(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
13 November 2008 (13.11.2008)

(21) International Application Number:
PCT/GB2008/001426

(22) International Filing Date:
23 April 2008 (23.04.2008)

(25) Filing Language:
English

(26) Publication Language:
English

(30) Priority Data:
0708549.1 3 May 2007 (03.05.2007) GB
0724447.8 15 December 2007 (15.12.2007) GB

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(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, ... [Continued on next page]

(54) Title: DISPENSING DEVICE AND METHOD OF USE THEREOF

(57) Abstract: A dispensing device (2) is provided including two or more compartments (4-12) for the containment of a fluid and/or one or more therein, dispensing means (23) for dispensing said fluid and/or items from said compartments (4-12) and actuation means (24) for actuating dispensing of said fluid and/or items from said compartments. The dispensing device further includes compression means (38) and said compression means are arranged such that actuation of said compression means using said actuation means allows compression and/or movement of the fluid and/or items contained in at least one of said compartments in use to allow dispensing through said dispensing means.
Dispensing Device and Method of Use Thereof

This invention relates to a dispensing device and method of use thereof.

It is known to provide dispensing devices including a plurality of compartments from which fluid and/or one or more items can be dispensed therefrom. One such device is disclosed in US5009342 in which a dual liquid spray assembly comprises an outer container with at least two compartments defined therein. A spray pump dispenser is mounted at the outlet of the container and a valve assembly is mounted between the compartments and the spray dispenser. The valve assembly comprises an inner valve member having a discharge outlet and at least two inlets for connection to the compartments. An outer control sleeve is rotatably mounted on the inner valve member for controlling connection between the discharge outlet and the inlets to determine which compartment fluid is dispensed from.

It is an aim of the present invention to provide an alternative dispensing device having multiple compartments.

It is a further aim of the present invention to provide a method of using an alternative dispensing device having multiple compartments.

According to a first aspect of the present invention there is provided a dispensing device, said dispensing device including two or more compartments for the containment of a fluid and/or one or more items therein, dispensing means for dispensing said fluid and/or said one or more items from said said compartments and actuation means for actuating dispensing of said fluid and/or said one or more items from said compartments, characterised in that the dispensing device
further includes compression means and said compression means are arranged such that actuation of said compression means using said actuation means allows compression and/or movement of the fluid and/or one or more items contained in at least one of said compartments in use to allow dispensing through said dispensing means.

The compression means can be integral with, associated with, attached to or detachably attached to the actuation means.

Preferably the compression means compresses and/or moves said fluid and/or said items towards and/or through said dispensing means when at least part of said compression means is brought into contact, either directly or indirectly, with at least part of said fluid and/or said items, and/or an increase in pressure or compressive force applied to the part of the compression means already in contact with the fluid and/or item(s) or gas/air surrounding the fluid and/or items.

In one embodiment movement of said actuation means results in at least part of said compression means being moved relative to one or more walls defining at least one of said compartments. Preferably movement of at least part of the compression means relative to the compartment wall(s) moves said fluid and/or items towards and/or through said dispensing means. Further preferably this movement or at least a component of this movement is in the direction of said dispensing means.

Preferably at least part of the compression means is slidably movable relative to a wall or walls of at least one of said compartment(s).

In one embodiment the compression means includes at least one plunger or plunger like element which is movably mounted in or
relative to said compartment(s). A part of said plunger element preferably contacts at least part of the fluid and/or said items in use during the dispensing process. The plunger element can be slidably movable relative to the compartment(s) in use.

A web, diaphragm, plate and/or the like can be associated with or forms part of said plunger element part or compression means to provide a larger surface area than the plunger element part to contact said fluid and/or said items in use, thereby increasing the ease with which said fluid and/or items can be moved in said compartment. The web, diaphragm, plate and/or the like is typically located on or adjacent a top or upper most surface of the fluid and/or items to be dispensed (i.e. at an end opposite to the end at which the dispensing means is located). It moves with the plunger element part on actuation thereof in said compartment.

