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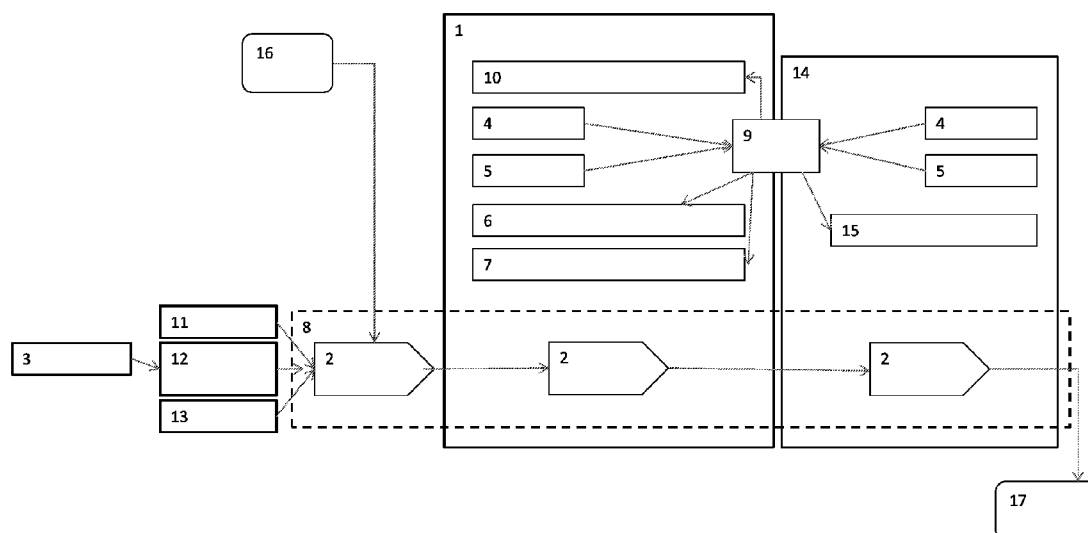
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(54) Title: DEVICE, SYSTEM AND METHOD FOR MARKING BAKERY PRODUCTS

Fig.1



(57) Abstract: The invention relates to a device, an organized system of machinery and a method for marking bakery products and other similar products, suitable to apply a chromatic marking in relief to the bottom of the products, said marking being recognizable to the touch, impossible to counterfeit, visible and indelible, without altering, or interfering with, the standard production process and, above all, without affecting the quality of the product.

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- *as to the identity of the inventor (Rule 4.17(i))*
- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*
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## DESCRIPTION

DESCRIPTION of a patent for an industrial invention titled:

**Device, system and method for marking bakery products.**

## FIELD OF APPLICATION

5 This invention relates to a device, a system and a method for marking bakery products.

In particular, the field of this invention pertains to methods for marking bakery products and other similar products, systems for the hyper-humidification of proving and baking chambers, and devices for  
10 facilitating the multiple marking of a number of products.

## PRIOR ART

It is well known that the need for verifying the point of origin of a product, ensuring its traceability and identifiability, certifying its quality or making it distinguishable from other similar rival products is  
15 becoming increasingly widespread. However, this often proves to be difficult when dealing with unpackaged products and products for human consumption.

These types of products are more complex to mark in order for the marking not to be counterfeit and without negatively affecting the  
20 quality of the product or its standard production process.

Some solutions to this problem are already well known, such as the application of removable paper stickers or edible paper labels, pre-

stamped and applied either manually or mechanically to larger products.

However, managing and operating such systems is clearly complex.

25 Moreover, they seem to be barely efficient in terms of adherence of the pre-stamped elements, due to the dusting of flour on bakery products and other similar products.

Similarly, laser marking, hot branding, high-pressure water jet engraving or even manual engraving by means of cutting tools (eg.

30 small blades or scalpels) are more expensive and even more complex.

Prior art includes a system for marking bread or other similar bakery products, either baked or prebaked to be frozen, which, in order to obtain an embossed or engraved marking with a special pigmentation, makes use of one or more plates to be fixed to the bottom of a baking  
35 tray or mould, at various distances, said plates bearing any symbol, as long as the symbol is provided with protruding and pointed edges, at least 5 mm thick or deep.

