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# (54) KNITTED FABRIC DESIGNING SYSTEM

SYSTEM ZUM ENTWERFEN VON MASCHENWARE

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## Description

### TECHNICAL FIELD

**[0001]** The present invention relates to a design system for a knitted fabric to design a knitted fabric in which stitches of a different gauge are intermixed according to the preamble of claim 1 and as known from DE 4431898.

### BACKGROUND ART

**[0002]** Conventionally, there has been proposed a system in which a knitted fabric is designed on a monitor (e.g. , refer to Patent Document 1). In this system, external dimensions of the knitted fabric is first decided to form a paper pattern on the system, and subsequently, a gauge, which is numbers of stitches per predetermined length (e.g., 10cm) in a vertical direction (wale direction) and in a horizontal direction (course direction), is decided to generate pattern data in which knitting units based on the gauge are assigned to the paper pattern. In this system, knitting codes prescribing what knitting motions are to be performed to the knitting units arrayed in the pattern data are applied to thereby design the knitted fabric. Moreover, in this system, the knitting units on each of which a vertical-horizontal ratio of the actual stitch is reflected are displayed on a monitor to thereby make it easy to design on the assumption of a finished state.

**[0003]** Patent Document 1: Japanese Patent Laid-open Publication No. H07-70889

### DISCLOSURE OF THE INVENTION

### PROBLEMS TO BE SOLVED BY THE INVENTION

**[0004]** There has been a demand to create a knitted fabric in which stitches different in size are intermixed, that is, a knitted fabric in which areas different in gauge are intermixed in order to enhance fashionability of the knitted fabric. On the other hand, there has been no system, including the above-described system of Patent Document 1, which incorporates, in pattern data, a gauge different from an initial gauge set when the pattern data is generated. Therefore, when a knitting area with a different gauge is provided in the knitted fabric, there is no method other than a method in which a system operator arranges knitting codes in knitting units so that the stitches each have a desired size in the said area. For example, as shown in Fig. 5, when the knitting area with the different gauge is assumed, the knitting is carried out from a lower portion of the drawing, and when reaching the knitting area with the different gauge, half gauge knitting in which a knitting code of knit (front stitches) and knitting codes of miss are combined is performed to increase a loop length of a stitch, and further, in the knitting course on the half gauge knitting, the knitting codes of miss are specified by an increased loop length. That is, in such a method, in spite of a portion made up of one stitch in the actual knitted fabric, one knitting code of knit and three knitting codes of miss are arranged on the monitor, which disadvantageously makes it difficult to assume the finishing state of the knitted fabric on the monitor.

**[0005]** The present invention has been made in view of the foregoing circumstance, and an object thereof is to provide a design system for a knitted fabric capable of easily designing a knitted fabric with an area different in gauge.

### MEANS FOR SOLVING THE PROBLEMS

**[0006]** A design system for a knitted fabric according to the present invention performs design of a knitted fabric on a computer by specifying a gauge, which is numbers of stitches per predetermined length in a vertical direction and a horizontal direction of the knitted fabric to thereby decide knitting units corresponding to the gauge, converting a paper pattern of the knitted fabric to pattern data made up of the knitting units to display on a display means, and arraying, in said knitting units, knitting codes specifying knitting motions in a flat knitting machine. The design system for a knitted fabric includes a different-gauge information setting means for setting different-gauge information regarding knitting with a gauge different from that of initial-gauge information set in designing the knitted fabric, a pattern data editing means for generating multiple-gauge pattern data having a plurality of knitting units different in gauge, based on the initial-gauge information and different-gauge information, and editing the multiple-gauge pattern data so that the knitting codes can be assigned to the respective knitting units in this multiple-gauge pattern data, a display processing means for causing the display means to display an edited state of the multiple-gauge pattern data, and a knitting program creating means for creating a knitting program of the knitted fabric based on the knitting codes assigned to the respective knitting units of the multiple-gauge pattern data.

**[0007]** As one aspect of the present invention, the pattern data editing means may have a border-area knitting setting part that decides a knitting method of stitches in a border portion between areas where knitting is performed with the different knitting units.

**[0008]** Moreover, as one aspect of the present invention, the pattern data editing means may have a different-gauge-area knitting setting part that decides a knitting method of stitches in a different-gauge area in accordance with a difference in size between the knitting units in the initial gauge and the knitting units in the different gauge.

**[0009]** Furthermore, as one aspect of the present invention, the pattern data editing means may convert the multiple-gauge pattern data to single-gauge pattern data made up of single knitting units. The display processing means may cause the display means to switchably display the multiple-gauge pattern data and the single-gauge pattern data.

## EFFECTS OF THE INVENTION

**[0010]** With the configuration of the present invention, since the multiple-gauge pattern data made up of a plurality of knitting units different in gauge is displayed on the display means, and the knitting codes can be assigned to these knitting units respectively, designing the knitted fabric while assuming a finishing state of the knitted fabric is enabled.

**[0011]** Including the border-area knitting setting part allows the design system for a knitted fabric to decide the knitting method by which the border portion between the different knitting units is naturally finished. Therefore, the effort of setting the knitting codes in the border portion, which an operator would conventionally perform, can be saved.

**[0012]** Including the different-gauge-area knitting setting part allows the design system for a knitted fabric to decide the knitting method of stitches in the different-gauge area. Therefore, the effort of setting the knitting codes in the knitting area with a different gauge, which an operator would conventionally perform, can be saved.

**[0013]** By simultaneously or switchably displaying the multiple-gauge pattern data and the single-gauge pattern data resulting from converting the multiple-gauge pattern data to the expression by the single gauge, efficient design of the knitted fabric is enabled. In a state where the multiple-gauge pattern data is displayed on the display means, the knitted fabric can be designed while assuming the finishing of the knitted fabric. Moreover, switching this multiple-gauge pattern data to the single-gauge pattern data allows the knitting method of the knitted fabric to be finely adjusted with ease in order to improve an actual knitting result of the knitted fabric.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0014]**

Fig. 1 is a block diagram of a design system for a knitted fabric described in an embodiment.
Fig. 2 is a flowchart showing a procedure for deciding a knitting method in a different-gauge area, and a knitting method in a border portion between the different-gauge area and an initial-gauge area.
Fig. 3 is a schematic diagram showing pattern data in a state where initial-gauge setting ends.
Fig. 4 is a schematic diagram showing one example of display of pattern data with a plurality of gauges.
Fig. 5 is a schematic diagram showing one example of display of pattern data with a single gauge.

