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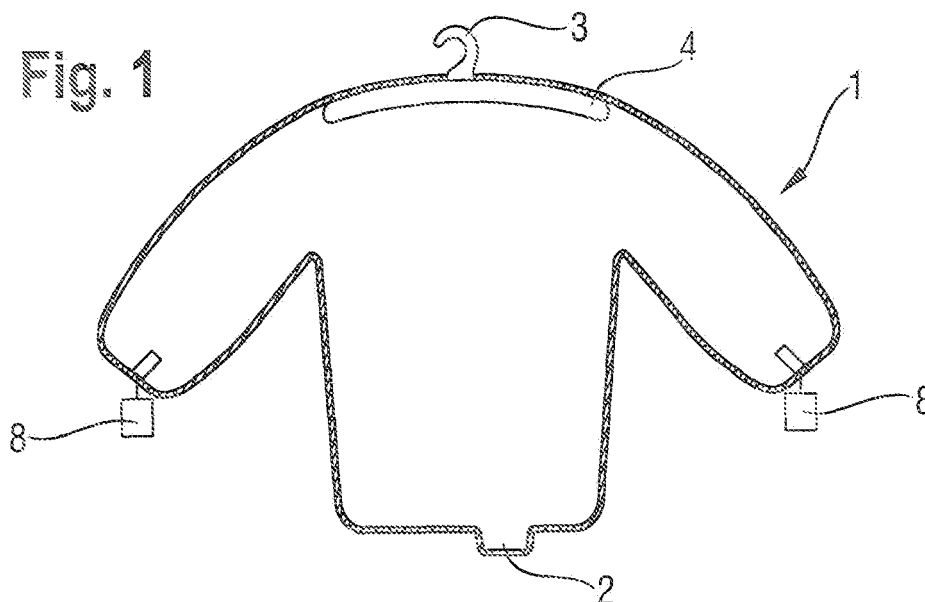
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(54) **Inflatable body and kit for de-wrinkling garments**

(57) An inflatable body (1) for de-wrinkling garments comprising an air inlet opening (2), wherein the inflatable body (1) comprises a nonwoven substrate having an air

permeability of from 0.005 m³/m²/min to 30 m³/m²/min, a kit comprising the inflatable body (1), and a method of dewrinkling garments.



Description

FIELD OF THE INVENTION

[0001] The present invention relates to an inflatable body for, and to a kit for de-wrinkling garments.

BACKGROUND OF THE INVENTION

[0002] Devices for de-wrinkling garments using an inflatable body and an air blowing device, are well known in the art.

[0003] One type is an all-in-one device. This device is a stand-alone device wherein the inflatable body and the air blower are integrated into one single device. These devices are rather expensive and typically occupy a lot of space. Usually, only one inflatable body is provided which can only accommodate one specific type of garment, such as a shirt. When one garment has been de-wrinkled, it has to be removed from the inflatable body in order to put a new garment over the inflatable body for a next de-wrinkling operation. Examples of such all-in-one devices are described in US6,834,441, US 2004/0245296 and US2005/0067442 (all assigned to BSH Bosch und Siemens Hausgerate GmbH).

[0004] Another type is a kit comprising several components which have to be assembled before use. These kits have the advantage that they can be disassembled, and therefore easily be stored away. Several shapes of inflatable bodies can be attached to the air blower, and thus these kits allow several types of garments to be de-wrinkled. Such kits are for example described in JP 2003-199996, JP 2003-199997, and JP 2003-199998 (all assigned to Matsushita Electric Industrial Co., Ltd.).

While these kits already provide some benefits over the all-in-one devices, they are still not convenient in use as a de-wrinkled garment has to be removed from the inflatable body before a new garment can be put on the inflatable body for a next de-wrinkling operation. Also the material of the inflatable body is still rather expensive. It is usually made of expensive, durable woven materials.

[0005] It is an objective of the present invention to provide a kit which is easy to store, convenient in use, and of low cost. It is another objective of the present invention to provide a kit for de-wrinkling garments which allows a user to de-wrinkle a series of garments without the need for removing the de-wrinkled garment from the inflatable body. It is a further objective of the present invention to provide a kit capable of de-wrinkling different types of garments.

