



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
25.08.2010 Bulletin 2010/34

(51) Int Cl.:
A44B 17/00 (2006.01)

(21) Application number: **09153184.8**

(22) Date of filing: **19.02.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA RS

(71) Applicant: **Zanella Srl**
35011 Campodarsego (IT)

(72) Inventors:
• **ZANELLA, Lorenzo**
35011, CAMPODARSEGO (IT)
• **ZANELLA, Andrea**
35011, CAMPODARSEGO (IT)

(74) Representative: **Vinci, Marcello**
Ufficio Veneto Brevetti
Via Sorio 116
35141 Padova (IT)

(54) **Elastic element for snap fasteners**

(57) The invention is a new elastic element (E) for female parts of snap fasteners suited to retain the pin of the male part of said snap fasteners, comprising two or more substantially rigid opposite arched parts (E1, E2) connected at each of their adjacent ends by one or more elastic parts (E4) having the function of bringing and

keeping together the ends of said arched parts (E1, E2) after the insertion or extraction of the pin of the male part, and wherein said elastic part (E4) has a multiple wave or sinusoidal shape, i.e. formed by alternately opposing curves (Ea, Eb, Ec, ..., En), and wherein said arched parts and said elastic parts form a generically closed ring shape.

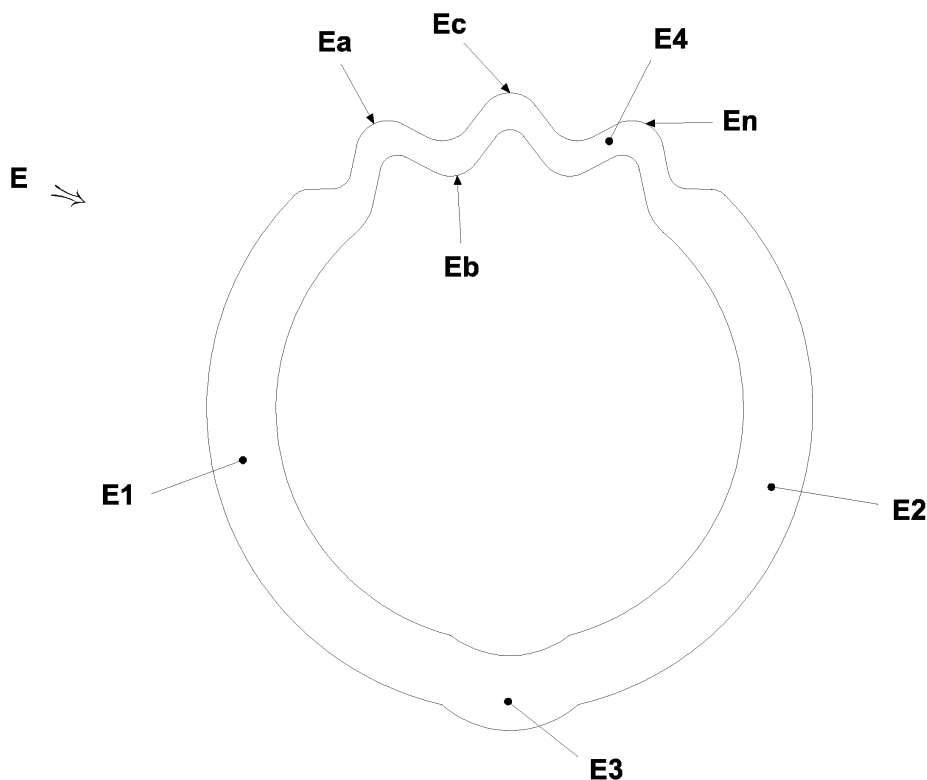


Fig. 1

Description

[0001] The present patent relates to snap fasteners and in particular concerns a new elastic element for female parts suited to retain the pin of male parts of snap fasteners.

[0002] Snap fasteners consist of two disc-shaped parts, male and female, which can be coupled.

[0003] The female part is provided with a central hole or seat, the edge of said hole or seat housing an elastic element.