## DESCRIPTION OF SYMBOLS

**[0015]**

100 design system for a knitted fabric
1 paper-pattern information setting means
2 initial-gauge setting means
3 different-gauge information setting means

31 different-gauge setting means
32 different-gauge area setting means

4 knitting unit calculating means
5 pattern data editing means

51 different-gauge-area knitting setting part
52 border-area knitting setting part

6 display processing means 7 display means 8 knitting program creating means
9 knitting code setting means 10 knitting code storing means

## DETAILED DESCRIPTION OF The PREFFERED EMBODIMENTS

**[0016]** Hereinafter, an embodiment of the present invention is described with reference to the drawings. In Figs. 3 to 5, a right-and-left direction (horizontal direction) on a paper plane is a course direction, and an upper-and-lower direction (vertical direction) on the paper plane is a wale direction.

**[0017]** Fig. 1 is a block diagram showing a design system for a knitted fabric of the present invention. A design system for a knitted fabric 100 includes setting means for inputting various settings in designing a knitted fabric. As the setting means, paper-pattern information setting means 1, initial-gauge setting means 2, different-gauge information setting means 3, and knitting code setting means 9 are exemplified , and for instance, the setting means is configured in a form of a keyboard, a digitizer and the like. Moreover, the design system for a knitted fabric includes pattern data editing means 5, display processing means 6, display means 7 (e.g., a monitor), and knitting program creating means 8. The pattern data editing means 5 generates multiple-gauge pattern data having a plurality of knitting units different in gauge, based on input information from the above-described respective types of setting means, and edits the multiple-gauge pattern data so that knitting codes can be assigned to the respective knitting units in the multiple-gauge pattern data. Moreover, the display processing means 6 causes the display means 7 to display the multiple-gauge pattern data in a state where the knitting units decided based on the different gauges are intermixed. Furthermore, the knitting program creating means 8 creates a knitting program for knitting the knitted fabric, based on the knitting codes assigned to the respective knitting units of the multiple-gauge pattern data. Hereinafter, by showing one example of the design of the knitted fabric utilizing this design system for a knitted fabric, the respective types of means are described in detail.

**[0018]** First, actual dimensions of the knitted fabric, that is, a shape and dimensions of a paper pattern are

inputted by the paper-pattern information setting means 1. The information of the paper pattern is outputted to knitting unit calculating means 4 described later and the pattern data editing means 5. Subsequently, an initial gauge, which is numbers of stitches per predetermined length in the vertical direction and the horizontal direction of the knitted fabric, is set by the initial-gauge setting means 2. The set initial gauge is inputted to the knitting unit calculating means 4. As these paper-pattern information setting means 1 and initial-gauge setting means 2, a configuration in which a numerical value is inputted into a dialogue box displayed on the display means 7 from a keyboard is common.

**[0019]** The knitting unit calculating means 4 calculates, from the inputted initial gauge and information of the paper pattern, a size of one stitch for the knitted fabric, that is, a size of the initial-gauge knitting unit to output to the pattern data editing means 5. The pattern data editing means 5 converts the paper pattern to pattern data made up of the initial-gauge knitting units to output to the display processing means 6. The display processing means 6 causes the display means 7 to display a state where the initial-gauge knitting units are disposed in the pattern data. Here, it is preferable that the display processing means 6, as described in Patent Document 1, creates the initial-gauge knitting units each having a shape on which a vertical-horizontal ratio of the actual stitch is reflected, and causes the display means 7 to display them.

**[0020]** As to what knitting is to be performed in the initial-gauge knitting units of the paper pattern, the knitting code setting means 9 for arranging the knitting codes in the initial-gauge knitting units is used. The knitting codes express knitting motions such as knit, tuck and miss by colors and numeric characters, graphics or combination of the same, for example, and is stored in a knitting code storing means 10. Arranging the knitting codes in the initial-gauge knitting units allows the knitting motions in the initial-gauge knitting units to be prescribed inside the pattern data editing means 5, and the knitting motions to be grasped on the display unit 7. As an illustration, a state where front stitches are arranged in all the initial-gauge knitting units is shown in Fig. 3.

**[0021]** In the design system for a knitted fabric 100 of the present invention, after the initial gauge is set, a different-gauge area having a gauge different from the initial gauge (different gauge) can be set inside the pattern data (initial-gauge area). Specifically, first, values of the gauge in the different-gauge area are set by different-gauge setting means 31 of the different-gauge information setting means 3. The setting by the different-gauge setting means 31 is inputted to the knitting unit calculating means 4, and the knitting units in the different-gauge area (different-gauge knitting units) are calculated. When the different-gauge knitting units are decided, the different-gauge area to be knitted with the gauge set by the different-gauge setting means 31 can be specified inside the pattern data by the different-gauge-area setting means 32. For example, as shown in Fig. 4, a configuration is cited, in which an icon for specifying the knitting area with the different gauge is displayed, and clicking on this icon switches the mode to a different-gauge-area setting mode, and a starting point of the different-gauge area and an ending point located at a diagonal position of this starting point are decided with a pointer on the display means 7 to specify the different-gauge area. The different-gauge information such as the different-gauge knitting units and position information of the different-gauge area is reflected on the paper pattern by the pattern data editing means 5, and the pattern data having the initial knitting units and the different-gauge knitting units (multiple-gauge pattern data) is displayed on the display means 7 through the display processing means 6. For example, when a different gauge twice the initial gauge in the vertical direction and twice in the horizontal direction is set, as shown in Fig. 4, the icon indicating the different-gauge knitting unit is displayed in a way it has four times the size of the initial-gauge knitting unit. The assignment of the knitting codes to these different-gauge knitting units by the knitting code setting means 9 is enabled as with the initial-gauge knitting units. Therefore, what knitting is to be performed to the different-gauge area can be grasped on the display means 7, and the design of the knitted fabric on the assumption of the finished state of the knitted fabric can be easily performed.