SUMMARY OF THE INVENTION

[0006] According to a first aspect, the present invention relates to an inflatable body for de-wrinkling garments, comprising an air inlet opening and **characterized in that** the inflatable body comprises a nonwoven substrate having an air permeability of from 0.005 m³/m²/min to 30

m³/m²/min.

[0007] According to a second aspect, the present invention relates to a package comprising at least one inflatable body.

[0008] According to a third aspect, the present invention relates to a kit for de-wrinkling garments. The kit comprises at least one inflatable body, and an air blowing device.

[0009] According to a fourth aspect, the present invention relates to a method for de-wrinkling garments, comprising the steps of:

- a. providing an inflatable body according to claims 1-9; then
- b. placing a garment over said inflatable body; then
- c. attaching the inlet opening of said inflatable body to the outlet opening of an air blowing device;
- d. blowing air into said inflatable body.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

Fig. 1 shows a cross-section of an inflatable body according to the present invention.

Fig. 2 shows a front view of a kit according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0011] The present invention relates to an inflatable body for, and a kit for de-wrinkling garments, and to a package comprising at least one inflatable body.

Inflatable body

[0012] The inflatable body is used to be inserted into a garment. As shown in Fig. 1, the inflatable body **1** is shaped such that it takes the form, when inflated, of the inside of a garment. Any common garment can be envisaged such a shirt or a pair of trousers.

In order to allow air to enter the inflatable body **1**, it comprises an air inlet opening **2**. The air inlet opening **2** allows air to be blown into the body **1**, such that the body **1** can expand to take the shape of the garment.

[0013] The inflatable body **1** comprises a nonwoven substrate. The term nonwoven is to be defined according to the commonly used definition of the "Nonwoven Fabrics Handbook" published by the Association of the Nonwoven Fabric Industry. As used herein, a "nonwoven substrate" is a substrate comprising nonwoven fibers and made according to methods as described herein below. The definition of nonwoven substrate does not include woven fabric.

[0014] Nonwoven fibers comprise fibers that are naturally occurring (modified or unmodified), as well as synthetically made fibers, or combinations thereof. As used herein, "natural" fibers include all those, which are natu-

rally available without being modified, regenerated or produced by man and are generated from plants, animals, insects or by-products of plants, animals and insects. Examples of suitable unmodified/modified naturally occurring fibers include cotton, Esparto grass, bagasse, kemp, flax, silk, wool, wood pulp, chemically modified wood pulp, jute, ethyl cellulose, cellulose acetate, and combinations thereof. As used herein, "synthetic" means that the materials are obtained primarily from various man-made materials or from natural materials that have been further altered. Non-limiting examples of synthetic materials useful in the present invention include those selected from the group consisting of acetate fibers, acrylic fibers, cellulose ester fibers, modacrylic fibers, polyamide fibers, polyester fibers, polyolefin fibers, polyvinyl alcohol fibers, rayon fibers and combinations thereof. Examples of suitable synthetic materials include acrylics such as acrilan, creslan, and the acrylonitrile-based fiber, orlon; cellulose ester fibers such as cellulose acetate, amel, and acele; polyamides such as nylons (e.g., nylon 6, nylon 66, nylon 610, and the like); polyesters such as fortrel, kodel, and the polyethylene terephthalate fiber, polybutylene terephthalate fiber, dacron; polyolefins such as polypropylene, polyethylene; polyvinyl acetate fibers and combinations thereof.

These and other suitable fibers and the non-wovens prepared therefrom are generally described in Riedel, "Non-woven Bonding Methods and Materials," Non-woven World (1987); The Encyclopedia Americana, vol. 11, pp. 147-153, and vol. 26, pp. 566-581 (1984).

[0015] Suitable synthetic materials may include solid single component (i.e., chemically homogeneous) fibers, multi-constituent fibers (i.e., more than one type of material making up each fiber), and multi-component fibers (i.e., synthetic fibers which comprise two or more distinct filament types which are somehow intertwined to produce a larger fiber), and combinations thereof. Bicomponent fibers may have a core-sheath configuration or a side-by-side configuration and may have the following polymer combinations: polyethylene/poly-propylene, polyethylvinyl acetate/polypropylene, poly-ethylene/polyester, polypropylene/polyester, copolyester/ polyester, and the like.

