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(54) **Can body with a sealing compound placed on a step or flange and method of forming such a can body**

(57) A can body is provided with a shelf or flange (17) onto which pliable material such as a lining compound (12) is deposited in fluid form. A closure (30) is placed onto the shelf (17) whilst the compound (12) is still in its fluid state. The closure (30) thus forms a depression in the compound (12), which then hardens into this shape

to fix the closure (30) in position. The can body of the invention is particularly suited to use in the packaging of foods which are then processed in an overpressure retort.

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Description

Technical field

[0001] This invention relates to a can body. In particular, it relates to the combination of a can body for products such as food, which are usually processed with overpressure.

Background art

[0002] Cans for the packaging food are typically of the two or three piece form, comprising a tubular can body, either cylindrical or irregular/polygonal in shape, with a base and closed by a can end, diaphragm, film, screw top or other closure. The base may be integral with a cylindrical can body so as to form a so-called two-piece can body, or the can body may be formed from a tube of sheet metal with the edges of the sheet metal joined by a welded side seam, which is then closed at both ends to form a three-piece can.

[0003] Typical food cans which are closed by a can end have sealing compound in the curled edge of a cover hook portion of the can end in order to provide a tight hermetic seam, usually known as a double seam due to the two thicknesses of metal in the seam, one from the can body and the other from the can end. A problem with a three piece can body is that the welded side seam provides an irregular sealing surface for seaming. The sealing compound needs to be precisely and uniformly placed so the resultant ring of sealing compound within the seam has the right width, thickness and position to ensure that the seam has the required tightness. Double seam technology is a precise art, which relies on numerous factors for seam integrity, of which the sealing compound is one important feature.

[0004] Cans for other products may use different closure arrangements, for example a peelable foil is typically seated on an intermediate ring which, in turn, is seamed to the can body. Such can and ring combinations are expensive to manufacture as the centre of the ring element is generally scrapped, leading to material wastage. Proposals such as those described in EP 1029613 A and PCT/WO 2005063587 avoid wasting the centre of the ring, but include additional manufacturing stages which in turn involve extra process time and/or capital equipment costs.

[0005] It is an advantage if cans are recloseable when the product is not to be used/consumed at a single time and is therefore only partly dispensed. Lever lid containers can generally be pressed back onto the can body in order to provide a degree of seal against the atmosphere. Food cans, on the other hand, which have seamed on can ends, have an end panel removed to provide access to the food and therefore require a separate cover for protecting the remaining food from the atmosphere. This is at best simple protection and rarely provides even a partial seal.

[0006] A further requirement for the closure is to maintain an hermetic seal during processing of the can contents. This is particularly important for food products, which may need to undergo a variety of types of processing, according to the food product. Overpressure retort processes are in common use for processing some food products such as tomatoes. Such food cans are often referred to as "vacuum" cans, although clearly there is a product in the can. In an overpressure process the pressure difference between the inside and outside of the can may be as high as 1 bar. Leakage of the can contents in any process leads to rejection of at least that can, and at worst affects the entire production run.

Disclosure of the invention

[0007] This invention seeks to provide a can body and closure element for closing by a variety of closure panels (can end, diaphragm, disc etc.) at a reduced cost in comparison with traditional peelable closures. In a specific example of the invention, it also seeks to provide a can body which, when filled, is suitable for closing and/or processing under partial vacuum such as in an overpressure retort process.

[0008] According to the present invention, there is provided a can body having a base and a sidewall, the can sidewall having a step or flange around its perimeter and a pliable material placed on the step which forms a seat for a closure.

[0009] The can body may be two or three piece type. When the pliable material is placed around the whole periphery of the step, it covers any weld margin. The sealing surface formed by the pliable material is uniform in height around the periphery, with the depth of material varying according to non-uniform features such as the weld margin.

[0010] The step may be either external or internal such that the sidewall is stepped out (or expanded) or stepped in, or may be in the form of a fold or flattened bead, which in turn may extend either inwardly or outwardly. A stepped in sidewall and outwardly flattened flange, whilst possible within the scope of the invention, is not recommended in practice due especially to cut edge considerations within the pack and the unnecessary usage of metal. The flattened bead has excellent hoop strength and therefore abuse resistance. Furthermore, a step of any kind which is on a beaded can body also has good abuse resistance due to the rigidity of the beaded sidewall.

