



(43) International Publication Date  
24 October 2013 (24.10.2013)

(51) International Patent Classification:

*B65D 65/46* (2006.01) *A23G 3/34* (2006.01)  
*A23G 3/28* (2006.01) *B23K 26/40* (2006.01)

(21) International Application Number:

PCT/CZ2013/000054

(22) International Filing Date:

19 April 2013 (19.04.2013)

(25) Filing Language:

Czech

(26) Publication Language:

English

(30) Priority Data:

PV 2012-275 19 April 2012 (19.04.2012) CZ

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(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,

[Continued on next page]

(54) Title: METHOD OF MANUFACTURING OF EDIBLE PAPER LABELS FOR MARKING FOOD PRODUCTS AND A DEVICE FOR PERFORMING THEREOF

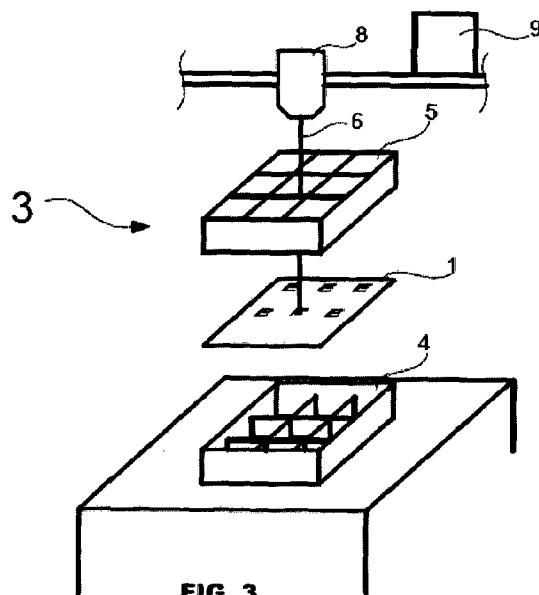


FIG. 3

(57) Abstract: The invention deals with a method of manufacturing of edible paper labels for marking food products based on the fact that the label graphic information is created by cutting the edible paper with a laser beam, while the edible paper processed this way is placed on the surface of a food product, and a device for manufacturing of such edible paper labels for marking food products consisting of a work surface, over which a laser head connected to a power supply is arranged.



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**Method of manufacturing of edible paper labels for marking food products and a device for performing thereof**

Field of the Technology

The invention deals with manufacturing of edible paper labels for marking bakery, confectionery and other food products and a device serving for this manufacturing.

State of the Art

Several methods of labelling food products, where text, logo or other graphic information is attached directly on an edible part of a product are known. This is required for various reasons like absence of packaging, confusability of a product with another similar one or requirement for the information to influence a consumer when choosing or handling a product.

One of the methods is presented in patent application GB 2291578. In this method substrate is applied on bakery product surface, which causes colour change during baking. The substrate contains e.g. sugar, carbohydrate, proteins or milk powder and is applied on the surface by spraying or painting.

Bakery products are commonly marked by printing a pattern located in the basket inside during dough rising or by cutting the dough surface or by changing the surface structure before baking. This method however does not enable sufficient product distinction and is easily imitable.

Another method is direct application of substrates of different colour than the colour of base by direct painting or by painting through a pattern template and their subsequent setting by drying or thermal hardening. Such a method is presented in patent application WO 94/10853.

Another marking method is based on using edible paper consisting of edible fibres and edible materials. Labels of edible paper, on which graphical information is created by printing with edible ink, are known at present. Such a method is described for example in document ES 2082728. The labels are made by means of a cutting form consisting of a set of knives fixed in a wooden base plate. Required shape or perforation is cut out of the edible paper by pressing in. Cutting by means of a matrix and a patric, whose mutual interaction cuts the required shape or perforation is also possible. These methods nevertheless require a special tool for each required shape of edible paper pattern. It may of course be used only for given pattern or perforation. These tools gradually wear out and form the substantial part of the marking costs. This leads to low shape variability of production and limited applicability of acquired tools. High detail cannot moreover be achieved by this method. This means that the label shape has to be adapted to the possibilities of the cutting form and resolution is insufficient for example for small texts or more complicated logos.

