(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 659 067 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
24.05.2006 Bulletin 2006/21

(51) Int Cl.:
B65D 1/02 *(2006.01)*

(21) Application number: **04425869.7**

(22) Date of filing: **22.11.2004**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL HR LT LV MK YU

(71) Applicants:
- **Romano, Cosimo**
  10146 Torino (IT)
- **Malacarne, Angelo**
  10146 Torino (IT)

(72) Inventors:
- **Romano, Cosimo**
  10146 Torino (IT)
- **Malacarne, Angelo**
  10146 Torino (IT)

(74) Representative: **Garavelli, Paolo**
A.BRE.MAR. S.R.L.,
Via Servais 27
10146 Torino (IT)

(54) Collapsible container for liquids, particularly for carbonated beverages

(57) A collapsible container (1) for liquids is disclosed comprising a side wall (2) having at least one part equipped with a first accordion-type structure (3), a lower portion (5) and an upper portion (7), and that it is equipped with a second, internal accordion-type structure (4).

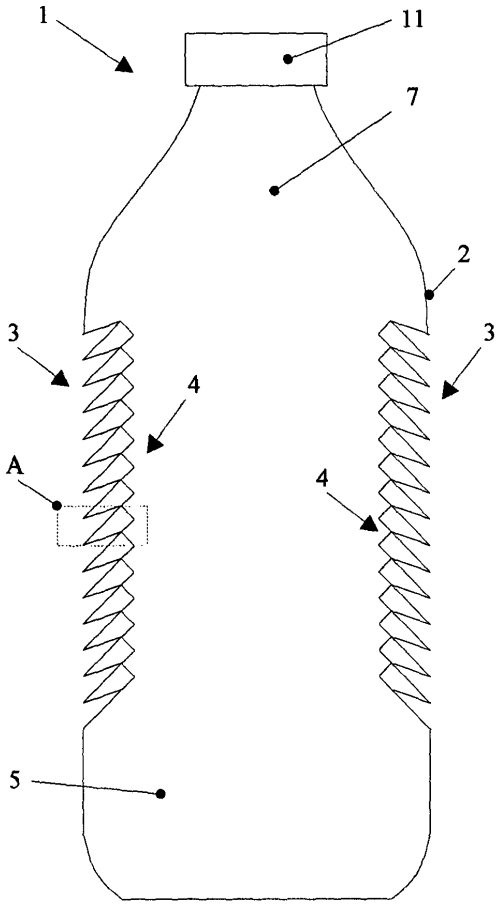

FIG. 1

EP 1 659 067 A1

Description

[0001] The present invention relates to a collapsible container for liquids, in particular for carbonated beverages.

[0002] The prior art provides for a high number of arrangements that provide containers for liquids, particularly bottles, that, due to their collapsible structure, allow adapting the container volume to the remaining amount of liquid inside it; as known, such containers, generally designed for carbonated drinkable liquids, provide the advantages of:

- drastically decreasing the liquid degassing inside the container, keeping the volume of air included between liquid and container plug, practically constant;
- gradually decreasing the container volume depending on the consumption of liquid inside it, thereby reducing the stocking space of the container;
- obtaining a container that, at the end of the consumption of liquid inside it, has already progressively collapsed to its minimum volume, being thereby able to be disposed of without requiring further compressing operations.

[0003] The majority of existing collapsible containers realise what has been described above by providing the side container wall with an accordion-type structure comprising a plurality of bends that are extended when the bottle is full and are gradually bent under a force that is exerted coaxially to the symmetry axis of the container towards its lower end in order to conform themselves to the volume of liquid remaining inside the container.

[0004] A first type of such containers proposed by the prior art provides for a bottle made of plastic material having substantially elastic properties equipped with a side wall comprising a plurality of accordion-type bends on at least one portion of their height formed of tapered and contrary surfaces having the same width. Due to the elastic properties of the bottle material and, above all, due to the symmetrical shape of each bend, this bottle has only a stable balance position coinciding with its completely extended position, this not making it particularly suitable for a frequent use, such as, for example, in case of drinkable liquids.

[0005] Another bottle of the collapsible type has therefore been proposed, in which every bend of the accordion-type structure is characterised by two stable balance positions, an extended position and a collapsed position, due to the fact that the two contrary tapered surfaces forming every bend have a different width and the smaller surface contains, in its collapsed configuration, the adjacent larger surface. An example of this second type of bottle is disclosed in US-A-4 492 313.