The above-mentioned technology is completely different from the invention at hand, in terms of both method and devices. The plates are  
40 made of a metal that is different from that of the baking tray or mould, and they are placed on the unbaked bread dough during leavening, in order to be later put into the oven with the baking tray or mould, so that, once the prebaked or baked products are taken out of the oven, they will keep the desired marking, either embossed or engraved, on their lowest

45 part, thanks to the stamping action derived from the different capability  
of absorbing and releasing heat the two materials used have  
[FR2855015/A1].

The supplying of moulded plates and the preparation of supporting  
baking trays seem to be necessary but rather complex, these being  
50 stages that will certainly affect the standard production process and,  
above all, the quality of the product.

Conversely, the invention at hand does not make use of stamps/plates or  
expensive metal moulds that stamp shapes also using heat, but it makes  
use of holes in the baking tray through which the part of the product to  
55 be marked will benefit from the different heating and cooling,  
humidifying and ventilation effects produced by a machinery.  
Therefore, this system is cheaper and does not affect the final quality of  
the product (i.e. it does not alter the baking process).

Patent **EP1477066/B1** also contributes to the prior art, as it describes a  
60 method for marking bread with letters or graphic symbols, by means of  
a metal stamp which is pre-heated to a temperature of 150 to 300  
degrees Celsius, and preferably to a temperature of 200 to 250 degrees  
Celsius, in order to be pressed onto the outer surface of the dough prior  
to baking.

65 However, the above-mentioned invention does not solve the technical  
problem linked to the fact that the marking is not recognizable to the

touch, as it is not stamped in relief, or at first sight, as it lacks particular pigmentation.

Furthermore, the marking of a large quantity of bread or similar bakery  
70 products would require altering, or interfering with, the standard production process and would probably affect the quality of the product.

Patent **EP1189515/B1** also contributes to the prior art, as it describes a method and apparatus for marking bread surface by spraying or spreading a moist solution of water and milk, egg and milk, or sugar  
75 and milk on the unbaked dough and later dusting the unbaked dough with a layer of flour falling from a higher mould. The single loaves of bread dough can move along a conveyor belt to be humidified and marked with flour prior to baking.

However, the above-mentioned invention does not solve the problem  
80 linked to the fact that the marking is not stamped in relief, and it cannot be quickly adjusted to other bakery products similar to bread: this would require a significant alteration of, or interference with, the standard production process.

Prior art also includes patent **GB2291578/A**, which provides a method  
85 for marking the crust of a bakery product, such as bread or other similar products, without affecting the quality of the product and without making use of preformed baking trays, which will eventually become unhygienic.

The above-mentioned invention makes use of an edible marking  
90 substance which is applied to a portion of the surface of the product  
prior to baking, so that the product is later baked for a time sufficient to  
develop differential surface colouration which will make the marking  
stand out.

The marking substance may comprise one or more of sugar,  
95 carbohydrate or proteinaceous material in an aqueous or organic  
medium and preferably comprises one or more of starch, glucose,  
protein, milk powder or skimmed milk powder in an aqueous or organic  
medium.

In a preferred method, the aqueous solution includes between 0.5 to 1  
100 part by weight of glucose to 1 part by weight of water.

In a preferred method, the marking substance is applied to the product  
by spraying or with a jet printer head that is not in contact with the  
bread surface but, in any case, a logo or mark or distinguishing lettering  
appears in the crust after final baking.

105 The above-mentioned method requires a specially devised system and it  
does not solve the problem linked to the fact that the marking, although  
pigmented, is not stamped in relief, or the fact that it cannot be quickly  
adjusted to other bakery products similar to bread: this would require a  
significant alteration of, or interference with, the standard production  
110 process.

Patent **FR2639795/A1** also contributes to the prior art, as it aims to precisely mark traditional and mass-produced bakery products, such as bread and other similar products, by pressing a customised shape onto the product (it does not specify whether prior to or after baking), said  
115 customised shape being previously soaked in a colouring liquid, such as caramel, coffee extract or any other permitted food colourant.

As in the case of a typewriter with an ink ribbon, the pattern to be stamped is reproduced upside down on a mould, which can be made of wood, metal, rubber, plastic, polyester or other materials, in order to be  
120 put in contact with the colourant and pressed onto the surface of the product or placed at the bottom of the baking mould, depending on the fact that the pattern to be stamped on the dough needs to be debossed, stamped in relief or flat.

