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(54) **Knit fabric and knitting method thereof.**

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**DE-A- 2 708 722**
**FR-A- 2 352 909**

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## Description

The present invention relates to a knitting method employed at the end of knitting of a fabric knitted by using a flat knitting machine, and a knit fabric knitted by executing the same method.

A knit fabric knitted by using a flat knitting machine is unraveled unless the loop in the final course is fixed. Generally, various knit-back preventive measures are taken. For example, in manual procedure, hand looping known as winding stop or welting stop is employed, and mechanically, the loop of the final course is sewn to the loop of the immediately preceding course by overlock sewing, or the loops are sewn together by a looping machine.

Such procedures are, however, complicated and require experienced skill, and it takes much labor in the processing step after knitting. Accordingly, it was attempted to bond the loop of the final course of knit fabric by using an adhesive, fuse by using thermofusible thread, or contract the stitch by using a thermoelastic thread, but since the stitch appears in the final end portion of the knit product, the appearance of the knit product is spoiled.

The invention is devised in the light of the above problems, in which the course terminating portion of the knit fabric in the knitting process already has an appearance as final product, so that the troublesome process of hand looping, overlock sewing, or sewing by locking machine after knitting may be omitted. It is hence an object of the invention to disclose a knit fabric beautiful in the finish of the course terminating portion, not required to prevent knitting-back by using such a thread as to cause to spoil the appearance of the knit fabric, by knitting the portion corresponding to the course terminating portion of knit product by ordinary cast-on-cloth knitting, and a knitting method for obtaining such knit fabric.

FR-A-2352909 discloses a knit product having a knitting start part, a main part and a knitting end part. The knitting start part and the main part form one piece of the knit product, whereas the knitting end part forms a separately knitted second piece of the knit product. Both pieces have an edge portion of courses without knit-back loops and are joined by loops of their respective final courses, followed by at least one more course to prevent unravelling of the join.

DE-A-2708722 discloses a method of knitting a fabric having a knitting start part, a main part and a knitting end part on a knitting machine having a pair of front and rear needle beds. Every other loop of the final course of the main part is first moved to be overlaid on an adjacent loop of this course on a single one of the needle beds.

According to one aspect of the invention, there is provided a knit product comprising a knitting start part, a main part and a knitting end part, the knitting start part and the main part forming one piece of the knit product whereas the knitting end part forms a separately knitted second piece of the knit product, whereby both pieces possess an edge portion of courses without knit-back loops and are joined by the loops of their respective final courses followed by at least one more course knit to prevent unravelling of the joining part, characterised in that every other loop of the final course of the main part is overlapped with an adjacent loop of this course whereby any hole formed in the joining part is clogged due to the curling property of the loops in the joining part of the knitting.

According to another aspect of the invention, there is provided a method of knitting a fabric composed of a knitting start part, a main part and a knitting end part, on a flat knitting machine with at least one pair of front and rear needle beds wherein every other loop of the final course of the main part is first moved to be overlaid on an adjacent loop of this course on a single one of the needle beds, characterised in that the needles of the selected one of the needle needle beds holding the overlapped loops are dislocated from knitting to be set in a held state, the knitting end part is subsequently knitted by using every other needle of the selected one of the needle beds which is not holding a loop of the final course of the main part and/or by using the needles of the opposite needle bed, then the loops of the final course of the main part and the loops of the final course of the knitting end part are joined, and the knitting is finished by executing the known knitting-back preventive measures after knitting at least one more course by using the needles of the needle bed at the curling and warping side of the loops sequentially knitted into the main part side.

A preferred fabric and a preferred knitting method according to the invention will now be described with reference to the accompanying drawings of which:-

Fig. 1 is a front view of a knit product knitted by the knitting method of the invention, Fig. 2 is a drawing showing a part of the loop of the knit product, Fig. 3 is its knitting drawing, and Figs. 4-A, 4-B, and 4-C are explanatory drawings showing the knit fabric in the midst of knitting from the side of knitting machine.

The drawings show knitting by using a flat knitting machine having a carriage (not shown) comprising a pair of front and rear needle beds and a single knitting system reciprocating on the needle beds, wherein needles A, B, ..., K, L are arranged in a row on the first needle bed 1, and needles a, b, ..., k, l corresponding to the above needles A, B, ..., K, L are disposed on the confronting second needle bed 2.

