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(71) Applicant: **Bianchi Massimo**
50013 Campi Bisenzio (FI) (IT)

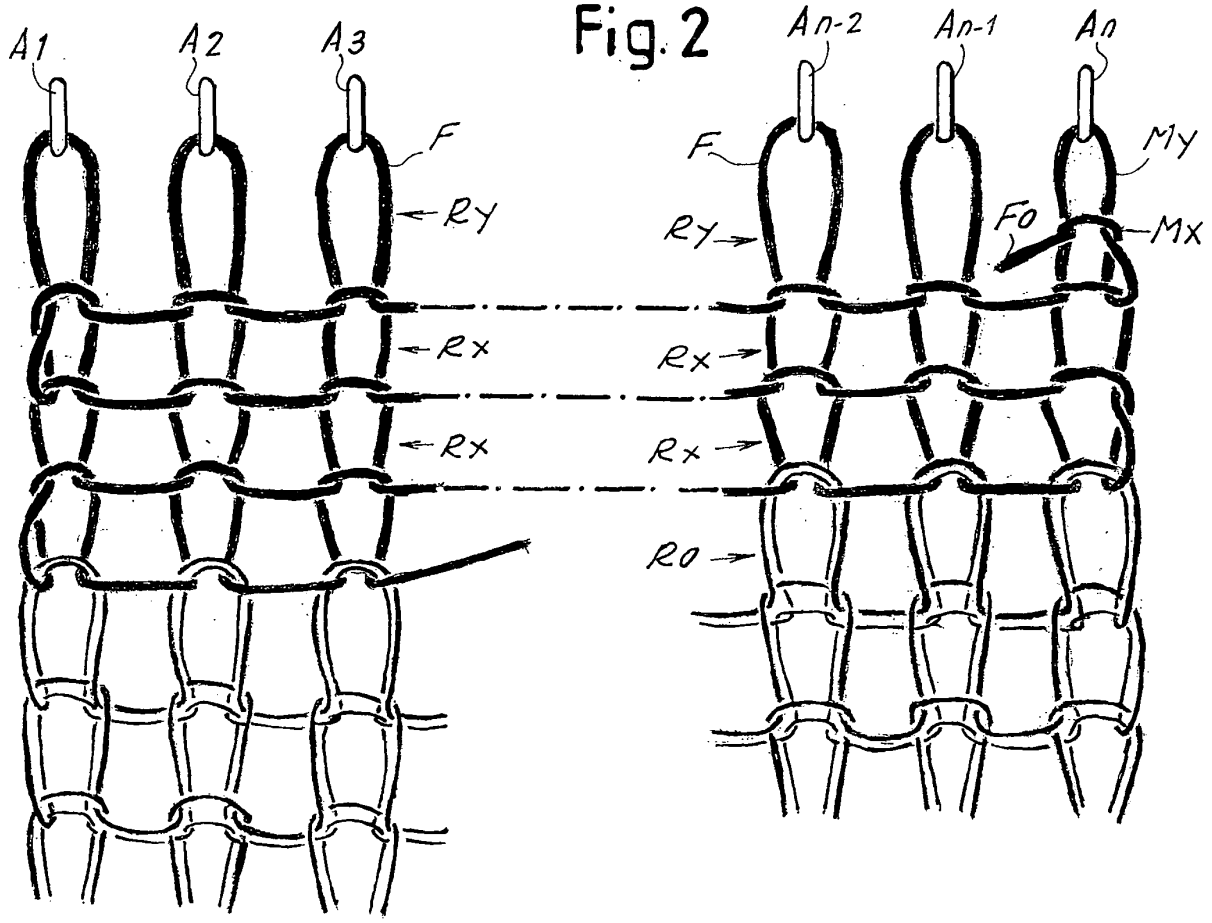
(72) Inventor: **Bianchi Massimo**
50013 Campi Bisenzio (FI) (IT)

(74) Representative: **Mannucci, Michele et al**
Ufficio Tecnico Ing.A. Mannucci S.r.l.
Via della Scala 4
50123 Firenze (IT)

(54) **A system for preventing unraveling of the end edge of a knitted fabric**

(57) To prevent so-called unstitching of the end edge of a knitted fabric structure (or of the closure of a tubular fabric), at the end of the final row (Ry) at least two subsequent relatively very tight end stitches (Mx, My) are formed with the end needle (An) and immediately afterwards the yarn (Fo) is cut at a limited distance from the last stitch (My).

