

Description

[0001] The present invention relates to a container made from a metal sheet material and having a shock-absorbing closure, comprising a container body with a circumferential shell, a lower bottom, an upper opening and a rim surrounding the opening, the rim having a sealing area adapted to engage a corresponding sealing area of a lid for sealing of the container by contact between the metal sheet materials of the rim and the lid, in which at least at one of the sealing areas securing means are provided, which are integral with the rim and/or the lid, for retaining the lid on the container body, when the lid is in a closing position, said securing means being designed in such a manner that securing engagement is obtained thereby that the lid is taken downwards relative to the container body to its closing position.

[0002] Containers of this type are used for transport and storage of paint and the like technical liquids. The securing means are to prevent the lid from coming off incidentally, for instance if a container is dropped or for any other reason subjected to an impact.

[0003] The metal sheet material, from which the container is made, or the metal sheet materials, from which the various parts of the container are made, may be of any suitable type and may be provided with lacquer, paint or a similar thin coating on one or both sides, as it is known per se.

[0004] For this type of containers security clearances exist, by which the containers are classified on the basis of dropping tests, in which filled, closed containers are dropped in such a manner that they land on the edge of the rim, which is consequently heavily deformed. The classification is made dependent on the height, from which a container can drop, without leaking.

[0005] Examples of a container of the type described by way of introduction are found in WO-A-92/04248, which describes containers, in which the securing means comprise at least one annular bead of a deformable material retained at one of the two sealing areas, the bead constituting an extension of the sealing area, in which an adhesive has been applied to at least one of the sealing areas, whereby the lid, when taken to its closing position, is brought into contact with the container body via the deformable bead, the adhesive binding the bead retained at one sealing area to the other sealing area.

[0006] WO-A-00/68107 discloses another container, in which the securing means comprise a circumferential, protruding portion of the lid or the rim near the sealing area, said protruding portion, when the lid is taken to its closing position, snap-engaging in a locking manner a corresponding, circumferential portion at the other sealing area.

[0007] In the containers disclosed in WO-A-92/04248 and WO-A-00/68107 the rims are constituted of independent members, which are flanged on the material of the shell at the upper edge of the container body.

[0008] WO-A-98/35882 describes an example of a container, in which the rim is designed integrally with the material of the shell.

[0009] GB-A-2 125 381 describes a container for storage of food articles under pressure (low pressure or overpressure) with a shell of corrugated material, a lid with a valve and a tightening band to keep lid and container body together. Between the rim of the container body and the lid sealing rings have been inserted in such a manner that there is no direct contact between the sheet materials of the container body and the lid. The object of the corrugations, which are not discussed in detail, is reinforcement, and the corrugations are shown as sine-shaped with inflections inclined approximately 65° relative to vertical. The tightening band, or alternatively a row of clamps, are supplementary members, which are to be applied to the container after application of the lid. This entails extra work, which is undesirable in connection with the present invention.

[0010] The object of the present invention is to design a container of the type mentioned by way of introduction in such a manner that its ability to prevent leakage, when dropped, is improved. It is thus the object to provide an improved container, which can be classified in a better safety class.

[0011] The object is met in that near the rim the shell is provided with at least one circumferential bead positioned outside the sealing area of the rim.

[0012] When a container falls from a high height, for instance 1 meter, the rim and the adjacent parts of the shell and the lid are heavily deformed with sharp bends between deformed and (substantially) not deformed portions. These sharp bends seem to be critical in respect of leakage. By designing a container according to the invention said bends seem to become less sharp, and tests have shown that a container designed according to the invention resists leakage at drops from substantially higher heights than a corresponding container without a bead according to the invention.

