the second transferring step, the stitch is transferred by the third cam system 6A.

[0038] In the third knitting course shown in the column C of FIG. 4, a first racking step, a first transferring step, a second racking step, a knitting step, and a second transferring step are performed in this order while the carriage 6 is moved rightward. In the case of the present knitting example, the order of the second racking step and the knitting step can be interchanged. In the first racking step, the BD and the BU are racked leftward. In the first transferring step, the stitch is transferred by the first cam system 6A. In the second racking step, the BD and the BU are racked rightward. In the knitting step, the stitch is knitted by the second cam system 6B. In the third

knitting course of the present example, prior to the knitting step, the yarn feeder 8 is moved in a direction opposite to the advancing direction of the carriage 6. The knitting step is performed by moving the yarn feeder 8 in the same direction as the advancing direction of the carriage 6. In the transferring step, the stitch is transferred by the third cam system 6C.

[0039] As described above, with the knitted fabric knitting method according to the present invention shown in the columns C of FIGS. 3 and 4, a knitted fabric can be knitted more efficiently than with the conventional knitted fabric knitting method shown in the column B.

Knitting Program and Storage Medium

[0040] A knitting program configured to cause a flat knitting machine to perform the above-described knitted fabric knitting method is a knitting program for causing a computer included in a flat knitting machine 5 (see FIG. 1) to control the flat knitting machine 5 so as to cause the flat knitting machine 5 to perform a plurality of knitting courses including a specific knitting course.

[0041] In the flat knitting machine 5, the cams included in the carriage 6 traveling over the needle beds act on butts of the needles, and the needles advance and withdraw along needle grooves of the needle beds, whereby stitches are formed. The flat knitting machine 5 includes a needle selection mechanism for determining a needle and what type of movement the needle is to perform, a carriage control mechanism for controlling the travel of the carriage 6 and the projection/retraction of the cams, and a racking control mechanism for controlling the racking of the needle beds. The knitting program causes the flat knitting machine to knit a knitted fabric by issuing commands to these mechanisms, and controlling the movement of the carriage 6, the racking positions of the needle beds, the movement of each individual needle, and so forth.

[0042] A storage medium having stored therein the knitting program may be installed in a knit designing system, or may be installed in the flat knitting machine. The storage medium may be a portable storage medium configured to allow a knitting program created in the knit designing system to be transferred to the flat knitting machine. Examples of the portable storage medium include a CD-ROM, a USB memory, and a magnetic disk. Here, the designing system for a knitted fabric is a system that allows a user to design a knitted fabric on a screen, thereby creating a knitting program for operating the flat knitting machine based on the user design.

Knit Designing System

[0043] As shown in a functional block diagram of FIG. 5, a knit designing system 1 for a knitted fabric that creates the knitting program based on a user design includes an input unit 2, a creation unit 3, a memory 4, and a display unit 10. The knit designing system 1 for a knitted fabric is configured to automatically create the above-described knitting program based on design data. Below, each of the components of the knit designing system 1 will be briefly described, and then a procedure by which the knit designing system 1 for a knitted fabric creates a knitting program based on information input by the user will be described.

[0044] The input unit 2 is used when the user edits the design data, and is configured in the form of a keyboard, a mouse, a scanner, a digitizer, or the like. The design data includes information regarding the shape and the size of a knitted fabric to be knitted, information relating to the kind of knitting yarn, information regarding knitting units constituting a knitted fabric, information regarding a knitting code assigned to each of the knitting units, and so forth. The information regarding each knitting code includes information regarding the position of the knitting unit and a knitting code assigned to that position.

[0045] Here, each knitting unit of a knitted fabric corresponds to one stitch of the knitted fabric. Each of the knitting codes assigned to the knitting units represents a knitting operation to be performed by the flat knitting machine, for example, using a color, a number, a figure, or a combination thereof. For example, a knitting code shown in red is defined as a knitting code for causing the flat knitting machine to knit a front stitch. Of course, one knitting code may define a plurality of knitting operations. Examples thereof include a knitting code for knitting a stitch, and thereafter transferring the stitch. These knitting codes are stored in the memory 4, which will be described later.