#### Summary of the Invention

The above drawbacks are solved by the method of manufacturing of edible paper labels for marking food products according to this invention. It is based on the fact that the graphical information of the label is cut in the edible paper by laser beam, while the edible paper treated this way is placed on the food product surface. The step of cutting the edible paper and the step of its attachment to the product surface may be performed separately in time and space or may be completely independent.

The label may advantageously be an object with an edge formed by cutting with laser beam. In such a solution it is not thus necessary to produce special tools for different patterns and information with very high detail may be created.

In the advantageous embodiment several layers of edible paper are cut by one laser beam at the same time. This substantially reduces the time necessary for manufacturing of edible paper labels. An interleaf may be advantageously put between the individual edible paper layers.

In the advantageous embodiment the laser beam is emitted by a CO<sub>2</sub> type laser.

The laser beam position is advantageously adjusted by means of a servo motor.

In another advantageous embodiment the laser beam is directed by reflection in a mirror tilted by means of a galvanometer.

This also substantially reduces the time necessary for manufacturing of edible paper labels. Edible paper is advantageously processed by means of a galvanic laser fitted with CCD camera, where these means enable exact pointing of the cutting graphic without necessity of manual adjustment. The galvanic laser in combination with the CCD camera thus enables individualization of orders and tailoring of one-shot orders, i.e. it enables the labels to be adapted to individual and specific needs of customers (e.g. different cake shapes and individual adjustment of peripheral labels).

According to an advantageous embodiment a stream of gas is applied to the cutting point together with the laser beam.

As an advantageous embodiment the edible paper may also be printed with edible ink or another edible paint in various, even organic food qualities.

When we say edible paper label for food product marking we mean any result of activity aimed at edible paper processing by the described technology or an activity combined with this technology. This activity may result in a plane or three dimensional objects of irregular shape, coloured or colourless, formed just by simple laser cut, with the aim to decorate a particular product or to be its separated complement or to serve separately for decorative and commercial purposes.

Edible paper means in the context of this technology any material consisting of edible raw materials, which is in the form suitable for application of the above laser processing technology, i.e. usually in the form of sheets, belts and cut offs suitable for this processing method.

Edible paper labels for marking food products according to this invention are able to substitute the existing decorations on the market, made of fondant (or other edible sugar materials like e.g. marzipan and similar edible decorations), not only in terms of processing precision, but also cheaper for end consumers. End consumers might demand for tailored individual decorations, without obligation to take large quantities, which might not suit to smaller entities, if necessary, each piece of the demanded quantity might be different. These labels may fully substitute chocolate labels known from confectionery products, while their price is remarkably lower. Moreover durability, i.e. also applicability of edible paper

products is much longer than that of the other commonly used decorations of fondant or other edible sugar materials, like e.g. marzipan and edible decorations similar to that.

The solution according to the invention has also environmental aspect. Labels of edible paper for marking food products also bring an interesting environmentally friendly alternative of existing solutions in some instances – e.g. edible paper baskets for muffin baking can be eaten so no waste is produced unlike in common paper baskets, which we would throw away. The labels typically serve as environmental friendly advertising media, where labels with advertiser's logo are baked on food product, e.g. bread – an advertisement that you can eat or throw away, but it does not strain the environment. Labels may however also include information on manufacturer, composition, EAN code and they can in principle substitute packaging material which is often unrecyclable. This technology enables us to respond to changes of design and information presented on the labels more flexibly than printing, flex printing etc., as this is digital printing and cutting modifiable at any time (adapted to individual needs and to e.g. seasons, events or further opportunities).

The invention also deals with a device for manufacturing of edible paper labels for marking food products based on the fact that it consists of a work surface over which a laser head connected to a power supply is arranged. The laser head may be advantageously equipped with a mean for movement over the work surface. The movement may be performed in vertical and/or horizontal direction in relation to the work surface. The laser beam may be directed e.g. by movement of the whole laser head as it is usual in portal laser, or by reflection in a mirror the position of which is adjusted by means of a galvanometer, as it is usual e.g. in a galvano laser (the galvano laser may be actually also movable in the space in relation to the work surface).