[0013] In a preferred embodiment the bead, seen in a vertical, diametric cross-sectional view of the container, is provided with sides inclining 25° - 35° relative to vertical, preferably approximately 30°. By designing certain areas of the shell, in which the material is not positioned in the substantially vertical plane as the remaining portions of the shell, a weakening is introduced, which has a negative influence on the carrying capacity, to be understood as the number of filled container, which can be stacked for transport. Therefore, the inclination of the sides of the bead relative to vertical must not be too big. On the other hand, a too small inclination will exclude or weaken the desired effect. 30° seem to be close to the optimum compromise between these two conflicting factors.

[0014] The shell normally has a conical or cylindrical portion between the bottom and the rim. The bead is preferably positioned at the upper border of the conical or cylindrical portion. One or more beads provided to

strengthen the middle part of the shell may thereby disrupt the conical or cylindrical portion, or a single bead may be provided in a conical portion to determine a nested position for a container in a second, empty container.

[0015] The bead is preferably extending outward relative to the interior of the container.

[0016] In connection with containers of the type in question it is preferred that the shell is substantially smooth, as the exterior side of the shell is normally decorated by direct printing on the material of the shell. Therefore, beads generally constitute an undesirable disruption of an otherwise smooth, decoration-carrying surface. In an embodiment, in which several closely spaced beads are provided at the rim, the closely spaced beads defining a bead section, a bead-free portion of the shell therefore preferably delimits said bead section. The bead section extends around the container body and has a given width in vertical direction. The bead-free portion is at least of the same width as the bead section and preferably substantially wider.

[0017] The bead section may contain exactly two beads. This embodiment has turned out to have good safety properties in respect of drops of the above-mentioned type.

[0018] The container is often designed in such a way that the lid in its closing position extends somewhat downwards into the container body relative to its upper edge. Consequently, the bead section preferably extends at the bottom level of parts of the lid in its closing position. Said parts of the lid are in this connection usually constituted by a circumferential depression close to the periphery of the lid.

[0019] In an embodiment the securing means comprise an adhesive at at least one of the sealing areas, the lid being, when taken to its closing position, brought into contact with the container body via the adhesive.

[0020] In other embodiments the securing means are designed as described in the above-mentioned WO-A-92/04248 or WO-A-00/68107.

[0021] The invention will be described in detail in the following by means of examples of embodiments with reference to the schematic drawings, in which

Fig. 1 is a perspective view of a container according to the invention,

Fig. 2 is a sectional view along the line II-II,

Fig. 3 is a view corresponding to Fig. 2, but the lid has been lifted from the container body, and

Figs 4 and 5 are views corresponding to Fig. 2 but of alternative embodiments.

[0022] Figs 1-3 show a container 1 with a container body 2 formed by a circumferential shell 3, a bottom not shown, which closes the container at the bottom, and an attached rim 4, which surrounds an upper opening in the container. The opening is in Figs 1 and 2 closed by means of a lid 5. The container is provided with a handle pivotally secured in holders 7, one of which only

being shown in Fig. 1.

[0023] The container body is preferably slightly conical such that empty container bodies may be nested. In this connection the holders 7 constitute stops, which determine how far the container bodies can be nested, whereby wedging is avoided. It is also known to let a circumferential carrier bead placed at a level corresponding to the one shown in respect of the holders 7 constitute such a stop.

[0024] The container is provided with a closure device of the type described in WO-A-92/04248.

[0025] The lid 5 is formed from a metal sheet material having a thickness of 0.15-0.5 mm and comprising a substantially plane middle portion 11 surrounded by a slightly elevated portion 12, which is in turn surrounded by a U-shaped duct 13, the bottom of which constitutes the lower part of the lid in its usual closing position shown in Figs 1 and 2. The exterior side of the outer leg of the U forms a substantially cylindrical sealing area 14 having a projection 15. Adjacent to the sealing area 14 a circumferential deformable bead 16 is provided, said bead being provided with an adhesive 17.