[0006] In order to further improve what has been disclosed in the previous type of container, WO-A-0044630 discloses a bottle having means for blocking the bending recovery of the accordion-type structure, comprising bends having an upper surface and a lower surface whose width is lower than the adjacent upper surface and having a curved shape with convexity directed towards the adjacent upper surface against which it collapses.

[0007] The margins for improving such bottles are however still high, since the accordion-type structure has still today several inconveniences as regards bottle stability and stiffness in its extended position, above all when the internal pressure is not kept sufficiently high by the plug, this situation occurring above all when the liquid is poured, bringing about inadequate torsions and/or flexures of the bottle body that sometimes make its use rather difficult.

[0008] Existing accordion-type structures moreover have no means for avoiding that obviously the liquid penetrates inside the bends; thereby, when the container is collapsed, the liquid can remain captured inside the collapsed bends, consequently generating an hydrostatic pressure that opposes the further bottle collapsing and creating an unavoidable waste of the liquid itself.

[0009] Object of the present invention is thereby providing a collapsible container for liquids, particularly for carbonated beverages, having an accordion-type structure equipped with at least one longitudinal reinforcing member adapted to increase the torsion and flexure stiffness of the container itself.

[0010] Moreover, an object of the present invention is providing a collapsible container for liquids equipped with a second, internal accordion-type structure adapted to prevent the liquid from entering the first, external accordion-type structure.

[0011] The above and other objects and advantages of the invention, as will appear from the following description, are obtained by a collapsible container for liquids as disclosed in Claim 1. Preferred embodiments and nontrivial variations of the present invention are the subject of the dependent claims.

[0012] The present invention will be better described by some preferred embodiments thereof, provided as a nonlimiting example, with reference to the enclosed drawings, in which:

- FIG. 1, 2 and 3 show a side sectional view of a container 1 according to the present invention in various collapsing positions;
- FIG. 4 shows an enlarged view of the part in the dashed box A in FIG. 1;
- FIG. 5 shows an enlarged view of another embodiment of the part in the dashed box A in FIG. 1; and
- FIG. 6 shows an enlarged view of still another embodiment of the part in the dashed box in FIG. 1.

[0013] The present invention will be described below as applied to a bottle having a circular section, preferably made of plastic material or anyway a suitably resilient material, but it cannot obviously be excluded that the inventive container can have any other sectional shape.

[0014] With reference therefore to FIG. 1 to 4, it is possible to note therein a container 1 according to the present invention shaped as a bottle; such container 1 comprises a side wall 2 of which at least a part is equipped with a first accordion-type structure 3 of a known type, a lower portion 5 and an upper portion 7 equipped with a neck at the end of which it is possible to apply a plug 11.

[0015] With particular reference to FIG. 4, the first accordion-type structure 2 is composed of a plurality of first bends 31 bent as a bellows, each one of which is composed of a first upper surface 311 and a first lower surface 313 indifferently having the same width or with the first lower surface 313 having a width that is less than the first upper surface 311. Moreover, both the first upper surface 311 and the first lower surface 313 could have, in their section, a linear or arc-shaped arrangement, as disclosed in the previously-mentioned document WO-A-0044630.

[0016] Always with reference to FIG. 1 to 4, it is possible to note that the container 1 is equipped inside with a second accordion-type structure 4 composed of a plurality of second bends 41 bent as a bellows, each one of which is composed of a second upper surface 411 and a second lower surface 413 having preferably the same width. Also in this case, however, the second upper surface 411 and/or the second lower surface 413 could have in their sections a linear or arc-shaped arrangement. Such second bends 41 are arranged next to the first bends 31 in such a way that, when the container 1 collapses, each second upper surface 411 collapses on a related adjacent second lower surface 413, in this way the second collapsed bends 41 being projecting towards the container 1 interior, and the first collapsed bends 31 being projecting towards the container 1 exterior. For such purpose, angle α shown in the Figures between the second upper surface 411 and the second lower surface 413, not collapsed, is preferably slightly less than 180° in order not to occupy an excessive volume inside the container 1 when it is not collapsed, though allowing the second bends 41 to be bent inwards when collapsing.

[0017] Moreover, as previously mentioned, the container 1 according to the present invention is equipped with at least one longitudinal reinforcing member. In FIG. 5 to 6, it is possible to note that such longitudinal reinforcing member is preferably at least one rib 13 that longitudinally runs along at least one portion of the container 1, preferably along at least the whole height of the accordion-type structure 3. It is clear that, in order to increase the container 1 efficiency, this latter one can be equipped with a plurality of ribs 13; their number must however be such as not to prevent the correct operation of the accordion-type structure 3.