The above-mentioned invention does not solve the problem linked to  
125 the marking of a large quantity of bread or similar bakery products, and it would cause a significant alteration of, or interference with, the standard production process and would probably affect the quality of the product.

The invention described in patent **DE000003803261** aims to increase  
130 the quality, amount of information and productivity of the marking process or the process of adding decorative elements to the crust of bakery products, such as bread or other similar products, in the most

hygienic conditions, while also reducing workforce and saving materials.

135 The latter method can be used to work on the surface of finished or semi-finished products without mechanical contact with the work equipment, while the production process continues. In particular, once the product that moves along a conveyor belt is baked or prebaked, it is irradiated with a CO<sub>2</sub> laser beam.

140 A metal stencil is placed between the laser source and the product, said metal stencil reproducing the negative space of the marking to be stamped and letting the electromagnetic radiation of the laser beam pass only through the gaps in the stencil reproducing the desired marking. The marking is stamped on the product surface, showing precise  
145 contours and a good contrast, especially on white bread.

However, the above-mentioned invention does not solve the problem linked to the fact that the pigmented marking is not recognizable to the touch, as it is not stamped in relief. The other problem that remains unsolved is the fact that another stage needs to be added to the standard  
150 ones of leavening and baking, thus making the process more expensive.

In addition, the laser could affect the quality of the product.

Furthermore, the marking of a large quantity of bread or other similar bakery products would require a significant alteration of, or interference

with, the standard production process and would probably affect the  
155 quality of the product.

#### TECHNICAL PROBLEM AND ITS SOLUTION

In light of the previously described prior art, the first technical problem  
that this invention aims to solve is the fact of applying a chromatic  
marking in relief to the bottom of bakery products or other similar  
160 products, through an organized system of machinery, a marking device  
and a method for reproducing a distinctive sign to be recognizable to the  
touch, visible, indelible, and impossible to counterfeit, without altering,  
or interfering with, the standard production process and above all  
without affecting the quality of the product.

165 To achieve this aim, this invention is capable of creating a shape in  
relief on the bottom surface of bakery products or other similar  
products, thanks to both the biochemical and physical effects produced  
by the endothermic reactions taking place during leavening and baking,  
due to the rheological properties of the dough, and the use of suitable  
170 systems and tools systematically organized to serve the purpose, as it  
will be described in the following paragraphs.

In particular, the invention systematically organizes the marking of  
products, within a standard industrial production process of bakery  
products or other similar products, by means of a machinery for varying  
175 ambient conditions provided with a programmable logic controller

(PLC), capable of managing ambient conditions, alternately or simultaneously, in the different areas along the circuit of the conveyor belts on which the frames containing bakery products or other similar products move along during leavening and baking.

180 Said machinery, becoming part of said process, only hyper-humidifies the areas of the product that are placed in the hollow parts of a supporting plate, while the areas of the product that are in direct contact with the non-hollow parts of the supporting plate remain non-humidified.

185 This further and prior occurring technical problem, consisting of delimiting the non-hollow parts of the supporting plate and the hollow parts of the supporting plate out of which the product will come out, is solved thanks to a marking device consisting of at least a frame, at least a supporting plate, both made of a material suitable to resist the  
190 standard high temperature necessary to bake bakery products and other similar products, and at least a stamping tool which, by mechanical pressing, or by means of a laser beam or any other way already invented or still to be invented, removes the material of said supporting plate, creating the negative space of at least a graphic sign of any shape and  
195 appearance on said supporting plate.

Said sign does not constitute part of the invention, and its shape, colour, lines and contour can change from case to case, but it could be part of a

further and different IP title, such as a verbal, figurative or three-dimensional trademark, a design, copyright or any other suitable form  
200 of protection.

A further technical problem which still has not been solved by the prior art is the fact of intervening in a standard industrial production process of bakery products and other similar products by regulating ambient conditions, in order to vary them depending on the area and according  
205 to the variation of external conditions.

In particular, this invention uses a method for varying ambient conditions characterized by the possibility to manage humidity and temperature parameters, alternately or simultaneously, in the different areas along the circuit of the conveyor belts on which frames and  
210 supporting plates move along.