Preferably the web, diaphragm, plate and/or the like is of substantially the same and/or slightly smaller dimensions or cross sectional area as the dimensions or cross sectional area of one of said compartments in which the web, diaphragm, plate and/or the like is movably mounted. This ensures substantially all the fluid and/or items are moved towards the dispensing means via the web, diaphragm, plate and/or the like in use.

The web, diaphragm, plate and/or the like can be substantially rigid in form or can be at least partially flexible in form, such as for example at the peripheral edges of the web, diaphragm, plate and/or the like.

In one embodiment the dispensing means includes a valve arrangement movable between an open position, wherein the fluid and/or one or more items can be dispensed, and a closed position, wherein the fluid and/or one or more items contained
in the compartments are prevents from being dispensed. Preferably said valve arrangement includes at least one one-way valve, such that fluid and/or items contained in said compartment can be dispensed therefrom but, once dispensed, said fluid and/or items cannot return back into the compartment via said dispensing means.

Preferably the one way valve is a simple slit valve to reduce the cost of manufacture of said dispensing device. One or more edges of said slit valve typically open outwardly of said dispensing device when pressure or force is applied on the compartment side of said valve to open said valve. Release of said pressure or force typically moves said edges of said slit valve into sealing engagement to close said valve.

The material from which the slit valve is formed is typically substantially resilient material, such as neoprene, rubber, suitable plastics material and/or the like.

In one embodiment a single or separate dispensing means/valve arrangement is associated with each of said two or more compartments of said device.

In an alternative embodiment a single dispensing means/valve arrangement is associated with or shared between two or more of said compartments of said device. The dispensing means/valve arrangement can be substantially fixed, such that fluid and/or items must pass from a first compartment to a second compartment before being dispensed through said dispensing means. Alternatively, the dispensing means, valve arrangement and/or one or more compartments are movably mounted to allow relative movement to take place between the dispensing means and an outlet defined in or associated with
each of said compartments to allow the compartment from which fluid or items are dispensed from to be changed.

In one embodiment the dispensing means, actuation means and/or one or more compartments can be moved manually or automatically via suitable mechanical, electrical and/or pneumatic means to allow the compartment with which the dispensing means and/or compression means is associated to be changed to a different compartment, thereby allowing adjustment of the compartment(s) from which dispensing or actuation of dispensing takes place.

Preferably sealing means are associated with an outlet of a compartment and/or dispensing means to substantially seal the same when said dispensing means are not associated therewith or when said dispensing means is in a closed position.

Preferably the dispensing means, actuation means, compression means and/or one or more compartments are movably mounted to allow one or more of the same to undergo relative movement, and further preferably relative rotational movement. This movement can be user selected, wherein a user-selects which compartment the fluid and/or items are to be dispensed from, and/or random, wherein the user does not directly select the compartment which the dispensing means is associated with at any particular time. For example, automated movement or association of a compartment with dispensing means, compression means and/or actuation means can be provided via suitable movement means to allow substantially random selection. Timing means could be provided to allow random movement to occur at certain time intervals. The latter option provides an element of surprise to a user since they do not know what compartment a fluid and/or items is to be
dispensed from. This is of particular advantage when the device is being used to dispense a child related product.

Relative movement of the dispensing means and/or one or more compartments can take place via the actuation means or separate movement activation means can be provided.

Preferably resilient biasing means are associated with the actuation means and/or compression means to bias the same from an "in-use" position to an "out of use" position. As such, user release of said actuation means following actuation thereof automatically moves said actuation means and/or said compression means to an "out of use" position.

The resilient biasing means can include a spring, sprung material and/or the like.

In one embodiment the actuation means are depressed, moved inwardly of or towards the dispensing means relative to one or more of said compartments to move said actuation means to an "in-use" position.

The compression means can be attached to or integral with said actuation means such that movement of said actuation means moves said compression means.