[0011] The pliable material may be a plastic, sealing compound, elastomeric material or rubber. The edge of the sidewall may be curled either outwardly or inwardly. An inwardly curled edge is useful for snap-fitting a closure component underneath the curl.

[0012] The can body is generally used in combination with a recloseable end or closure which includes a vacuum release feature such as a tab or ring pull, customised tab or press down button. The closure or release feature itself may include tamper evident features and/or leak

detection.

[0013] The design of the can body of the invention minimises impact on the closure during processing and handling, although additional mechanical clipping may be provided for extra security if desired during handling, filling or re-closure.

[0014] According to another aspect of the present invention, there is provided a method for forming a can body with a step in its sidewall, the method comprising, in a first embodiment, the steps of forming a curl in an edge of the can body's sidewall by die curling, beading the sidewall, forming a step and applying fluid sealing compound on the step.

[0015] In a second embodiment, the beading and step forming stages may be carried out independently or simultaneously and thereafter the curl is formed in a spin curling stage. Spin curling is preferable where reduced top load is required as there is much less top load in spin curling than in die curling.

[0016] A closure is preferably placed on the sealing compound whilst the compound is still fluid, thereby adhering the closure to the can body. This method is preferred where double seaming is used for closing a three-piece can. Alternatively, the closure may be mechanically clipped to the can body so as to maintain a seal during filling but before vacuum (negative pressure) is achieved in the can.

Brief description of the drawings

[0017] Preferred embodiments of the invention will now be described, by way of example only, with reference to the drawings, in which:

Figure 1 is a schematic side section of a can body having a flattened bead as a radially inward step;
 Figure 2 is a schematic side section of a can body having a step which is stepped radially outwardly;
 Figure 3 is a partial section of a closure seated on sealing compound;
 Figure 4 is a schematic side section similar to that of figure 1, with a clip retaining the closure and providing a lever-open function;
 Figure 5 is an alternative embodiment in which the can body includes an independent ring; and
 Figure 6 is a lever open version of the closure of figure 1.

Mode(s) for carrying out the invention

[0018] The schematic side sections of figures 1 and 2 each comprise a can body of 0.16 mm tinplate terminating at the upper end of its sidewall 3 in an outward curl 5. The can body wall thickness could be in the range of 0.14 to 0.25 mm. The sidewall 3 of each figure includes a step 10 which provides a shelf on which sealing compound 12 is deposited. A closure 20 of 0.16 to 0.21 mm gauge tinplate or tin free steel is seated on the shelf 10 as shown.

[0019] In figure 1, the step 10 comprises a bead 15, which has been flattened so as to form a shelf of the order of 3 mm in width with a relatively flat upper surface 17 on which the sealing compound 12 is deposited whilst in a fluid state. The width and geometry of the shelf must be sufficient to allow for placement and curing of the compound without the liquid compound flowing over the edge of the shelf.

[0020] The closure 20 is of thinner metal than the can body, typically 0.21 mm for an easy open end. The closure is placed on the fluid compound, thereby forming a depression 13 in the compound, which sets into this shape as the compound hardens. The lining of the example of figure 3 is 038 lining compound but other types may be suitable.

[0021] As shown in figure 3, the lining compound 12 has been deposited as a liquid over the weld step 25 which it fills so as to provide a smooth surface for seating the closure 20.

[0022] Similarly, the step 10 of the can body of figure 2 forms a shelf for the fluid sealing compound onto which the closure 20 is placed and forms depression 13.

[0023] Alternative embodiments of the invention are shown in figures 4 and 5. Figure 4 is a similar side section to that of figure 1 with the can body terminating in an inwards curl 5. The closure 30 comprises a centre panel 32, which extends radially outwardly into a bead 34 and terminates in an radially outward curl 36. The closure bead 34 is seated on the sealing compound 12 on the upper surface of shelf 17 as in the example of figure 1. A plastic clip 40 clips over the pair of curls 5, 36 to retain the closure more firmly in position. In figure 4, the clip 40 extends radially inwardly into a tab 38 for ease of opening.