Fig. 2



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Description

[0001] The problem of preventing, in use, unraveling of the final rows of a knitted fabric, such as the closing edge of the closed toe of socks, is well known and has still not been satisfactorily solved.

[0002] Some solutions currently adopted imply the use of costly machines and the active presence of an operator. Besides being costly, the solutions obtained are somewhat ineffective and also uncomfortable for the person wearing, for example, a sock with the toe closed with a machine of the aforesaid type.

[0003] The invention solves the problem set forth above in a manner that is simple, inexpensive, safe and free of discomfort for the person wearing a product with final edge, such as the toe closure in socks and stockings.

[0004] A subject of the present invention is a system to prevent unraveling of the end row of a knitted fabric, such as so-called unstitching of the end row of a knitted fabric structure or also and in particular of the closure of a tubular fabric, according to which at least two subsequent relatively very tight end stitches are formed at the end of the final row with at least the end needle of the row, so that immediately afterwards the yarn can simply be cut at a limited distance from the last stitch. The end needle can be at the end of a product or in any other point thereof (or of a tubular product).

[0005] Advantageously the stitches of at least the second last row of stitches are relatively very tight.

[0006] Preferably, the stitches of the final row or in proximity of said two subsequent relatively very tight last end stitches are relatively very long stitches.

[0007] Unhooking of the product from the needles can be activated or facilitated with air suction, to thus unthread the loop of the last from said two tight end stitches, which remain held only by the last needle.

[0008] In a possible embodiment, a further end stitch can be implemented with at least said end needle.

[0009] A subject of the present invention is also a product in which an end edge of the knitted fabric - such as so-called unthreading of the final edge of a knitted fabric structure or of the closure of a tubular fabric - has at the end of the final row at least two subsequent relatively very tight end stitches, immediately before cutting of the yarn.

[0010] The stitches of at least the second last row of stitches can be relatively very tight.

[0011] The stitches of the last row at least in proximity of said two subsequent relatively very tight last end stitches, can be relatively very long stitches.

[0012] The product can also comprise a further end stitch.

[0013] The invention will be better understood by following the description and accompanying drawing, which shows a non-limiting practical embodiment of the invention, which can be a solution providing for joining of two edges, of the type which is adopted, for example, to close the toe of a sock or stocking or other tubular product. In the drawing:

figure 1 shows two portions of a series of rows before the end operation according to the invention;
figure 2 is analogous to figure 1, but shows the arrangement at the end of the operation according to the invention;
figure 3 is analogous to figure 2 but shows the arrangement at the end of the operation, but when an air suction has been implemented; and
figure 4 shows a modified embodiment, with the formation of a further stitch.

[0014] Figures 1 and 2 show - separated - some rows of stitches with a yarn 1 or 3 or with two double yarns 1 and 3, coming from the joining of two edges; in any case a last row Ro is implemented, engaged by the needles A1, A2 .....An-2, An-1, An; this last needle An is responsible for forming the last stitch of the last row. The row Ro can be a row that joins two edges, such as in the case of a closure of a tube.

[0015] The last stitch Mn of the last row Ro, formed by the needle An, must be fastened in some manner to prevent unraveling (unthreading) of the row Ro and subsequently of the other rows contiguous thereto. Current systems - also very complex - do not ensure simple and safe fastening, even having recourse to a different yarn to those 1 and 3.

[0016] Vice versa, according to the present invention and the solution illustrated in figures 1 and 2, after the row Ro - and preferably after one or more optional further rows Rx obtained with a different yarn and with stitches that are preferably relatively tight - with a yarn F a last row Ry with relatively long stitches is created with the needles A1, A2 .....An-2, An-1, while with the last needle An a relatively very tight end stitch Mx is created (figure 2) and subsequently, again with the same needle An, a further end stitch My, also relatively very tight; immediately afterwards the yarn F of the row Ry can be cut to create an end Fo also relatively short, as can be seen in figure 2.