The two or more compartments are preferably arranged in a circle or form a housing with a substantially circular cross section. The compartments can be provided in abutting relationship with each other or can be a spaced distance apart.

Preferably the two or more compartments form at least part of a housing of the dispensing device.
In a preferred embodiment the actuation means are arranged at one end of said compartments and the dispensing means are arranged at the opposite end of said compartments.

The two or more compartments can be provided in a housing or outer covering if required.

In one embodiment the fluid and/or items can be located in a sub-compartment or reservoir contained with a main compartment. Preferably the sub-compartment or reservoir is substantially flexible in form and further preferably can be disposable, such as a bag, sac and/or the like.

According to a further aspect of the present invention there is provided a dispensing device, said dispensing device including two or more compartments for the containment of a fluid and/or one or more items therein, dispensing means for dispensing said fluid and/or said one or more items from said compartments and actuation means for actuating dispensing of said fluid and/or said items from said dispensing means, and wherein at least one of a compartment, actuation means and/or dispensing means is movably mounted with respect an other of the compartment, actuation means and/or dispensing means, thereby allowing the compartment from which fluid and/or items are to be dispensed from to be changed.

Movement of the compartment, actuation means and/or dispensing means can take place manually or automatically via mechanical, electrical and/or pneumatic means.

Preferably the movement is rotational movement.

The actuation means and/or dispensing means can be of any suitable type.
According to a second aspect of the present invention there is provided a method of using a dispensing device, said dispensing device including two or more compartments for the containment of a fluid and/or one or more items therein, said method including the steps of actuating actuation means which moves fluid and/or one or more items from at least one of said compartments through dispensing means, characterised in that the dispensing device further includes compression means and said compression means are arranged such that on actuation of said compression means using said actuation means, the fluid and/or one or more items contained said compartment(s) are compressed or moved through said dispensing means.

Embodiments of the present invention will now be described with reference to the accompanying figures, wherein:

Figure 1 is a perspective view of a dispensing device in one embodiment of the present invention;

Figure 2 is a detailed view of a base of the device in figure 1 in one embodiment;

Figure 3 is a detailed view of a base of the device in figure 1 in a further embodiment;

Figure 4 is a perspective view of the dispensing device in figure 1 with part of the housing removed;

Figure 5 is a simplified view of the dispensing mechanism used in one embodiment of the present invention;

Figures 6a-6d illustrate different stages of the dispensing process using the dispensing mechanism in figure 5;
Figures 7a-7e illustrate a perspective view, exploded view from a first end, exploded view from a second end, exploded view and detailed view of dispensing means of dispensing apparatus according to a further embodiment of the present invention;

Figure 8a illustrates the location of a dispensing bag in the dispensing apparatus in one embodiment;

Figures 8b and 8c illustrate a side view and a top view respectively of a dispensing valve for use in one embodiment of the present invention.

Referring firstly to figures 1-4, there is illustrated a dispensing device 2 for dispensing a plurality of different fluids in the form of liquids or creams, such as for example handcream, toothpaste, liquid soap, shampoo and/or the like.

Device 2 includes a plurality of compartments 4-12 which are substantially elongate in form and each are provided in the shape of a segment of a circle when viewed in cross section. The compartments in combination for a tubular like housing of the device. A different fluid is typically provided in each compartment, although the same fluid or fluid type could be provided in more than one compartment. The side wall 14 of each compartment abuts the side wall of an adjacent compartment. A first outer and substantially convex end 16 of each compartment forms a peripheral wall of the device and a second opposite and substantially concave end 18 of each compartment defines part of a central channel.