[0024] In figure 5, the can body includes a separate ring component 50 with a step 56 in the ring rather than the can body wall itself. The ring is fixed to the can sidewall typically by a double seam, and then the can and ring combination are closed by, for example, a peelable panel. In figure 5, the ring component 50 is shown with a seaming panel 54, prior to seaming to the can body. The flat panel of the closure 32 prevents the radius of the closure settling too deeply into the lining compound 12, or cutting through the compound onto shelf 56 itself. The closure disc has hemmed edges and is stuck to the lining compound 12 as described above, with tab 38 being folded back over the panel.

[0025] The lever open version of figure 6 has a closure 20 which is similar to that of figure 1 and comprises a panel and an upright wall depending from the panel which terminates in a curl. The upright wall in the embodiment of figure 6 includes a groove 62 into which a spoon 60 or other lever can be inserted in order to lever the closure off sealing compound 12 for opening of the container.

[0026] Numerous other embodiments are of course possible within the scope of the invention as defined by the claims.

Claims

ously.

1. A can body having a base and a sidewall, the can sidewall having a step or flange around its perimeter and sealing compound placed on the step which forms a seat for a closure. 5
2. A can body according to claim 1, in which the step is an expanded part of the sidewall periphery. 10
3. A can body according to claim 1, in which the step is a fold or flattened bead in the sidewall periphery.
4. A can body according to any one of claims 1 to 3, in which the pliable material is a plastic, elastomeric material, sealing compound or rubber. 15
5. A can body according to any one of claims 1 to 4, in which the sidewall includes a welded side seam and the pliable material covers the weld. 20
6. A can body according to any one of claims 1 to 5, in which the edge of the sidewall is curled either outwardly or inwardly. 25
7. A can body according to any one of claims 1 to 6, in which the sealing surface formed by the compound is uniform in height.
8. In combination, the can body of any one of claims 1 to 7 and a recloseable end or closure which includes a vacuum release feature. 30
9. In combination, the can body of any one of claims 1 to 7 and a recloseable end or closure which includes a tab. 35
10. A method of forming a can body with a step in its sidewall, the method comprising, in the following order, the steps of: 40
 - forming a curl in an edge of the can body's sidewall by die curling,
 - beading the sidewall,
 - forming a step and 45
 - applying a fluid pliable material on the step.
11. A method of forming a can body with a step in its sidewall, the method comprising, in the following order, the steps of: 50
 - beading the sidewall,
 - forming a step in the sidewalls,
 - forming a curl by spin curling and
 - applying a fluid pliable material on the step. 55
12. A method according to claim 8, in which beading and step forming are carried out substantially simultane-
13. A method according to any one of claims 7 to 9, further comprising placing a closure on the pliable material whilst the material is still fluid, thereby adhering the closure to the can body.