[0016] Methods of making nonwovens are well known in the art. Generally, these nonwovens can be made by air-laying, water-laying, meltblowing, coforming, spunbonding, or carding processes in which the fibers or filaments are first cut to desired lengths from long strands, passed into a water or air stream, and then deposited onto a screen through which the fiber-laden air or water is passed. The resulting layer, regardless of its method of production or composition, is then subjected to at least one of several types of bonding operations to anchor the individual fibers together to form a self-sustaining substrate. Suitable processes include, but are not limited to, air-entanglement, hydro-entanglement, thermal bonding, carding, needle-punching, or any other process known in the art, and combinations of these processes.

The nonwoven substrate can comprise a single layer, or multiple layers. The multiple layers may also be bonded together to form a laminate of 2 or more layers.

[0017] The nonwoven substrate to be used for the inflatable body **1** of the present invention needs to have an air permeability of from 0.005 m³/m²/min to 30 m³/m²/min. Preferably, the nonwoven substrate has an air permeability of from 0.5 m³/m²/min to 5 m³/m²/min, and more preferably from 1 m³/m²/min to 2 m³/m²/min. The air permeability is measured according to standard test method ASTM D737-96.

[0018] One preferred nonwoven substrate is a thermoplastic film, more preferably a thermoplastic film made of polyethylene or polypropylene. One example of a suitable nonwoven substrate is a calendared 50-60 gsm polypropylene film having an air permeability of 3.4 m³/m²/min, from BBA Fiberweb (United Kingdom). Other examples of suitable nonwoven substrates include HYFOL PP Plus, HYFOL PE Soft Textile and Apra B 140 from Rheinische Kunststoffwerke AG (Germany), having a thickness of 10-20 microns and basis weight of between 20 and 30 gsm.

[0019] The thermoplastic film is preferably an apertured thermoplastic film, comprising apertures having a diameter, on average, of from 100 micrometer to 150 micrometer, preferably from 110 micrometer to 140 micrometer, most preferably from 115 micrometer to 135 micrometer. The apertures are spaced apart, on average, at a distance of 0.5 cm to 1.5 cm, more preferably from 0.7 cm to 1.3 cm, even more preferably from 0.9 cm to 1.1 cm, most preferably 1 cm. An example of such a nonwoven substrate is a hotneedle apertured film of 60% polypropylene-40% ethylene vinyl acetate co-extruded nonwoven (product code DH 245), from Clipay.

[0020] Another preferred nonwoven substrate is a laminate of at least 2 layers, of which one layer is a thermoplastic film as described above, and the other layer is preferably acetate or polyester based. Examples are the 25 gsm polyethylene film (FPE G25N) and 19 gsm polyethylene film/13 gsm spunbond polypropylene nonwoven from Clipay (United States of America) and a spunlace substrate of a 0.16 dtex 70% viscose-30% polyester laminated with a poly-urethane membrane from Fama-jerseys (Italy). These materials are low to non air-permeable and require aperturing to achieve the required permeability.

[0021] Optional, but preferred, features may be attached to or incorporated in the inflatable body **1**.

Preferably, the inflatable body **1** will comprise a hanger **3** which allows to hang the inflatable body **1** to e.g. a clothes rack. The hanger **3** may be removably attachable to the inflatable body **1**, or it may be permanently integrated with the inflatable body **1**. Preferably, the hanger **3** is made of a low cost, plastic material such as polyethylene or polypropylene.

[0022] A second optional, but preferred, feature is a garment support member **4** to support the garment while it is being de-wrinkled. The garment support member **4**

may be removable attachable to the inflatable body **1** or to the hanger **3**, or it may be permanently integrated with the inflatable body **1**. Preferably, the garment support member **4** is also inflatable and made of a low-cost, plastic material such as polyethylene or polypropylene.

[0023] Most preferably, the inflatable body **1** comprises both a hanger **3** and a garment support member **4**, preferably an inflatable garment support member **4**.