**[0022]** Here, although the display as shown in Fig. 4 is convenient on the design of the knitted fabric, when the knitted fabric is actually knitted, it is necessary to create a knitting program on which how to perform the knitting in the different-gauge area having stitches of the different size from that of initial-gauge area, and how to perform the joining between the different-gauge area and the initial-gauge area are reflected. Consequently, the design system for a knitted fabric 100 of the present invention decides a knitting method in the different-gauge area by a different-gauge-area knitting setting part 51 included in the pattern data editing means 5, and decides a knitting method in a border portion between the different-gauge area and the initial-gauge area by a border-area knitting setting part 52 included in the pattern data editing means 5 to create the knitting program by the knitting program creating means 8, based on these types of information. Hereinafter, taking, as one example, a case where the knitting codes of the knit (front stitches) are assigned to the different-gauge knitting units as shown in Fig. 4, a creation procedure of the knitting program is described with reference to the block diagram of Fig. 1 and a flowchart of Fig. 2.

**[0023]** First, the different-gauge-area knitting setting part 51 acquires initial-gauge information including the initial-gauge knitting units and different-gauge information including the different-gauge knitting units and the different-gauge knitting area (steps 1 and 2). As the initial-gauge information and the different-gauge information, the information that is already inputted to the pattern data editing means 5 when the different-gauge area is set in the pattern data made up of the initial-gauge knitting units

may be used. Subsequently, the different-gauge-area knitting setting part 51 specifies a number of the different-gauge knitting units in the different-gauge area and the position information, from the initial-gauge information and the different-gauge information (step 3).

**[0024]** Once the number of the different-gauge knitting units and the position information are specified, the different-gauge-area knitting setting part 51 decides how to perform the knitting in the different-gauge area. For example, the different-gauge-area knitting setting part 51 determines whether a difference in size between the initial-gauge knitting unit and the different-gauge knitting unit is not less than a predetermined value (step 4), and decides whether knitting in step 5-1 is to be performed, or knitting in step 5-2 is to be performed, which steps are described next. This predetermined value may be a fixed value inputted in advance, may be a correction value resulting from automatically correcting this fixed value with reference to information of the knitting such as a size of a knitting yarn, or may be changeable by an operator. Alternatively, instead of providing this step 4, a configuration may be employed, in which the processing directly moves to step 5-1 or step 5-2 described next from step 3.

**[0025]** If the size difference is not less than the predetermined value, the different-gauge-area knitting setting part 51 sets the knitting in which the size of stitches in the different-gauge area is adjusted by adjusting a number of knitting needles used to execute the knitting codes set for the different-gauge knitting units (step 5-1). Taking Fig. 4 as an example, the size of each of the different-gauge knitting units corresponds to the exactly four initial-gauge knitting units. Consequently, for example, as shown in Fig. 5, which is referred to in the description of the background art, the different-gauge-knitting unit is separated into four knitting units, and knit and missing are assigned to two knitting units at a lower stage (first course) to assure the size of the stitch in the different-gauge area, and two misses are set for two knitting units at an upper stage (second course). That is, four knitting needles are used to execute the knitting code of knit set for the different-gauge knitting unit. In contrast, when the knitting code of knit is set for the initial-gauge knitting unit in the initial-gauge area, the number of the knitting needles used to execute the knitting code of knit is one. For example, if the whole needle knitting is performed in the initial-gauge area, the knitting method is changed so that half gauge knitting is performed in the different-gauge area.

**[0026]** Here, while in the description with reference to Fig. 4, the different-gauge knitting unit is larger than the initial-gauge knitting unit, in a reverse situation, the number of knitting needles used to execute the knitting code set for the different-gauge knitting unit may be made smaller than the number of needles used for the initial-gauge knitting unit for which the same knitting code is set. For example, when the half gauge knitting is performed in the initial-gauge area, two knitting needles to perform knit and miss may be used in order to make a stitch in the initial-gauge knitting unit, while in the different-gauge area, the whole needle knitting may be performed.

**[0027]** On the other hand, if the size difference is less than the predetermined value, the different-gauge-area knitting setting part 51 sets the knitting in which the size of the stitches is adjusted by changing a loop length of the stitches of the different-gauge knitting units to execute the knitting codes set for the different-gauge knitting units (step 5-2). Representatively, by adjusting a drawing amount of the knitting needle when the stitch is made, the loop length of the stitch can be changed. For example, when the different-gauge knitting unit is larger than the initial-gauge knitting unit, the drawing amount of the knitting needle is made larger, and when the different-gauge knitting unit is smaller than the initial-gauge knitting unit, the drawing amount of the knitting needle is made smaller.

**[0028]** Once the knitting method for the different-gauge area is decided, the border-area knitting setting part 52 of the pattern data editing means 5 accesses knitting method data of the border portion (step 6) to decide a knitting method in the border portion between the initial-gauge area and the different-gauge area (step 7). The knitting method data of the border portion is an aggregate of publicly known knitting methods stored in storage means (not shown) inside the design system for a knitted fabric 100, and the border-area knitting setting part 52 decides an optimal knitting method from the aggregate of the knitting methods with reference to the initial-gauge information, the different-gauge information and the knitting method for the different-gauge area. Normally, since the initial-gauge area and the different-gauge area are different in number of stitches in the upper and lower border portions lining up in the wale direction of both the areas, the knitting method for matching the numbers to each other is mainly selected. For example, in the case of Fig. 4, the size of the different-gauge knitting unit in the course direction is equivalent to the two initial-gauge knitting units. Accordingly, in the lower border portion where the area is changed from the initial-gauge area to the different-gauge area, for example, two adjacent stitches are overlapped on a stitch row in the initial-gauge area lining up in the border portion, thereby forming double stitches so that the number of stitches in the course direction of the initial-gauge area matches the number of stitches in the course direction of the different-gauge area, and stitches of the different-gauge area are knitted on these double stitches. Moreover, in the upper border portion where the area is changed from the different-gauge area to the initial-gauge area, for example, stitches in a stitch row of the different-gauge area lining up in the border portion are split knit so that the number of stitches matches the number of stitches of the initial-gauge area, and the stitches of the initial-gauge area are knitted on these split stitches. When the size difference between the different-gauge area and the initial-gauge area is very small, the number of stitches lining up in the border por-

tion between the initial-gauge area and the different-gauge area can be the same, and thus, at this time, the adjustment of the number of stitches in the border portion may not be performed.

