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(54) Compound needle for rectilinear knitting machines

(57) A composite needle, particularly for rectilinear knitting machines, comprising a needle body (2) that forms a hook-like portion (3) at one end and a slider (4) that can slidingly engage the needle body (2), the needle body (2) having, in a central portion, an I-shaped transverse cross-section that forms two slots (10, 11) that slidingly accommodate laminas (12, 13) forming the slider (4). The needle body (2), proximate to the end that forms the hook-like portion (3), has elements (27) for divaricating the laminas (12, 13) in the extracted position with respect to the needle body (2).

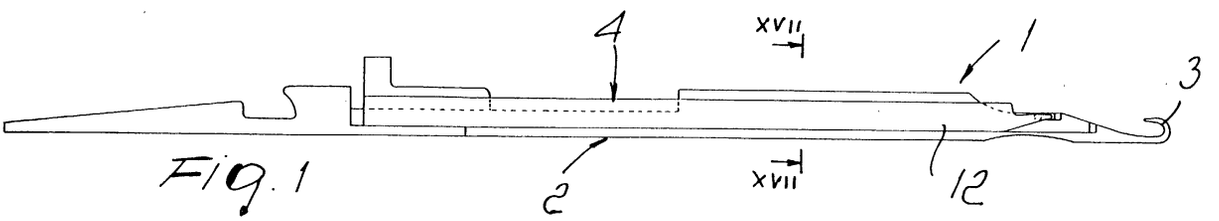

Fig. 1

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Description

[0001] The present invention relates to a composite needle or sliding needle, particularly for rectilinear knitting machines.

[0002] As is known, so-called sliding needles are generally constituted by a needle body that forms, at one of its ends, the hook-like portion, on which a slider can slide; the front end of the slider forms the latch for closing the hook-like portion and the stitch transfer element.

[0003] Generally, in said needles the slider can also be constituted in practice by a pair of laminas arranged side by side within the body of the needle, which has a substantially U-shaped cross-section.

[0004] The laminas are mutually compressed at their free end, and this situation inevitably causes an accumulation of dirt that is difficult to remove.

[0005] The aim of the invention is indeed to eliminate the drawbacks noted above by providing a composite needle, particularly for rectilinear knitting machines, that is structured so that it is of the self-cleaning type, i.e., capable of removing continuously the dirt that inevitably accumulates in the needle working area.

[0006] Within this aim, an object of the invention is to provide a composite needle that is suitable for application in conventional rectilinear knitting machines while having optimized characteristics.

[0007] Another object of the present invention is to provide a composite needle that thanks to its particular constructive characteristics is capable of giving the greatest assurances of reliability and safety in use.

[0008] Another object of the present invention is to provide a composite needle particularly for rectilinear knitting machines that can be obtained easily starting from commonly commercially available elements and materials and is further competitive from a merely economical standpoint.

[0009] This aim and these and other objects that will become better apparent hereinafter are achieved by a composite needle particularly for rectilinear knitting machines, according to the invention, which comprises a needle body that forms a hook-like portion at one end and a slider that can slidingly engage said needle body, characterized in that said needle body has, in a central portion, an I-shaped transverse cross-section that forms two slots that slidingly accommodate laminas that form said slider, said needle body, proximate to the end that forms said hook-like portion, having means for divaricating said laminas in the extracted position with respect to said needle body.

[0010] Further characteristics and advantages of the present invention will become better apparent from the description of a preferred but not exclusive embodiment of a composite needle particularly for rectilinear knitting machines, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figures 1 and 2 are respectively a side elevation view and a top plan view of a first embodiment of the needle with the laminas in retracted position;

Figures 3 and 4 are respectively a side elevation view and a top plan view of the needle with the slider in the extracted position;

Figure 5, 6, 7 and 8 are highly enlarged-scale views of the preceding figures, illustrating the end of the hook-like portion;

Figures 9 and 10 are respectively a side elevation view and a top plan view of the composite needle in a second embodiment;

Figures 11 and 12 are respectively a side elevation view and a top plan view of the needle with the slider in the extracted position;

Figures 13, 14, 15 and 16 are highly enlarged-scale views of Figures 9 to 12;

Figure 17 is a sectional view, taken along the line XVII-XVII of Figure 1;

Figure 18 is a view of the step in which the needles mutually cross;

Figure 19 is a highly enlarged-scale view of the crossing ends.

[0011] With reference to the figures and particularly to Figures 1 to 8, a composite needle particularly for rectilinear knitting machines is shown which is generally designated by the reference numeral 1 and has a needle body 2 that forms, at one of its ends, a hook-like or curved portion 3.

[0012] A slider 4 that can slide with respect to the needle body 2 is provided.

[0013] In constructive detail, the needle body 2 has in transverse cross-section, as shown more clearly in Figure 17, a substantially I-shaped configuration, with two lateral slots 10 and 11 that contain the laminas 12 and 13 and form the slider.

[0014] The laminas, as shown more clearly in Figures 5 and 6, end with a tab-shaped portion 20, which is bent toward the central body 21 of the needle body 2.

[0015] As shown more clearly in Figure 6, in the central part 21 of the needle body 2, recesses 25 are provided that allow to accommodate the tabs 20 with the slider in the retracted position.

[0016] The recesses 25 have, at the end directed toward the hook-shaped portion 3, wider portions 26, and there are also divaricating means provided as divaricating elements 27 at the end of the slots 10 and 11 which are designed to space one another the laminas 12 and 13, which remain in the spaced position even when they are arranged in the extracted position.