[0026] The shell 3 of the container body 2 has a substantially smooth, conical portion 21 extending from the bottom and close to the rim 4. The conical portion may, as indicated above, comprise a circumferential carrier bead on a level with the holders 7. The shell 3 has a shoulder piece 22, whereby a cavity is established, which accommodates the attached rim 4, a substantially cylindrical sealing area 23 of the rim 4 extending in extension of the conical portion 21. At the sealing area 23 a bead 24 of a deformable material is provided. The rim 4 is connected with the upper edge of the shell 3 by a folded seam 25. Between the sealing area 23 and the conical portion 21 a groove 26 is provided.

[0027] The shell 3 is near the rim 4 provided with two circumferential, closely spaced beads 27. The beads may have a triangular or sine-shaped cross-section or something between. Their sides or inflexions form angles α and β of approximately 30° and approximately 150° , respectively, with vertical as shown in Fig. 3. The beads 27 have in the embodiment a width b of approximately 5 mm. The upper bead 27 may be positioned immediately under the shoulder piece 22 or it may be displaced slightly downward relative thereto such that a small conical portion having a width h is provided between the shoulder piece 22 and the beads 27. The width h may be of the same size as the width of the beads 27, but it has preferably a size corresponding to half the width of a bead.

[0028] The beads 27 protrude outwards relative to the interior of the container in order not to bar the possibility of nesting empty containers by reducing the interior free diameter.

[0029] The two beads 27 form together a bead section placed under the sealing area of the rim. Under the bead section the shell has a smooth, bead-free, conical portion, which by and large extends down to the bottom. If

the containers had been provided with a carrier-bead, a smooth, bead-free, conical portion would be present between the bead section and the carrier bead, said conical portion having a width which would at least be equal to the width of the bead section.

[0030] When the container is to be used, the container body 2 is filled with a material for storage and/or transport, for instance paint. Then the container is closed thereby that the lid is pressed down into its closing position shown in Fig. 2. This makes the projection 15 engage the groove 26, and the adhesive 17 is brought into interconnecting the beads 16 and 24, said beads thus constituting extensions of their respective adjacent sealing areas 14, 23.

[0031] The connection between the container body and the lid by means of the two beads 16, 24 and the adhesive 17 constitutes a shock-absorbing securing means, which has the effect that the container can endure to drop down on the folded seam 25 from a certain height. The presence of the beads 27 has the effect that this height is substantially bigger than if no beads were present.

[0032] Figs 4 and 5 show other embodiments of the invention with other closure devices known from WO-A-92/04248, where the same reference numerals designate the same elements as in Figs 1-3.

Claims

1. A container made from a metal sheet material and having a shock-absorbing closure, comprising a container body (2) with a circumferential shell (3), a lower bottom, an upper opening and a rim (4) surrounding the opening, the rim (4) having a sealing area (23) adapted to engage a corresponding sealing area (14) of a lid (5) for sealing of the container by contact between the metal sheet materials of the rim and the lid, in which at least at one of the sealing areas (14, 23) securing means (16, 17, 24) are provided, which are integral with the rim (4) and/or the lid (5), for retaining the lid (5) on the container body (2), when the lid is in a closing position, said securing means (16, 17, 24) being designed in such a manner that securing engagement is obtained thereby that the lid (5) is taken downwards relative to the container body (2) to its closing position, **characterized in that** near the rim (4) the shell (3) is provided with at least one circumferential bead (27) positioned outside the sealing area (23) of the rim.
2. A container according to claim 1, **characterized in that** the bead (27), viewed in vertical, diametric cross-section of the container (1), is provided with sides inclining 25° - 35° relative to vertical, preferably approximately 30°.
3. A container according to claim 1 or 2, in which the shell (3) has a conical or cylindrical portion (21) between the bottom and the rim, **characterized in that** the bead (27) is positioned at the upper border of the conical or cylindrical portion (21).
4. A container according to claims 1-3, **characterized in that** the bead (27) is extending outwards relative to the interior of the container.
5. A container according to claims 1-4, **characterized in that** several closely spaced beads (27) are provided at the rim (4), the closely spaced beads (27) defining a bead section, which is delimited downwards by a bead-free portion of the shell (3).
6. A container according to claim 5, **characterized in that** the bead section contains exactly two beads (27).
7. A container according to claim 5 or 6, in which the lid in its closing position extends somewhat downwards into the container body relative to its upper edge, **characterized in that** the bead section extends at the bottom level of parts of the lid in its closing position.
8. A container according to claims 1-7, **characterized in that** the securing means comprise an adhesive (17) at at least one of the sealing areas (14), the lid being, when taken to its closing position, brought into contact with the container body via the adhesive.
9. A container according to claims 1-7, **characterized in that** the securing means comprise at least one circumferential bead (16, 24) made from a deformable material and retained at one of the two sealing areas (14, 23), the bead (16, 24) constituting an extension of the sealing area (14, 23), that an adhesive (17) has been applied to at least one of the sealing areas (14), whereby the lid (5), when taken to its closing position, is brought in contact with the container body via the deformable bead (16, 24), the adhesive (17) binding the bead retained at one sealing area to the other sealing area.
10. A container according to claims 1-9, **characterized in that** the securing means comprise a circumferential, protruding portion (15) of the lid (5) or the rim close to the sealing area, said protruding portion, when the lid is taken to its closing position, snap-engaging in a locking manner a corresponding, circumferential portion (26) at the other sealing area.