A cutting stand of advantageous grille shape may be located on the work surface to fix the edible paper position in the horizontal plane and to support it from bellow.

To fix the edible paper in the horizontal plane a weight copying the shape of cutting stand grille may advantageously be located between the cutting stand and the laser head.

To cool the cut substrate and reduce its burning at the cutting point the device for manufacturing of edible paper labels for marking food products may be equipped with gas stream supply, typically air.

Processing labels with laser cutting from edible paper is quick, adaptable and enables coping with large variability of orders, where different shapes and various processing methods are required within multiple orders.

#### Description of the Figures on the Drawings

The invention is described in detail on particular examples of embodiments in the attached drawings. Fig. 1 shows edible paper and edible ink printing. Fig. 2 and 3 show location of the edible paper in the portal laser and cutting stand. Fig. 4 then shows simultaneous cutting of more layers of edible paper. Fig. 5 shows an advantageous system of laser beam directing. Figures 6 and 7 present examples of labels and their application to a food product.

#### Description of the Exemplary Embodiment

Edible paper 1 is the basic substrate for manufacturing of edible paper labels for marking food products. It is fully edible and may be made for example from dried suspension of ground edible vegetable fibres and water, where the substance components are starch based polysaccharides, proteins like gluten, collagen, casein, sugar mixtures and aromatic essences or their combinations. The fibrous material may be made from e.g. rhubarb, dill, hemp, coca leaves, tobacco, medicinal herbs and spices. The edible paper may be made from a combination of materials like potato starch, maize starch, rice flour, vegetable oil, milk powder and water or combination of all or some of these raw materials in combination with emulsifiers.

As seen in Fig. 1 the edible paper 1 may be printed by known printing technologies with edible ink 2 or different edible colouring in various qualities, including organic, as the chapter State of the Art presents. The edible ink 2 usually consists of a mixture of glucose, sorbitol, sucrose and dextrose. Fructose, aspartame and saccharine are used as sweeteners in the production. Water based edible inks may also contain emulsifiers, hydrocolloid stabilizers and humidifiers based on xanthane, mucilage, sorbitol and starch. E.g. organic cocoa and other edible colourings of organic quality may also be used for printing.

In Fig. 2 the edible paper 1 is put directly on the work surface of the portal laser 3. However as Fig. 3 shows it may be advantageously placed on a cutting stand 4, which is made e.g. of acrylic glass and may have grille shape. It fixes position of the edible paper 1 in the horizontal plane and also supports the edible paper 1 from below. A weight 5 is located on top of the edible paper 1, which may be made e.g. of stainless steel, it copies the shape of the cutting stand 4 grille. The weight 5 fixes the edible paper 1 in horizontal position. The cutting stand 4 grille defines the individual cells in which the edible paper 1 is cut by the laser beam 6.

When several sheets of edible paper 1 are cut at the same time, i.e. several layers with one laser beam 6, interleaves 7 of normal paper or different suitable material are placed in the cutting stand 4 in combination with the edible paper 1, the individual layers of edible paper 1 are interlaid by the interleaves 7 as Fig. 4 shows. The shape and perforation of the interleaf 7 copies the cutting stand 4 grille. This method enables more layers of edible paper 1 to be cut at the same time. Normal paper, which is a common material made by compaction of cellulose fibres, like for example cellulose made from wood, cotton or hemp or different harmless material of synthetic origin may be used as the interleaf 7. After placing the required number of layers of edible paper 1 and interleaves 7 a weight 5 is laid on top to fix all the layers to be cut.

This system containing the cutting stand 4, at least one sheet of edible paper 1 and the weight 5 is, as Fig. 3 shows, placed on the work surface of a laser cutting device like for example CO<sup>2</sup>, where the laser beam 6 power supply uses carbon dioxide as the active environment. Different laser types, like for example Nd:YAG, LED and other laser device types may alternatively be used. A laser head 8, which directs the laser beam 6 from the power supply 9 to the required point of the edible paper 1, is movably attached near the system. The position of the laser head 8 in relation to the edible paper 1 is adjusted for example by means of servo motors. This position adjustment enables us to determine the place where the laser beam 6 impinges on the substrate consisting of at least one layer or sheet of edible paper 1.