[0046] The creation unit 3 serves to create a knitting program for a knitted fabric, and can be configured by a computer, for example. The creation unit 3 includes a determination unit 31 that determines whether a specific knitting course can be performed based on the design data, and a construction unit 32 that creates a knitting program based on a result of determination performed by the determination unit 31.

[0047] The determination unit 31 includes a first determination unit 31A and a second determination unit 31B. The first determination unit 31A refers to all steps involved in knitting a knitted fabric, and extracts, from all the steps, a step group constituting a specific knitting course. Examples of the step group include the following three step groups:.

(1) A step group in which a racking step, a transferring step, a racking step, and a transferring step are performed in this order.

(2) A step group in which a racking step, a transferring step, a racking step, a knitting step, and a transferring step are performed in this order.

(3) A step group in which a racking step, a transferring step, a knitting step, a racking step, and a transferring step are performed in this order.

[0048] The second determination unit 31B determines

whether each of the step groups extracted by the first determination unit 31A can be performed while the carriage 6 is moved in one direction. Whether all of the steps included in one step group can be performed is determined based on, for example, the following information. The second determination unit 31B determines whether a racking step can be performed at the timing at which the cam systems 6A, 6B, and 6C are not acting on the needles, for example, based on the following information.

(1) The type of the cam systems 6A, 6B, and 6C included in the flat knitting machine 5. Examples of the type of cam systems include a cam system dedicated to the knitting step, a cam system dedicated to the transferring step, and a cam system capable of performing both the knitting step and the transferring step.
(2) The number of cam systems 6A, 6B, and 6C.
(3) The movement speed of the carriage 6.
(4) The distance between a cam system that performs the first transferring step and a cam system that performs the second transferring step, and the distance between a cam system that performs transferring steps and a cam system that performs knitting steps.
(5) The positions on the needle beds at which the first transferring step and the second transferring step are performed.

[0049] The construction unit 32 creates, based on the design data, a knitting program in which the operations of racking and needles, the procedure for feeding knitting yarn, and so forth are set. In the present example, the construction unit 32 creates a knitting program including a specific knitting course, based on a result of determination performed by the determination unit 31. If the above-described step group is not extracted by the first determination unit 31A, the construction unit 32 creates a knitting program constituted by a conventional knitting course. If the above-described step group is extracted by the first determination unit 31A, the construction unit 32 creates a knitting program so as to perform a specific knitting course for a step group for which the result of determination performed by the second determination unit 31B is "YES". The construction unit 32 creates a knitting program so as to perform a conventional knitting course for a step group for which the result of determination performed by the second determination unit 31B is "NO". The knitting program created by the construction unit 32 is transmitted to the flat knitting machine 5 via a storage medium such as a magnetic disk, or a wired or wireless connection, or the like.

[0050] The memory 4 is a storage medium such as a solid-state drive or a hard disk. Information such as the design data and the knitting codes are stored in the memory 4.

[0051] The display unit 10 is for visually grasping information relating to the design of the knitted fabric, and is not particularly limited. Examples of the display unit 10 include a liquid crystal display. Using a touch panel as the display unit 10 allows the display unit 10 to perform a portion of the functions of the input unit 2.

[0052] With the knit designing system 1 having the above-described configuration, a knitting program with which a plurality of knitting courses including at least one specific knitting course are performed is automatically created. With the knitting program, a knitted fabric can be more efficiently knitted than with a conventional knitting program.

Other Embodiments

[0053] The knitted fabric knitting method according to the present invention may also be performed using a flat knitting machine including two or four or more cam systems mounted therein. In particular, with a flat knitting machine including four cam systems, a knitted fabric may be more efficiently knitted than with a flat knitting machine including three cam systems. For a flat knitting machine including four cam systems, the distance between a cam system that performs the first transferring step and a cam system that performs the second transferring step can be easily secured. Accordingly, the number of specific knitting courses may be increased. In addition, such a flat knitting machine may drastically reduce the number of empty courses in which only the carriage is moved.

