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(54) A needle arrangement for knitting machine

(57) Disclosed is a needle arrangement for knitting machine which effectively solves the problem of faulty loop transfer. The needle arrangement includes a cylinder needle (2) which cooperates with a dial needle to form loops and a needle bed having a plurality of axially extended needle walls projected from a periphery thereof. The cylinder needle (2) includes a hook (22), a latch (23) and a transfer-shoulder (21) integrally formed with a stem of the needle (2) below the latch (23). The transfer-shoulder (21) is so formed that it has a curved cross section and an outward and downward inclined top edge. The inclined top edge provides a shoulder clip for the dial needle to extend into. The curved transfer-shoulder (21) establishes an eye (24) of transfer needle between it and the stem of the needle (2) and allows the needle (2) to locate in the needle bed with the projected needle walls of the needle bed received in the eyes of transfer needles.

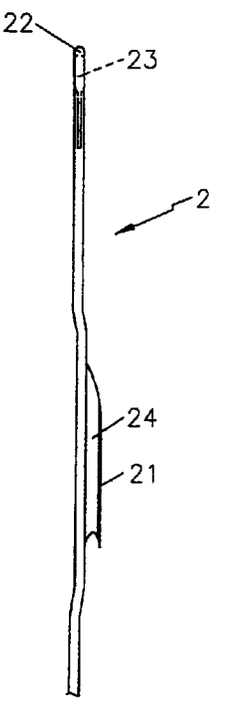

FIG. 12

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Description

The present invention relates to a needle arrangement for knitting machine, and more particularly to a transfer needle which has an integrally formed transfer-shoulder.

Figs. 1 to 10 illustrate the structure of a conventional needle. As shown in the drawings, the conventional cylinder needle 1 is formed below a hook 12 and a latch 13 with a fixed groove 15 which has two fixing edges 14 at each side. A transfer-shoulder 11 of the needle 1 is welded to the fixed groove 15, forming an eye 16 of transfer needle thereat. When a loop formed by the cylinder needle 1 is transferred toward a dial needle 5, as shown in Fig. 3, the dial needle 5 must extend through a central portion of the loop and the eye 16 of transfer needle to pass through a shoulder clip 17 on the needle 1. When the cylinder needle 1 is lowered, it causes the loop to be transferred to the dial needle 5 and be hooked by the dial needle 5. In the case the loop density is high and it is not easy for the dial needle 5 to extend through the center of the loops, the transfer-shoulder 11 of the needle 1 tends to be compressed and therefore become flattened. A flattened transfer-shoulder 11 of the needle 1 will cause faults in needle transfer, as illustrated in Fig. 6. Moreover, a yarn tangled with the needle 1 during the process of transferring will cause an upper end of the transfer-shoulder 11 to deform and tightly press against a stem of the needle 1, making the dial needle 5 be detained in the eye of transfer needle 16 of the needle 1 and causes difficulty in the transfer of the dial needle 5 and accordingly, faults in the stitch, as shown in Figs. 7 to 9. Such tangled yarn and deformed eye of transfer needle 16 result in frequent faults in the knitting, inferior quality, and increased production cost. Further, needles 1 are respectively seated in needle grooves 41 formed on a needle bed 4 and are located and separated only by every two adjacent projected needle walls 42. Since the needle bed 4 has top gaps between every two projected needle walls requiring extended space to meet the need of knitting, needles 1 unstably shake either to the left or the right during transfer. This also results in products with inferior quality.

It is therefore tried by the inventor to develop an improved needle arrangement to eliminate the above mentioned drawbacks existed in the conventional needle.

A primary object of the present invention is to provide an improved needle arrangement for knitting machine. The improved needle arrangement according to the present invention includes a cylinder needle which works with a corresponding dial needle to form loops, a needle bed, and a plurality of projected needle walls formed on the needle bed. The cylinder needle each is formed with a hook and a latch. A transfer-shoulder is provided on a stem of the needle below the latch and forms an integral part of the needle. The transfer-shoulder of the needle is so formed that it has a curved cross section and an outward and downward inclined top edge which forms a shoulder clip between the transfer-shoulder and the needle. The stem of the needle and the integrally formed transfer-shoulder together form an eye of transfer needle which extends across the projected needle wall formed on the needle bed when the needle is seated on the needle bed.