Dispensing means 23 are provided adjacent a base 22 of the compartments for dispensing the fluid from the compartments as will be described in more detail below.
User actuation means 24 includes a handle portion, which in this example is a substantially dome shaped lid 26, and a support shaft 28. The support shaft 28 is slidably located in the channel defined by ends 18 of the compartment. Both the lid 26 and support shaft 28 are capable of undergoing substantially linear and reciprocal motion between an "out of use" position, wherein lid 26 is raised a spaced distance apart from a top 30 of the compartments, as shown in figure 1, to an "in use position", wherein lid 26 is lowered towards top 30 of the compartments. A user moves lid 26 from the out of use position to the in use position by applying a downward force on top of lid 26 towards base 22 of the device. Resilient biasing means (not shown) are provided in or associated with the support shaft 28 to automatically return lid 26 and shaft 28 to the out of use position when the user releases the downward pressure on lid 26.

Locking means can be provided to lock the user actuation means in an in-use or out-of-use position if required, such as for transport purposes and/or the like.

A cylindrical outer sleeve or housing 32 is provided to protect the actuation mechanism and to improve the aesthetic appearance of the device. The outer sleeve 32 is joined to a lower edge 34 of lid 26 and moves with the lid between the in use and out of use positions. The cross sectional area of outer sleeve 32 is slightly larger than the cross sectional area of the circular arranged compartments or inner housing, thereby allowing the outer sleeve 32 to slide around the outer end walls of said compartments when lid 26 is depressed towards base 22 in a telescopic like manner. An outwardly protruding rim 36 provided above the base 22 of device 2 limits movement of sleeve 32 by preventing movement of sleeve 32 below said rim.
Compression means 38 is associated with lid 26 to apply a compressive or downward force to the top surface of the fluid contained in one of the compartments on depression of lid 26 to the in use position. This compressive or downward force moves the fluid in the compartment towards dispensing means 23 for dispensing therefrom.

Dispensing of fluid from two or more of compartments 4-12 can take place substantially simultaneously by providing a single or plurality of compression means 38, the or each compression means associated with a different compartment. Alternatively, separate compression and actuation means can be provided for each compartment so that dispensing of fluid from one compartment can take place independently of and separate to dispensing of fluid from a different compartment. Alternatively still, compression means 38 and/or lid 26 can be rotated relative to the compartments so that a user can determine which compartment the actuation means is to act on.

The dispensing means 23 is typically in the form of a one way valve 40. A single one way valve 40 can be provided on device 2, as shown in figure 2, to allow dispensing of fluid from one of the compartments at any one time. The compartments 4-12 and/or dispensing means 23 can be capable of relative movement to allow the dispensing means to be moved to a required compartment from which fluid is to be dispensed. This movement can be random or user defined. In the illustrated example, the dispensing means 23 is attached to rim 36 and user rotation of rim 36 rotates the dispensing means relative to base 22 of the compartments. Outlet apertures are defined in the base of each compartment and when the outlet is substantially aligned with dispensing means 23, fluid can be dispensed therefrom.
In figure 3 a plurality of valves 40, 42, 44 are provided, each valve being associated with a different compartment 4-12.

Fluid can be located directly in compartments 4-12 or fluid can be contained in a bag 46 prior to being located in compartments 4-12. This allows fluid to be easily replaced and/or removed as and when required.

The outer sleeve 32 could be removed to allow access to a top opening of the compartments to allow the bags 46 to be changed.

The compression means 38 in figures 1-4 typically includes an elongate plunger element 48 which is slidably movable in one of the selected compartments by actuation of lid 26, as shown in figures 6a-6d. The plunger element 48 follows the movement of the lid 26 between the in use and out of use positions. As the plunger element is depressed towards base 22, as shown by arrow 50 in figures 6a-6c of the compartments, the free end of the plunger element 48 applies a compressive force to an upper surface of the fluid, thereby forcing fluid 50 towards and through the dispensing means 23. On release of lid 26, resilient biasing means forces the lid and the plunger 48 in an upwardly direction, as shown by arrow 52 in figure 6d, thereby releasing the pressure of plunger 48 on the fluid and stopping the dispensing of fluid through dispensing means 23.