[0024] The advantage of the low cost inflatable body **1** according to the present invention is that the de-wrinkled garment can remain on the inflatable body **1** and simply be put away in a wardrobe or on a clothes rack, preferably with the hanger, without the need to remove the garment from the inflatable body **1**. In order to de-wrinkle multiple further garments, a user can simply take a further inflatable body.

[0025] Another advantage of providing a low cost inflatable body **1** according to the present invention, is that several inflatable bodies can be packaged in a relatively small sized package and be easily stored away prior to use. Another advantage is that several inflatable bodies, each having a different shape such that they can accommodate different types of garments. Inflatable bodies of different shapes can be sold in one package or in different packages.

Kit for de-wrinkling garments

[0026] The kit for de-wrinkling garments according to the present invention, comprises two essential elements, as shown in Fig. 2: at least one inflatable body **1**, as described above, and an air blowing device **5**.

[0027] The air blowing device **5** comprises a housing comprising an air fan (not shown) and an air outlet opening **6**. The air outlet opening **6** is to be connected to the air inlet opening **2** of the inflatable body **1**. In order to fit the air outlet opening **6** to the air inlet opening **2**, a separate fitment **7** may optionally be used.

[0028] Preferably, the fan has a power of from 20W to 80W, and is capable of generating a pressure inside the body of from 50 Pascal to 400 Pascal, sufficient to blow up the inflatable body **1** to the extent that the body **1** stretches the garment in order to have de-wrinkling effect, but low enough to avoid damage to the inflatable body **1** and/or garment. A pressure of about 200 Pascal is preferred.

[0029] As the kit is to be used in the domestic market, noise generation of the air blowing device **5** is preferably kept to a minimum. As such, the air blowing device **5** preferably generates a noise level of from 30 decibel (db) to 80 db.

[0030] Preferably, the air blowing device **5** may further comprise a heating element, such that the air blowing device **5** is capable of blowing air with a temperature of from 30°C to 80°C. Blowing warm air into the inflatable body **1** has a positive effect on the de-wrinkling process.

[0031] Examples of a suitable fans for use in the air blowing device are the circular duct fans from Systemair

(Sweden) , particularly the RVK 100-125 fan.

Optional features

[0032] The inflatable body **1** and/or de-wrinkling kit may further comprise one or more optional features.

[0033] A first optional, but preferred, feature is a garment stretching means **8**. This can be for example one or more weights which can be clipped onto certain parts of the inflatable body **1** or of the garment. This can also be an elastic strap which can be attached to the inflatable body **1** or garment, and then be fastened to the air blowing device **5**.

[0034] Another optional, but preferred, feature is a delivery system for delivering moisture or actives to the garments. This can be a simple trigger or aerosol spray container which can be included to the de-wrinkling kit to spray onto the outer surface of the garments before, during or immediately after the de-wrinkling process. It can also be a system, such as a nebuliser, an electronic spray device or a steaming device, which is integrated into the housing of the air blowing device **5**, and thus delivers the actives from within the air-permeable inflatable body **1** to the garment.

[0035] Preferred actives to be delivered to the garment include, but are not limited thereto, water, perfume or any suitable fabric care agent known in the art. Especially preferred actives to be delivered are those which directly contribute to the de-wrinkling process itself. Especially of interest is the de-wrinkling chemistry which is available on the market under the brand name Downy Wrinkle Release (from The Procter & Gamble Company), and extensively described in U.S. Patents US7,049,276, US6,984,336, US6,755,987, US6,652,766, US6,569,345 and European Patent numbers EP1201817 and EP1096056 (all assigned to The Procter & Gamble Company).

Method for de-wrinkling garments

[0036] The method for de-wrinkling garments using the kit of the present invention, comprises the following steps:

- a. providing an inflatable body **1** as described above; then
- b. placing a garment over said inflatable body **1**; then
- c. attaching the inlet opening **2** of said inflatable body **1** to the outlet opening **6** of an air blowing device **5**;
- d. blowing air into said inflatable body **1**.