[0054] The knitted fabric knitting method according to the present invention can also be performed using a two-bed flat knitting machine. In the case of using a two-bed flat knitting machine, a front knitted fabric part and a back knitted fabric part are knitted using half-gauge knitting. Half-gauge knitting means that knitting is performed with an empty needle disposed between adjacent stitches. The empty needle disposed between adjacent stitches is used to transfer stitches.

Claims

1. A knitted fabric knitting method for knitting a knitted fabric by performing a plurality of knitting courses, using a flat knitting machine (5) including a first needle bed (FD, FU) and a second needle bed (BD, BU) capable of being racked relative to each other, and a carriage (6) in which at least two cam systems (6A, 6B, 6C) are mounted, the method being **characterized in that**

the plurality of knitting courses include at least one specific knitting course,
in each specific knitting course, a first racking step, a first transferring step, a second racking step, and a second transferring step are performed in this order while the carriage (6) moves in one direction to pass through one knitting region, and

the one knitting region is a region in which a series of stitches formed continuously in a knitting width direction are held.

2. The knitted fabric knitting method according to claim 1,

wherein the flat knitting machine (5) includes a self-propelled yarn feeder (8), and,
in the specific knitting course, a knitting step is further performed after the first racking step.

3. A knit designing system (1) **characterized by** comprising:

an input unit (2) configured to allow a user to edit design data relating to knitting of a knitted fabric; and
a creation unit (3) configured to create, based on the design data, a knitting program readable by a computer included in a flat knitting machine (5),
wherein the creation unit (3) is configured to create the knitting program configured to cause the computer to control the flat knitting machine (5) in order to cause the flat knitting machine (5) to perform the knitted fabric knitting method according to claim 1 or 2.

4. A storage medium (4) having stored therein a knitting program readable by a computer included in a flat knitting machine (5), the storage medium (4) being **characterized in that**
the knitting program is configured to cause the computer to control the flat knitting machine (5) so as to cause the flat knitting machine (5) to perform the knitted fabric knitting method according to claim 1 or 2.