Fig. 1 shows a knit product 100 knitted by executing the method of the invention, in which there is a rib knit part 10 knitted by ordinary knitting out in the knitting start portion in the lower part of the course in the garment, and a main part 20 is located in the middle

of the course, while a knitting end portion 30 of rib knitting is found in the upper part of the course.

Fig. 2 shows a part of loop diagram of the knit product 100, in which the main part 20 is indicated by a thin line, the knitting end part 30 by a thick line, and the loop knitted after the joining of the main part 20 and knitting end part 30 mentioned below, being concealed at the lower side of the knit product by dotted line, respectively.

Fig. 3 illustrates the individual knitting diagrams, and the knitting start part 10 and the subsequent main part 20 of the rib knitting can be knitted properly by the conventional knitting method and are not shown here and are not mentioned particularly because they do not require particular explanation.

That is, Fig. 3 shows from the latter half of the subsequent main part 20. In blocks, 1, 2, the final two courses 11, 12, of the main part 20 are knitted by means of the needles of the first needle bed 1. Depending on the design, the knitting structure of the main body 20 may be changed. After the main part 20, in block 3, the loop held on every other needle B, D, ..., J, K of the needles A, B, ..., K, L holding the final loop of the main part 20 is moved to the needles b, d, ..., j, l of the second needle bed 2 at the opposite end. In the next block 4, the loop on every other needle A, C, ..., I, K not moved in block 3 is moved to the needles b, d, ..., j, 1 of the second needle bed 2 to overlay the loops. Since it is difficult to express the state of this portion in the loop diagram, symbols b, j, 1 in the overlapped loops are used. With the loop of the main part 20 held, the needles b, d, ..., j, l are dislocated from the knitting and are held.

At the end of block 4, no loop is held any longer on the needles of the first needle bed 1 which initially held the loop of the main part 20. In the second needle bed 2, every other needle a, c, ..., i, k are blank needles not holding a loop.

Blocks 5 to 12 are knitting diagrams showing knitting of the rib knitting end portion 30 using the blank needles, and in block 5, using the needles B, D, ..., J, L of the first needle bed 1 and needles a, c, ..., i, k of the second needle bed 2, the knitting end portion 30 is knitted out. In the subsequent blocks 6, 7, 8, using the same needles, the knitting is terminated. Then in blocks 9 to 12, the rib knitting portions knitted. Hereby, by properly repeating blocks 9, 10, it is designed to adjust the height at the knitting end portion 30.

By such knitting, a two-piece knit structure comprising a knit fabric composed of knitting start portion 10 and main part 20, and a knit fabric forming the knitting end portion 30 as approximately shown in Fig. 4-A drops from the peak of the needle bed. In block 13, the loop 14 of the final course of the knitting end portion 30 held on the needles B,D, ..., J, L of the first needle bed 1 is moved and overlaid on the needles b, d, ..., j, l of the second needle bed 2 kept in an inactive state, while holding the loop 12 of the final course of the main part 20.

In this stage, in other words, as shown in Fig. 4-B, the main part 20 and the knitting end portion 30 are joined on the second needle bed 2, and linked to form one knit fabric, and as the measure for preventing knit-back, when knitting is stopped by using thermofusible thread or thermoelastic thread as mentioned above, the openings (eyelets) formed by movement of the stitches in blocks, 3, 4 appear at the main part 20 side in the joined portion, which may significantly spoil the appearance of product. Accordingly, after knitting by the needles of the second needle bed in blocks 14, 15, knit-back preventive measures are taken in blocks 16, 17.

As shown in Fig. 4-C, the loops 15, 16 formed in blocks 14, 15 positioned at the peak of an inverted Y-shaped knitting and held on the needles of the needle bed of the flat knitting machine are curled due to the intrinsic property of the loop when released from the knitting machine at the end of knitting, and are warped upward to the main part 20 side, thereby blocking the hole formed at the terminal part of the main part 20 of the joining part.

Alternatively, by heat-treating after knitting the knit loops as the knit-back preventive measures in blocks 16, 17, the knit product will be completed without unravelling of the loops formed in blocks 14, 15.