When a first garment has been de-wrinkled, the garment can be removed while still being on the inflatable body **1**, and be stored away on a clothes rack or in a wardrobe. However, in a preferred method of the invention, the de-wrinkled garment remains on the inflatable body. In order to de-wrinkle a further garment, a further inflatable body **1** is used, and steps c. and d. are repeated.

[0037] Preferably, the garment is premoistened before air is blown into the inflatable body 1.

Example

[0038] A hotneedle apertured film of 60% polypropylene/40% ethylene vinyl acetate co-extruded nonwoven material (product code DH 245), from Clopay is used to sew an inflatable body in the form of a shirt. Protrusions are inserted to achieve 0.5, 1.7, 2.4 and 6.7 cfm (cubic feet per minute). A cheap hanger is inserted for easy hanging of the body with an opening in the bottom part to achieve inflation. To achieve the de-wrinkling performance a shirt is hung over the body and the sleeves of the body are inserted in the shirt. The shirts are pre-moistened via a sprayer. The upper button of the shirt is closed. In its simplest execution, the body is connected with a low noise air fan RVK 100-125 from Systemair. The bottom of the shirts are stretched with clips which can be attached to the bottom part of the body. After 15 minutes of inflation the front part of the shirt are de-wrinkled by 1 wrinkle grade as described in a standard AATCC-128 (wrinkle recovery of fabrics) method. The shirt is graded before inflation yielding a wrinkle grade of 1.5 and after inflation a grade which exceed 2.5.

[0039] The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm".

Claims

1. An inflatable body (1) for de-wrinkling garments, comprising an air inlet opening (2), **characterized in that** said inflatable body (1) comprises a nonwoven substrate having an air permeability of from 0.005 m³/m²/min to 30 m³/m²/min.
2. An inflatable body (1) according to claim 1 wherein said air permeability is from 0.5 m³/m²/min to 5 m³/m²/min.
3. An inflatable body (1) according to claims 1-2, wherein said air permeability is from 1 m³/m²/min to 2 m³/m²/min.
4. An inflatable body (1) according to any preceding claim, wherein said nonwoven substrate is a thermoplastic film.
5. An inflatable body (1) according claims 1-3, wherein said nonwoven substrate is a laminate comprising at least 2 layers, one of which is a thermoplastic film..
6. An inflatable body (1) according to claims 4-5, wherein said thermoplastic film is a polyethylene film or a polypropylene film.
7. An inflatable body (1) according to claims 4-6, wherein said thermoplastic film is a pinholed thermoplastic film comprising pinholes having an average diameter of from 100 micrometer to 150 micrometer, said pinholes being spaced apart at a distance, on average, of 0.5-1.5 cm, preferably 1 cm.
8. An inflatable body (1) according to any preceding claim, wherein said inflatable body (1) further comprises a hanger (3).
9. An inflatable body (1) according to any preceding claim, wherein said inflatable body further comprises a garment support member (4), preferably an inflatable garment support member (4).
10. A package comprising at least one inflatable body (1) according to any preceding claim.
11. A package comprising:
 - a. at least one inflatable body (1) according to claims 1-9 having a first shape for accommodating a first type of garment; and
 - b. at least one inflatable body (1) according to claims 1-9 having a second shape different from said first shape for accommodating a second type of garment;
12. A kit for de-wrinkling garments comprising:
 - a. at least one inflatable body (1) or a package according to any preceding claim; and
 - b. an air blowing device (5).
13. A kit according to claim 12, wherein said air blowing device (5) is capable of blowing air having a temperature of from 30°C to 80°C.
14. A kit according to claims 12-13, wherein said air blowing device (5) generates a noise of from 30 db to 80 db.
15. A kit according to claims 12-14, further comprising a delivery system for delivering moisture or actives to the garments.
16. A method of de-wrinkling garments, comprising the steps of:
 - a. providing an inflatable body (1) according to claims 1-9; then
 - b. placing a garment over said inflatable body (1); then

- c. attaching the inlet opening of said inflatable body (1) to the outlet opening of an air blowing device (5);
- d. blowing air into said inflatable body (1).

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17. A method according to claim 16, wherein the garment is pre-moistened prior to blowing air into said inflatable body (1).