With the arrangements provided by the present invention, the shoulder clip permits the yarn tangled with the cylinder needle to be easily hooked by the dial needle without causing faulty loop transfer and adversely affecting the quality of the products.

The present invention can be better understood by referring to the following detailed description of the preferred embodiment and the accompanying drawings, wherein

Fig. 1 is a front elevational view of a conventional needle;

Fig. 2 is a side elevational view of the conventional needle shown in Fig. 1;

Fig. 3 illustrates the manner in which the conventional needle cooperates with a dial needle to transfer and knit loops;

Figs. 4 and 5 illustrate the process of knitting by the conventional cylinder needle and dial needle;

Fig. 6 illustrates a compressed and flattened transfer-shoulder which prevents a loop from transferring to the dial needle;

Figs. 7 to 9 are side elevational views of Figs. 3 to 5, respectively;

Fig. 10 is a front elevational view showing the needle bed for the conventional needles;

Fig. 11 is a fragmentary front elevational view of a needle according to the present invention;

Fig. 12 is a side elevational view of Fig. 11;

Figs. 13 and 15 illustrate the knitting process by the needles according to the present invention;

Fig. 14 is a fragmentary and enlarged view of Fig. 13;

Fig. 16 is a schematic view showing the needle bed according to the present invention;

Fig. 17 is a fragmentary and enlarged perspective view of Fig. 16;

Figs. 18 and 19 show the unstable transfer of the conventional needles from the needle bed, as well

as knitting carried out by the unstable needles with offset gating; and

Fig. 20 and 21 show the stable transfer of the needles of the present invention from the needle bed, as well as knitting carried out by these stable needles with centralized gating.

Please refer to Figs. 11 through 15. The present invention relates to an improved needle structure which includes a needle 2 having a hook, 22, a latch 23, and a transfer-shoulder 21 integrally formed with a stem of the needle 2 below the latch 23. The transfer-shoulder 21 has a downward and outward inclined upper edge from where an eye of transfer needle 24 and a shoulder clip 25 are formed. With the transfer-shoulder 21 so formed, a yarn tangled with the needle 2 can still be transferred to a dial needle 5 without faulty loop transfer.

Please further refer to Figs. 16 through 21. The needle 2 is seated on a needle bed 3. A plurality of axially extended and outward projected needle walls 31 are formed around a peripheral wall of the needle bed 3 so that a needle groove 32 is formed between every two adjacent projected needle walls 31. The projected needle wall 31 each has a narrowed upper ridge portion 311 and an extended lower portion. The needle 2 is located in the needle groove 32 with the narrowed ridge portion 311 of the needle wall 31 received in the integrally formed transfer-shoulder 21 of the needle 2, such that the needle 2 has a controlled travel, that is, to stably move up and down in a shuttling movement in the needle groove 32. The problems of a deformed cylinder needle 2 preventing the dial needle 5 from hooking up the yarn as well as the products with inferior quality can therefore be avoided.

Claims

1. A needle arrangement for knitting machine, comprising a plurality of cylinder needles (2) and a needle bed (3) formed with a plurality of axially extended and outward projected needle walls (31); said cylinder needle (2) each being formed with a hook (22), a latch (23) and a transfer shoulder (21) below said latch (23); and said transfer shoulder being so formed that it has a curved cross section.

2. A needle arrangement as claimed in claim 1, wherein said transfer shoulder (21) has an outward and downward inclined top edge at where a shoulder clip (25) is formed.

3. A needle arrangement as claimed in claim 2, wherein said transfer shoulder (21) is integrally formed with said needle (2) and thereby establishes an eye (24) of a transfer needle between said transfer shoulder (21) and a stem of said needle (2).

4. A needle arrangement as claimed in claim 3, wherein said projected needle walls (31) on said needle bed (3) each has a narrowed top ridge portion (311) and an extended lower portion.

5. A needle arrangement as claimed in claim 4, wherein each of said narrowed top ridge portions (311) of said needle walls (31) is received in said eye of transfer needle (24) of each said needle (2).