Fig. 1

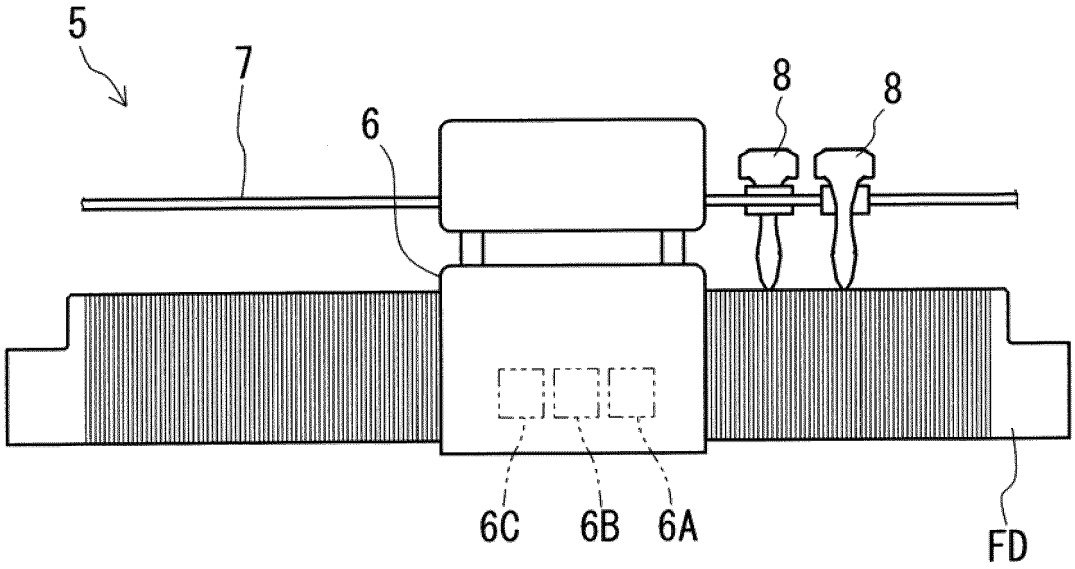


Fig. 2

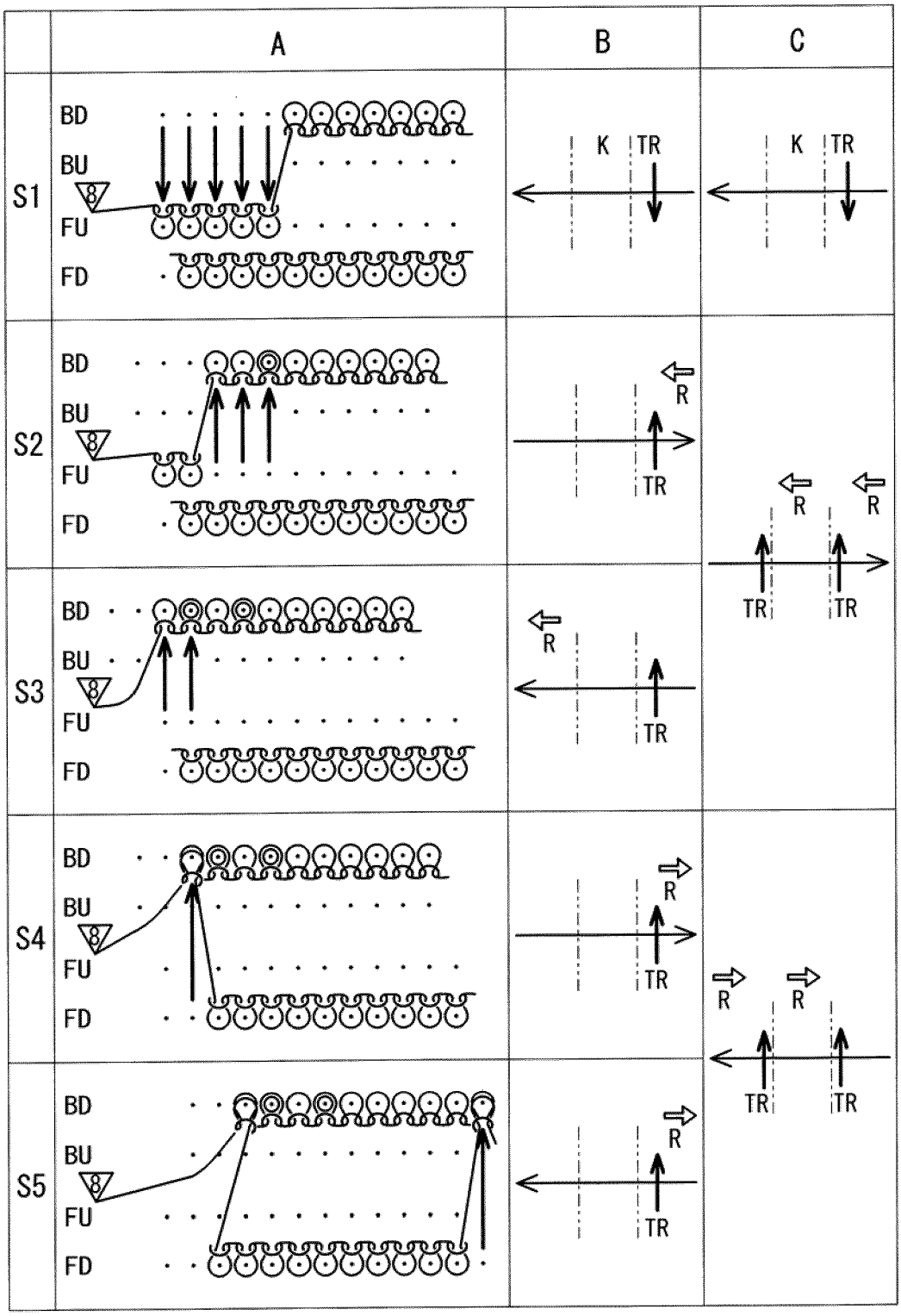


Fig 3

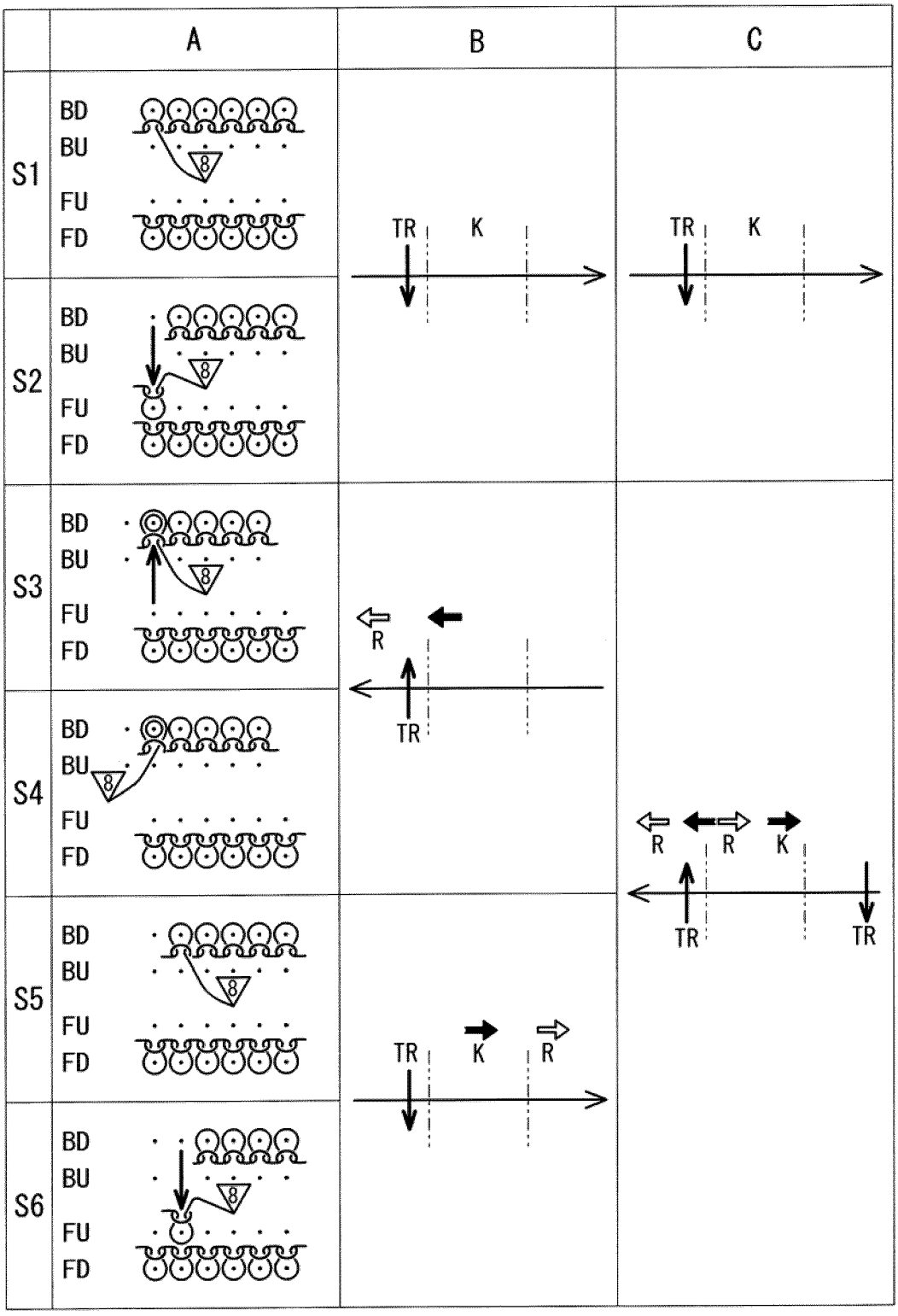


Fig. 4