An outwardly extending peripheral web 54 can be provided adjacent the base 56 of plunger 48, as shown in figure 6a, to increase the surface area on the fluid over which the plunger applies pressure, thereby increasing the efficiency of the dispensing process.
With reference to figures 5, an example of further compression means 38 is illustrated. In this example, a downward protruding arm 58 is located on a lower surface of lid 26. On depression/actuation of lid 26, a lower end of arm 58 is moved into engagement with a top end 60 of plunger 48 associated with a particular compartment 10, thereby causing plunger 48 to be slidably moved in compartment 10 towards end 22. The plunger 48 associated with compartment 4 is not actuated since arm 58 does not engage with the compartment 4 plunger. Lid 26 can be rotated relative to the compartments (or the compartments relative to lid 26) so that arm 58 can engage with a different compartment as and when required. The compartments could move relative to lid 26 in a step wise controlled manner or could spin in a random manner until the same comes to a natural stop.

The components of the dispensing device can be formed from any suitable material and can be any suitable size, shape and/or design. A stand 20 can be attached to the base 22 of the compartments to raise the device above a surface on which the stand is located in use. The dispensing means can then be located adjacent a side or on the base of a compartment as required. Any multiple number of compartments can be provided with the dispensing device as required.

Referring to figures 7a-7e, there is illustrated a further embodiment of a dispensing device 102 according to the present invention. The dispensing device 102 includes a housing 104 which in this example is substantially cylindrical in form but could be any shape. A sleeve 103 is provided in the interior of the housing 104 and is divided into four separate compartments 106, 108, 110, 112 by a cross member 114 which is provided longitudinally and through substantially the entire sleeve interior. As such, the housing interior is also separated into four separate compartments. It will be appreciated that the sleeve is
not essential and that the housing could be directly divided into the plurality of compartments.

Each sleeve compartment has a slot 116 defined in an outer wall thereof. The slot 116 runs substantially longitudinally of the housing 104. Corresponding slots 118 are defined in the outer wall of the housing.

Compression means in the form of member 120 (only one of which is shown in the drawings for the purpose of clarity) are provided in each compartment. The shape of member 120 is substantially complementary to the shape of the compartment in which it is located (i.e. wedge shaped in this example) and the dimensions are only slightly smaller than the interior dimensions of the compartment, thereby allowing member 120 to be slidably moved longitudinally of the compartment whilst substantially preventing any substance located in the compartment from moving past member 120 (i.e. prevents substance from being squeezed around the exterior of member 120).

User actuation means in the form of a protruding tab 122 is provided on the curved outer surface of compression member 120. Tab 122 is joined to member 120 via arm 124. With the device assembled, compression member 120 is located in a compartment, arm 124 is slidably mounted in slots 116, 118 of each compartment and tab 122 protrudes from an outer surface of housing 104. As such, a user can slide tab 122 longitudinally of housing 104 to move compression member 120 within each compartment, thereby independently moving substance or one or more items located in the compartment.

Dispensing means in the form of a dispensing plate 126 is provided at a dispensing end 128 of housing 104. The dispensing
plate 126 is typically detachably attached to housing via an attachment collar 130.

Dispensing plate 126 includes a front plate 132 having four apertures 134 defined therethrough. The rear surface of plate 132 has compartment dividing means 136 for separating apertures 134 of adjacent compartments from each other. Recesses 138 are defined in the dividing means 136 to allow an item or substance in one of the compartments to be dispensed through the corresponding aperture 134 for that compartment via the corresponding recess 138.

The collar 130 is typically provided with a screw thread 140 on an inner surface thereof which engages with a complementary screw thread (not shown) provided on the outer surface of housing 104 adjacent end 128. Other forms of attachment can be used to attach collar 130 to end 128 of housing 104, such as friction fit and/or the like. The dispensing plate 126 is located between collar 130 and end 128 of housing 104 to maintain plate 126 in position in use.

Figure 7d shows a slight variation of the dispensing plate 126 in which four separate dispensing plates 126' are provided, with a front plate 132' dividing means 136' and attachment collar 130'.