[0017] With the arrangement described above, the laminas have a tooth 30-for engaging the stitch, which acts as an element for removing any dirt particles.

[0018] Furthermore, the solution adopted provides in practice a continuous scraping on the laminas that facilitates cleaning.

[0019] According to a different embodiment, which is conceptually related to the preceding one, Figures 9 to

16 illustrate a needle, designated by the reference numeral 100, the needle body 101 of which has a central portion that has a solution that is fully comparable to the one shown in Figure 17 and a slider 102 that is formed by two laminas 103 and 104, which can slide in the slots formed by the needle body.

[0020] Proximate to the hook-like portion 105, the needle body 101 forms two shaped side walls or shoulders 110, which delimit a central passage 111 through which the laminas 103 and 104 are passed during extraction and, by elastic flexing, are divaricated by the portion 105, as shown in Figure 16.

[0021] With this embodiment also, the laminas, in their motion, due to the presence of a similar tooth 120 on the laminas, remove the dirt; moreover, when crossing other needles, as shown in Figures 18 and 19, any dirt between the laminas is expelled therefrom.

[0022] The described arrangement performs a scraping effect on the laminas that allows to have always an optimum level of cleanness.

[0023] From the above description it is evident that the invention achieves the intended aim and objects; in particular, the fact is stressed that the composite needle according to the invention is particularly flexible thanks to the adoption of a needle body that has an I-shaped cross-section, which allows to better guide the laminas without stiffening the assembly.

[0024] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0025] All the details may further be replaced with other technically equivalent elements.

[0026] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements.

[0027] The disclosures in Italian Patent Application No. MI2001A002095 from which this application claims priority are incorporated herein by reference.

[0028] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A composite needle particularly for rectilinear knitting machines, comprising a needle body (2) that forms a hook-like portion (3) at one end and a slider (4) that can slidingly engage said needle body (2), **characterized in that** said needle body (2) has, in a central portion (21), an I-shaped transverse cross-sectional shape comprising two slots (10, 11) that slidingly accommodate laminas (12, 13) that form said slider (4), said needle body (2), proximate to the end that forms said hook-like portion (3), having divaricating means (27) for divaricating said laminas (12, 13) in the extracted position with respect to said needle body (2).

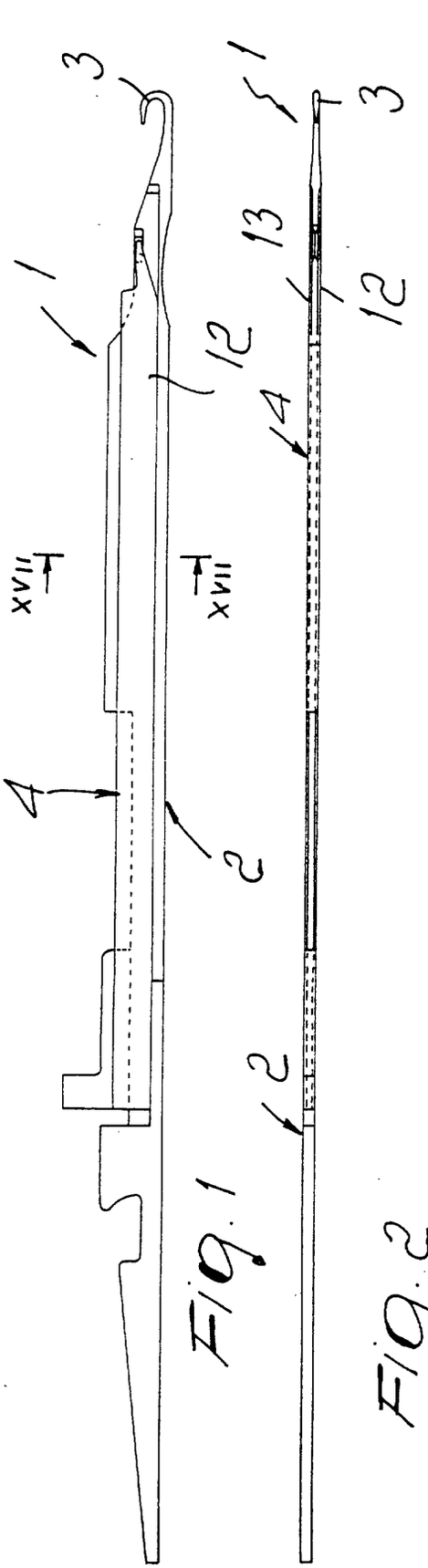
2. The composite needle according to claim 1, **characterized in that** said laminas (12, 13) end with a tab-shaped portion (20) that is bent toward the central portion (21) of said needle body (2), recesses (25) being provided on said central portion in order to accommodate said tab-shaped portions (20) with said slider (4) in the retracted position.