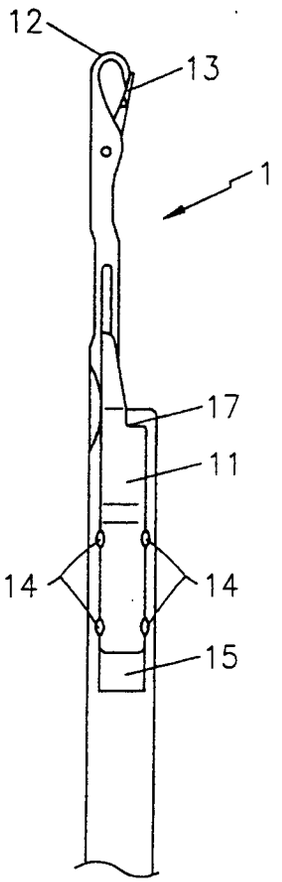


FIG.1

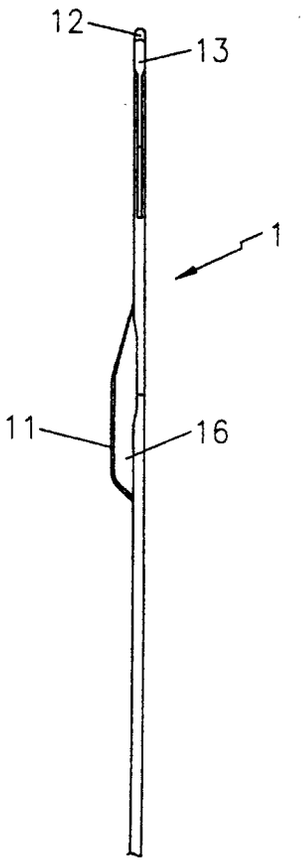


FIG.2

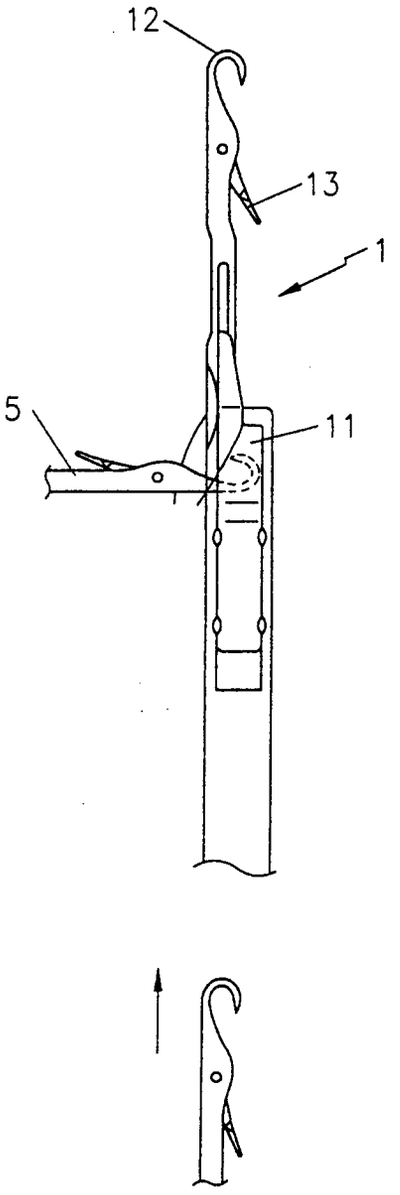


FIG.3

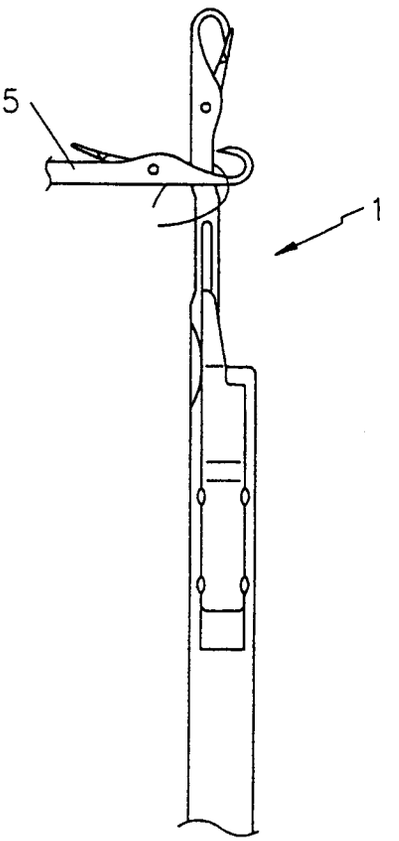


FIG.4