**[0029]** Furthermore, between the initial-gauge area and the different-gauge area, the number of the courses might be different in the border portion in the course direction of both the areas. At this time, the border-area knitting setting part 52 selects the knitting method for the border portion so that no kink, slack and the like are caused in the knitted fabric by the difference in the number of courses. Every how many courses the initial gauge area and the different-gauge area are to be connected is decided in accordance with a ratio between the initial-gauge area and the different-gauge area. In the case shown in Fig. 4, one course of the different-gauge area is connected with respect to two courses of the initial-gauge area.

**[0030]** Once the knitting method in the different-gauge area and the knitting method in the border portion where the gauge differs are decided, the knitting program creating means 8 creates the knitting program in which actual motions of the knitting needles, a feeding procedure of the knitting yarn, and the like are set, based on these knitting codes (step 8). The created knitting program is sent to a flat knitting machine via a storage medium such as a magnetic disk, a cable, a wireless or the like.

**[0031]** While in the above-described flowchart of Fig. 2, a relationship between the initial-gauge area and the different-gauge area is taken as an example, by utilizing a concept to decide the knitting method in the different-gauge area and the knitting method in the border portion where the gauge differs, which are shown in this flowchart, two or more different-gauge areas different from the initial gauge area can also be set. The knitting methods in the different-gauge areas may be decided with reference to the initial-gauge knitting units. Also, the knitting methods in border portions where the gauge differs may be decided with reference to the initial-gauge knitting units. For example, even when the different-gauge areas different in gauge are adjacent to each other, once the knitting method for the border portion between one of the different-gauge areas and the initial-gauge area is decided with reference to the initial-gauge knitting units, the knitting method for the border portion between the one different-gauge area and the other different-gauge area is also indirectly decided with reference to the initial-gauge knitting units.

**[0032]** The processing described above is executed inside the pattern data editing means 5, and although the pattern data having the initial gauge and the different gauge (multiple-gauge pattern data) as shown in Fig. 4 is displayed on the display means 7 in order to make it easy to design the knitted fabric on the assumption of the finishing, inside the pattern data editing means 5, there exists data of the pattern data expressed by a single gauge (single-gauge pattern data) as shown in Fig. 5. In the present embodiment, a configuration may be employed, in which by a displaying switchover command means not shown (e.g., an icon displayed on the display means 7 or the keyboard), switchover between the display with the plurality of gauges and the display with the single gauge is commanded to the display processing means 6. Obviously, the display processing means 6 may be operated so that the display with the plurality of gauges and the display with the single gauge are simultaneously performed. Moreover, since the knitting program is created, the display may be switched to the display of the knitting program.

**[0033]** The above-described embodiment is an example, and any modification can be made without departing from the scope of the claims.

## INDUSTRIAL APPLICABILITY

**[0034]** The design system for a knitted fabric of the present invention is preferably applicable to the knitting of a knitted fabric having a diversity of structure patterns in which multiple gauges are intermixed.

## Claims

**1.** A design system for a knitted fabric (100) to perform design of a knitted fabric on a computer by specifying a gauge, which is numbers of stitches per predetermined length in a vertical direction and a horizontal direction of the knitted fabric to thereby decide knitting units corresponding to the gauge, converting a paper pattern of the knitted fabric to pattern data made up of the knitting units to display on a display means (7), and arraying, in said knitting units, knitting codes specifying knitting motions in a flat knitting machine, **characterised in that** the design system comprises:

a different-gauge information setting means (32) for setting different-gauge information regarding knitting with a gauge different from that of initial-gauge information set in designing the knitted fabric;

a pattern data editing means (5) for generating multiple-gauge pattern data having a plurality of knitting units different in gauge, based on the initial-gauge information and different-gauge information, and editing the multiple-gauge pattern data so that the knitting codes can be assigned to the respective knitting units in this multiple-gauge pattern data;

a display processing means (6) for causing the display means to display an edited state of the multiple-gauge pattern data; and

a knitting program creating means (8) for creating a knitting program of the knitted fabric, based on the knitting codes assigned to the respective knitting units of the multiple-gauge pattern data.

2. The design system for a knitted fabric according to claim 1, wherein
the pattern data editing means (5) has a border-area knitting setting part that decides a knitting method of stitches in a border portion between areas where knitting is performed with the different knitting units.

3. The design system for a knitted fabric according to claim 1 or 2, wherein
the pattern data editing means (5) has a different-gauge-area knitting setting part that decides a knitting method of stitches in a different-gauge area in accordance with a difference in size between the knitting units in an initial gauge and the knitting units in a different gauge.

4. The design system for a knitted fabric according to any one of claims 1 to 3, wherein
the pattern data editing means (5) converts the multiple-gauge pattern data to single-gauge pattern data made up of single knitting units, and
the display processing means (6) causes the display means to switchably display the multiple-gauge pattern data and the single-gauge pattern data.

**Patentansprüche**

1. Entwurfssystem für ein Gestrick (100) zum Durchführen des Entwerfens eines Gestricks auf einem Computer durch das Spezifizieren einer Feinheit, das die Anzahl von Maschen pro vorbestimmter Länge in einer vertikalen Richtung und einer horizontalen Richtung des Gestricks angibt, um auf diese Weise Strickeinheiten in Entsprechung zu der Feinheit zu bestimmen, zum Umwandeln eines Papiermusters des Gestricks zu Musterdaten, die aus den Strickeinheiten bestehen, zum Darstellen auf Anzeigemitteln (7), und zum Anordnen, in den Strickeinheiten, von Strickcodes, die Strickbewegungen in einer Flachstrickmaschine spezifizieren, **dadurch gekennzeichnet, dass** das Entwurfssystem aufweist:

   Andere-Feinheit-Informations-Einstellmittel (32) zum Einstellen von Andere-Feinheit-Informationen für das Stricken mit einer Feinheit, die sich von derjenigen der beim Entwerfen des Gestricks gesetzten Anfängliche-Feinheit-Informationen unterscheidet,
   Musterdaten-Editierungsmittel (5) zum Erzeugen von Mehrere-Feinheiten-Musterdaten mit einer Vielzahl von Strickeinheiten mit verschiedenen Feinheiten basierend auf den Anfängliche-Feinheit-Informationen und den Andere-Feinheit-Informationen und zum Bearbeiten der Mehrere-Feinheiten-Musterdaten, sodass die Strickcodes den entsprechenden Strickeinheiten in diesen Mehrere-Feinheiten-Musterdaten zugewiesen werden können,
   Anzeigeverarbeitungsmittel (6) zum Veranlassen der Anzeigemittel zum Anzeigen eines bearbeiteten Zustands des Mehrere-Feinheiten-Musterdaten, und
   Strickprogramm-Erzeugungsmittel (8) zum Erzeugen eines Strickprogramms für das Gestrick basierend auf den Strickcodes, die den entsprechenden Strickeinheiten der Mehrere-Feinheiten-Musterdaten zugewiesen wurden.