The number of knittings in blocks 16, 17 is not limited, and should be done at least often enough for blocking the holes.

The knit fabric and knitting method of the invention are not limited to the foregoing embodiment alone, and the knitting start portion and knitting end portion may be other than rib knitting, and the loop exchange direction or sequence between the needle beds may be changed, depending on whether the knit main part is used in the outer surface of the knit product or in the inner surface. The needle beds and needles used in knitting may be changed as required, as far as not departing from the scope of the invention as defined by the appended claims.

## Claims

1. A knit product comprising a knitting start part (10), a main part (20) and a knitting end part (30), the knitting start part (10) and the main part (20) forming one piece of the knit product whereas the knitting end part (30) forms a separately knitted second piece of the knit product, whereby both pieces possess an edge portion of courses (11, 12; 14) without knit-back loops and are joined by the loops of their respective final courses followed by at least one more course knit to prevent unravelling of the joining part, characterised in that every other loop of the final course (12) of the main part (20) is overlapped with an adjacent

loop of this course whereby any hole formed in the joining part is clogged due to the curling property of the loops in the joining part of the knitting.

2. A method of knitting a fabric composed of a knitting start part (10), a main part (20) and a knitting end part (30), on a flat knitting machine with at least one pair of front and rear needle beds (1, 2) wherein every other loop of the final course (12) of the main part (10) is first moved to be overlaid on an adjacent loop of this course on a single one of the needle beds (2), characterised in that the needles (b, d, ..... j, l) of the selected one of the needle needle beds (2) holding the overlapped loops are dislocated from knitting to be set in a held state, the knitting end part is subsequently knitted by using every other needle (a, c, .... i, k) of the selected one (2) of the needle beds which is not holding a loop of the final course of the main part (20) and/or by using the needles (B, D, ..... J, L) of the opposite needle bed (1), then the loops of the final course of the main part (20) and the loops of the final course of the knitting end part (30) are joined, and the knitting is finished by executing the known knitting-back preventive measures after knitting at least one more course by using the needles of the needle bed at the curling and warping side of the loops sequentially knitted into the main part side.

**Patentansprüche**

1. Maschenware, bestehend aus einem Anfangsstrickteil (10), einem Hauptteil (20) und einem Abschlußstrickteil (30), wobei das Anfangsstrickteil (10) und das Hauptteil (20) ein Stück der Maschenware bilden, während des Abschlußstrickteil (30) ein separat gestricktes, zweites Stück der Maschenware bildet und beide Stücke einen Randbereich von Maschenreihen (11, 12, 14) ohne Strickschlußmaschen besitzen und durch die Maschen ihrer entsprechenden Endmaschenreihen verbunden sind, denen mindestens eine weitere Maschenreihe folgt, die gestrickt wird, um das Auftrennen des Verbindungsteiles zu verhindern, dadurch gekennzeichnet, daß jede andere Masche der Endmaschenreihe (12) des Hauptteiles (20) mit einer benachbarten Masche dieser Maschenreihe überdeckt ist, wobei jedes in dem Verbindungsteil gebildete Loch aufgrund der Kräuselfähigkeit der Maschen in dem Verbindungsteil des Gestrickes zugesetzt ist.

2. Verfahren zum Stricken einer aus einem Anfangsstrickteil (10), einem Hauptteil (20) und einem Abschlußstrickteil (30) bestehenden Maschenware auf einer Flachstrickmaschine mit mindestens einem Paar vorderen und hinteren Nadelbetten (1, 2), bei dem jede andere Masche der Endmaschenreihe (12) des Hauptteiles (10) zuerst bewegt wird, um über eine benachbarte Masche dieser Maschenreihe auf ein einziges der Nadelbetten (2) gezogen zu werden, dadurch gekennzeichnet, daß die Nadeln (b, d, ...., j, l) des ausgewählten der Nadelbetten (2), die die überzogenen Maschen halten, aus dem Strickvorgang genommen werden, um in einen Haltestatus gesetzt zu werden, das Abschlußstrickteil daraufhin durch Verwenden jeder anderen Nadel (a, c, ....., i, k) des ausgewählten (2) der Nadelbetten, die keine Masche der Endmaschenreihe des Hauptteiles (20) hält, und/oder durch Verwenden der Nadeln (B, D, ..., J, L) des gegenüberliegenden Nadelbettes (1) gestrickt wird, anschließend die Maschen der Endmaschenreihe des Hauptteiles (20) und die Maschen der Endmaschenreihe des Abschlußstrickteiles (30) verbunden werden, und das Stricken durch Ausführen der bekannten, Rücklaufmaschen vorbeugenden Maßnahmen nach dem Stricken mindestens einer weiteren Maschenreihe unter Verwendung der Nadeln des Nadelbettes auf der Kräusel- und Krümmungsseite der Maschen, die nachfolgend in die Hauptteilseite eingebunden wird, beendet wird.