To increase the speed of the change of the place of impingement of the laser beam 6 a laser head 8 containing the device described in Fig. 5 is used. Here the laser beam 6 is directed by reflection in a mirror 10, the position of which is adjusted by galvanometer 11.

Supply of a stream of gas 12 for example air is located at the cutting point to cool the substrate and to reduce its burning and to increase the cut quality.

Graphic information 13 is thus created on the edible paper 1 by cutting with the laser beam 6. The required graphic information 13 is clear from Fig. 6 and is created as at least one object the edge of which is created by cutting with the laser beam 6 or as at least one hole the shape of which is created by cutting with the laser beam 6, or as their combination. The graphic information 13 can thus contain for example a text, pictures or characters and any other symbols. The edible paper 1 containing the graphic information 13 thus becomes an edible paper label 14.

The edible paper label 14 label is applied to food products 15 as seen in Fig. 7, like bakery and confectionery products. The edible paper label 14 is attached to the food product 15 surface for example by means of adhesive substance, water contained in the products or the products or the label is moistened. Particularly quality attachment can be achieved in bakery by baking the food product 15 together with the edible paper label 14, which also causes change of the label visual structure.

#### Industrial Applicability

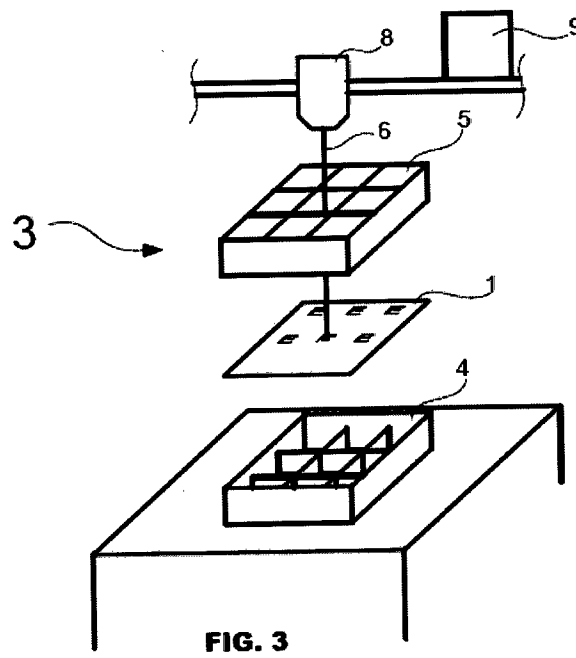
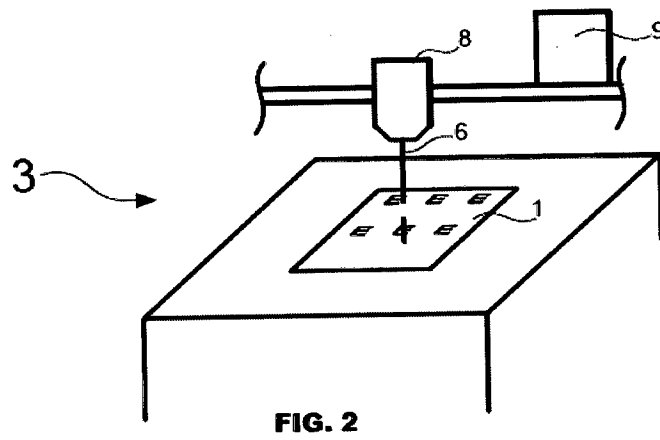
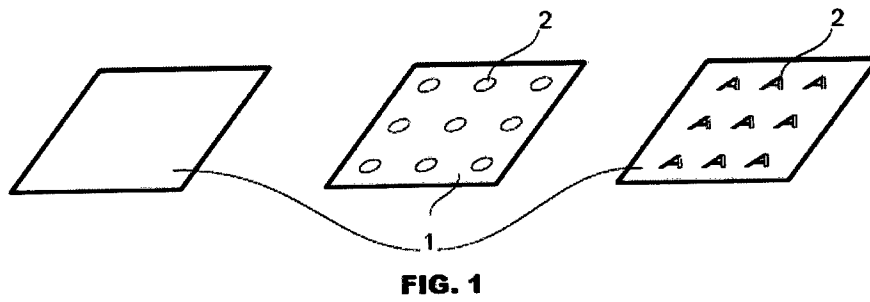
The edible paper labels made this way or the device according to the invention may be very variable and elaborated in detail and may be used particularly for marking bakery, confectionary or other food products.