[0017] With this arrangement, the end Fo of the yarn - which has formed the last row Ry and the end stitches Mx and My - remains engaged between the two end stitches Mx and My (figure 2) or in the stitch Mx, when the end Fo is unthreaded and straightened as indicated in figure 3 and eliminating the stitch My but in any case said end Fo remaining held by the stitch Mx; in any case, the stitch Mx remains stable, preventing unthreading of the row Ry, the stitches of which are by formation relatively long.

[0018] At the moment in which the product is held only by the needle An, an air suction can be activated according to fA so that the end Fo is unthreaded from the arrangement of figure 2 to the arrangement of figure 3.

[0019] Figure 4 shows a modified embodiment (with respect to figures 2 and 3) as this last needle An, is operated to create, in addition to the two end stitches Mx

and My, a further third end stitch Mz, thus creating with the end Fo of the yarn F (with which the row Ry and the stitches Mx and My have been formed) also said third stitch Mz.

[0020] The rows Rx, Rx, Ry can be formed with a special yarn F or with one of the same yarns 1 and 3 with which the last rows of the end edge of the product were formed.

[0021] According to the invention, fastening of the end Fo of the yarn F with the end stitches Mx, My and optionally Mz is ensured, practically without the need for any measures and without any particular bulk, as is instead present in conventional systems used to date.

[0022] It is understood that the drawing only shows an example provided by way of a practical demonstration of the invention, which can vary in forms and arrangements without however departing from the scope of the concept underlying the invention. The arrangement according to the invention can be provided in any point in which the last row ends.

Claims

1. A system for preventing unraveling of the end edge of a knitted fabric, such as so-called unthreading of the final edge of a knitted fabric structure or of the closure of a tubular fabric, **characterized in that** at least two subsequent relatively very tight end stitches (Mx, My) are formed at the end of the final row with an end needle, and immediately afterwards the yarn being cut (in Fo) at a limited distance from the last stitch.

2. System for preventing unraveling of the end edge as claimed in claim 1, **characterized in that** the stitches of at least the second last row (Rx) of stitches are relatively very tight.

3. System for preventing unraveling of the end edge as claimed in at least claim 1 and/or 2, **characterized in that** the stitches of the last row (Ry) at least in proximity of said two subsequent relatively very tight last end stitches (Mx, My) are relatively very long stitches.

4. System for preventing unraveling of the end edge as claimed in at least claim 1, **characterized in that** upon unhooking the product from the needles an air suction is operated to unthread the loop (Fo, My) of the last (My) of said two tight end stitches (Mx, My).

5. System for preventing unraveling of the end edge as claimed in at least claim 1 or 2, **characterized in that** a further end stitch (Mz) subsequent to said two end stitches (Mx, My) is formed with at least said end needle (An).

6. An end edge of a knitted fabric, such as so-called unthreading of the final edge of a knitted fabric structure or of the closure of a tubular fabric, **characterized in that** at least two subsequent relatively very tight end stitches (Mx, My) are provided at the end of the final row (Ry), immediately before the yarn is cut.

7. An end edge as claimed in claim 6, **characterized in that** the stitches of at least the second last row (Rx) of stitches are relatively very tight.

8. An end edge as claimed in claim 6 and/or 7, **characterized in that** the stitches of the last row, at least in proximity of said two subsequent relatively very tight last end stitches (Mx, My) are relatively very long stitches.

9. An end edge as claimed in at least one of claims 6 to 8, **characterized in that** it also comprises a further end stitch (Mz) formed subsequently to said two end stitches (Mx, My).