**Revendications**

1. Produit tricoté comprenant une partie de début de tricotage (10), une partie principale (20) et une partie de fin de tricotage (30), la partie de début de tricotage (10) et la partie principale (20) formant partie intégrante du produit tricoté, alors que la partie de fin de tricotage (30) forme une deuxième partie, tricotée séparément, du produit tricoté, les deux parties présentant une partie terminale de rangées (11, 12 ; 14) sans mailles d'arrêt et étant assemblées par les mailles de leur rangée terminale respective, suivie d'au moins une rangée supplémentaire tricotée pour empêcher le détricotage de la partie d'assemblage, caractérisé en ce qu'une maille sur deux de la rangée terminale (12) de la partie principale (20) est recouverte par une maille adjacente de cette rangée, tout trou formé dans la partie d'assemblage étant obstrué du fait du caractère frisant des mailles dans la partie d'assemblage du tricot.

2. Procédé de tricotage d'une étoffe composée d'une partie de début de tricotage (10), d'une partie principale (20) et d'une partie de fin de tricotage (30), sur une tricoteuse à plat possédant au moins une paire de fontures avant et arrière

(1, 2), une maille sur deux de la rangée terminale (12) de la partie principale (20) étant, tout d'abord, déplacée pour recouvrir une maille adjacente de cette rangée, sur une seule fonture (2), caractérisé en ce que les aiguilles (b, d, .....j, l) de la fonture choisie (2) maintenant les mailles recouvertes sont déplacées de la position de tricotage dans une position de retenue, la partie de fin de tricotage est ensuite tricotée en utilisant une aiguille sur deux (a, c ..... i, k) de la fonture choisie (2) qui ne maintient pas une maille de la rangée terminale de la partie principale (20) et/ou en utilisant les aiguilles (B, D, .... J, L) de la fonture opposée (1), les mailles de la rangée terminale de la partie principale (20) et les mailles de la rangée terminale de la partie de fin de tricotage (30) sont assemblées, et le tricotage est terminé en utilisant les mesures connues empêchant le détricotage, après avoir tricoté au moins une rangée supplémentaire, en utilisant les aiguilles de la fonture située du côté de la frisure et de la chaîne des mailles, tricotées de façon séquentielle en direction de la partie principale.