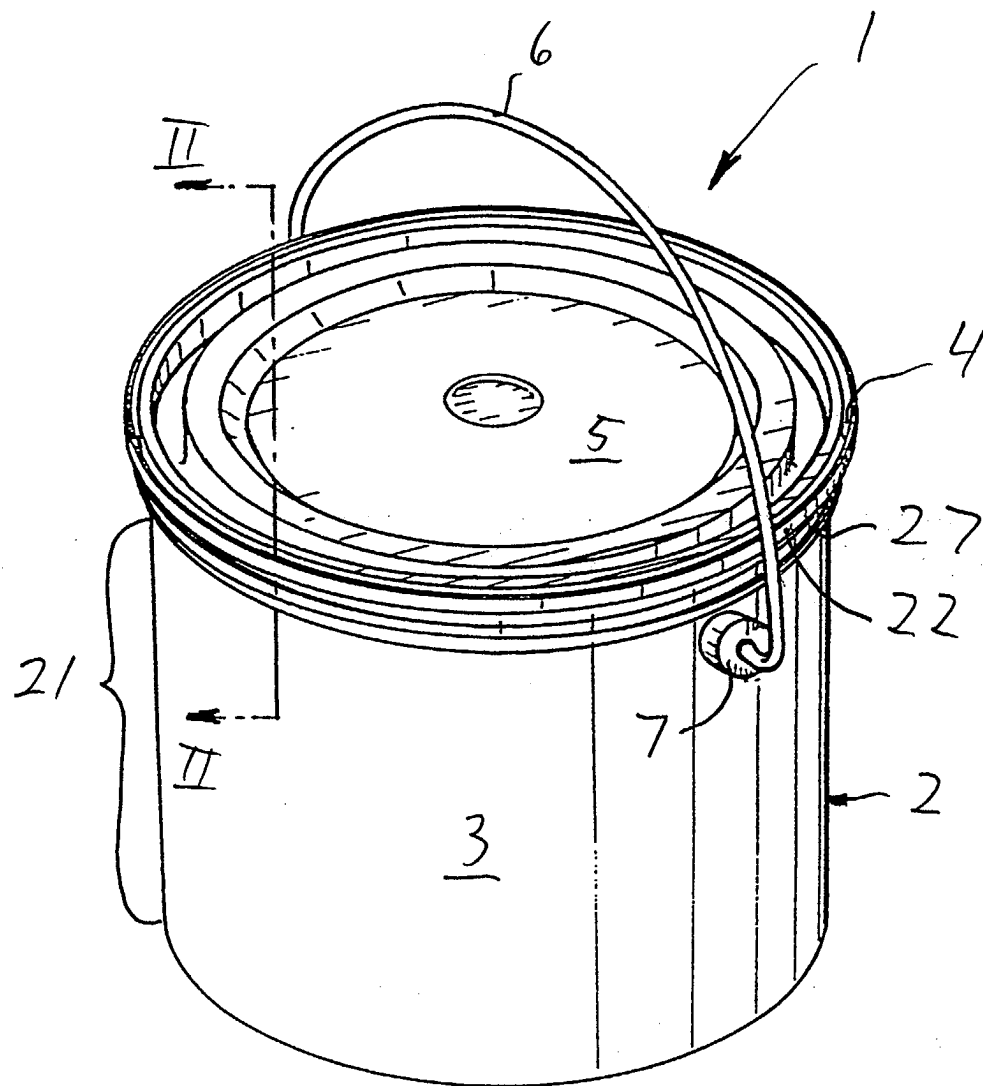
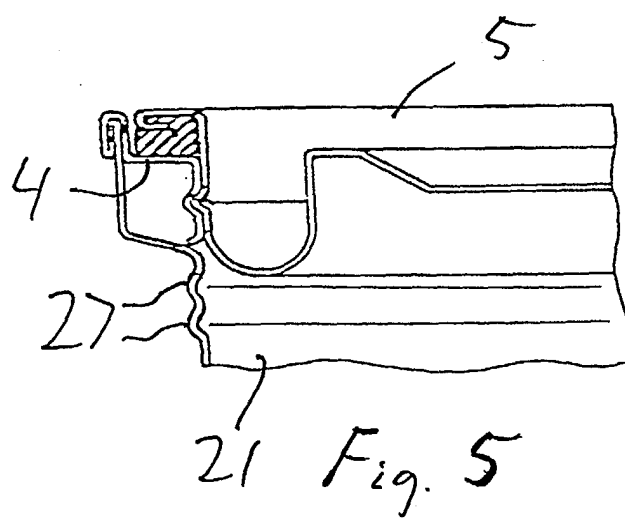