[0004] The centre of the male part is provided with a pin with mushroom-shaped profile, i.e. with end having a larger diameter than the body of the pin.

[0005] The hole or seat of the female part houses the pin of the male part.

[0006] When at rest, the elastic element of the female part is provided with an opening or internal diameter that is smaller than the diameter of the end or head of the pin of the male part and substantially equal to or slightly smaller than the diameter of the body of the pin of the male part.

[0007] The two parts, male and female, are coupled by inserting the pin of the male part into the hole or seat of the female part through the elastic element of said female part.

[0008] Said insertion/coupling entails the elastic element of the female part being widened by the passage of the end of the pin of the male part and then contracting, due to its elastic properties, around the body of the pin of the male part.

[0009] The resistance due to the elastic properties of said elastic element retains the end of said pin of the male part in the hole or seat of said female part, preventing it from accidentally coming out.

[0010] To separate the two parts, male and female, it is necessary to exert a force sufficient to widen said elastic element to the extent necessary for the passage of said end of said pin.

[0011] Elastic elements for snap fasteners are known which have various shapes, the main ones being:

- open ring: formed by a section of wire shaped in a circle, the ends of which are near but not joined;
- omega: formed by a section of omega-shaped wire, the ends of which are elongated and run alongside the central arched part of the omega shape;
- hexagon: formed by a closed ring element in the shape of a hexagon.

[0012] Snap fasteners are known in which the elastic element of the female part is replaced by the edge of the opening of said female part divided into elastic portions which resist the passage of the end of the pin of the male part.

[0013] The known elastic elements have various drawbacks.

[0014] The ring and omega-shaped elastic elements

are normally obtained by bending metal wire and require specific equipment and machines for their production.

[0015] The ring-shaped elastic elements have a constant section and are stressed at various points of their shape. The constant section is sized as a compromise between resistance to wear produced by the passage of the pin of the male part and the elasticity necessary to expand when said pin of said male part passes through. The widening stress is therefore exerted at a generically intermediate point between the two facing ends of the open ring shape or in the area of least resistance of the material. Said repeated stress can cause the elastic element to break, making the snap fastener unserviceable.

[0016] The omega-shaped elastic elements are stressed during bending at their bending points, i.e. at the points where the metal has already been mechanically bent and where the radius of curvature is small. Due to said small radius of curvature, the portions subjected to bending can easily break. To remedy all the above drawbacks, a new elastic element for snap fasteners has been devised and produced.

[0017] One object of the new elastic element for snap fasteners is to resist the continuous stress due to the passage of the pin of the male part.

[0018] A further object of the new elastic element is to prevent the pin of the male part from accidentally coming out of the female part of the snap fastener.

[0019] A further object of the new elastic element is to eliminate the need for specific machines or equipment for its production.

[0020] A further object of the new elastic element is to reduce or eliminate the noise resulting from insertion of the pin of the male part into the female part of the snap fastener.

[0021] These and further direct and complementary objects are achieved by the new elastic element for snap fasteners having a generically closed ring shape, formed by two substantially rigid arched parts, joined at one end by a third flexible part acting as a hinge, and joined at the other end by a fourth elastic part having the function of maintaining said two arched parts close to each other.

[0022] The two arched parts have a radius of curvature substantially equal to the hole or seat of the female part of the snap fastener and together are shorter than the circumference of the hole or seat of the female part of the snap fastener.

[0023] The third flexible part acting as a hinge can have any shape suitable for the purpose of permitting rotation between said two arched parts. Said third flexible part has a preferably arched shape with smaller radius than said first two arched parts.

[0024] The fourth elastic part having the function of keeping said two arched parts close to each other can have any shape suitable for the purpose of maintaining adjacent the ends of the two arched parts opposite the third flexible part acting as a hinge.

[0025] Said fourth elastic part preferably has the shape of a multiple wave, i.e. formed of alternately opposing

curves.

[0026] The first two arch-shaped parts have a constant width or section suitable for giving said parts rigidity and resistance to the stress caused by the pin of the male part of the snap fastener.

[0027] The third flexible part acting as a hinge can have a width or section equal to or smaller than the width or section of the two arched parts.