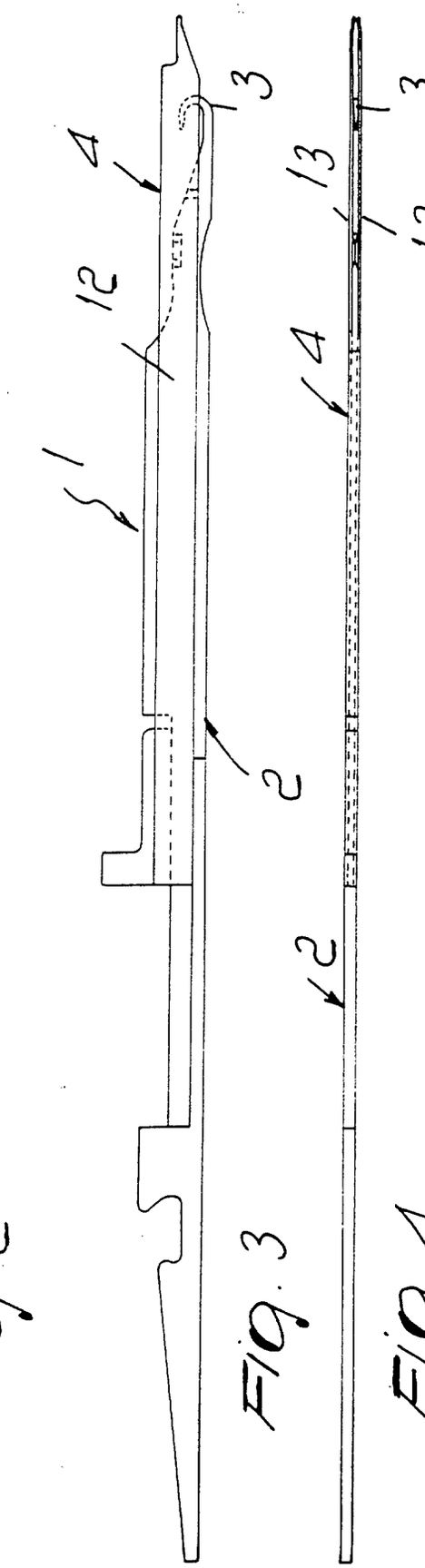
3. The composite needle according to the preceding claims, **characterized in that** said recesses (25) have, at the end directed toward the hook-shaped portion (3), wider regions (26) that can engage said tab-shaped portions (20), said divaricating means (27) being further provided at the end of said slots (10, 11).

4. The composite needle according to one or more of the preceding claims, **characterized in that** said laminas (12, 13) have a tooth (30) that is directed toward the end provided with said tab-shaped portions (20).

5. The composite needle according to one or more of the preceding claims, **characterized in that** said needle body (101) has, in the portion that is directed toward said hook-like portion (105), a pair of contoured shoulders (110) that delimit a central passage (111) for forming said divaricating means (105).

6. The composite needle according to one or more of the preceding claims, **characterized in that** it comprises cleaning means (30, 120) for cleaning said laminas (12, 13, 112, 113) by scraping.