The variation of ambient conditions is managed through parameters to be preset on a programmable logic controller (PLC) (temperature range of 20 to 35°, humidity range of 85 to 90%) and which can be adjusted according to external (seasonal or occasional) conditions.

## 215       MODE OR MODES FOR CARRYING OUT THE INVENTION

These and other aims are achieved thanks to an organized system of leavening and baking, aimed at marking bakery products and other similar products, consisting of one or more machinery for varying ambient conditions characterized by the possibility to monitor and

220 manage humidity and heat parameters, alternately or simultaneously, in the different areas along the circuit, according to claims 1, 2 and 3.

The invention also discloses a marking device, consisting of a stamping tool, a frame and a supporting plate, which is useful to delimit hollow parts and non-hollow parts in at least one of said supporting plates,  
225 according to claims 4 and 5.

The invention also describes a method for varying ambient conditions characterized by the possibility to manage parameters such as, for example, humidity and temperature, alternately or simultaneously, in the different areas of the frames and of the supporting plates, differently  
230 distributing heat and humidity depending on the hollow or non-hollow parts of said supporting plate.

The variation of ambient conditions is managed through parameters to be preset on a programmable logic controller (PLC) and which can be adjusted depending on the hollow or non-hollow parts and according to  
235 external conditions.

The organized system for managing and monitoring ambient conditions, the marking device and the method for varying the ambient conditions of the production areas produce the following technical effects:

- they mark, trace and identify bakery products or other similar  
240 products for human or animal consumption in an unambiguous, indelible and impossible-to-counterfeit way;

- they create a marking of any shape, in relief and chromatically different from the rest of the product, without negatively affecting the quality of the product;
- 245 - they achieve the above-mentioned aims in a standard production process, without adding any further production stages, but by organizing the process in the most suitable way to achieve the aim.

The above-mentioned technical effects and other technical effects of the invention will be explained in more detail in the following description  
250 of one of the modes for carrying out the invention, as an illustrative, yet incomplete example, with reference to the attached drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a block diagram of the organized system for the selective monitoring and managing of ambient conditions (temperature  
255 and humidity) which is part of a standard process for producing bakery products and other similar products.

Figure 2 shows a marking device for the marking of bakery products and other similar products.

Figure 3 shows a stamping tool, which is a necessary component of said  
260 marking device.

In the example shown in the Figures, the particular shape of the negative space of the marking or the particular shape of the mechanically operated marking device are only illustrative examples, as

the marking device can reproduce any shape of any sign that can be  
265 represented three-dimensionally.

Therefore, the Figures are illustrative and representative of only one of  
the modes for carrying out the invention.

### DETAILED DESCRIPTION

Organized system for marking bakery products, according to the  
270 invention, consisting of at least:

- a climatic chamber (1);
- a humidifier (10) to be used in the climatic chamber (1);
- an automated handling unit (8) where the marking tools (2) move  
along;
- 275 - evaporation units (7) placed along the circuit of the climatic chamber  
(1);
- a baking chamber (14);
- a heat exchanger (6);
- a programmable logic controller (9) which, when in use, is capable of  
280 managing ambient conditions such as humidity values (4) and  
temperature values (5), alternately or simultaneously, in the different  
areas along the circuit of the automatic handling units (8);
- a stamping tool (3) which, when in use, perforates the marking tool (2)  
consisting of a frame (11) and a supporting plate (12);

285 - a perforated supporting plate (12) which moves along the circuit, on  
the automatic handling units (8), the perforated hollow parts of said  
supporting plate (12) being the negative space of the marking (13).

In the following paragraphs, an organized system to be used with  
bakery products and other similar products will be mentioned, said  
290 organized system considering relevant ambient conditions such as  
humidity and temperature, which are necessary for leavening and  
baking, although the organized system can also be applied to any  
production process of any product and with any ambient condition  
suitable to modify the thickness and colour of a product, such as, for  
295 example, light, smoke, steam, and so on.

The invention described in the example here mentioned is configured to  
mark a cooked food product, but it can also be configured to mark,  
using the same organized system, uncooked, frozen, flash-frozen and  
toasted food products or products that are not for human consumption,  
300 already existing or still to be invented, as long as the expansion of the  
material they are made of and their colour can be varied by ambient  
conditions that can be preset on a programmable logic controller,  
already existing or still to be invented.