[0028] The fourth elastic part has a width or section smaller than the width or section of the two arched parts, in such a way as to be sufficiently flexible and elastic.

[0029] The new elastic element for snap fasteners can be produced in any elastic stainless material, for example stainless spring steel or, more preferably, plastic.

[0030] The new elastic element for snap fasteners is housed in the hole or seat of the female part of the snap fastener.

[0031] When the elastic element is in the rest position, with the two male and female parts of the snap fastener separated, none of its parts is subjected to pressure or deformation. In said position the two arch-shaped parts of the new elastic element are relatively close to each other, so that the space between them is smaller than the diameter of the head or end of the pin of the male part of the snap fastener.

[0032] When the male and female parts are coupled, i.e. the pin of the male part of the snap fastener is inserted into the female part of said snap fastener, the head of the pin of the male part bears against the elastic element of the female part of the snap fastener, thus widening it.

[0033] Substantially, during the expansion of the new elastic element, the two arched parts maintain their shape, the third flexible part bends or bends in the area of connection with said two arched parts allowing the two arched parts to expand with a reciprocal rotation movement, and the fourth elastic part modifies its shape allowing said two arched parts to expand.

[0034] When the head of the pin of the male part of the snap fastener has passed through the new elastic element, the fourth elastic part of said new elastic element closes the arched parts so that they assume their previous position. If the stem of the pin of the male part of the snap fastener has a greater section than the distance of said arched parts in the rest position, said fourth elastic part of the new elastic element re-closes said arched parts of the new elastic element in contact with said stem of said pin.

[0035] In this position the fourth elastic part of the new elastic element for snap fasteners keeps the two arched parts of said elastic element close to each other, retaining the pin of the male part of the snap fastener.

[0036] When an adequate force is exerted on the male part of the snap fastener, in the opposite direction with respect to the female part of said snap fastener, the head of the pin of the male part of the snap fastener causes the two arched parts of the new elastic element to expand far enough for said head of said pin to pass between said two arched parts.

[0037] After extraction of the pin of the male part from the female part of the snap fastener, the fourth elastic part of said new elastic element re-closes the arched parts to their rest position.

5 [0038] The characteristics of the new elastic element for snap fasteners will be better clarified by the following description with reference to the drawing attached by way of non-limiting example.

10 [0039] The new elastic element (E) for snap fasteners has a generically closed ring shape formed by two substantially rigid arched parts (E1, E2) joined at one end by a third flexible part (E3) acting as a hinge and joined at the other end by a fourth elastic part (E4) having the function of keeping said two arched parts close to each other.

15 [0040] The two arched parts (E1, E2) have a radius of curvature substantially equal to the hole or seat of the female part of the snap fastener and together they are shorter than the circumference of the hole or seat of the female part of the snap fastener.

20 [0041] The third flexible part (E3), acting as a hinge, has an arched form with smaller radius than said first two arched parts (E1, E2). In particular, in this example said third flexible part (E3) has the convex side towards the centre of the elastic element (E).

25 [0042] The fourth elastic part (E4), having the function of keeping said two arched parts (E1, E2) close together, has a multiple wave or sinusoidal shape, i.e. formed by alternately opposing curves (Ea, Eb, Ec, ..., En).

30 [0043] Said fourth elastic part (E4) has a section smaller than the width or section of the two arched parts (E1, E2), in such a way as to be sufficiently flexible and elastic.

35 [0044] The same figure illustrates, with a broken line, the generic conformation of the new elastic element (E) during passage of the head of the pin of the male part of the snap fastener.

[0045] Therefore, with reference to the preceding description and the attached drawing, the following claims are expressed.

Claims

1. Elastic element (E) for female parts of snap fasteners suited to retain the pin of the male part of said snap fasteners, **characterised in that** it comprises two or more substantially rigid opposite arched parts (E1, E2) connected at each of their adjacent ends by at least one elastic part (E4) having the function of maintaining the ends of said arched parts (E1, E2) close to each other, the above arrangement forming a generically closed ring shape.
2. Elastic element (E) according to claim 1, **characterised in that** it has one or more flexible parts (E3) acting as a hinge connecting the adjacent ends of two or more pairs of arched elements (E1, E2).