3
1
XVII
XVII
4
2
Fig. 1


1
3
13
12
4
2
Fig. 2

1
4
12
3
2
Fig. 3

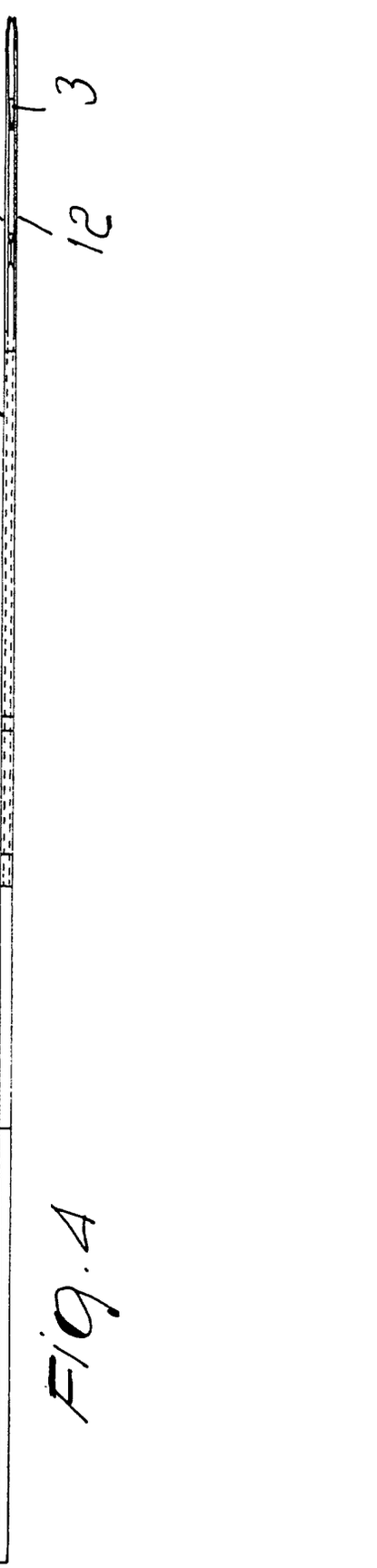

3
13
12
4
2
Fig. 4

Fig. 5

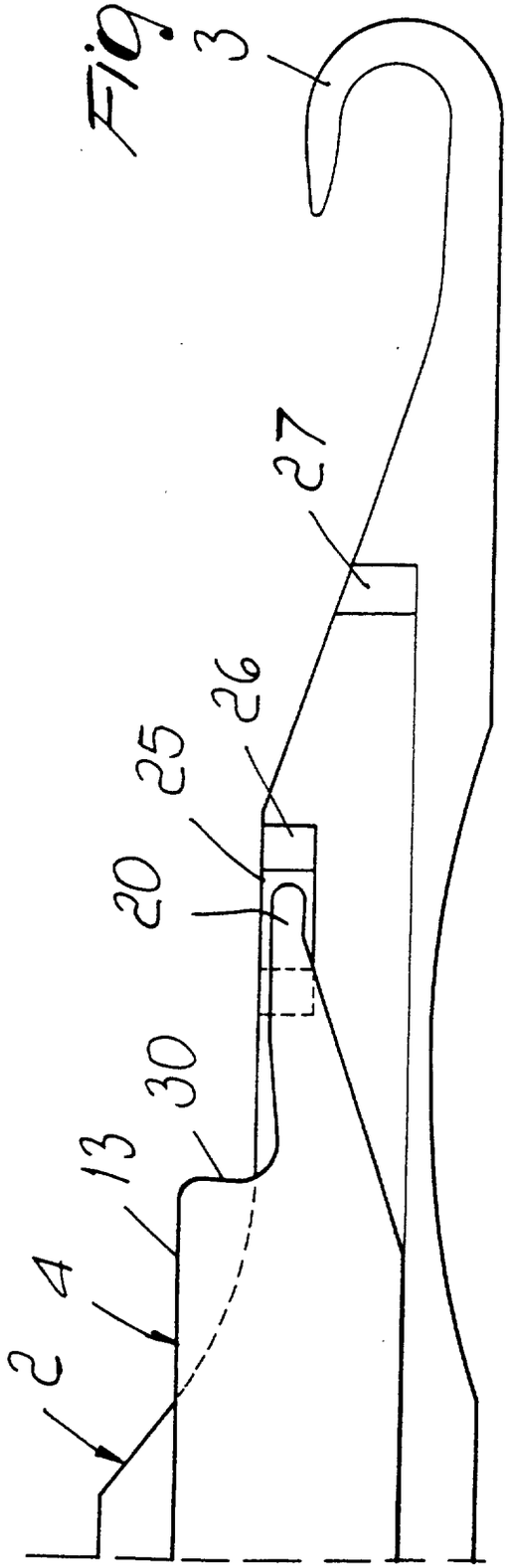
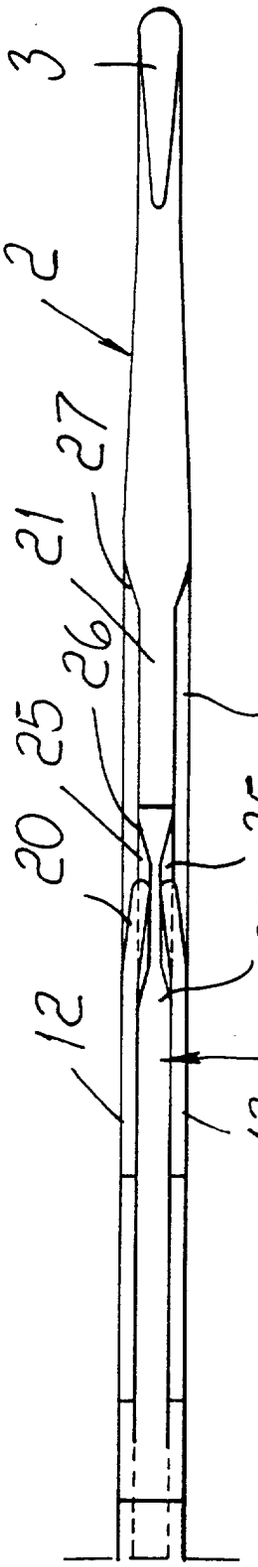