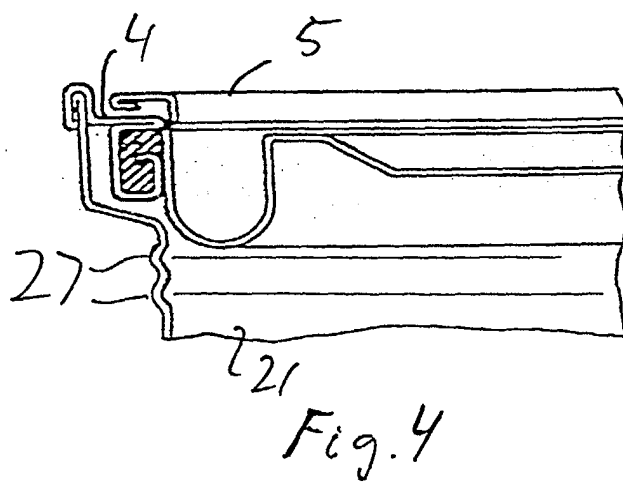
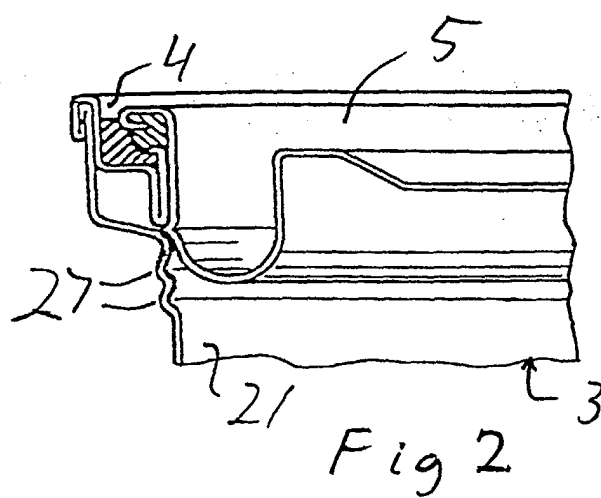