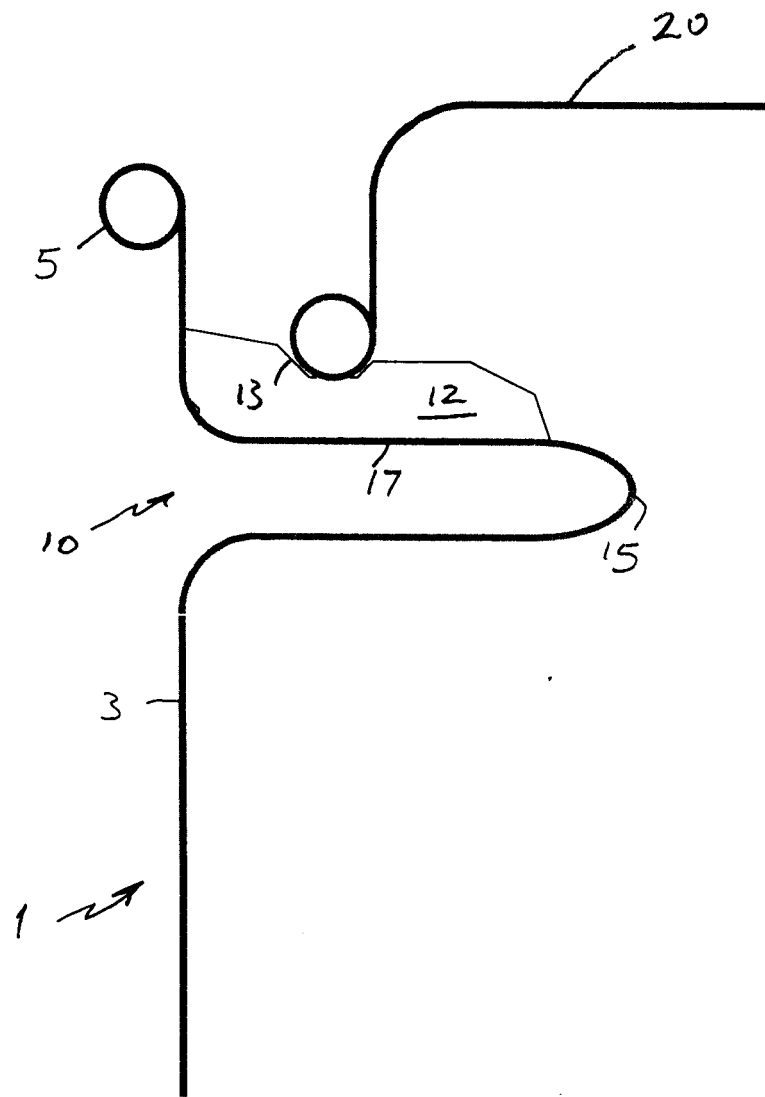


Fig. 1

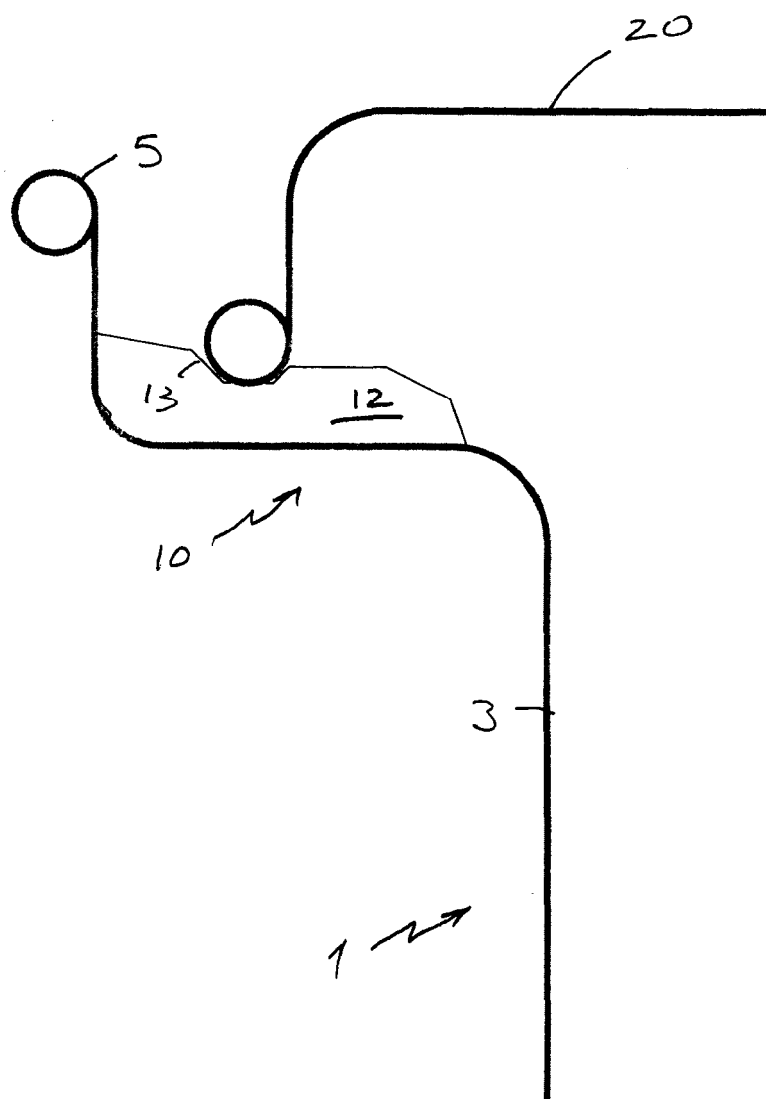


Fig. 2

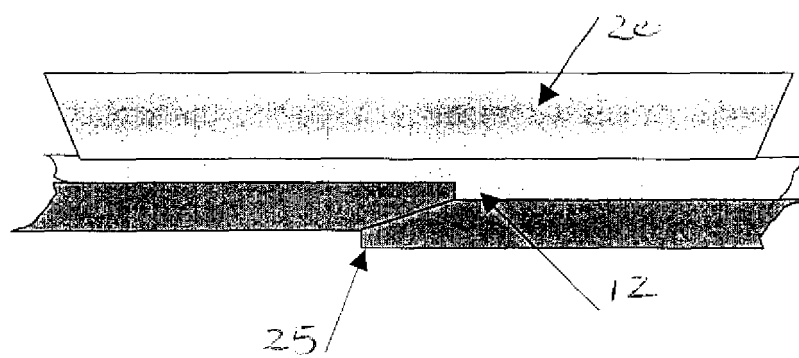


Fig. 3

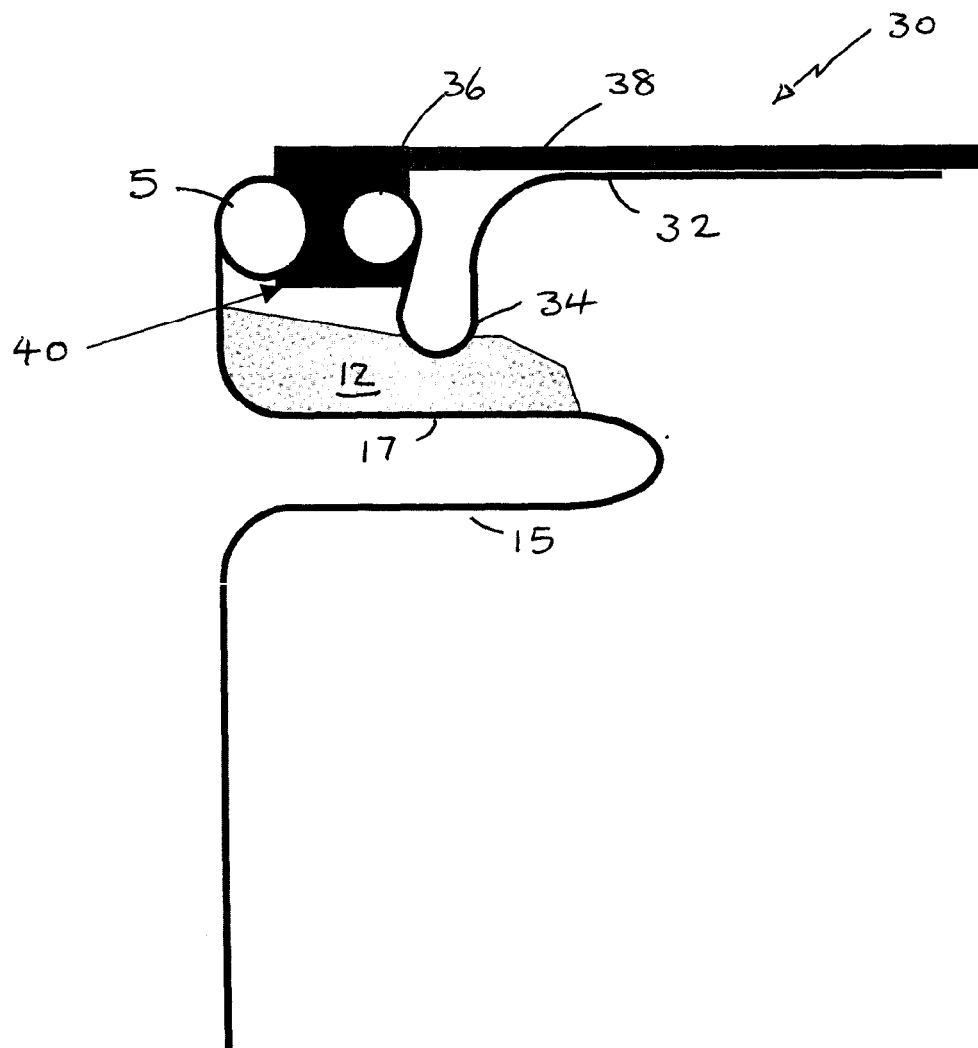


Fig. 4

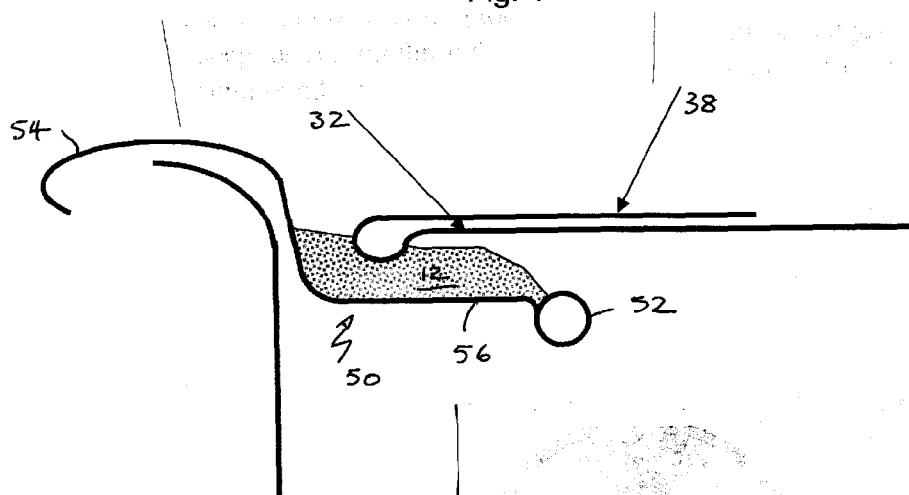


Fig. 5

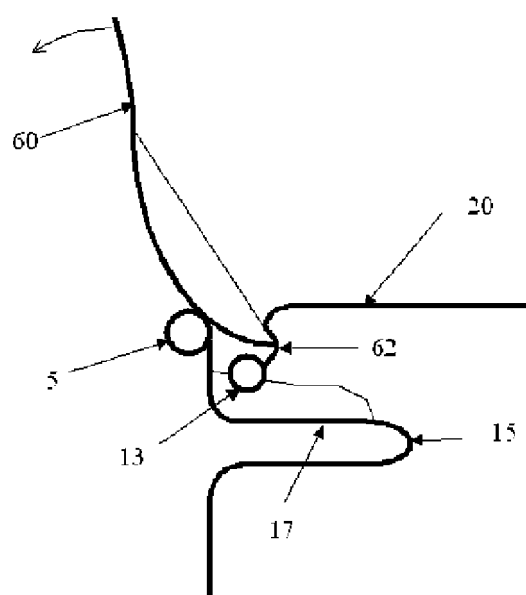


Fig. 6



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 11 2915

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 2 639 561 A (CARNAUD SA) 1 June 1990 (1990-06-01) * claims 1,3,4,6,8; figures 1-6 * * page 2, line 17 - line 34 * * page 