Fig. 6



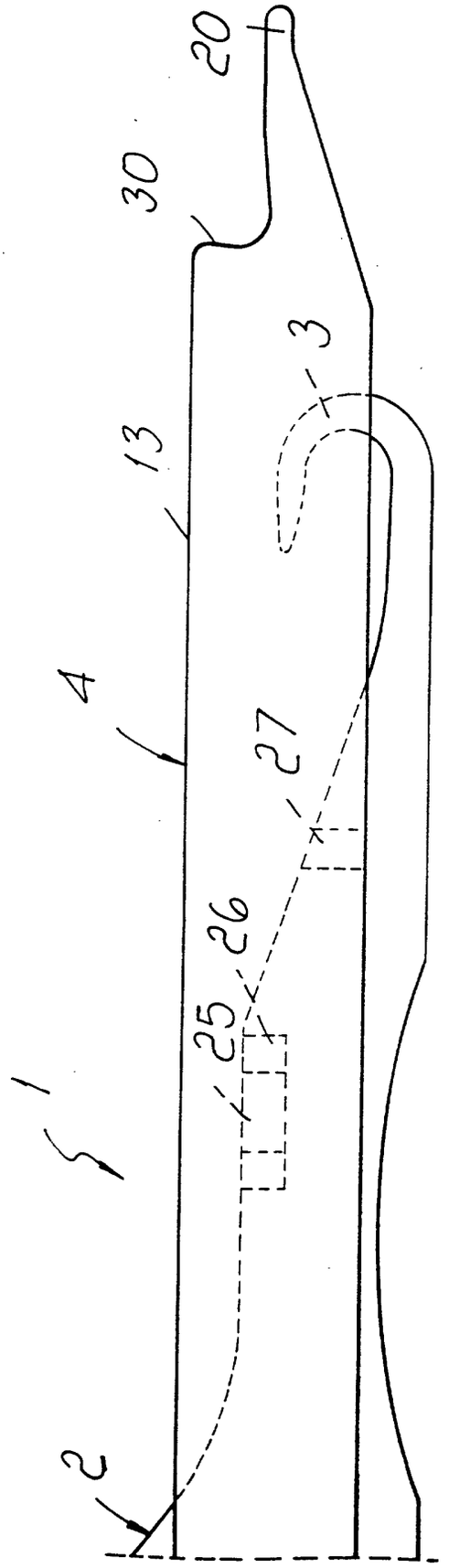


Fig. 7

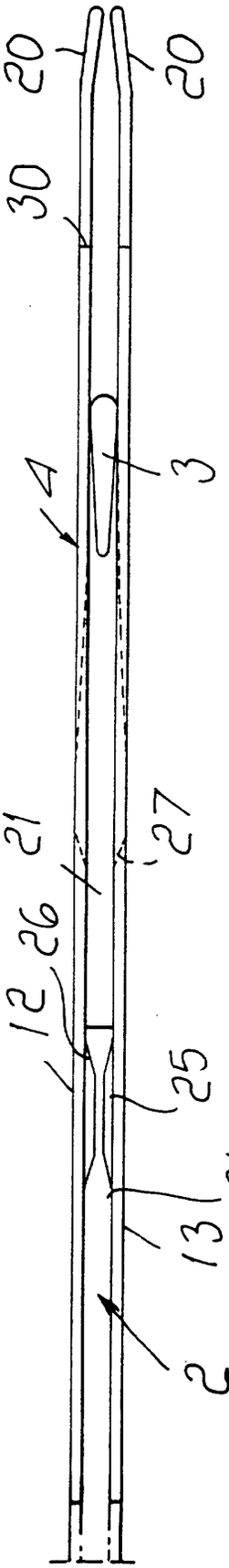


Fig. 8

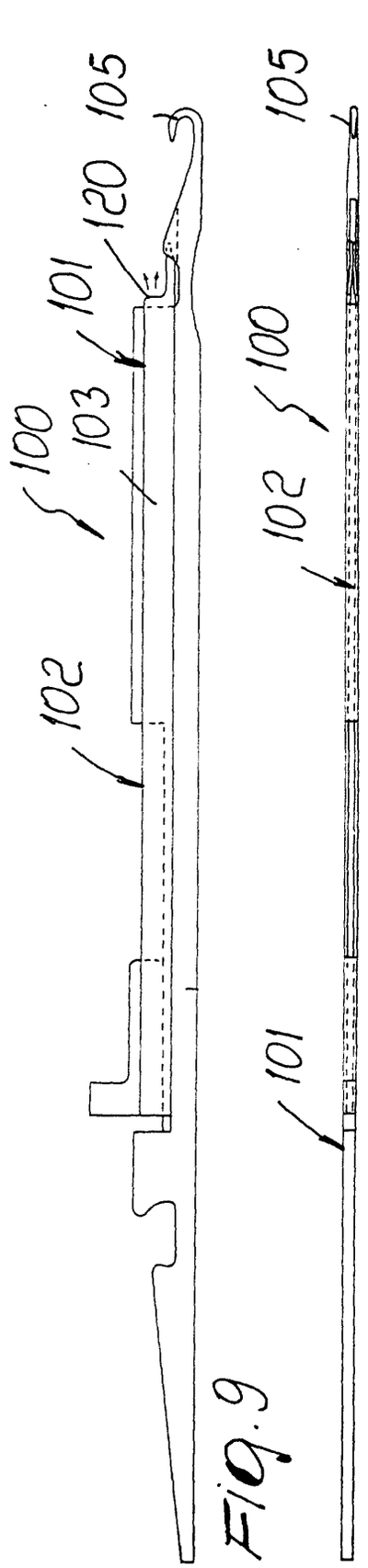


Fig. 9

Fig. 10

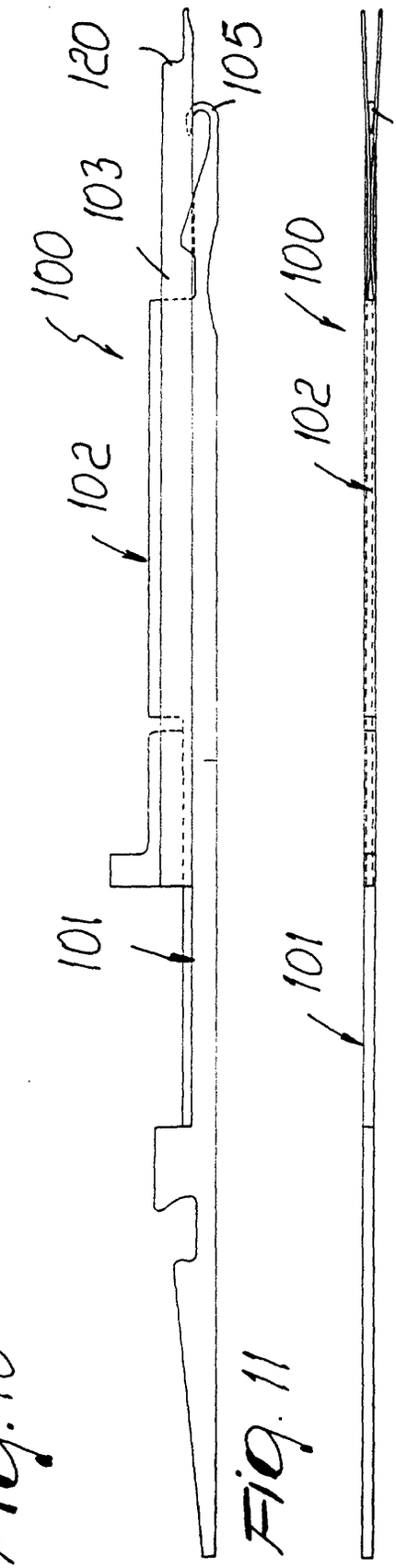


Fig. 11

Fig. 12

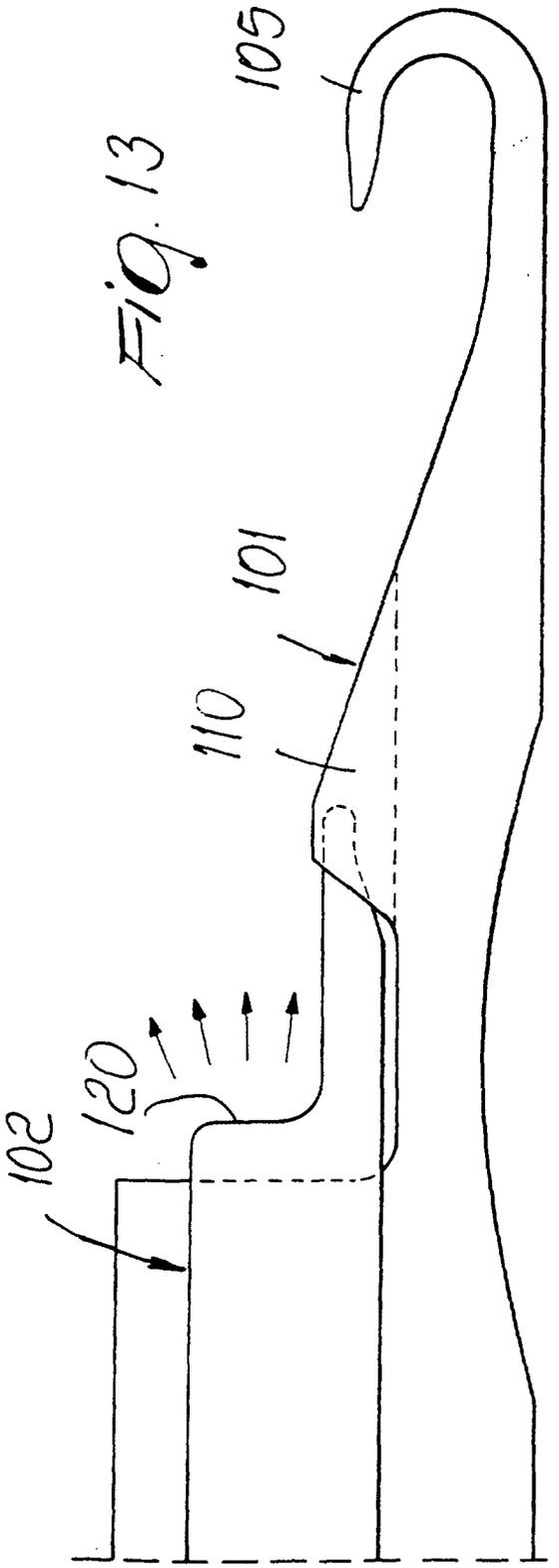


Fig. 13

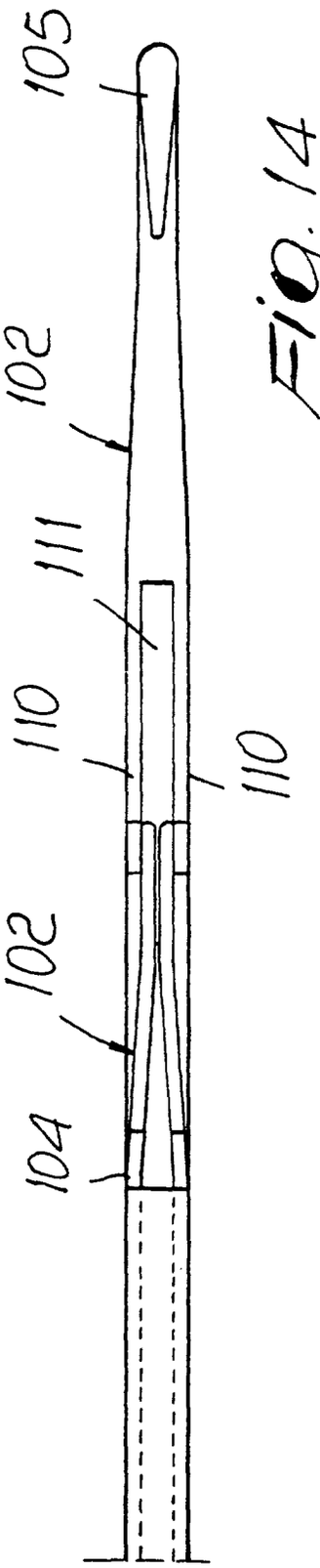


Fig. 14

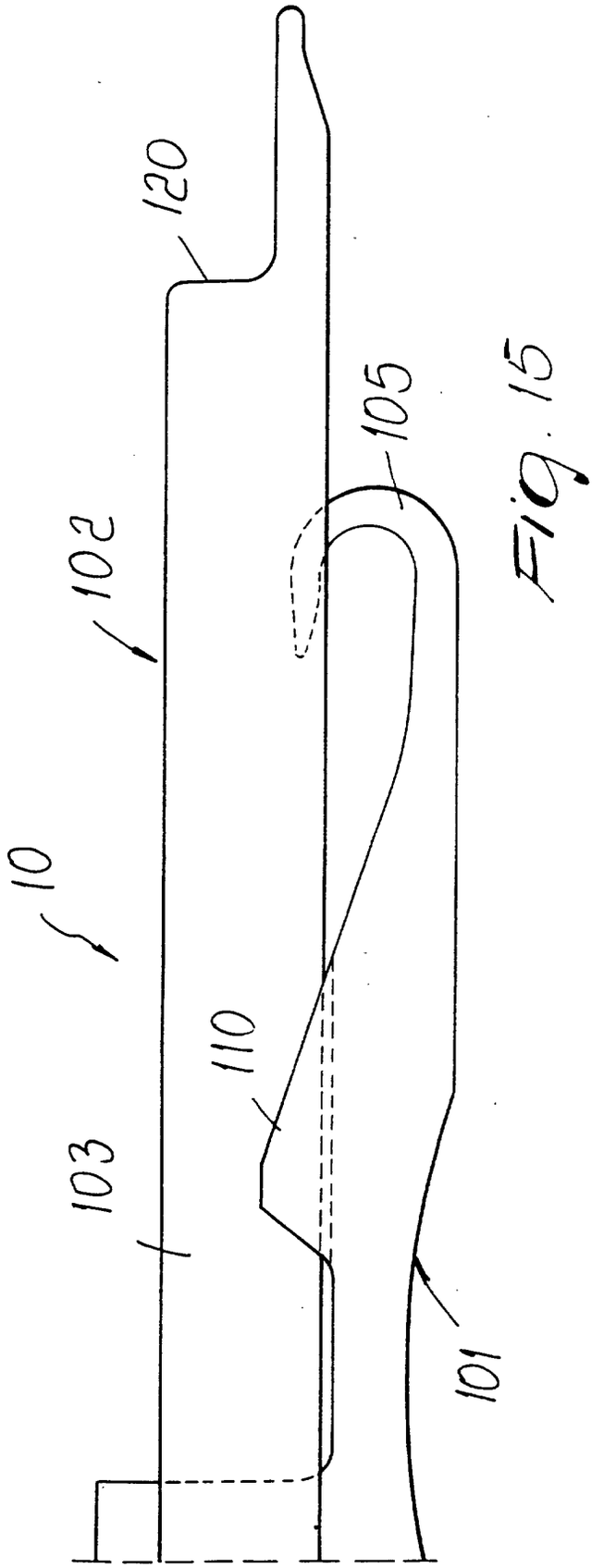


Fig. 15