2. Entwurfssystem für ein Gestrick nach Anspruch 1, wobei:

   die Musterdaten-Editierungsmittel (5) einen Randbereich-Stricksetzteil aufweisen, der eine Strickmethode für Maschen in einem Randteil zwischen Bereichen, in denen das Stricken mit den verschiedenen Strickeinheiten durchgeführt wird, bestimmt.

3. Entwurfssystem für ein Gestrick nach Anspruch 1 oder 2, wobei:

   die Musterdaten-Editierungsmittel (5) einen Andere-Feinheit-Bereich-Stricksetzteil aufweisen, der eine Strickmethode für Maschen in einem Andere-Feinheit-Bereich gemäß einer Größendifferenz zwischen den Strickeinheiten in einer anfänglichen Feinheit und den Strickeinheiten in einer anderen Feinheit bestimmt.

4. Entwurfssystem für ein Gestrick nach einem der Ansprüche 1 bis 3, wobei:

   die Musterdaten-Editierungsmittel (5) die Mehrere-Feinheiten-Musterdaten zu Einzelne-Feinheit-Musterdaten, die aus gleichen Strickeinheiten bestehen, umwandeln, und
   die Anzeigeverarbeitungsmittel (6) die Anzeigemittel veranlassen, wechselbar die Mehrere-Feinheiten-Musterdaten und die Einzelne-Feinheit-Musterdaten anzuzeigen.

**Revendications**

1. Système de conception pour un tissu tricoté (100) pour réaliser la conception d'un tissu tricoté sur un ordinateur en spécifiant une jauge, qui représente des nombres de mailles pour une longueur prédéterminée dans une direction verticale et dans une direction horizontale du tissu tricoté, pour déterminer ainsi des unités de tricotage correspondant à la jauge, convertir un motif sur papier du tissu tricoté en données de motif constituées des unités de tricotage à afficher sur des moyens d'affichage (7), et disposer, dans lesdites unités de tricotage, des codes de

tricotage spécifiant des mouvements de tricotage dans une machine à tricoter à plat, **caractérisé en ce que** le système de conception comprend :

des moyens de réglage d'informations de jauge différente (32) pour régler des informations de jauge différente concernant un tricotage avec une jauge différente de la jauge des informations de jauge initiale réglées dans la conception du tissu tricoté ;
des moyens d'édition de données de motif (5) pour générer des données de motif à jauge multiple comportant une pluralité d'unités de tricotage différentes en termes de jauge, sur la base des informations de jauge initiale et des informations de jauge différente, et éditer les données de motif à jauge multiple de telle sorte que les codes de tricotage puissent être affectés aux unités de tricotage respectives dans ces données de motif à jauge multiple ;
des moyens de traitement d'affichage (6) pour amener les moyens d'affichage à afficher un état édité des données de motif à jauge multiple ; et
des moyens de création de programme de tricotage (8) pour créer un programme de tricotage du tissu tricoté, sur la base des codes de tricotage affectés aux unités de tricotage respectives des données de motif à jauge multiple.

**2.** Système de conception pour un tissu tricoté selon la revendication 1, dans lequel
les moyens d'édition de données de motif (5) comportent une partie de réglage de tricotage de région de frontière qui détermine un procédé de tricotage de mailles dans une portion de frontière entre des régions où le tricotage est réalisé avec les différentes unités dé tricotage.

**3.** Système de conception pour un tissu tricoté selon la revendication 1 ou 2, dans lequel
les moyens d'édition de données de motif (5) comportent une partie de réglage de tricotage de région à jauge différente qui détermine un procédé de tricotage de mailles dans une région à jauge différente conformément à une différence de taille entre les unités de tricotage dans une jauge initiale et les unités de tricotage dans une jauge différente.

**4.** Système de conception pour un tissu tricoté selon l'une quelconque des revendications 1 à 3, dans lequel
les moyens d'édition de données de motif (5) convertissent les données de motif à jauge multiple en des données de motif à jauge simple constituées d'unités de tricotage simples, et
les moyens de traitement d'affichage (6) amènent les moyens d'affichage à afficher de façon commutable les données de motif à jauge multiple et les données de motif à jauge simple.