3. Elastic element (E) according to claim 1, **characterised in that** said elastic part (E4) has a multiple wave or sinusoidal shape, i.e. formed by alternately opposing curves (Ea, Eb, Ec, ..., En). 5
4. Elastic element (E) according to claims 1, 3, **characterised in that** the insertion of the head of the pin of the male part results in said arched parts (E1, E2) being spaced from each other and/or rotating and one or more elastic parts (E4) modifying their shape permitting the expansion and/or rotation and/or spacing of said arched parts (E1, E2). 10
5. Elastic element (E) according to the preceding claims, **characterised in that** the insertion of the head of the pin of the male part results in said arched parts (E1, E2) being spaced from each other and/or rotating, and wherein one or more elastic parts (E4) modify their form, permitting the expansion and/or rotation and/or spacing of said arched parts (E1, E2), and wherein one or more flexible parts (E3) bend or bend in the area of connection with said arched parts (E1, E2) allowing said arched parts (E1, E2) to translate and/or rotate reciprocally. 15 20 25
6. Snap fastener consisting of a male part with connection pin having mushroom-shaped section or widened end and a female part provided with a hole or seat, the edge of which houses an elastic element (E) suited to retain said pin of said male part, **characterised in that** said elastic element (E) comprises two or more substantially rigid opposite arched parts (E1, E2) connected at each of their adjacent ends by one or more elastic parts (E4) having the function of bringing and keeping together the ends of said arched parts (E1, E2) after the insertion or extraction of the pin of the male part, and wherein said elastic part (E4) has a multiple wave or sinusoidal shape, i.e. formed by alternately opposing curves (Ea, Eb, Ec, ..., En), and wherein said arched parts and said elastic parts form a generically closed ring shape. 30 35 40
7. Snap fastener consisting of a male part with connection pin having mushroom-shaped section or widened end and a female part provided with a hole or seat, the edge of which houses an elastic element (E) suited to retain said pin of said male part, **characterised in that** said elastic element (E) comprises two or more substantially rigid opposite arched parts (E1, E2) connected at each of their adjacent ends by one or more elastic parts (E4) having the function of bringing and keeping together the ends of said arched parts (E1, E2) after the insertion or extraction of the pin of the male part, and wherein said elastic part (E4) has a multiple wave or sinusoidal shape, i.e. formed of alternately opposing curves (Ea, Eb, Ec, ..., En), and wherein one or more flexible parts (E3) acting as hinge connect the adjacent ends of 45 50 55
- two or more pairs of arched elements (E1, E2).