Fig. 1



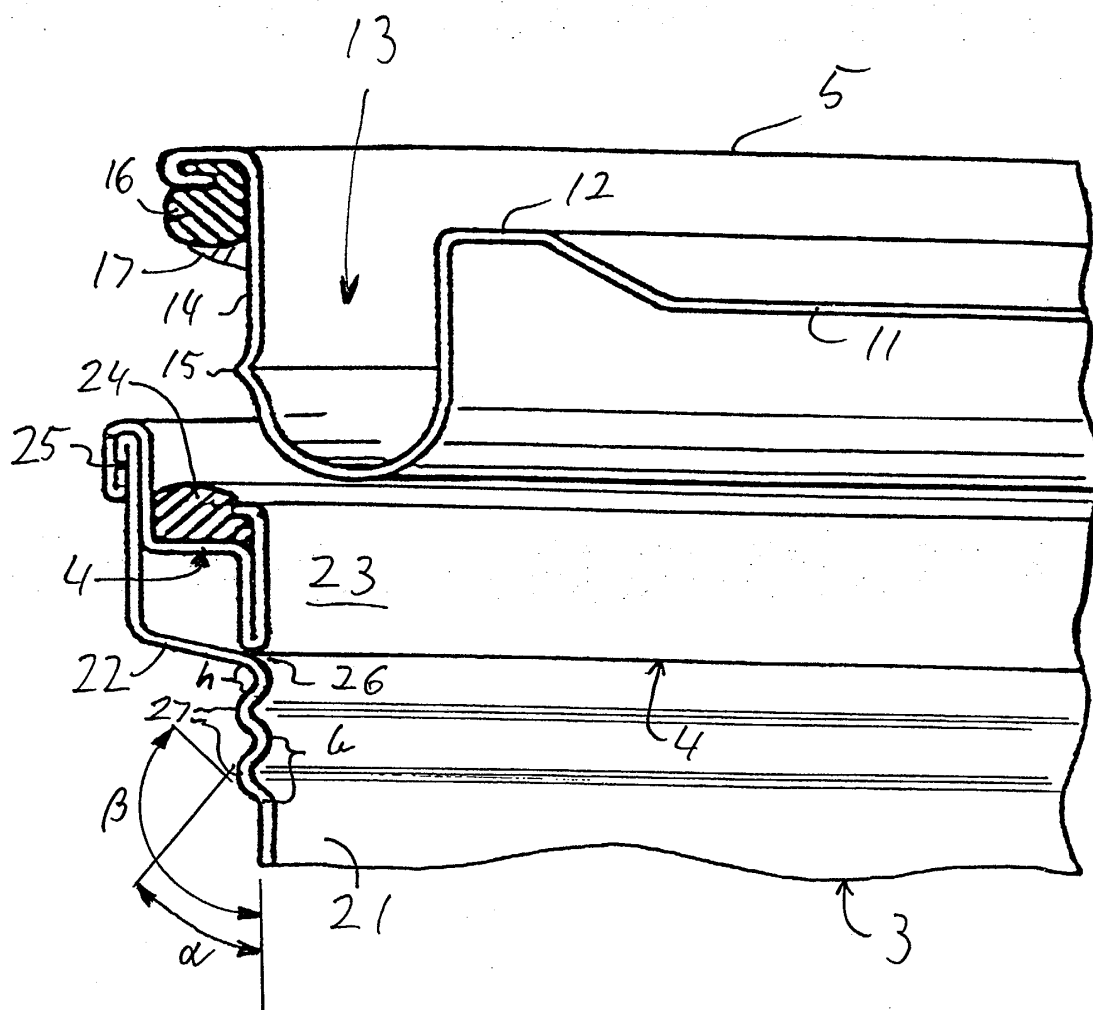


Fig. 3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 38 8050

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	US 4 880 131 A (KNOWLTON PAUL ET AL) 14 November 1989 (1989-11-14)	1,3-7	B65D1/44 B65D8/12
Y	* column 3, line 27 - line 54 * * column 8, line 51 - column 9, line 6 * * column 10, line 4 - line 29; figures 3A,5 *	2,8-10	B65D43/02 B44D3/12