In a preferred mode for carrying out the invention, the organized system  
305 for marking includes a conveyor belt that allows the supporting plates to  
move along thanks to different automatic handling units (8), such as, for

example, industrial robots or other equipment already invented or still to be invented, as long as the supporting plates (12) move along the entire circuit, as described in the following paragraphs.

310 As previously stated, the invention consists of said organized system for marking and a composite marking device consisting of:

- at least a frame (11);
- at least a marking plate (12);
- at least a stamping tool (3) which, when in use, perforates a supporting

315 unit consisting of a frame (11) and a marking plate (12).

Said device is designed to support the multiple marking of a number of products.

In the example in Figure 2, the frame is 600 x 800 mm.

However, the size, the material used and the type of support are not  
320 binding for carrying out the invention. The invention is applicable to any type of support that can serve the purpose and any type of material suitable to its function. In order to make an example linked to bakery products, it needs to be a material suitable for baking at high temperatures, as long as they are preset using the technical solution  
325 proposed.

In a preferred mode for carrying out the invention and in the example shown in Figure 2, the marking plate (2) consists of a 15/10 mm thick

aluminium sheet with a Teflon coating, and the negative space of the marking is obtained by perforation.

330 Said marking plate is perforated several times, showing 12 vertical columns of negative spaces, at a distance of 48.00 mm one from the other, and 17 horizontal rows at a distance of 45.00 mm one from the other, with the row and the column both being at a distance of 25.00 mm from the edge of the frame.

335 The rows are not perfectly aligned.

Figure 3 shows an ideal stamping tool consisting of a mould for automated engraving, i.e. removal of the metal through automated removal.

However, the material, shape, size, distance between rows and columns,  
340 the fact that they are not aligned, their distance from the edge of the frame and the type of stamping tool can be diverse, as long as they can serve the purpose. Therefore, the material used needs to be resistant to high temperature, as in the case of the example described, or resistant to low temperatures in other cases, or resistant to smoke, light, and so on.

345 Also the size and the distance between the hollow parts can be diverse. The stamping tool can be different from that shown in the example, as long as it can create hollow parts or perforated areas to be used as the negative space of the marking. Therefore, the stamping tool can also

serve the purpose by laser perforation, cutting or any other suitable way  
350 already existing or still to be invented.

The invention also includes a mode of operation of the above-described system and device.

According to said mode of operation, a first preparatory stage, necessary to achieve the final result, consists in humidification. This  
355 proves to be essential, as it makes the unbaked product more permeable and malleable.

The preparatory humidification of the dough is crucial to the quality of the marking, as it has multiple effects on the rheological properties of the dough, optimizing the effects produced by the endothermic reactions  
360 and determining a different thermal diffusivity during processing, from leavening to baking.

During leavening, in the preparatory stage before baking, a more permeable, and hence softer, dough can be placed on the support more easily and will come out of the negative space of the marking plate (2).  
365 During baking, the effects of the preparatory stage contribute to the better shaping of a marking in relief, improving the expansion of the dough and extending the time required for solidification.

The second stage consists in the hyper-humidification of the areas of the product that are placed in the hollow parts of the supporting plate,  
370 compared to the areas of the product that are in direct contact with the

non-hollow parts of the supporting plate, and in the simultaneous use of the evaporation units (7) placed along the circuit of the climatic chamber (1).

The climatic chamber (1) allows the leavening of the dough, or batters  
375 or any other product, in a controlled environment, but it also facilitates the condensation of steam, or any other ambient condition, onto the surface of the product that is exposed to the environment (including the bottom of the marking plate), and lastly, it keeps the humidification properties unchanged (almost-wet effect) until the automated handling  
380 unit containing the marking tools (frames combined with marking plates) is put into the oven. This allows to avoid the undesired effects caused by the exposition of the product to the environment and to prevent the fact that external temperature and humidity can remove the superficial humidity of the product or any other value essential to obtain  
385 a coloured and in-relief marking of the final product.

In the example linked to bakery products and other similar products, this stage is ideally managed through parameters preset on a programmable logic controller, with a temperature range of 20 to 35° and a humidity range of 85 to 90%, which parameters can be adjusted  
390 according to the different types or conditions of the raw materials used.