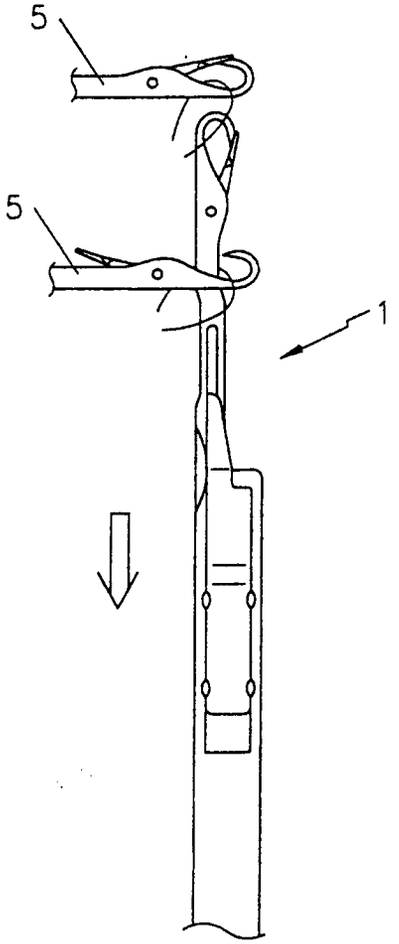


FIG.5

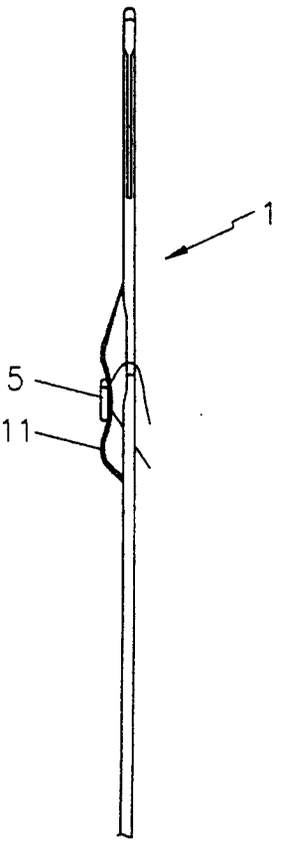


FIG.6

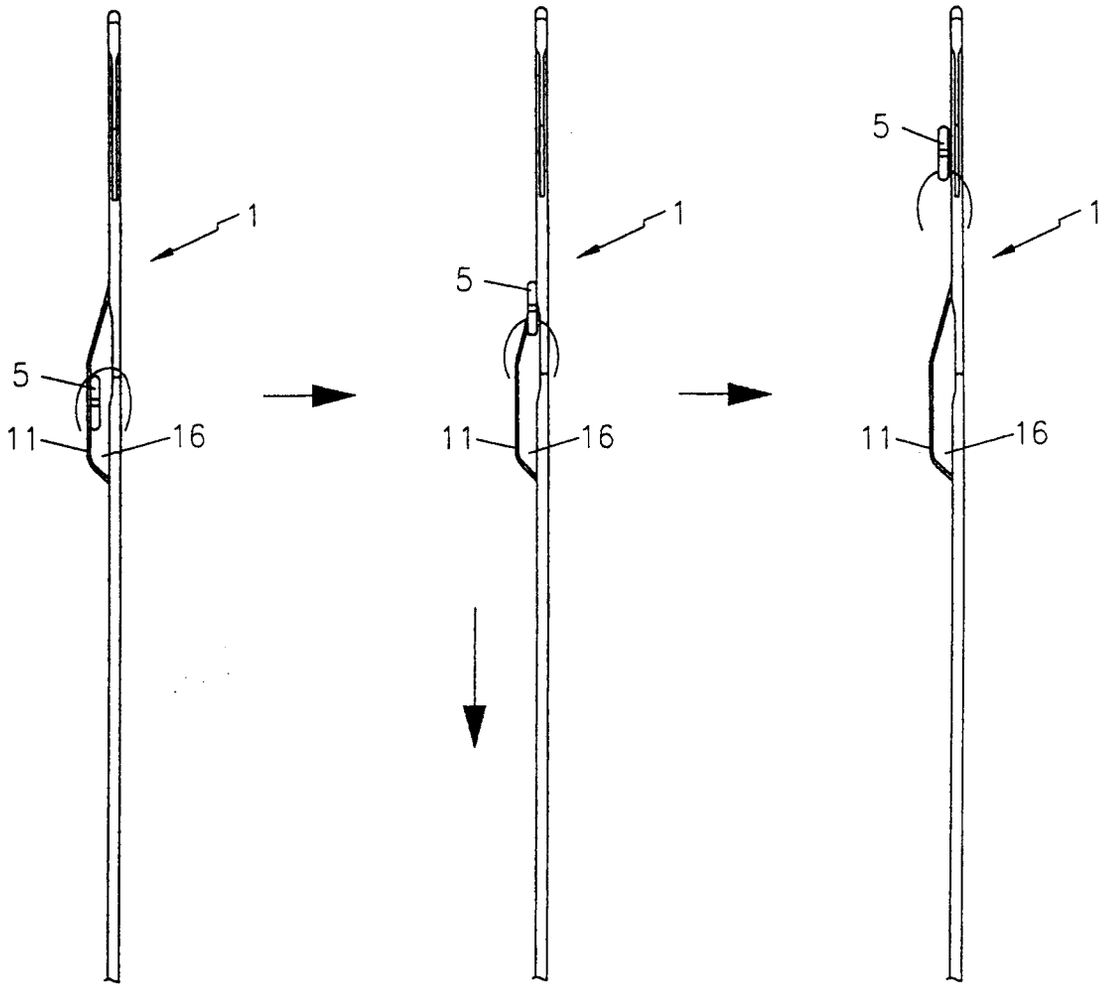


FIG.7 FIG.8 FIG.9

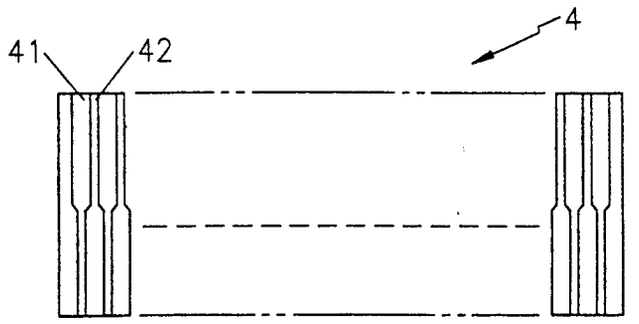