10. A system for preventing unraveling of the end edge of a knitted fabric, as described and illustrated.

11. An end edge of a knitted fabric with a simple or double end stitch, as described and illustrated.

Fig.1

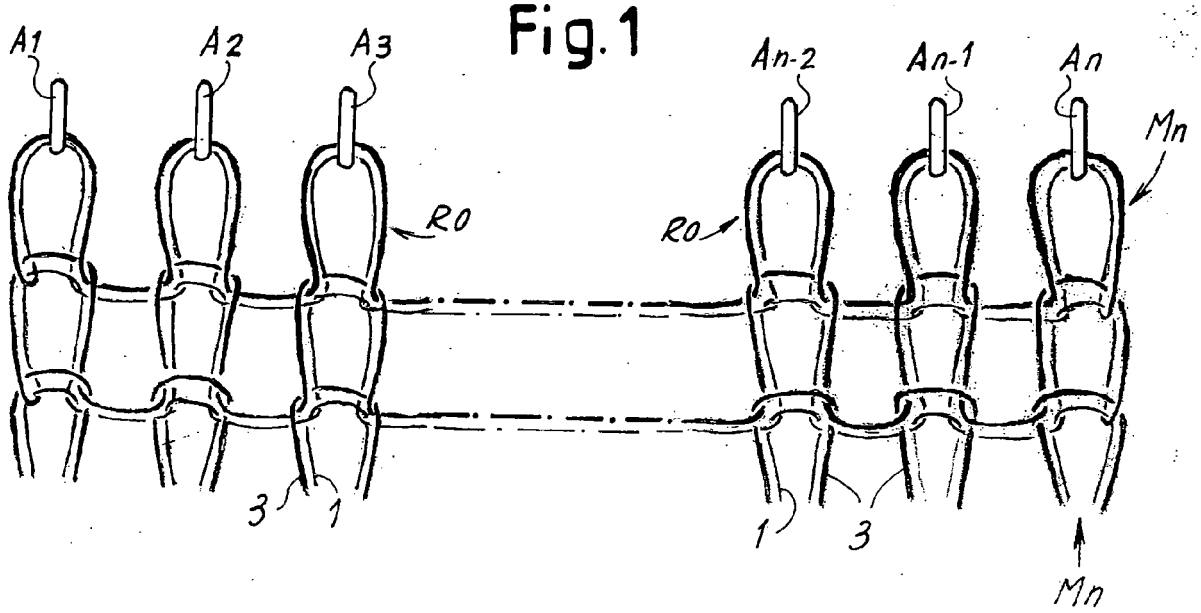

A1
A2
A3
An-2
An-1
An
Mn
R0
R0
3
1
1
3
Mn

Fig.2

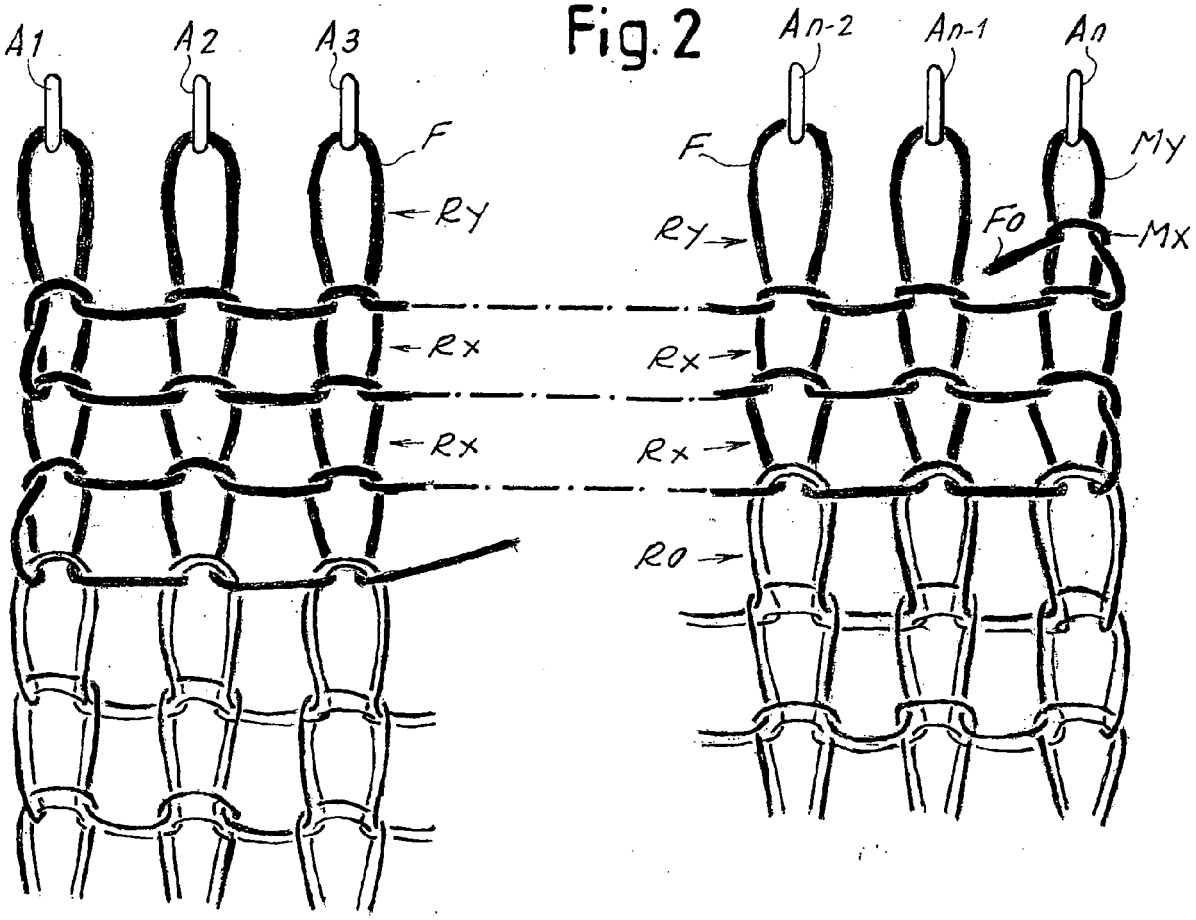

A1
A2
A3
An-2
An-1
An
F
Ry
F
My
Ry
Fo
Mx
Rx
Rx
Rx
Rx
R0

Fig.3