Said stage is further characterized by a variation of preset parameters, according to external (seasonal or occasional) conditions. The saturation

of the environment induced by cold steam (ultrasound humidification) is monitored through hygrometers/sensors (4) (5) and automatically  
395 adjusted by the programmable logic controller (PLC), which adjusts the preset values every millisecond, according to external conditions, in order to keep the ambient conditions that serve the purpose constant.

Placed in said ambient conditions, the product rises in the preset time (which varies depending on the type and size of the batters) and can be  
400 directly baked or further mechanically processed (eg. decorative cutting), the latter being irrelevant to the result of the marking process.

The creation of said ambient conditions (which result in an increased plasticity of the product) allows a better rising of the portion of the product placed in the hollow parts of the marking plate (negative space  
405 of the marking (13)). During baking, the (induced) higher elasticity and malleability allow a better shaping of a marking in relief, thanks to the longer time required for the crystallization of the crust and the resulting longer time necessary for the rising of the dough that comes out of the negative space of the marking (13) (hollow part of marking plate). The  
410 difference in the baking time of the dough in contact with the metal of the supporting plate and the longer baking time of the dough in the hollow parts of the supporting plate, and hence the difference in the different times for the crystallization or solidification of starch,

contributes to determine the chromatic difference between the part in  
415 relief and the rest of the product, thus resulting in the final marking.

The third stage consists in a different thermal diffusion of heat in the hollow and non-hollow parts of the marking plate (2), which allows a longer expansion of the dough, determined by the action of carbon dioxide, and the resulting increase in the thickness of the  
420 stamp/marking. At the same time, the increased hydration resulting from the process allows to obtain the chromatic difference between the part in relief and the rest of the product caused by the thermal differential (thermal diffusivity) between different physical bodies.

In a preferred mode, an industrial convection oven is used. However, an  
425 industrial conventional oven or any other equipment producing heat can also be used. In every case, the result is always the leavening of the dough and thus the creation of a marking in relief.

The higher and more direct amount of heat at the base of the product, and in particular in the hollow parts representing the negative space of  
430 the marking (13), has a role in the increased formation of melanoidins, producing a faster expansion of the dough and, at the same time, a faster solidification of the part in relief.

This principle, briefly described above, is explained by the variation of ambient conditions during the standard processes of leavening and  
435 baking of bread and other similar bakery products (Maillard reaction).

The reaction explains the transformation of the dough produced by the interaction between biochemical and physical processes developing during baking due to an increase in external temperature. Due to said effects, when the core of the product reaches a temperature of 60 – 70°  
440 cal, the volume of the dough increases rapidly, as a result of the increase in the internal pressure produced by carbon dioxide, because of the activity of enzymes and the evaporation of water caused by heat.

In this first phase, the difference between the temperature of the product and the temperature of the baking chamber determines the formation of  
445 a layer of condensed steam on the surface of the dough, said layer of condensed steam creating a barrier that prevents the emission of carbon dioxide. Said barrier determines an increase in internal pressure, due to the presence of gases, which results in the expansion of the dough. Thus, the dough comes out of the negative spaces (13) in the marking  
450 plate (2). The relief part of the marking starts to develop, up to the crystallization of the surface.

When the temperature rises (a possible and ideal temperature range going from 120 to 140° C) the steam layer produced by the condensation of the steam slowly evaporates again, absorbing heat from  
455 the environment and, thanks to the hyper-humidification of the preparatory stage, a different temperature gradient is determined. This causes a delay in the solidification of the starch of the surfaces that are

in the hollow parts of the support (as it is more elastic in these areas),  
compared to the drier surfaces that are in direct contact with the  
460 support.

The preparatory humidification and the variation of ambient conditions  
in these two consecutive stages allow to obtain a double effect. Firstly,  
the increased plasticity of the humidified parts allows the solidification  
or crystallization at a later stage, and hence a longer and more gradual  
465 development of the part in relief. Secondly, the different thermal  
diffusion allows to obtain a different colour of the marking compared to  
the rest of the product.

Later, when the temperature rises, the surface crystallization of the  
dough and the development of the crust start, due to the decrease in the  
470 quantity of water inside the product as a result of its gradual  
evaporation.