FIG.10

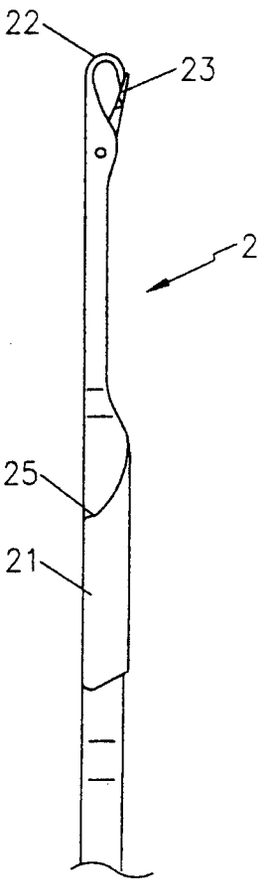


FIG.11

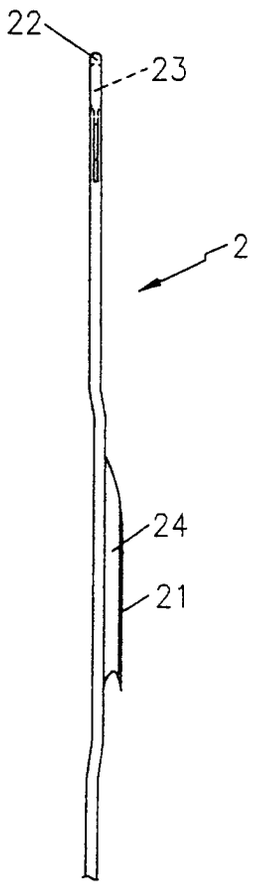


FIG.12

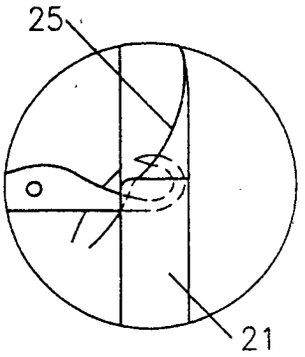
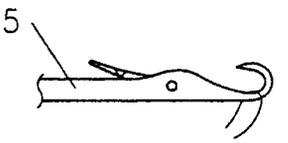