3, line 10 - page 4, line 19 * * page 5, line 1 - line 24 *	1,3-7, 10-12	INV. B21D51/46 B65D8/20 B65D21/02
Y	* claims 1,3,4; figures 3-6 *	13	
A	* figure 8 *	8,9	
X	DE 40 38 870 A1 (EFFEM GMBH, 2810 VERDEN, DE) 4 June 1992 (1992-06-04) * page 2, column 2, line 2 - line 20; claims 1,3,4,7-9; figures 2,5,6 * * page 2, column 2, line 54 - page 3, column 3, line 1 * * page 3, column 3, line 15 - line 43 * * page 3, column 4, line 19 - line 35 * * page 3, column 3, line 25 - line 31 * * figures 1,2 *	1,2,4, 7-9	
Y		13	TECHNICAL FIELDS SEARCHED (IPC) B21D B65D
A	WO 96/07593 A (CARNAUDMETALBOX PLC; CARNAUDMETALBOX S.A; CARNAUDMETALBOX N.V; CARNAUD) 14 March 1996 (1996-03-14) * page 9, line 34 - page 10, line 23; claims 2,6; figure 7 *	1-5,7-9	
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 8 August 2006	Examiner Cano Palmero, A
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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
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08-08-2006

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- WO 2005063587 A [0004]