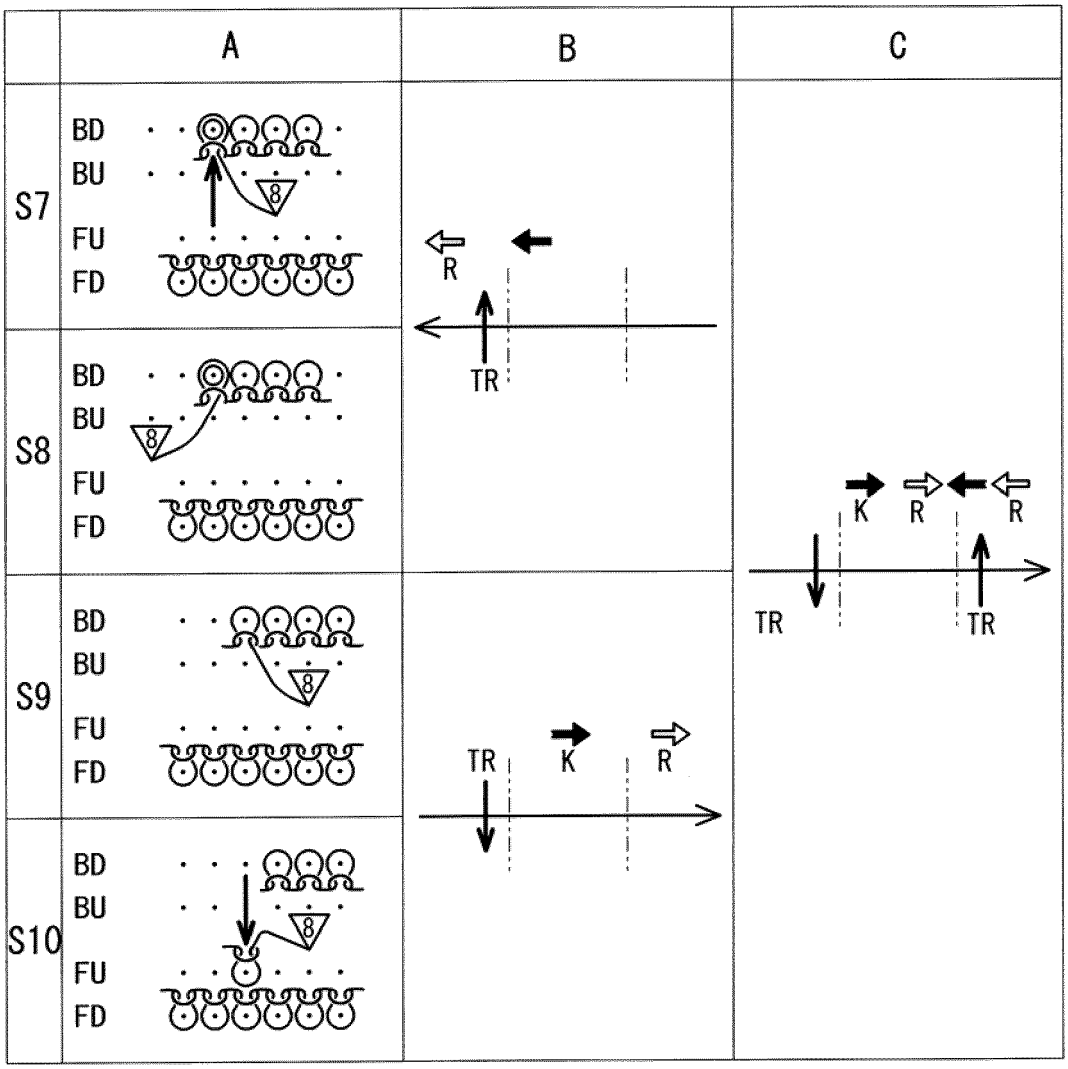
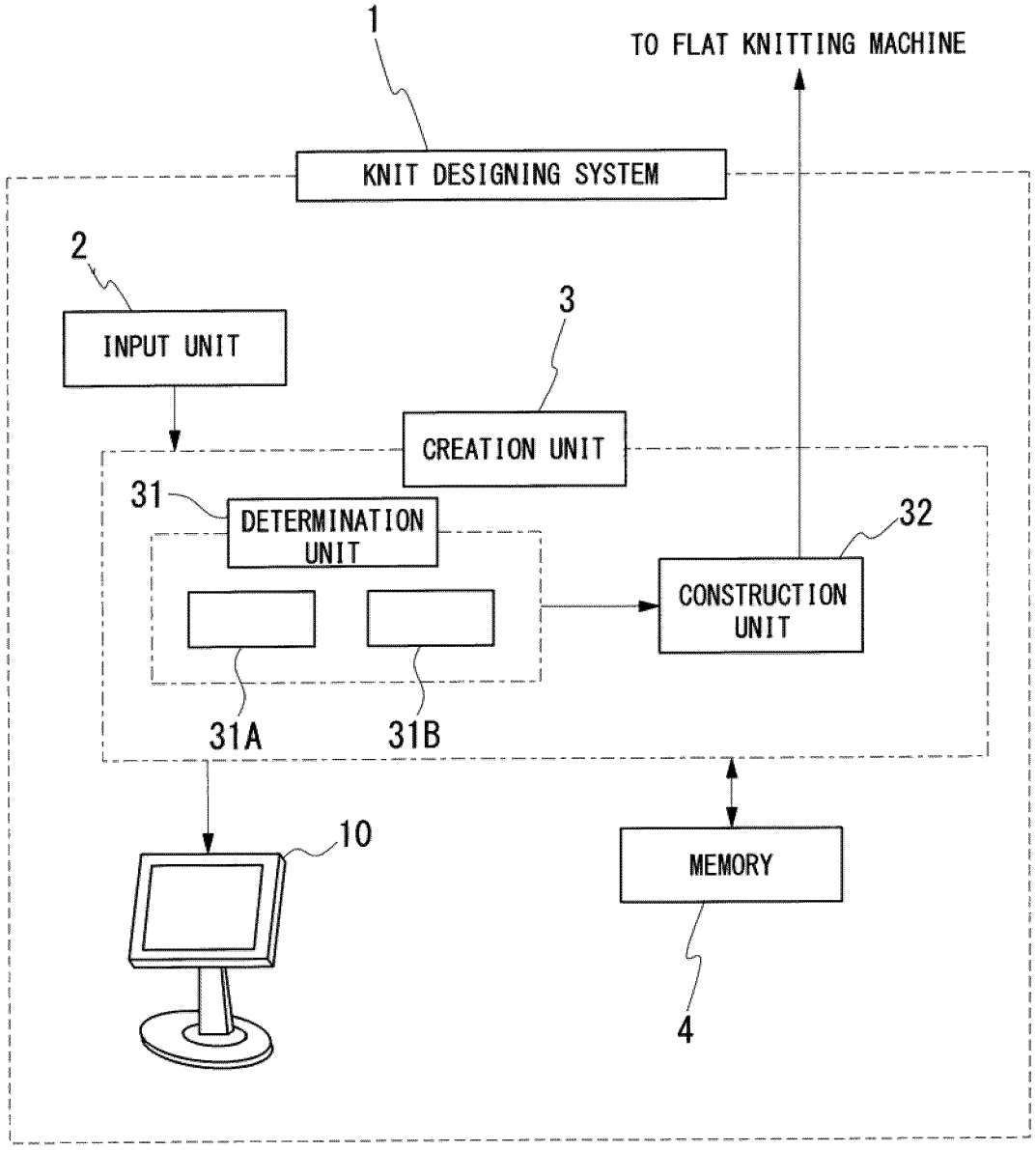


Fig. 5


1
TO FLAT KNITTING MACHINE
KNIT DESIGNING SYSTEM
2
INPUT UNIT
3
CREATION UNIT
31
DETERMINATION UNIT
32
CONSTRUCTION UNIT
31A
31B
10
MEMORY
4

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EUROPEAN SEARCH REPORT

Application Number
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D04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	28 October 2022	Kirner, Katharina

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