FIG.14



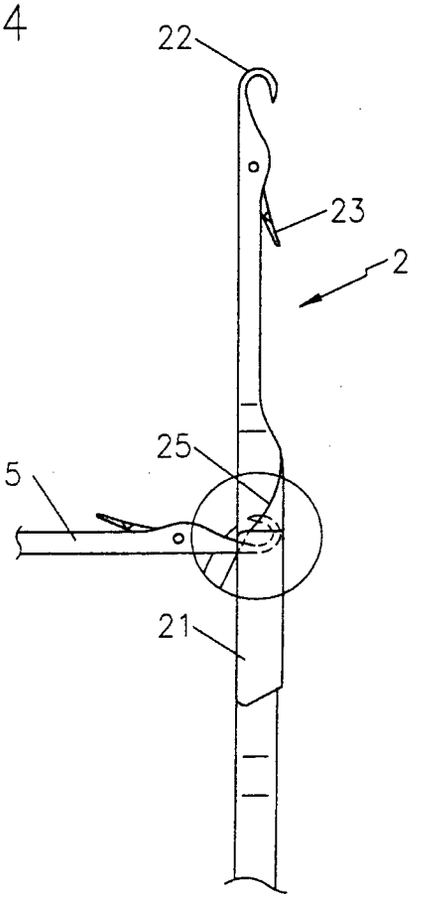


FIG.13

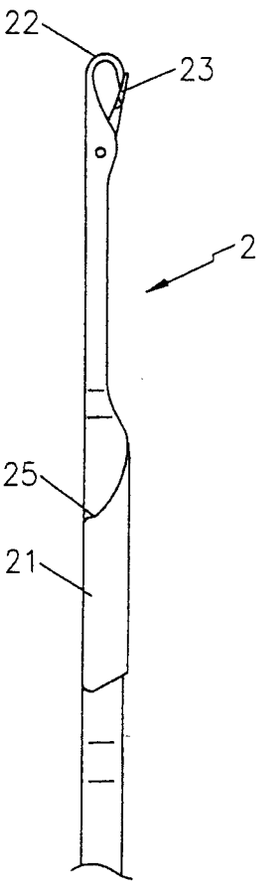


FIG.15

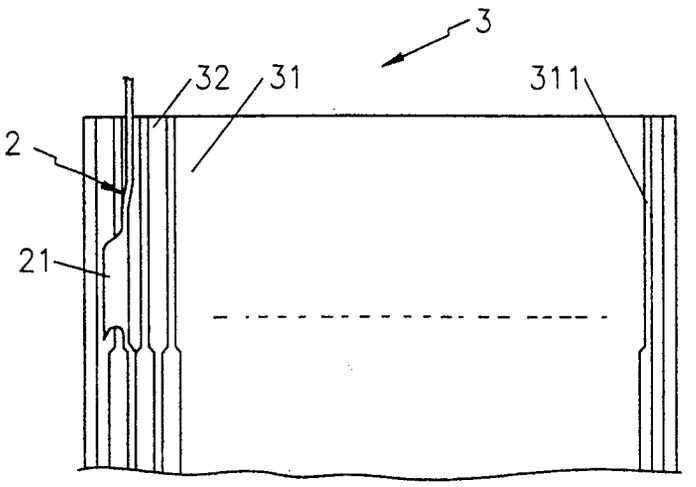


FIG.16

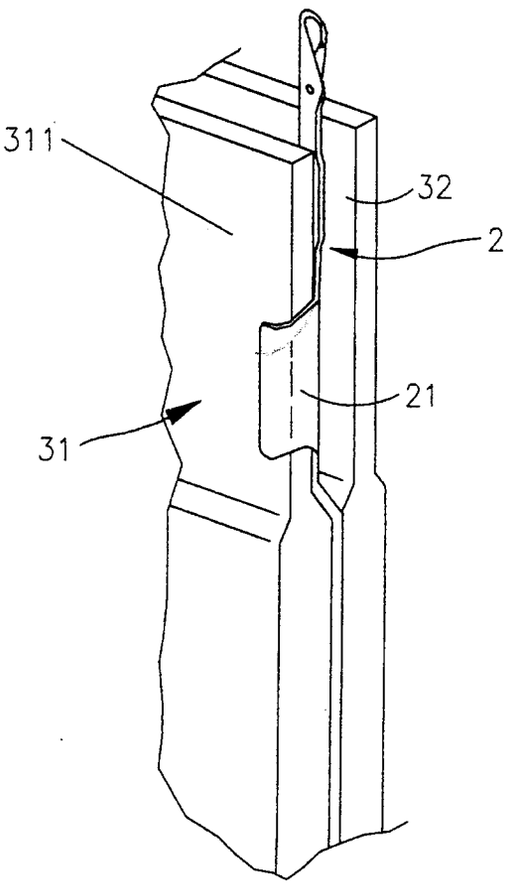


FIG.17

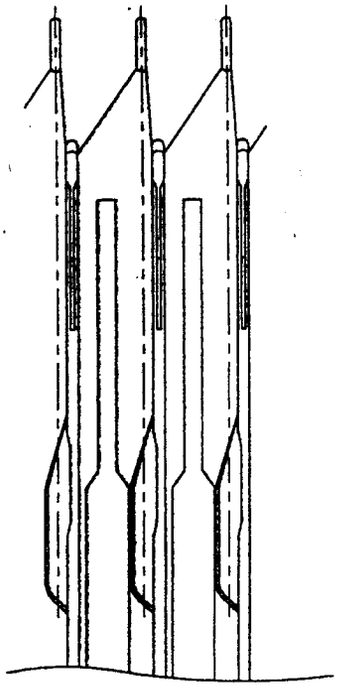


FIG.18

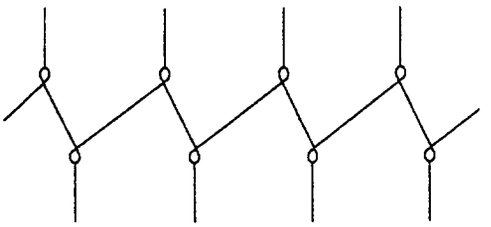


FIG.19

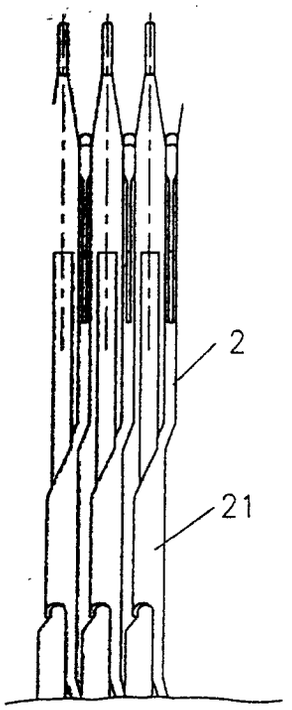


FIG.20

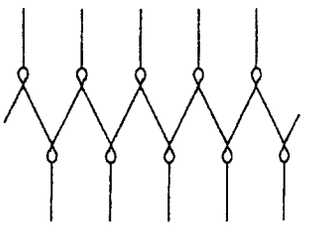


FIG.21

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 11 3981

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US-A-2 953 914 (ZERUNEITH) * column 2, line 10 - line 66; figures 1-11 * ---	1-3	D04B35/02
A	FR-A-1 174 015 (WILDT & CO LTD) ---		
A	DE-A-32 39 111 (SAKURAI LTD) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6) D04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	23 December 1996	Van Gelder, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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