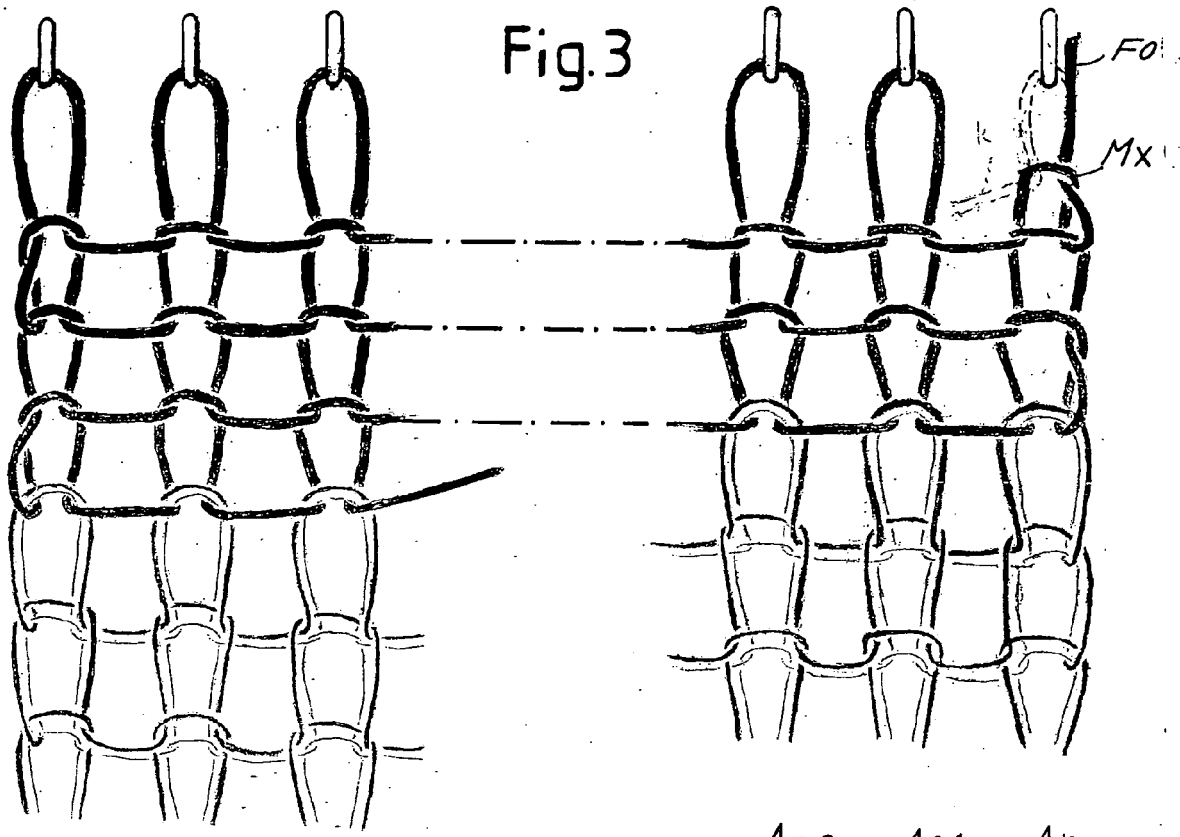
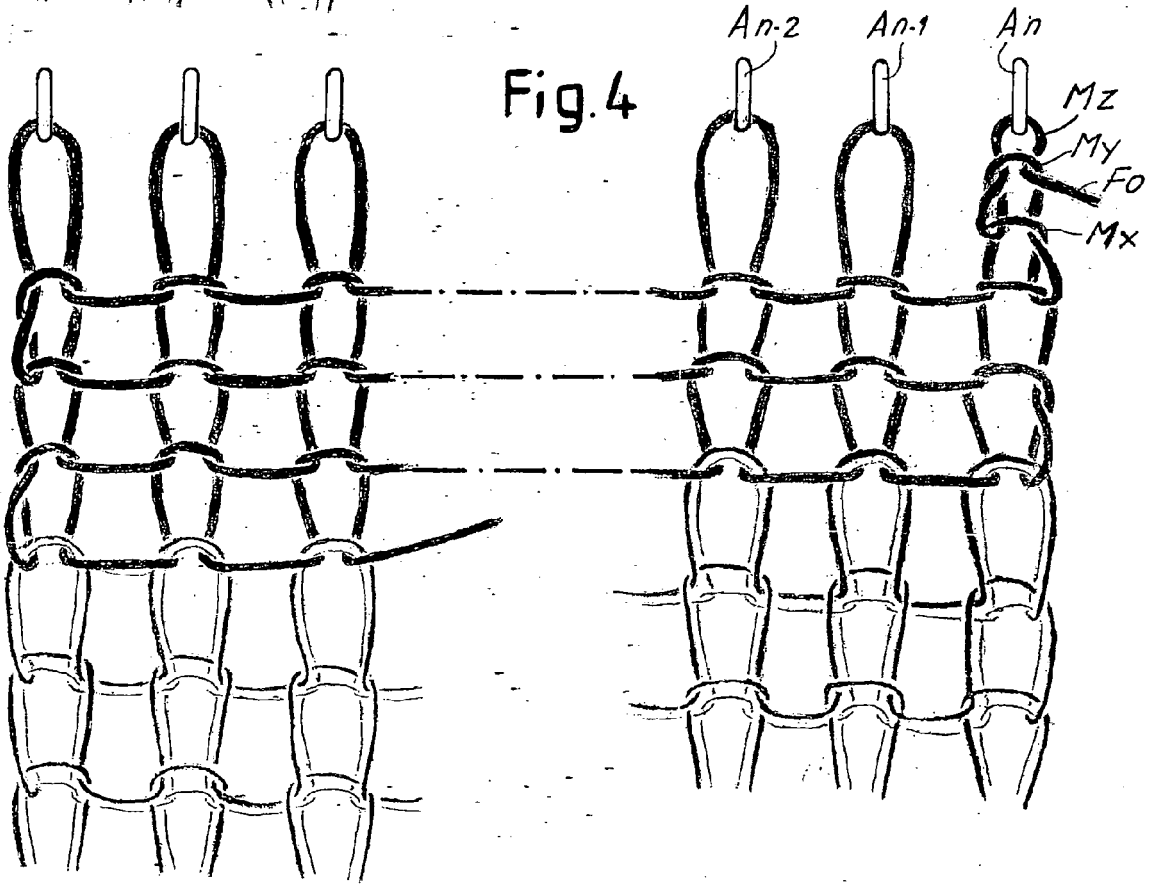


Fig.4



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EUROPEAN SEARCH REPORT

Application Number
EP 08 42 5570

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 2 114 170 A (STOLL GESCHAEFTSFUEHRUNGSGESEL) 17 August 1983 (1983-08-17) * the whole document *	1	INV. D04B1/22
A	US 5 259 207 A (MITSUMOTO SHIGENOBU [JP]) 9 November 1993 (1993-11-09) * the whole document *	1	
A	DE 38 05 234 A1 (SHIMA SEIKI MFG [JP]) 31 August 1989 (1989-08-31) * the whole document *	1	
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TECHNICAL FIELDS SEARCHED (IPC)

D04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 January 2009	Pieracci, Andrea

CATEGORY OF CITED DOCUMENTS

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13-01-2009

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