Fig. 1

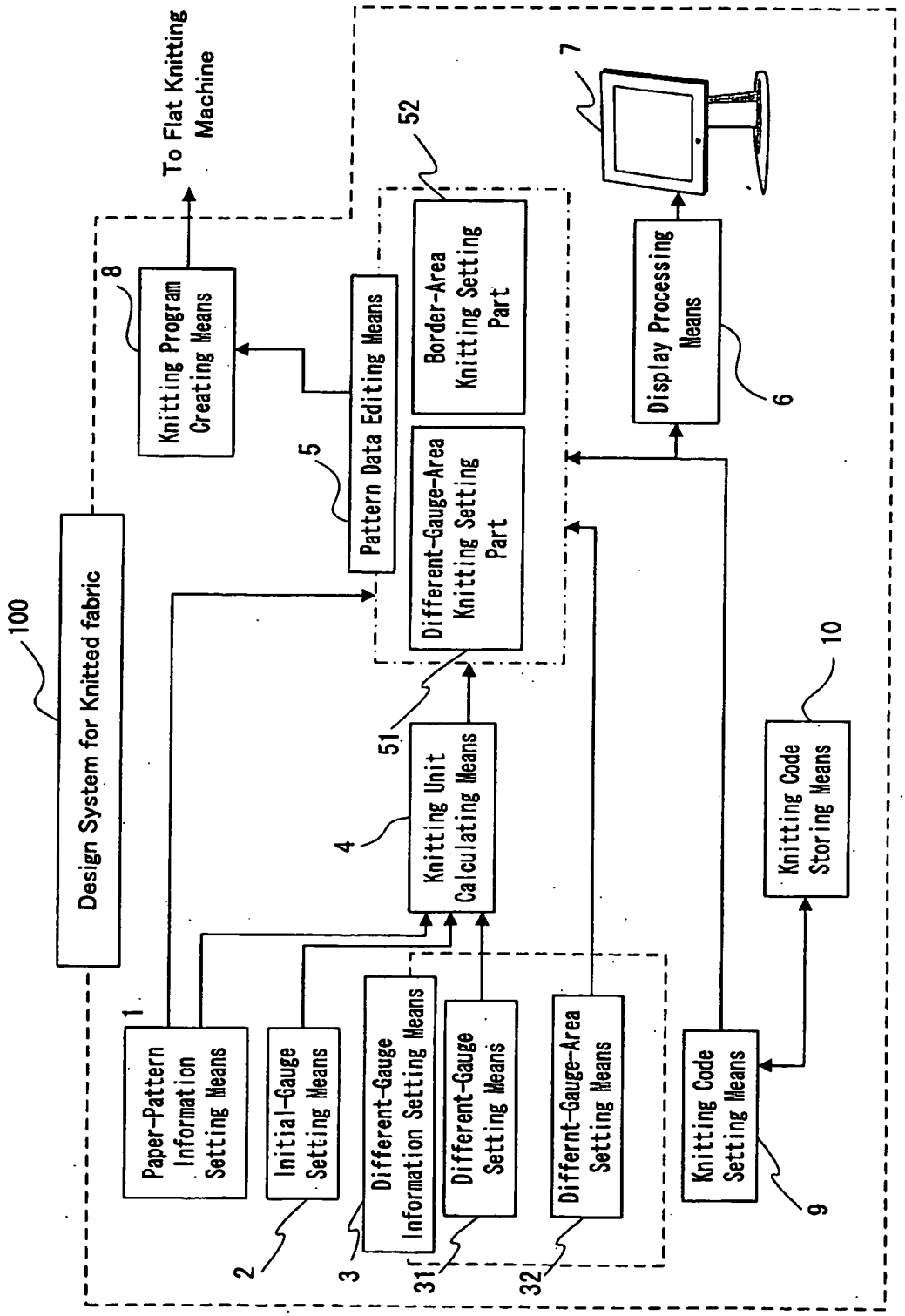

100
Design System for Knitted fabric
To Flat Knitting Machine
Knitting Program Creating Means
8
Pattern Data Editing Means
5
Border-Area Knitting Setting Part
52
Different-Gauge-Area Knitting Setting Part
51
Knitting Unit Calculating Means
4
Display Processing Means
6
7
Knitting Code Storing Means
10
Knitting Code Setting Means
9
Paper-Pattern Information Setting Means
1
Initial-Gauge Setting Means
2
Different-Gauge Information Setting Means
3
Different-Gauge Setting Means
31
Differnt-Gauge-Area Setting Means
32

Fig. 2

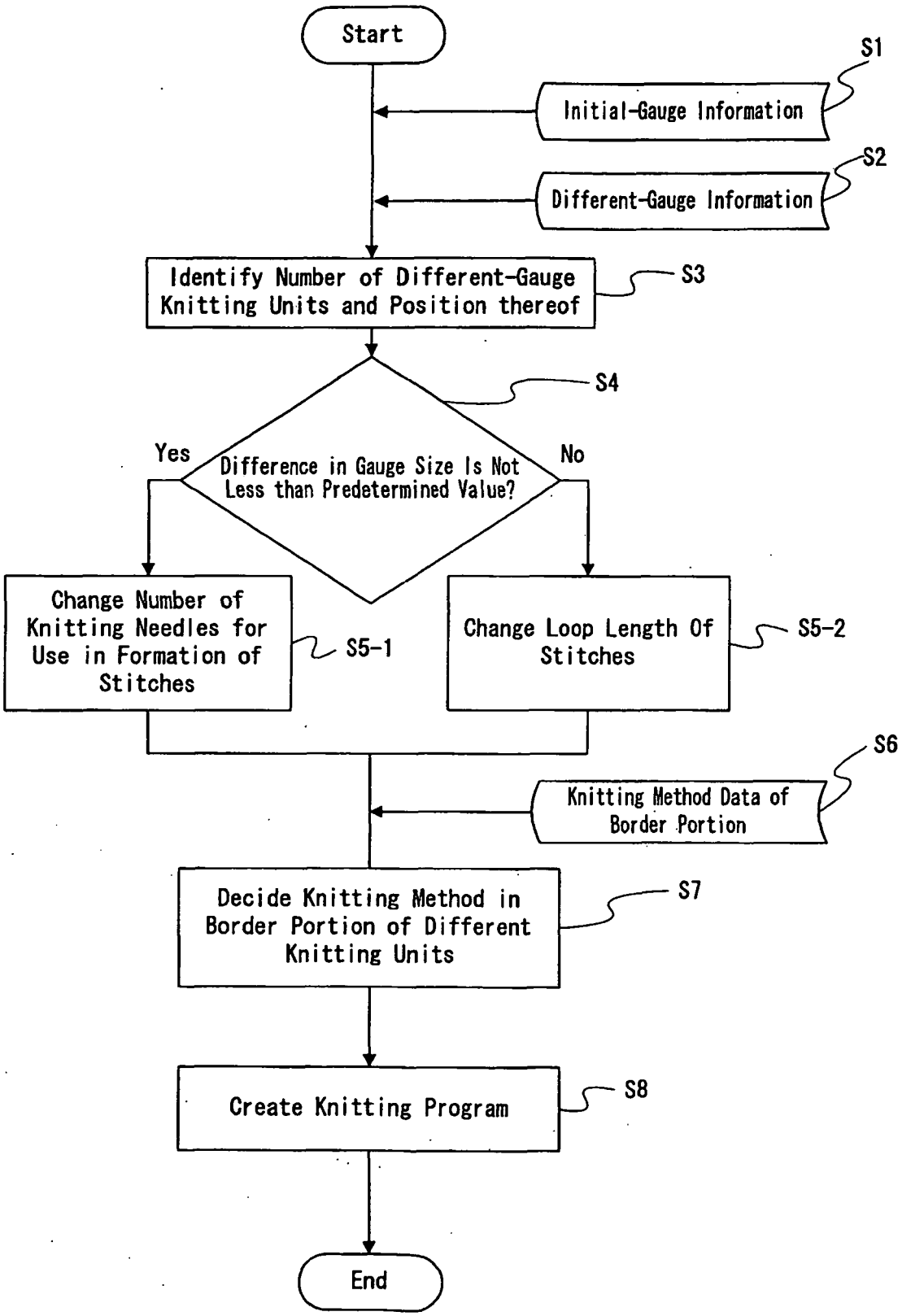

Start
S1
Initial-Gauge Information
S2
Different-Gauge Information
Identify Number of Different-Gauge Knitting Units and Position thereof
S3
S4
Yes
Difference in Gauge Size Is Not Less than Predetermined Value?
No
Change Number of Knitting Needles for Use in Formation of Stitches
S5-1
Change Loop Length Of Stitches
S5-2
S6
Knitting Method Data of Border Portion
Decide Knitting Method in Border Portion of Different Knitting Units
S7
Create Knitting Program
S8
End