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Fig. 1

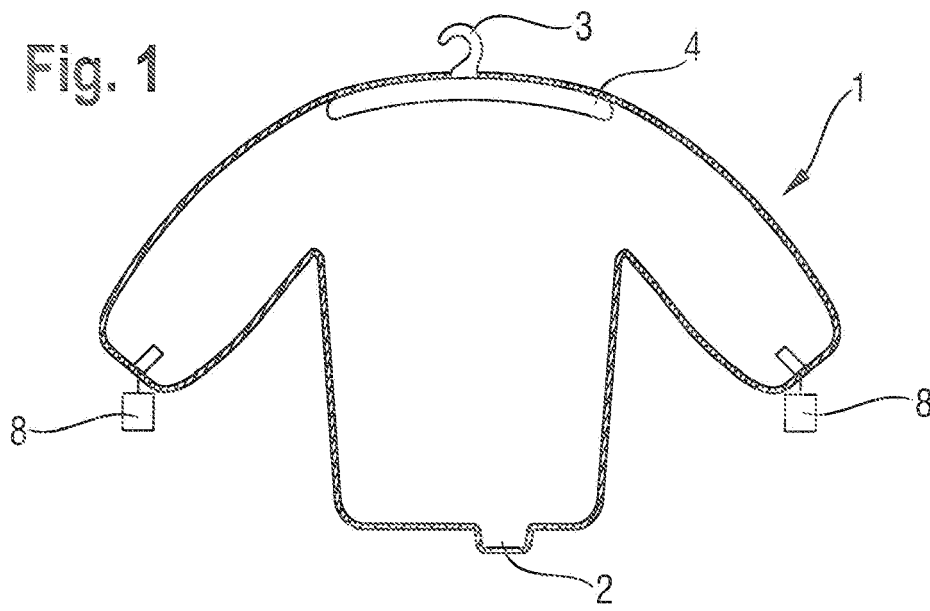
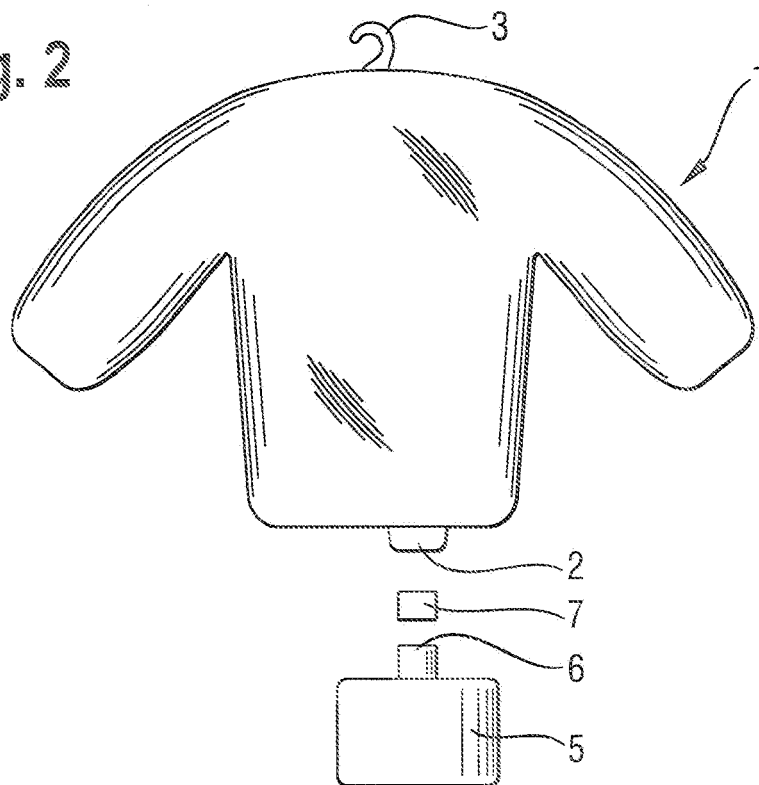


Fig. 2





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 12 2851

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Place of search		Date of completion of the search	Examiner
Munich		20 May 2008	Clivio, Eugenio
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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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 07 12 2851

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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