[0018] Preferably, the ribs 13, due to costs and mass economy reasons, are of the same material composing side wall 2, accordion-type structure 3, lower portion 5, upper portion 7 and neck 9; it is however obvious that such ribs 13 can also be made, depending on specific needs, of a different material.

[0019] With particular reference to FIG. 5, it is possible to note a sectional view of a preferred embodiment of a bend 31 of the container 1 according to the present invention: in such embodiment, in fact, it is possible to note that the rib 13 longitudinally runs both on the upper surface 311 and on the lower surface 312; moreover, in such embodiment, the rib 13 is external to the bend 31. Still more, in order to allow a correct collapsing of the accordion-type structure 3, it is possible to provide that, next to the bending points of the bend 31, the rib 13 is equipped with suitable weakening points 131 that, when the container 1 collapses, can also possibly break.

[0020] With reference now to FIG: 6, it is possible to note an alternative embodiment of the container 1: in such an embodiment, in fact, the rib 13 is inside the bend 31; also in this case, as previously described, it is possible to provide that, next to the bending points of the bend 31, the rib 13 is equipped with suitable weakening points 131.

[0021] From the manufacturing point of view, it is clear that, preferably, the longitudinal reinforcing members are realised onto the container 1, by moulding or extrusion, before manufacturing the accordion-type structure 3, and in particular the bends 31. Alternatively, the longitudinal reinforcing members could be heat-welded or glued onto the container 1 before manufacturing the accordion-type structure 3.

[0022] The second accordion-type structure 4 and/or the longitudinal reinforcing members allow the container 1 to solve the disadvantages of what has been proposed in the prior art. The second accordion-type structure 4, in fact, by preventing the liquid from entering the interstices created by the first accordion-type structure 3 from the prior art, solves the previously mentioned problems. Moreover, the same second accordion-type structure 4 contributes to the increase of stiffness and stability of the container 1. In addition, the longitudinal reinforcing members allow further increasing the stability and stiffness of the container 1 itself, above all along the accordion-type structure 3: in traditional bottles, in fact, when the liquid has to be poured, the plug removal zeroes the pressure exerted onto the bottle walls by liquid and air that are hermetically enclosed therein: consequently, due to its very same nature, the traditional accordion-type structure of the bottle tends to be flexed and distorted under the force exerted by the hand that grasps it and inclines it, making it very difficult for the liquid to comfortably and correctly go out.

[0023] By instead using the container 1 according to the present invention, the second accordion-type structure 4 and/or the longitudinal reinforcing members concur to keep the accordion-type structure 3 sufficiently stable and stiff, thereby allowing, even after having removed the plug 11, a greater stiffness and stability of the container 1, guaranteeing an adequate and easy pouring.

Claims

1. Collapsible container (1) for liquids comprising a side wall (2) having at least one part equipped with a first accordion-type structure (3), a lower portion (5) and an upper portion (7), **characterised in that** it is equipped with a second, internal accordion-type structure (4).

2. Container (1) according to Claim 1, **characterised in that** said second accordion-type structure (4) is composed of a plurality of second bends (41) bent as a bellows, each one of said second bends (41) being composed of a second upper surface (411) and a second lower surface (413).

3. Container (1) according to Claim 2, **characterised in that** said second upper surface (411) and said second lower surface (413) preferably have the same width.

4. Container (1) according to Claim 2, **characterised in that** an angle α included between said second upper surface (411) and said second lower surface (413) is preferably less than 180°.

5. Container (1) according to Claim 1, **characterised in that** it is equipped with at least one longitudinal reinforcing member.

6. Container (1) according to Claim 1, **characterised in that** it is adapted to contain carbonated beverages.

7. Container (1) according to Claim 5, **characterised in that** said longitudinal reinforcing member slides along at least the accordion-type structure (3).

8. Container (1) according to Claim 5, **characterised in that** said longitudinal reinforcing member is at least one rib (13).

9. Container (1) according to Claim 5, **characterised in that** said longitudinal reinforcing member is outside said container (1).

10. Container (1) according to Claim 5, **characterised in that** said longitudinal reinforcing member is inside said container (1).

11. Container (1) according to Claim 8, **characterised in that** said rib (13) is equipped with weakening points (131) corresponding to bending points of at least one bend (31) of said accordion-type structure (3).

12. Container (1) according to Claim 5, **characterised in that** said longitudinal reinforcing member is moulded onto said container (1).

13. Container (1) according to Claim 3, **characterised in that** said longitudinal reinforcing member is extruded onto said container (1).

14. Container (1) according to Claim 3, **characterised in that** said longitudinal reinforcing member is heat-welded or glued onto said container (1).