Fig. 3

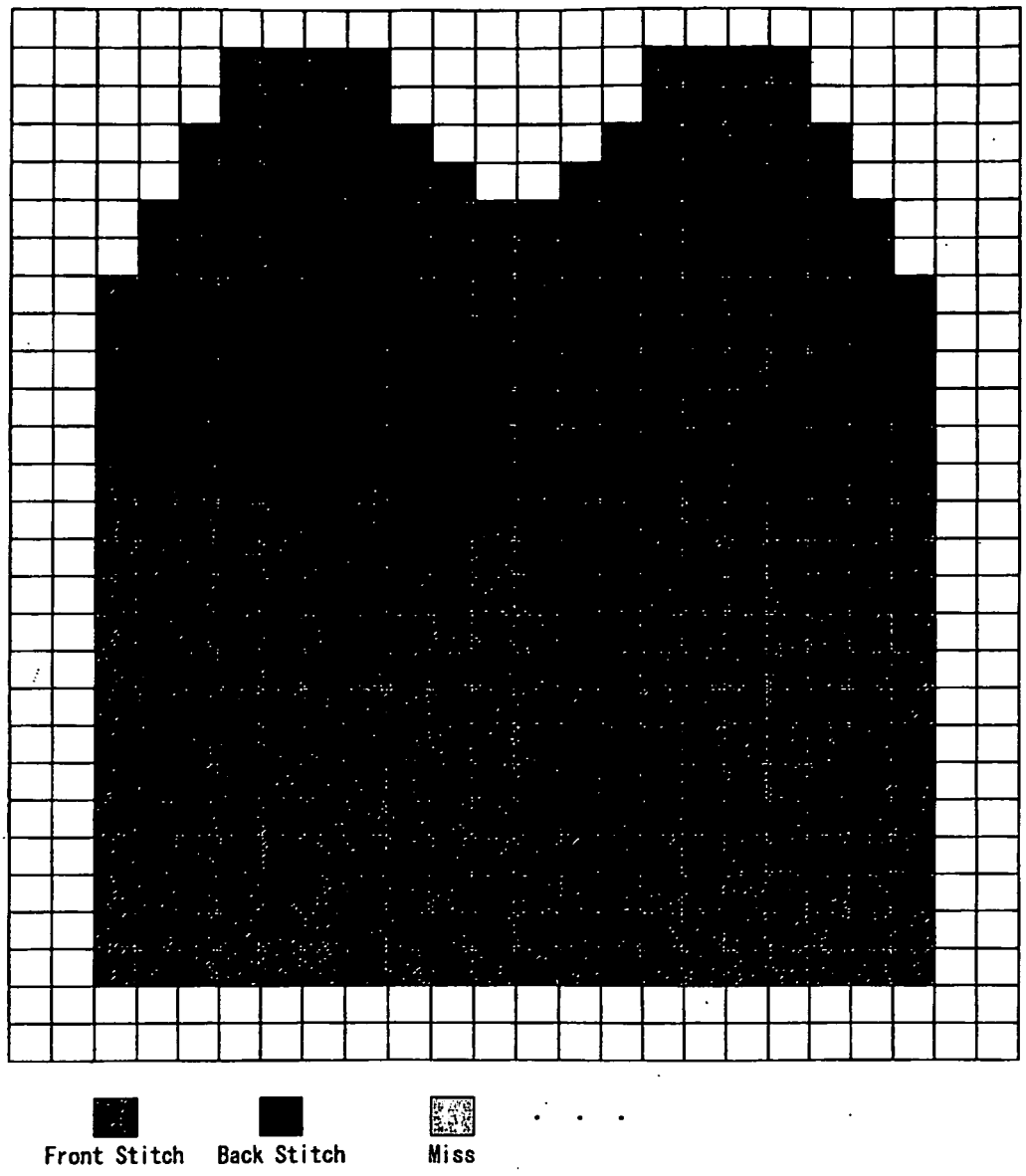


Fig. 4

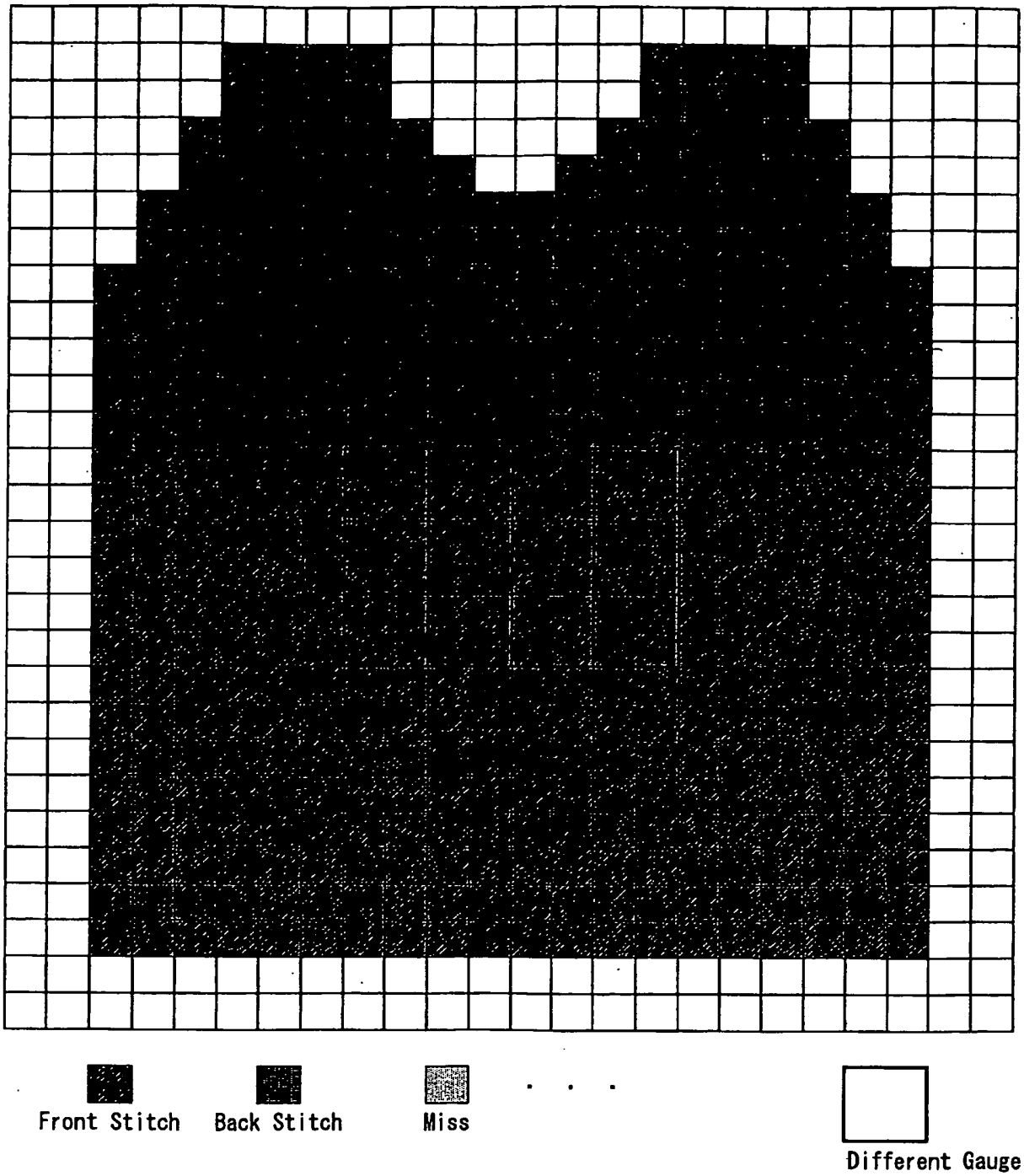
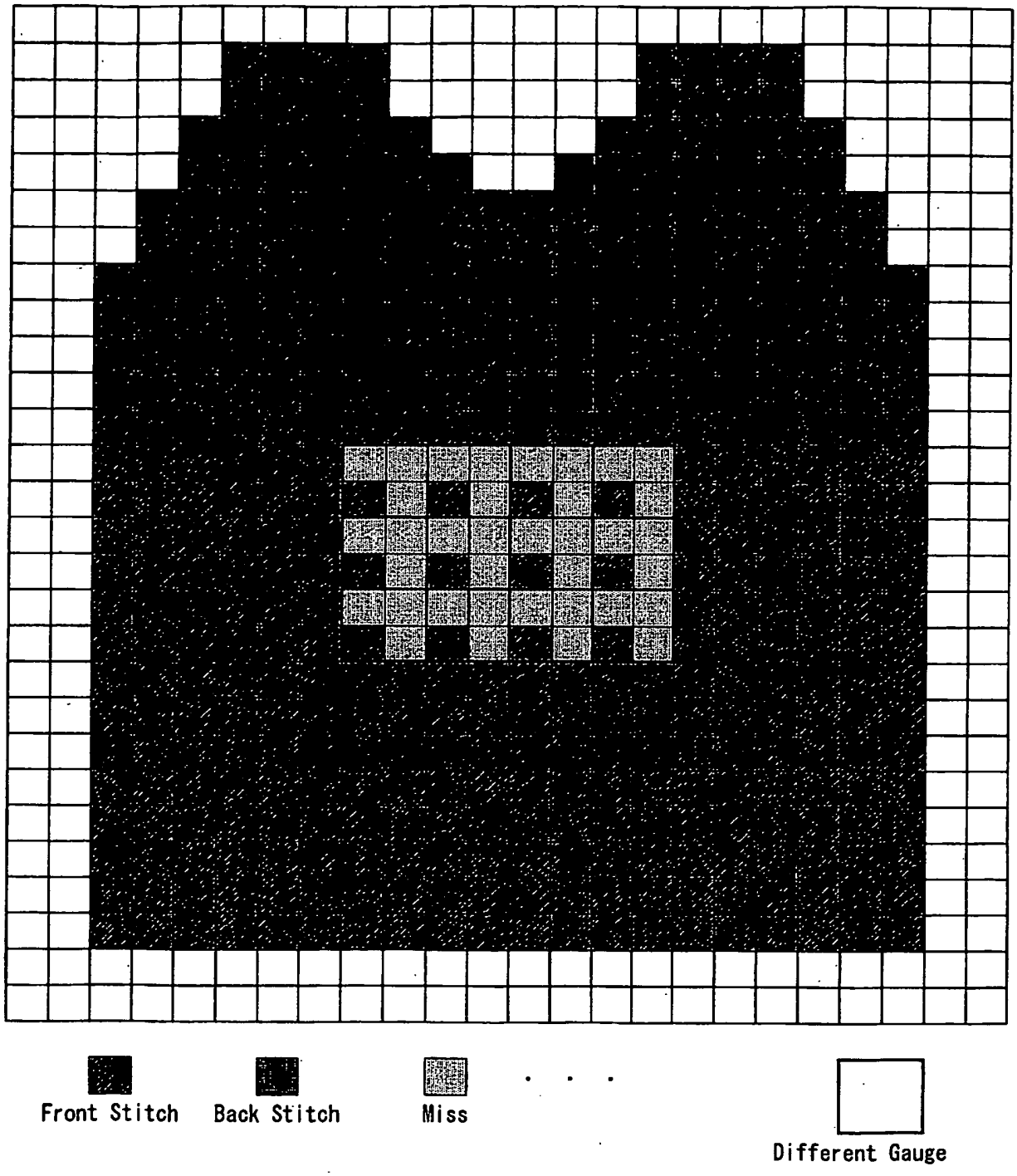


Fig. 5



## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- DE 4431898 **[0001]**
- JP H0770889 B **[0003]**