Fig.1

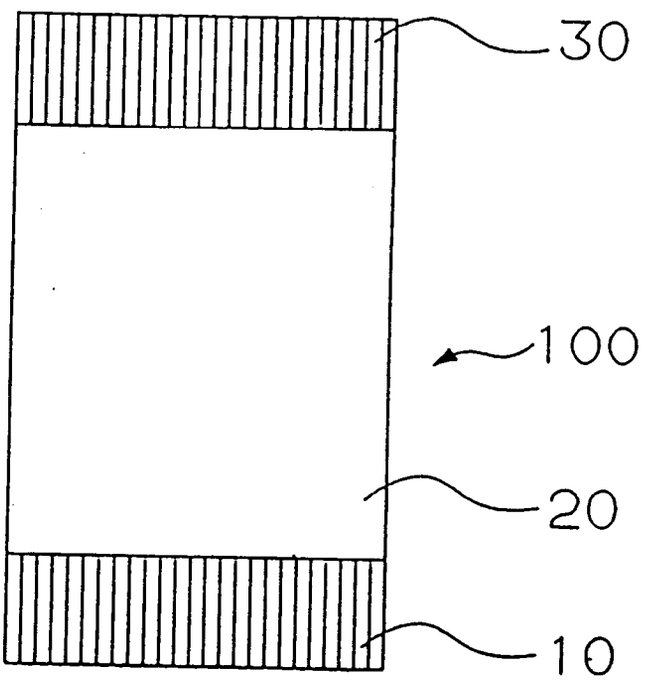

Fig. 2

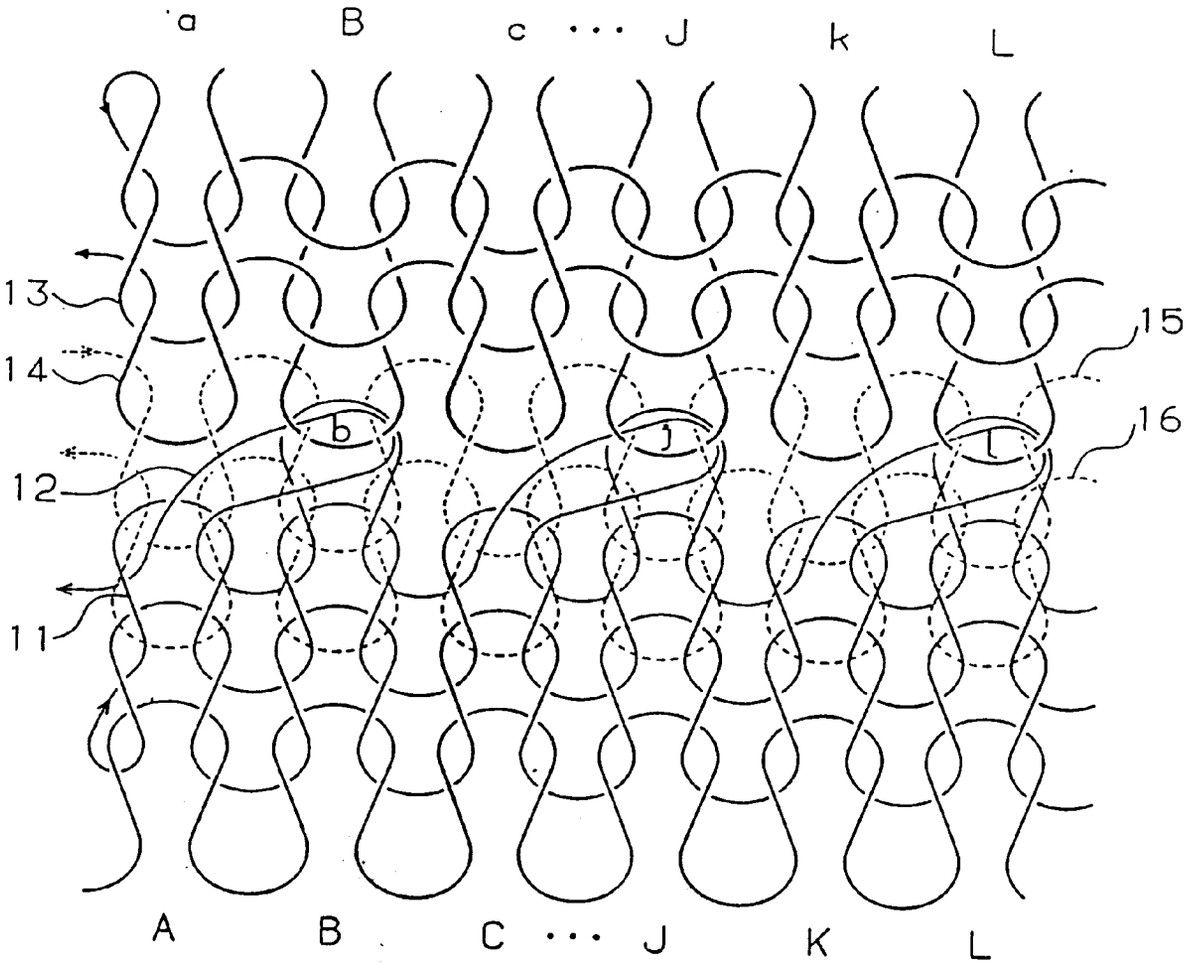

Fig.3-1

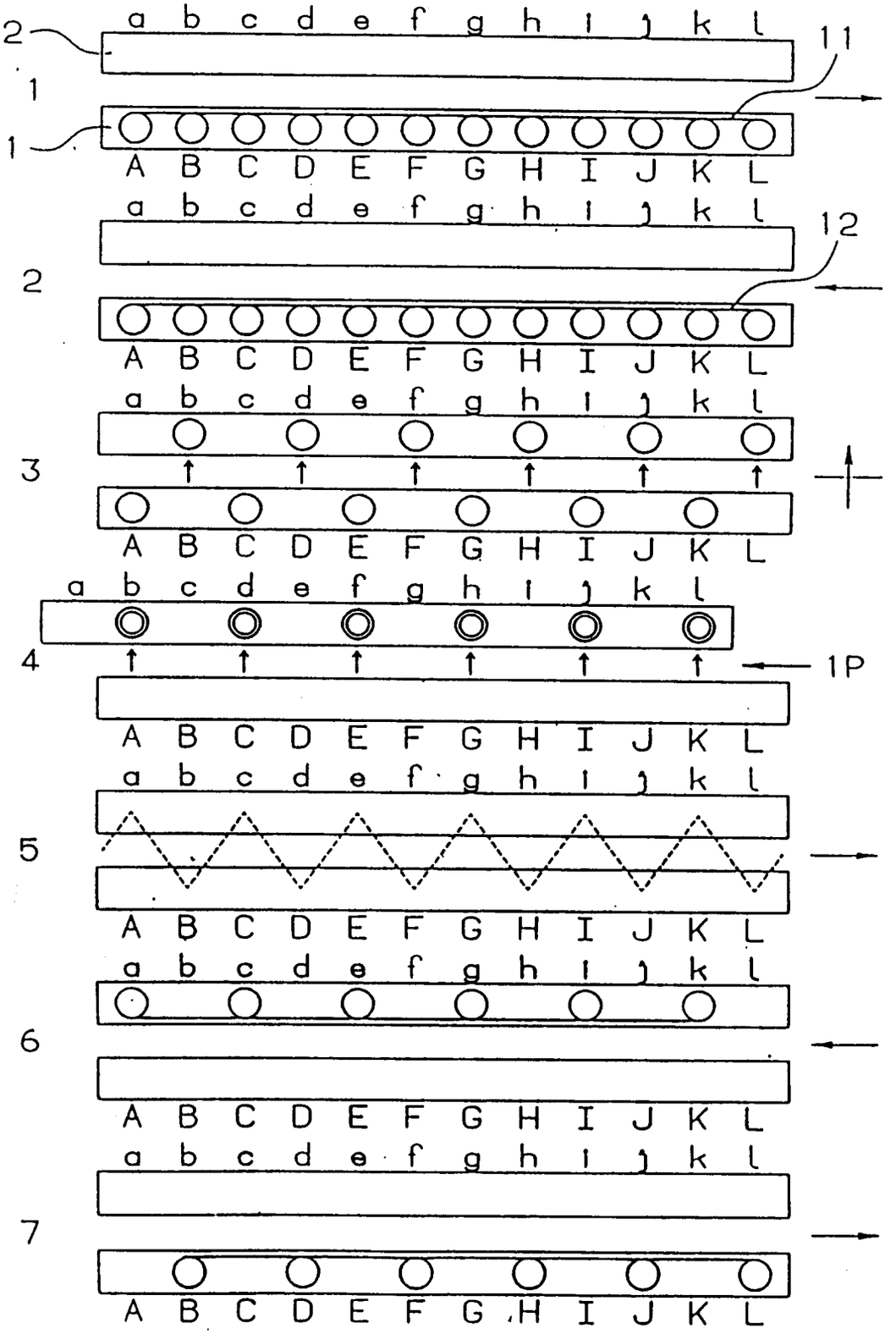