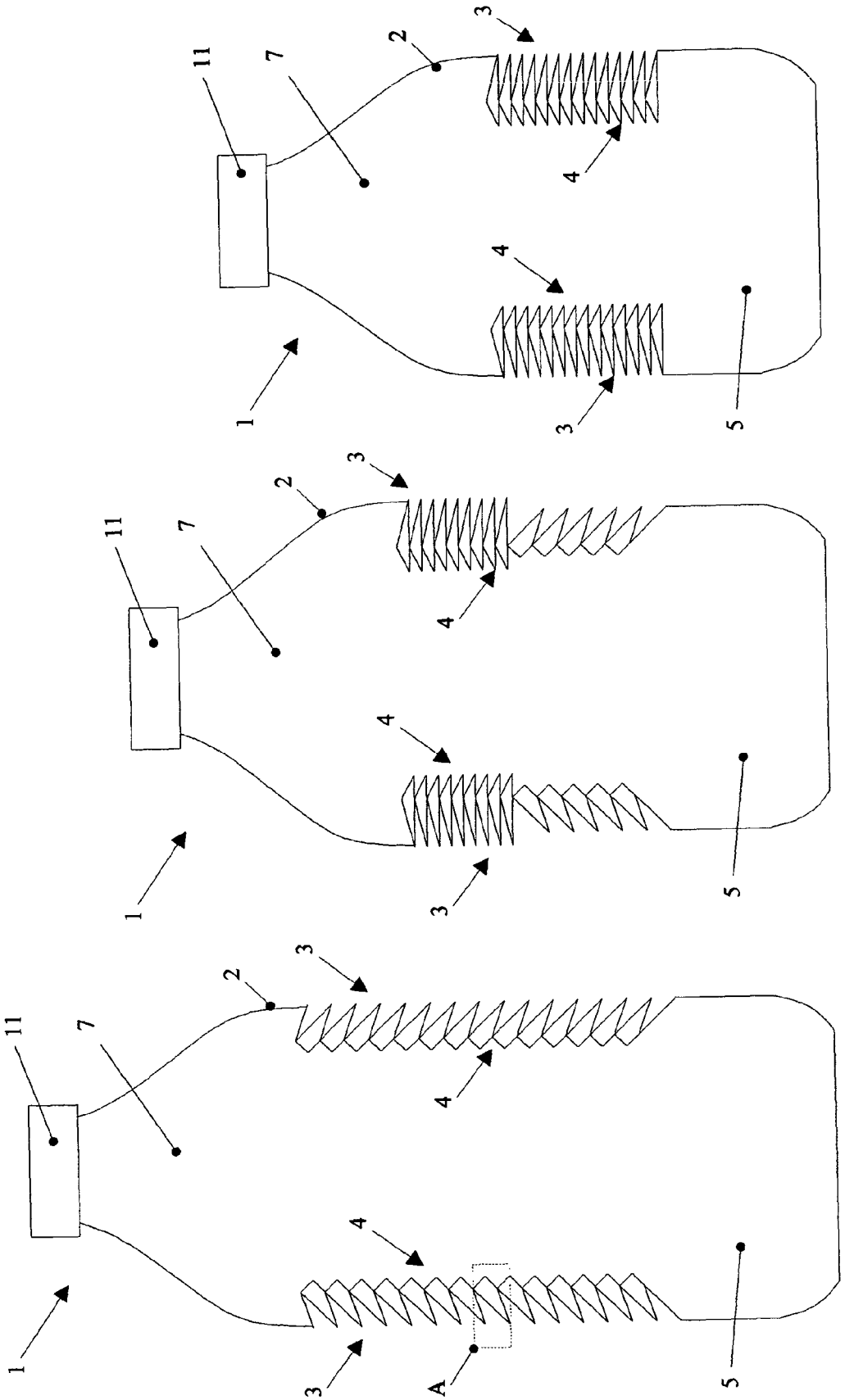

FIG. 3

FIG. 2

FIG. 1

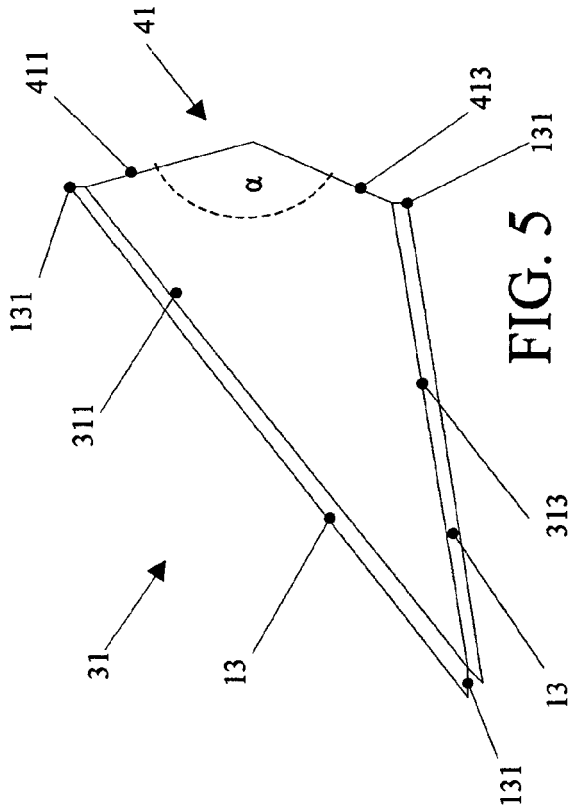

FIG. 5

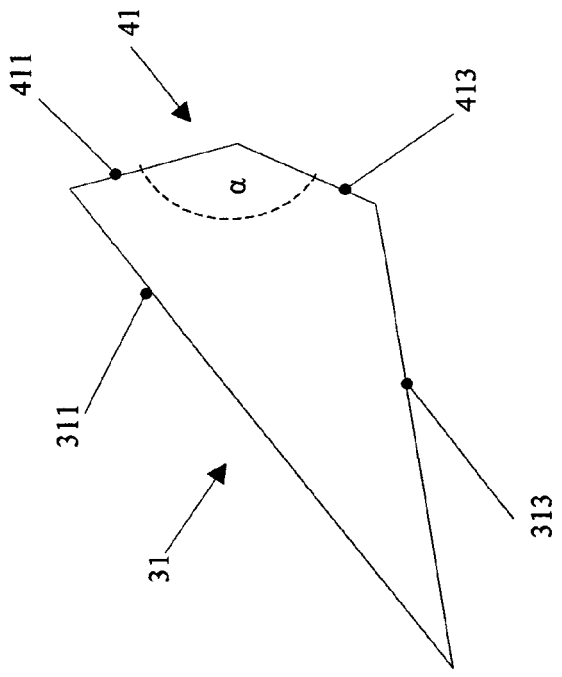

FIG. 4

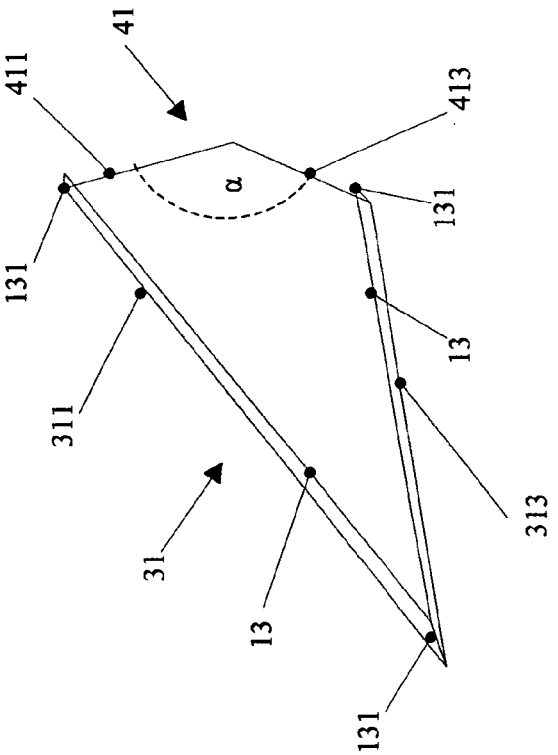

FIG. 6

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 42 5869

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.7)
X	PATENT ABSTRACTS OF JAPAN vol. 018, no. 559 (M-1692), 25 October 1994 (1994-10-25) & JP 06 199349 A (RISO KAGAKU CORP), 19 July 1994 (1994-07-19) * abstract *	1-4	B65D1/02
Y		5,7-9,12	

Y	FR 1 191 951 A (LUCKE) 22 October 1959 (1959-10-22) * the whole document *	5,7-9,12	

A	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 02, 29 February 2000 (2000-02-29) & JP 11 301633 A (TOYO SEIKAN KAISHA LTD), 2 November 1999 (1999-11-02) * abstract *	1,5,7-9,12	

			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 June 2005	Gino, C

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 42 5869

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.

13-06-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 06199349 A	19-07-1994	NONE	
FR 1191951 A	22-10-1959	NONE	
JP 11301633 A	02-11-1999	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82