## CLAIMS

1. Method of manufacturing of edible paper labels for marking food products, **characterized by the fact** that the graphic information of the label is created by cutting the edible paper (1) with laser beam (6), while the edible paper (1) processed this way is placed on the surface of a food product.
2. The method of manufacturing according to claim 1, **characterized by the fact** that the label is an object the edge of which is created by cutting with a laser beam (6).
3. The method of manufacturing according to claim 1 or 2, **characterized by the fact** that several layers of edible paper (1) are cut with one laser beam (6) at the same time.
4. The method of manufacturing according to claim 3, **characterized by the fact** that an interleaf (7) is placed between the edible paper (1) layers.
5. The method of manufacturing according to any of the claims 1 to 4, **characterized by the fact** that the laser beam (6) is emitted by CO<sub>2</sub> type laser.
6. The method of manufacturing according to any of the claims 1 to 5, **characterized by the fact** that the laser beam (6) position is adjusted by means of a servo motor.
7. The method of manufacturing according to any of the claims 1 to 6, **characterized by the fact** that the laser beam (6) is directed by reflection in a mirror tilted by a galvanometer.
8. The method of manufacturing according to any of the claims 1 to 7, **characterized by the fact** that stream of gas is supplied to the cutting point together with the laser beam (6).

9. The method of manufacturing according to any of the claims 1 to 8, **characterized by the fact** that the edible paper (1) is printed with edible ink (2) or different suitable edible colouring.
10. A device for performing the method according to the claims 1 to 9, **characterized by the fact** that it consists of a work surface (3), over which a laser head (8) connected to a power supply (9) is arranged.
11. The device according to claim 10, **characterized by the fact** that the laser head (8) is equipped with a means for movement over the work surface.
12. The device according to claim 10 or 11, **characterized by the fact** that a cut stand (4) is arranged on the work surface.
13. The device according to claim 12, **characterized by the fact** that a weight (5) is arranged between the cutting stand (4) and the laser head (8).
14. The device according to any of the claims 10 to 13, **characterized by the fact** that it is also equipped with supply (12) of a stream of gas, typically air.

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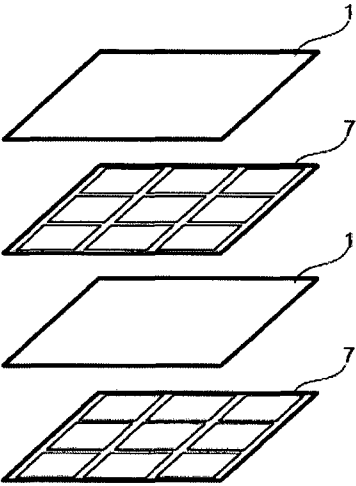