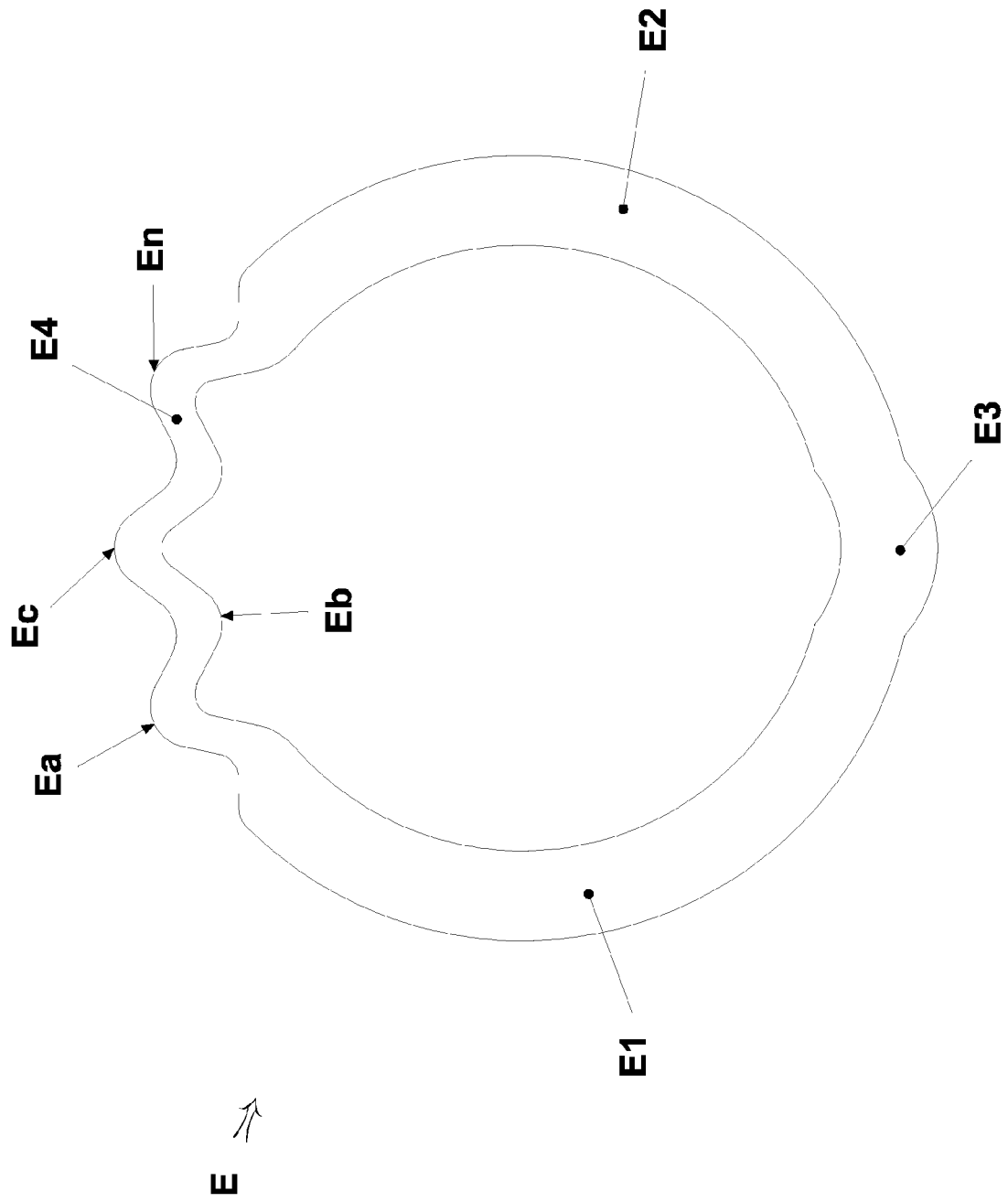


Fig. 1

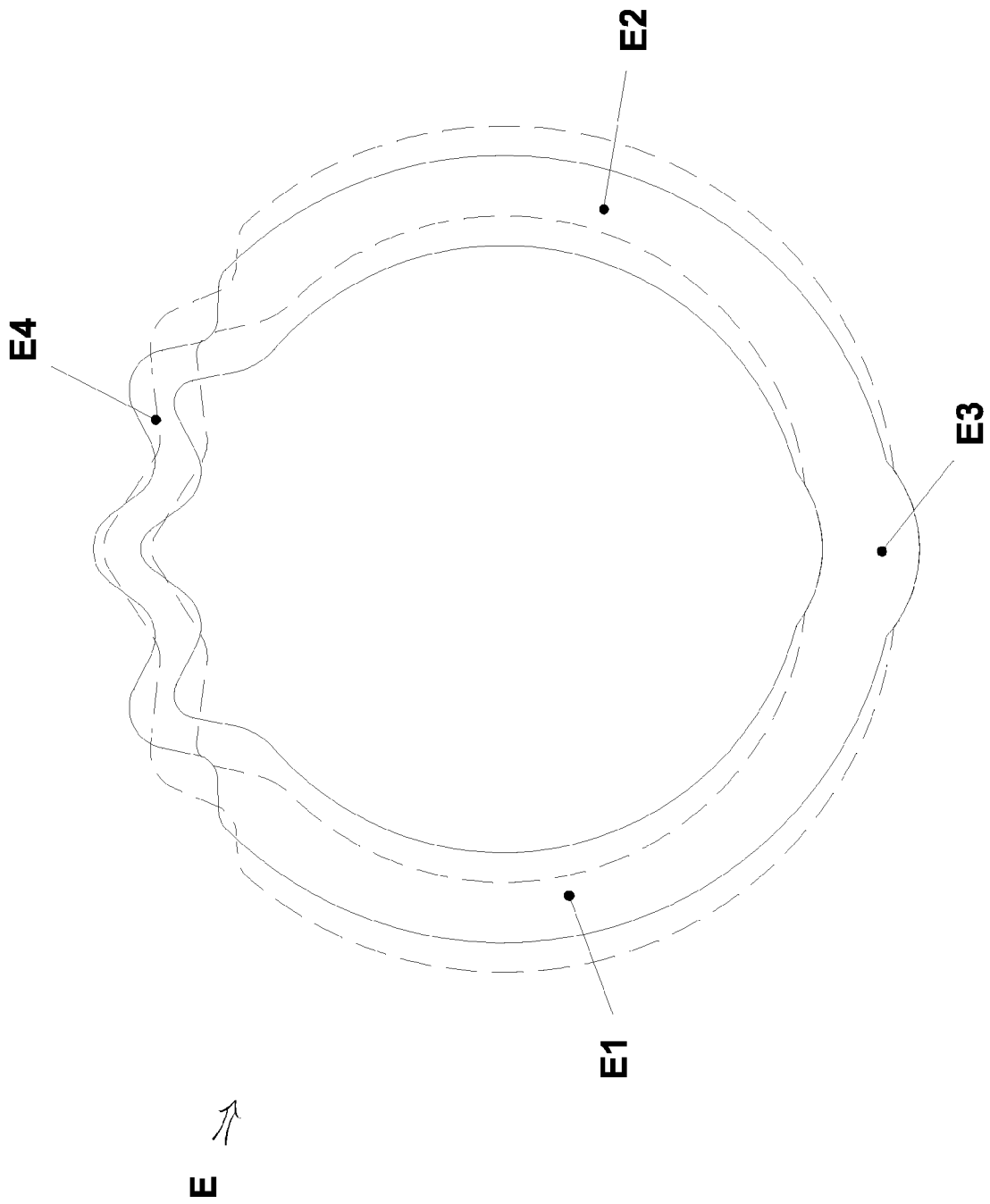


Fig. 2



EUROPEAN SEARCH REPORT

Application Number
EP 09 15 3184

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 067 694 A (CANDOTTI RICCARDO [IT]) 30 May 2000 (2000-05-30) * column 3, lines 45-50,62 - column 4, lines 4,19-21,43-45; figures 12,14 *	1-7	INV. A44B17/00
X	FR 1 597 718 A (WILLIAM PRYM) 29 June 1970 (1970-06-29) * page 4, lines 30,31,41 - page 5, line 2 *	1	
A	DE 398 635 C (LOUIS WITTE OEILLET UND METAL) 17 July 1924 (1924-07-17) * page 1, lines 39-42; figure 1 *	1,6-7	
A	DE 199 19 399 A1 (COBRA SRL [IT]) 4 November 1999 (1999-11-04) * column 2, lines 58-68; figure 3 *	1-7	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A44B
Place of search		Date of completion of the search	Examiner
The Hague		6 July 2009	Monné, Eric
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 L : document cited for other reasons & : member of the same patent family, corresponding document			

1
EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 15 3184

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-07-2009

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6067694 A	30-05-2000	AT 190473 T	15-04-2000
		AU 7292396 A	15-05-1997
		BR 9611352 A	06-04-1999
		DE 69607193 D1	20-04-2000
		DE 69607193 T2	09-11-2000
		WO 9715207 A1	01-05-1997
		EP 0855865 A1	05-08-1998
		ES 2146024 T3	16-07-2000
		HK 1015231 A1	06-04-2001
FR 1597718 A	29-06-1970	BE 724786 A	16-05-1969
DE 398635 C	17-07-1924	NONE	
DE 19919399 A1	04-11-1999	IT PD980037 U1	28-10-1999