Referring to figure 8a, there is illustrated an example of a possible refill bag or sleeve 202 that can be used in a device similar to that shown in figures 7a-7e. The bag 202 is of similar shape and dimensions to the compartment 106 in which it is to be located in use. The bag could be formed from biodegradable material if required.

The valve plate 132' is joined to a dispensing end of bag 202 to allow liquid contained in bag 202 to be dispensed through
aperture 134'. The collar 130 maintains the valve plate 132 and bag 202 in position in housing 104. The valve plate and bag could be integrally formed, such as for example formed from biodegradable material, or could be attached or detachably attached as required.

Figures 8b and 8c illustrate a side view and top view respectively of a one way valve body 204 that can be located with aperture 134 or 134'. More particularly, valve body 204 has a dome shaped portion 206 with a dispensing slit 208 defined therein and a peripheral flange portion 210 to support the valve on dispensing plate 126. The valve is typically formed from a flexible material, such as rubber or plastic.

The one or more compartments and/or housing can be any suitable shape and/or size. The compartments within a housing can different shapes or sizes if required.

The sliding compression means can be substantially free moving or can incorporate a biasing means, such as a spring, or a ratchet mechanism.

The collar can be fixedly attached to the dispensing device or detachably attached as required.
Claims:

1. A dispensing device, said dispensing device including two or more compartments for the containment of a fluid and/or one or more items therein, dispensing means for dispensing said fluid and/or said one or more items from said compartments and actuation means for actuating dispensing of said fluid and/or said one or more items from said compartments, characterised in that the dispensing device further includes compression means and said compression means are arranged such that actuation of said compression means using said actuation means allows compression and/or movement of the fluid and/or one or more items contained in at least one of said compartments in use to allow dispensing through said dispensing means.

2. A dispensing device according to claim 1 characterised in that at least part of the compression means is slidably movable relative to a wall of at least one of the compartments.

3. A dispensing device according to claim 1 characterised in that the compression means includes at least one plunger element which is movably mounted in or relative to said compartment(s).

4. A dispensing device according to claim 1 characterised in that the compression means includes a web, diaphragm or plate which is arranged to contact said fluid and/or one or more items during a dispensing process in use.

5. A dispensing device according to claim 4 characterised in that web, diaphragm or plate is of substantially the same or
slightly smaller dimensions than the compartment ins
which said web, diaphragm or plate is movably mounted.

6. A dispensing device according to claim 1 characterised in that the dispensing means includes at least one valve arrangement and said valve arrangement is movable between an open position, wherein fluid and/or one or more items contained in said compartment(s) can be dispensed therefrom, and a closed position, wherein fluid and/or one or more items contains in said compartment(s) are prevented from being dispensed therefrom.

7. A dispensing device according to claim 6 characterised in that at least one valve arrangement includes a slit valve.

8. A dispensing device according to claim 1 characterised in that separate dispensing means are provided on each of two or more of said compartments.

9. A dispensing device according to claim 1 characterised in that a single dispensing means is shared between two or more of said compartments.

10. A dispensing device according to claim 1 wherein sealing means are associated with an outlet defined in one of the compartments and/or the dispensing means.

11. A dispensing device according to claim 1 characterised in that the dispensing means, one or more compartments, compression means and/or user actuation means are movably mounted via movement means to allow relative movement between the compartments, the dispensing means, the compression means and/or the user
actuation means so that the compartment from which fluid or items are dispensed in use can be changed.

12. A dispensing device according to claim 11 characterised in that the dispensing means, one or more compartments, compression means and/or user actuation means are capable of relative rotational movement.

13. A dispensing device according to claim 11 wherein the movement means are arranged to allow a user to define the compartment that the fluid and/or one or more items are to be dispensed from in use.

14. A dispensing device according to claim 11 wherein the movement means are arranged such that the compartment from which the fluid and/or one or more items are to be dispensed from is substantially randomly selected via the movement means.