FIG. 4

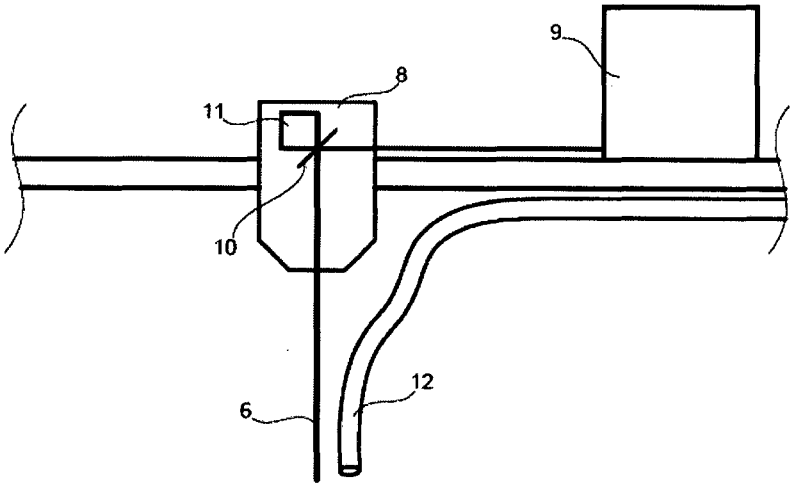


FIG. 5

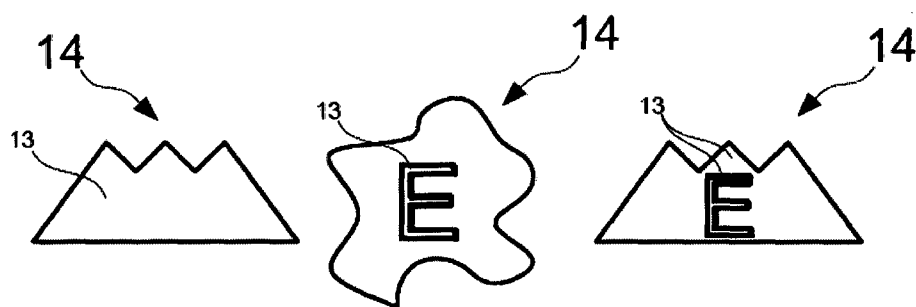


FIG. 6

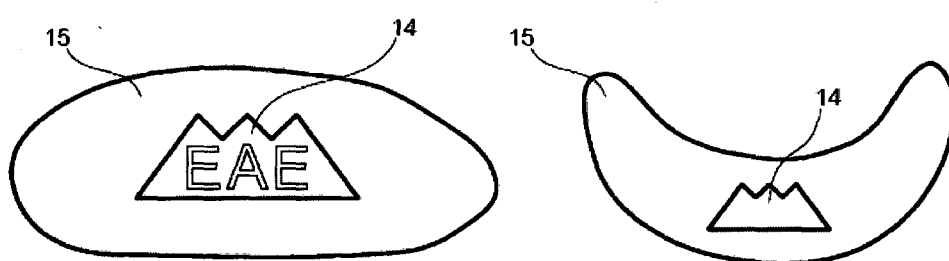


FIG. 7

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/CZ2013/000054

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. B65D65/46      A23G3/28      A23G3/34      B23K26/40 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) B65D A23G B23K		
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 practicable, search terms used) EPO-Internal, WPI Data, COMPENDEX, FSTA		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	US 6 376 000 B1 (WATERS PETER B [US]) 23 April 2002 (2002-04-23) column 5, lines 26-46; figure 7 -----	1-9
X	US 2007/048365 A1 (RAO JOHN J [US]) 1 March 2007 (2007-03-01)	10,11
Y	figure 10 paragraphs [0010], [0023], [0058] ----- <div style="text-align: center;">-/-</div>	1-9
<div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.</span> <span><input checked="" type="checkbox"/> See patent family annex.</span> </div>		
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 50%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p> </div> </div>		
Date of the actual completion of the international search  <div style="text-align: center; font-size: 1.2em;">26 September 2013</div>		Date of mailing of the international search report  <div style="text-align: center; font-size: 1.2em;">08/10/2013</div>
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer  <div style="text-align: center; font-size: 1.2em;">Götz, Michael</div>

## INTERNATIONAL SEARCH REPORT

International application No  
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	claim 1; figure 1 column 1, line 66 - column 2, line 10 column 3, lines 12-20 column 5, lines 17-25 -----	1-9
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Y	figure 1 column 2, line 65 - column 3, line 20 columns 43-17 -----	1-9
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Y	paragraphs [0025] - [0029] claim 1 -----	1-9
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Y	figure 6 paragraphs [0058] - [0065] -----	1-9
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