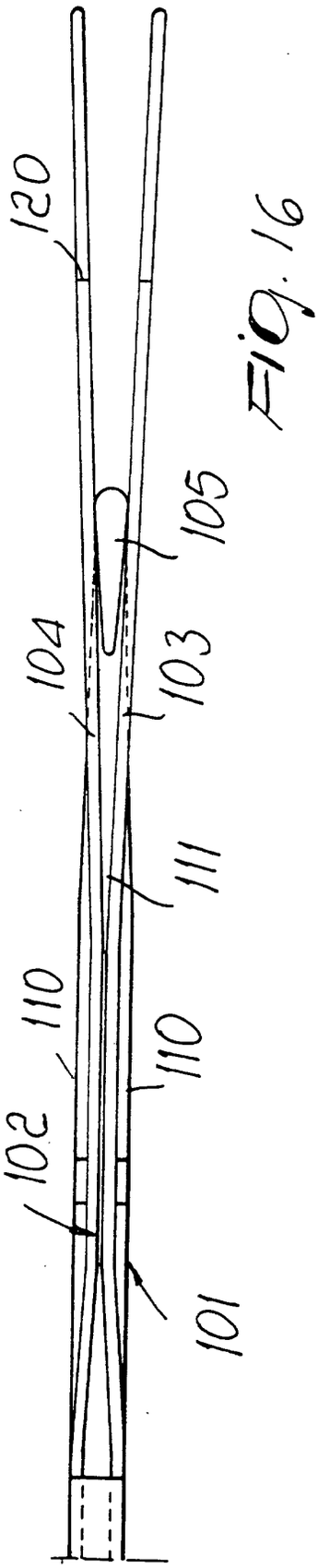


Fig. 16

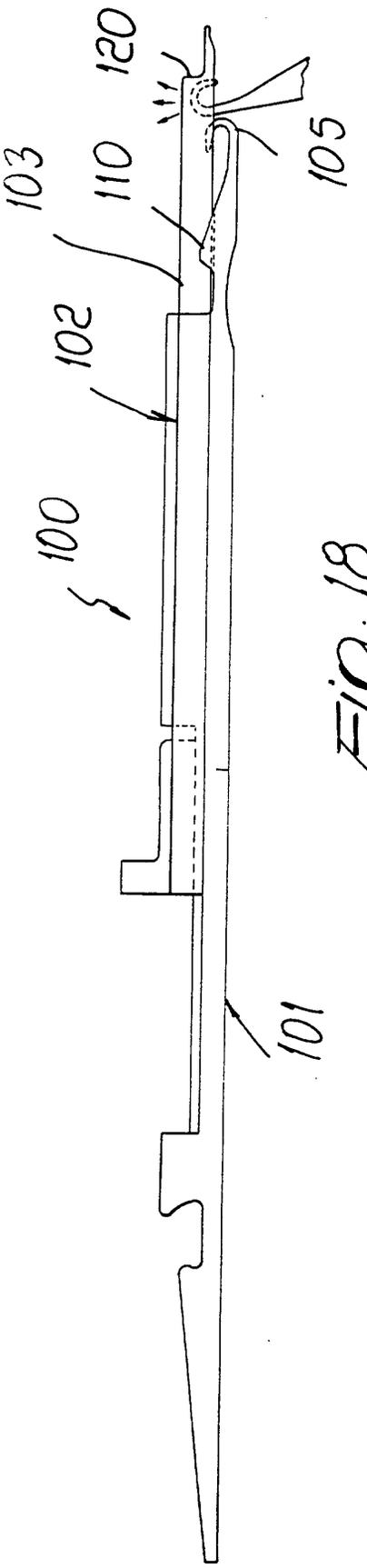


Fig. 18

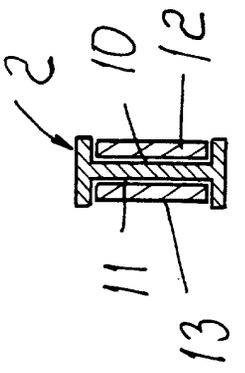


Fig. 17

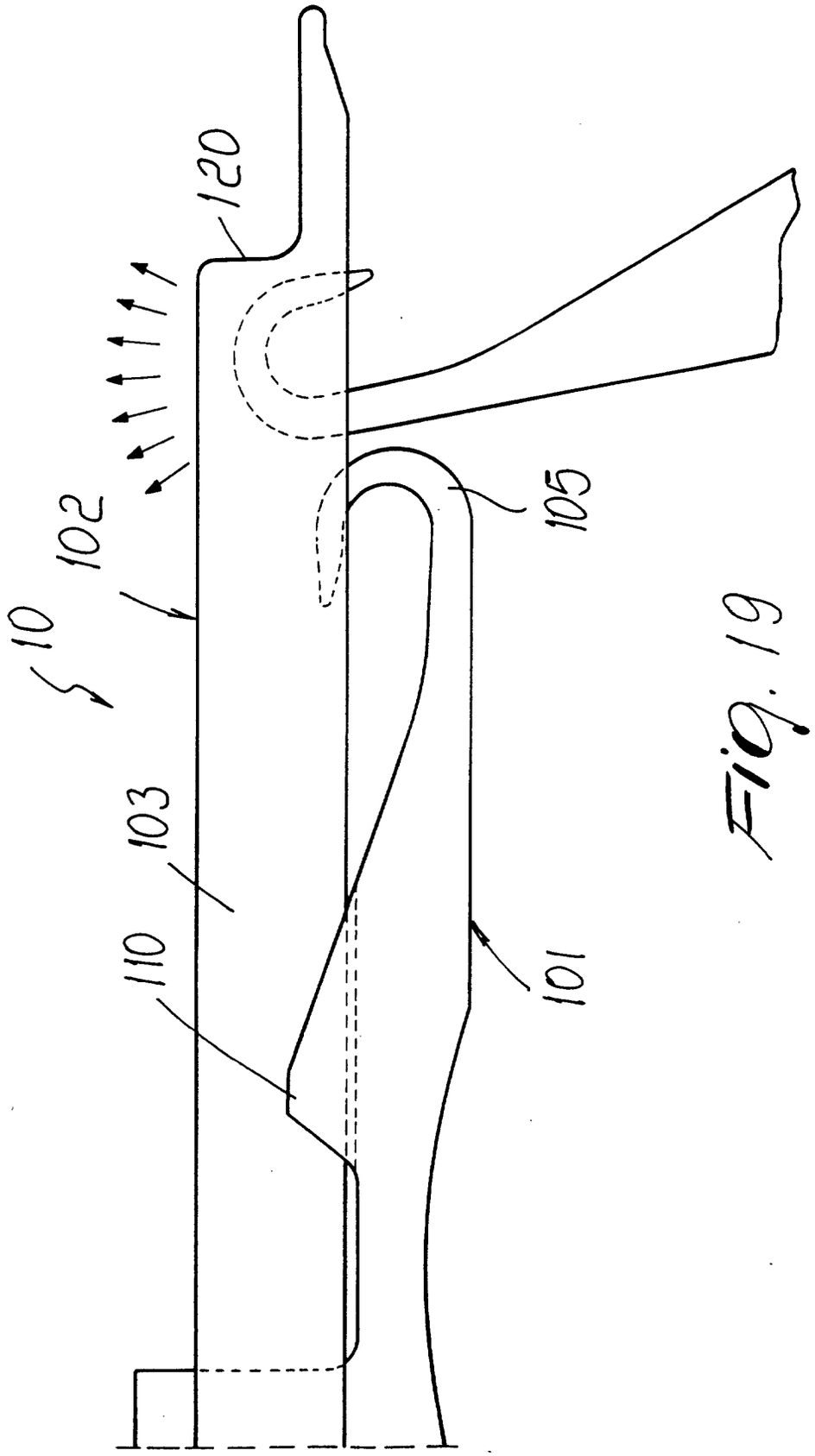


Fig. 19

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 02 2161

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	WO 01 31102 A (SHIMA MASAHIRO ;SHIMA SEIKI MFG (JP)) 3 May 2001 (2001-05-03) * abstract; figures 2,4,5 *	1,2,4-6	D04B35/02 D04B35/06
P,A	EP 1 229 159 A (SHIMA SEIKI MFG) 7 August 2002 (2002-08-07) * column 5, line 39 - column 6, line 10; figures 2,4,5 *	1,2,4-6	
Y	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 19, 5 June 2001 (2001-06-05) & JP 2001 032154 A (SHIMA SEIKI MFG LTD), 6 February 2001 (2001-02-06) * abstract; figures 3,10-B *	1,2,4-6	
A	US 6 233 977 B1 (RUOFF KLAUS ET AL) 22 May 2001 (2001-05-22) * column 1, line 58 - column 3, line 32; figures 1-5 *	1,6	
A	DE 199 50 259 C (GROZ BECKERT KG) 25 January 2001 (2001-01-25) * the whole document *		TECHNICAL FIELDS SEARCHED (Int.Cl.7) D04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	12 November 2002	Dreyer, C

CATEGORY OF CITED DOCUMENTS

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