Fig. 3-2

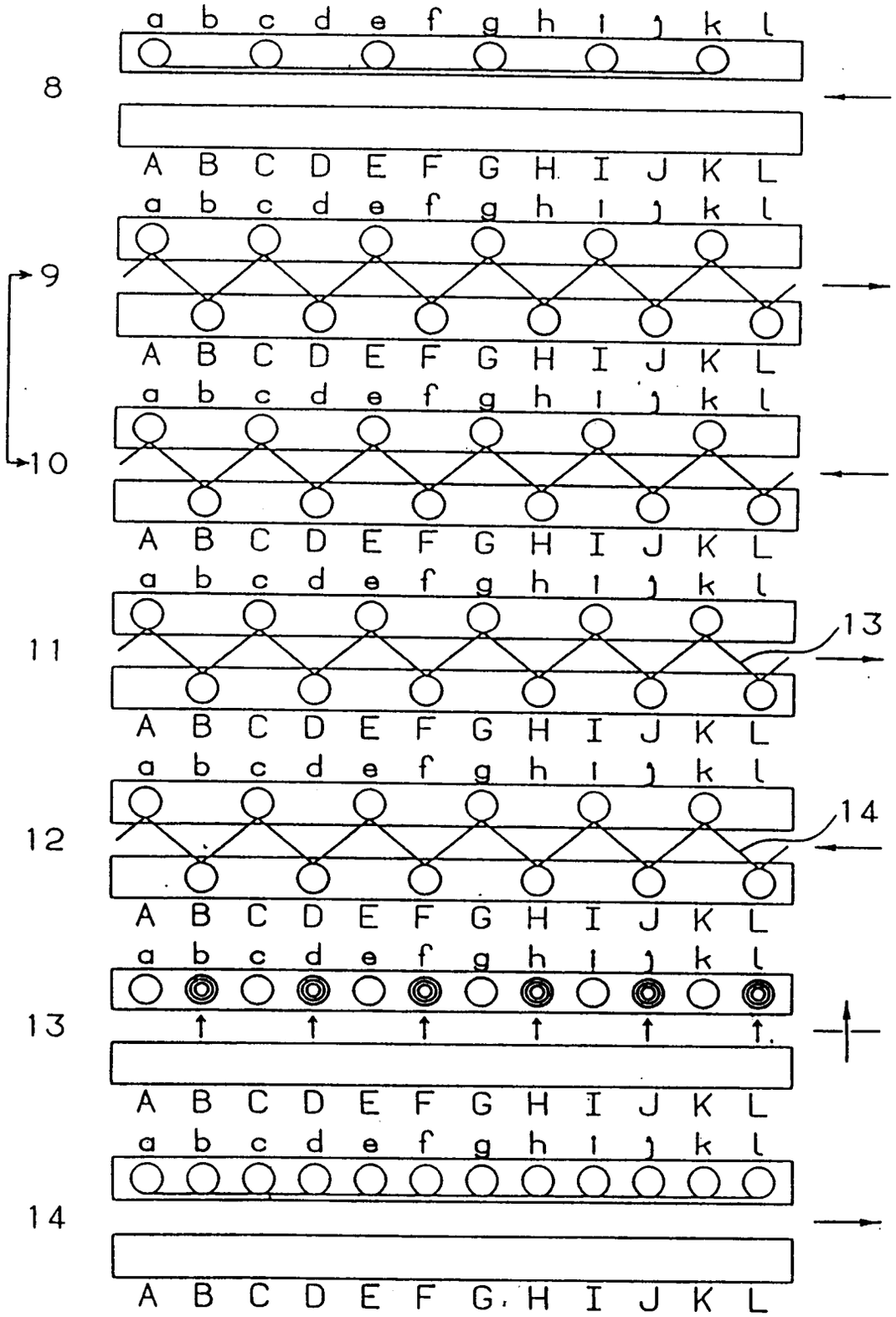

Fig.3-3

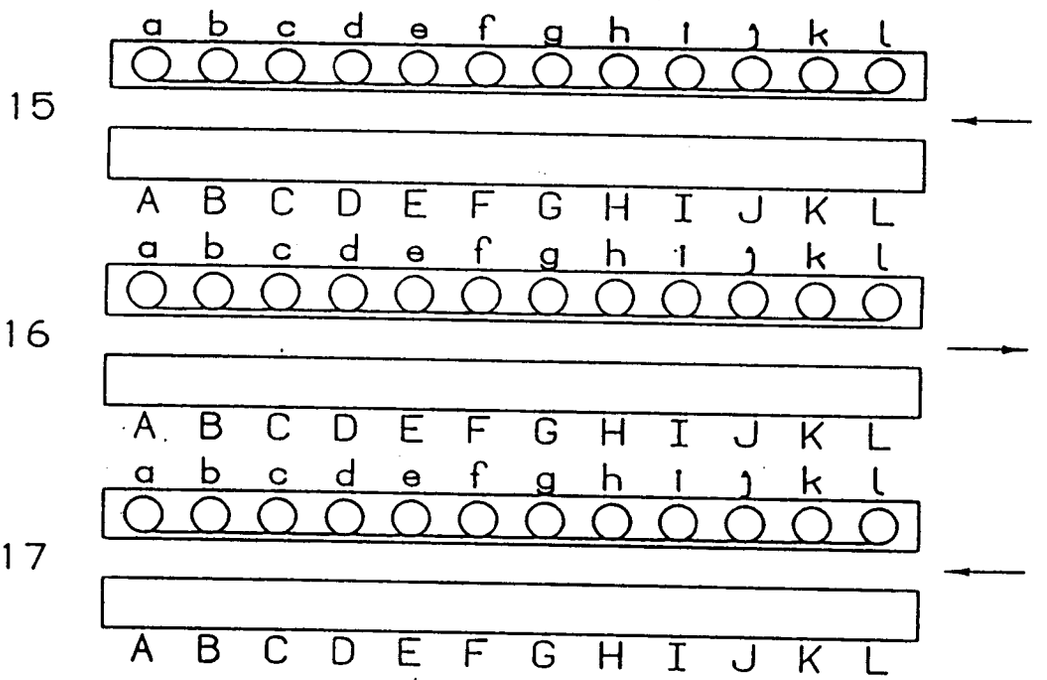