X	DE 40 35 769 A (EFFEM GMBH) 21 May 1992 (1992-05-21)	1,3-5	
Y	* column 3, line 6 - line 48; figures 1-3 *	7-10	

X	US 4 513 872 A (BULL CYRIL A) 30 April 1985 (1985-04-30)	1,3,4	
Y	* column 3, line 9 - line 30; figure 6 *	2,7-10	

D,Y	WO 92 04248 A (BALTIC METALVAREFAB) 19 March 1992 (1992-03-19) * figures 1-5 *	7-10	

Y	US 3 268 109 A (MARTINUS COPPENS MATTHEUS JOHA) 23 August 1966 (1966-08-23) * column 1, line 17 - line 26 * * column 4, line 50 - line 57; figure 2 *	2	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B65D B44D

A	US 3 472 418 A (ULLMAN FREDERICK E) 14 October 1969 (1969-10-14) * column 2, line 3 - line 12 * * column 2, line 33 - line 39 *	1	

A	AU 609 767 B (CONTAINERS LTD) 9 May 1991 (1991-05-09) * figure 2 *	1-10	

The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 30 October 2003	Examiner Appelt, L
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 (P44C01)

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

EP 03 38 8050

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.

30-10-2003

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4880131	A	14-11-1989	AT 75687 T	15-05-1992
			AT 86203 T	15-03-1993
			AU 2441288 A	18-05-1989
			CA 1324343 C	16-11-1993
			CA 1288641 C	10-09-1991
			DE 3870813 D1	11-06-1992
			DE 3878931 D1	08-04-1993
			EP 0316754 A1	24-05-1989
			EP 0428190 A1	22-05-1991
			ES 2031982 T3	01-01-1993
			ES 2033624 T1	01-04-1993
			NZ 226646 A	26-07-1990
			US 4839491 A	13-06-1989
			US 4936482 A	26-06-1990
			US 5065888 A	19-11-1991
			US 5103995 A	14-04-1992
			US 5152417 A	06-10-1992
			US 5240138 A	31-08-1993
			US 5316169 A	31-05-1994
			ZA 8808423 A	25-07-1990
DE 4035769	A	21-05-1992	DE 4035769 A1	21-05-1992
			AU 8735491 A	11-06-1992
			WO 9208656 A1	29-05-1992
US 4513872	A	30-04-1985	GB 2109777 A	08-06-1983
			DE 3241953 A1	26-05-1983
			FR 2516478 A1	20-05-1983
			IN 157535 A1	19-04-1986
			US 4560313 A	24-12-1985
			US 4667499 A	26-05-1987
			ZA 8208245 A	31-08-1983
WO 9204248	A	19-03-1992	DK 210390 A	04-03-1992
			AT 116247 T	15-01-1995
			DE 69106373 D1	09-02-1995
			DE 69106373 T2	10-08-1995
			WO 9204248 A1	19-03-1992
			DK 546051 T3	12-06-1995
			EP 0546051 A1	16-06-1993
			ES 2067950 T3	01-04-1995
			FI 930952 A ,B,	03-03-1993
			NO 930763 A	02-03-1993
US 3268109	A	23-08-1966	NONE	

EPO FORM P0459

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

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

EP 03 38 8050

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.

30-10-2003

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 3472418	A	14-10-1969	CH	466127 A	30-11-1968
			DE	1611960 A1	18-02-1971
			ES	136574 Y	16-08-1969
			FR	1558011 A	21-02-1969
			GB	1162958 A	04-09-1969
			NL	6802574 A ,B	28-08-1968

AU 609767	B	09-05-1991	AU	609767 B2	09-05-1991
			AU	1075088 A	28-07-1988

EPO FORM P0459

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