15. A dispensing device according to claim 1 wherein resilient biasing means are associated with the actuation means and/or compression means to bias the actuation means and/or compression means from an "in-use" position to an "out-of-use" position.

16. A dispensing device according to claim 1 wherein the fluid and/or one or more items are located in a sub-compartment or reservoir contained within a main compartment.

17. A method of using a dispensing device, said dispensing device including two or more compartments for the containment of a fluid and/or one or more items therein, said method including the steps of actuating
actuation means which moves fluid and/or one or more items from at least one of said compartments through dispensing means, characterised in that the dispensing device further includes compression means and said compression means are arranged such that on actuation of said compression means using said actuation means, the fluid and/or one or more items contained said compartment(s) are compressed or moved through said dispensing means.
## INTERNATIONAL SEARCH REPORT

**International application No:**

PCT/GB2008/001426

**A CLASSIFICATION OF SUBJECT MATTER**

INV. B05B11/00 B05B11/02 B05C17/005 B05C17/001 A45D34/00

**ADD.**

B05B12/14

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

B05B B05C A45D B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAO

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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<th>Citation of document, with indication, where appropriate of the relevant passages</th>
<th>Relevant to claim No</th>
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<tr>
<td>X</td>
<td>WO 02/36482 A (MANNE JOSEPH [US])&lt;br&gt;10 May 2002 (2002-05-10)&lt;br&gt;page 4, line 1 - line 5&lt;br&gt;page 4, paragraph 2&lt;br&gt;page 6, paragraph 2&lt;br&gt;page 9&lt;br&gt;page 18, paragraph 1&lt;br&gt;figures</td>
<td>1-6, 8-17</td>
</tr>
<tr>
<td>X</td>
<td>DE 199 51 504 A1 (ESPE DENTAL AG [DE]) 3M&lt;br&gt;ESPE AG [DE]) 10 May 2001 (2001-05-10)&lt;br&gt;abstract&lt;br&gt;column 1, line 50 - line 60&lt;br&gt;figures</td>
<td>1, 11, 13, 14</td>
</tr>
<tr>
<td>X</td>
<td>EP 0 992 438 A (KELLER WILHELM A [CH])&lt;br&gt;12 April 2000 (2000-04-12)&lt;br&gt;the whole document</td>
<td>1-14, 16, 17</td>
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Further documents are listed in the continuation of Box C

See patent family annex

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Date of the actual completion of the International search

8 August 2008

Date of mailing of the International search report

18/08/2008

Name and mailing address of the ISA

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Barre, Vincent
### DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Relevant to claim No</th>
</tr>
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<tr>
<td>x</td>
<td>CH 337 744 A (MAILLARD JULES [CH]) 15 April 1959 (1959-04-15) the whole document</td>
<td>1-6,8,17</td>
</tr>
<tr>
<td>x</td>
<td>FR 2 416 718 A (VIELLARD PAUL HENRI [FR]) 7 September 1979 (1979-09-07) page 2, figures</td>
<td>1,6,7</td>
</tr>
<tr>
<td>x</td>
<td>DE 101 28 611 A1 (FISCHER ARTUR WERKE GMBH [DE]) 19 December 2002 (2002-12-19) the whole document</td>
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## INTERNATIONAL SEARCH REPORT

**Information on patent family members**

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<th>Patent document cited in search report</th>
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<tr>
<td></td>
<td></td>
<td>EP 1330410 A</td>
<td>30-07-2003</td>
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<tr>
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<td>JP 2004513033 T</td>
<td>30-04-2004</td>
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<td>WO 0130488 A2</td>
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<td>WO 0021858 A1</td>
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<td>JP 2002527310 T</td>
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<td>US 6578738 A1</td>
<td>17-06-2003</td>
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<td>FR 2416718 A</td>
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<td>DE 10128611 A1</td>
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<td>EP 1395371 A1</td>
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