a b c d e f g h i j k l
15
A B C D E F G H I J K L
a b c d e f g h i j k l
16
A B C D E F G H I J K L
a b c d e f g h i j k l
17
A B C D E F G H I J K L

Fig.4-A

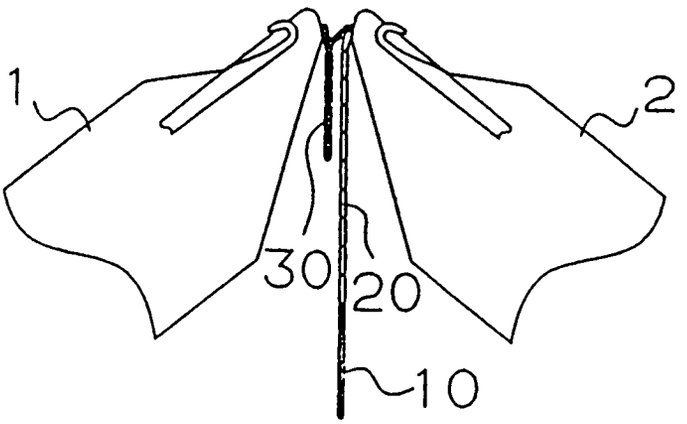


Fig.4-B

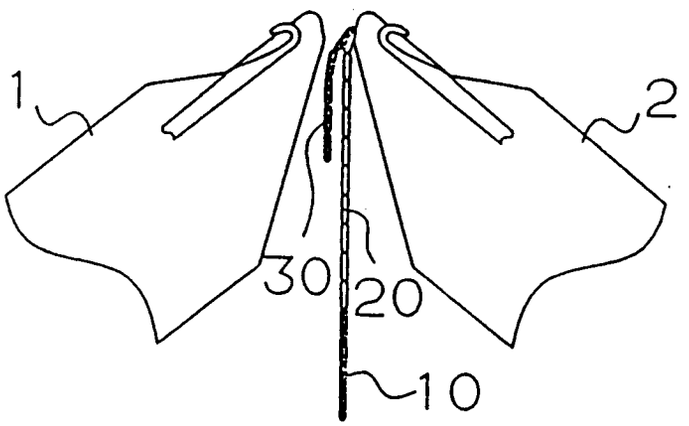


Fig.4-C