About 24/26 minutes after the products are put into the oven (the baking  
time varies depending on the type and size of bread), the process ends  
with the complete solidification of the crust, and hence of the stamp or  
475 marking.

The invention described allows to mark, identify and trace a product,  
and especially a bakery product or any other similar product, which is  
marketed without any packaging.

The marking system provided by this invention is integrated in a  
480 standard production process without the need to add any other stages,  
and hence without any increase in the costs.

The process can be applied to products for human or animal  
consumption, without affecting the quality of the final product.

The result of the process, i.e. the marking, being an integral part of the  
485 product, cannot be separated, in any way, from the product itself.

The system can mark a food product easily and cheaply, and in  
accordance with the regulations on food safety.

This invention leads to a marking that cannot be easily copied and can  
be a useful way to prevent counterfeiting.

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## CLAIMS

1. Organized system for marking products, including products for human and animal consumption, such as bakery products, according to the invention, consisting of:

- 5       - at least a climatic chamber (1);
- at least a machinery for varying ambient conditions (10) to be used in the climatic chamber (1);
- at least an automated handling unit (8) where the marking tools (2) move along;
- 10       - at least a dispersion device to facilitate the dispersion of elements useful to vary ambient conditions (7) placed along the circuit of the climatic chamber (1);
- at least a heat exchanger (6);
- a baking chamber (14);
- 15       - a machinery for temperature variation (15) to be used in said baking chamber (14);
- at least a programmable logic controller (9) which, when in use, monitors ambient conditions every millisecond, in at least a climatic chamber (1) and/or in the baking chamber (14),
- 20       alternately or simultaneously, by means of devices for the monitoring of ambient conditions (4) (5) placed in the different areas of the climatic chamber (1) and of the baking chamber

(14), adjusting them to preset parameters, according to the variation of internal and external conditions;

- 25       - a stamping tool (3) which, when in use, perforates a marking tool (2) consisting of a frame (11) and a supporting plate (12);
- a perforated supporting plate (12) which moves along the circuit, on the automatic handling units (8), the hollow parts of said supporting plate (12) being perforated by the stamping tool (3)
- 30       and being the negative space of the marking (13).

2. Organized system for marking products according to the main claim, where said at least one climatic chamber (1) consists of a delimited closed space provided with at least a machinery for varying ambient conditions (10), further provided with dispersion devices that facilitate

35       the dispersion of elements useful to vary ambient conditions (7).

3. Organized system for marking products according to the previous claims including an automatic handling unit (8) which, when in use, allows the marking tools (2) to move along the entire circuit, consisting of at least a climatic chamber (1) and at least a baking chamber (14).

40       4. Organized system for marking products according to the previous claims including a marking device consisting of:

- at least a frame (11);
- at least a supporting plate (12);

- at least a stamping tool (3) which, when in use, perforates a  
45 marking tool (2) consisting of a frame (11) and a supporting  
plate (12);

**5.** Device for marking products according to the main claim and claim  
4, including a stamping tool (3) which, when in use, perforates a  
supporting plate (12), creating the negative space of the marking (13)  
50 onto said supporting plate (12), by perforation, where said stamping tool  
(3) can be a mechanical pressure tool, a heat tool, a laser tool, a  
hydraulic pressure tool or any other tool that can serve the purpose.

**6.** Mode of operation of the above-described organized system and  
composite device consisting of a first stage of preparatory hydration,  
55 which has an effect on the rheological properties of the dough, a second  
stage of hyper-humidification of the hollow parts, compared to the non-  
hollow parts, by means of dispersion devices that facilitate the  
dispersion of elements useful to vary ambient conditions (7) placed  
along the circuit of the climatic chamber (1) and regulated by a  
60 programmable logic controller (9), and a third stage of temperature  
variation.

**7.** Mode of operation of the organized system and composite device  
according to the previous claims further characterized by an automated  
variation of preset optimum parameters, said automated variation  
65 happening through the machinery for varying ambient conditions (10)

and the heat exchanger (6) and being managed by a programmable logic controller (9) which, when in use, keeps the preset parameters constant, adjusting the parameters according to the ambient conditions registered, through sensors (5) or other measurement instruments (4), every  
70 millisecond, in the climatic chamber (1) and in the baking chamber (14).

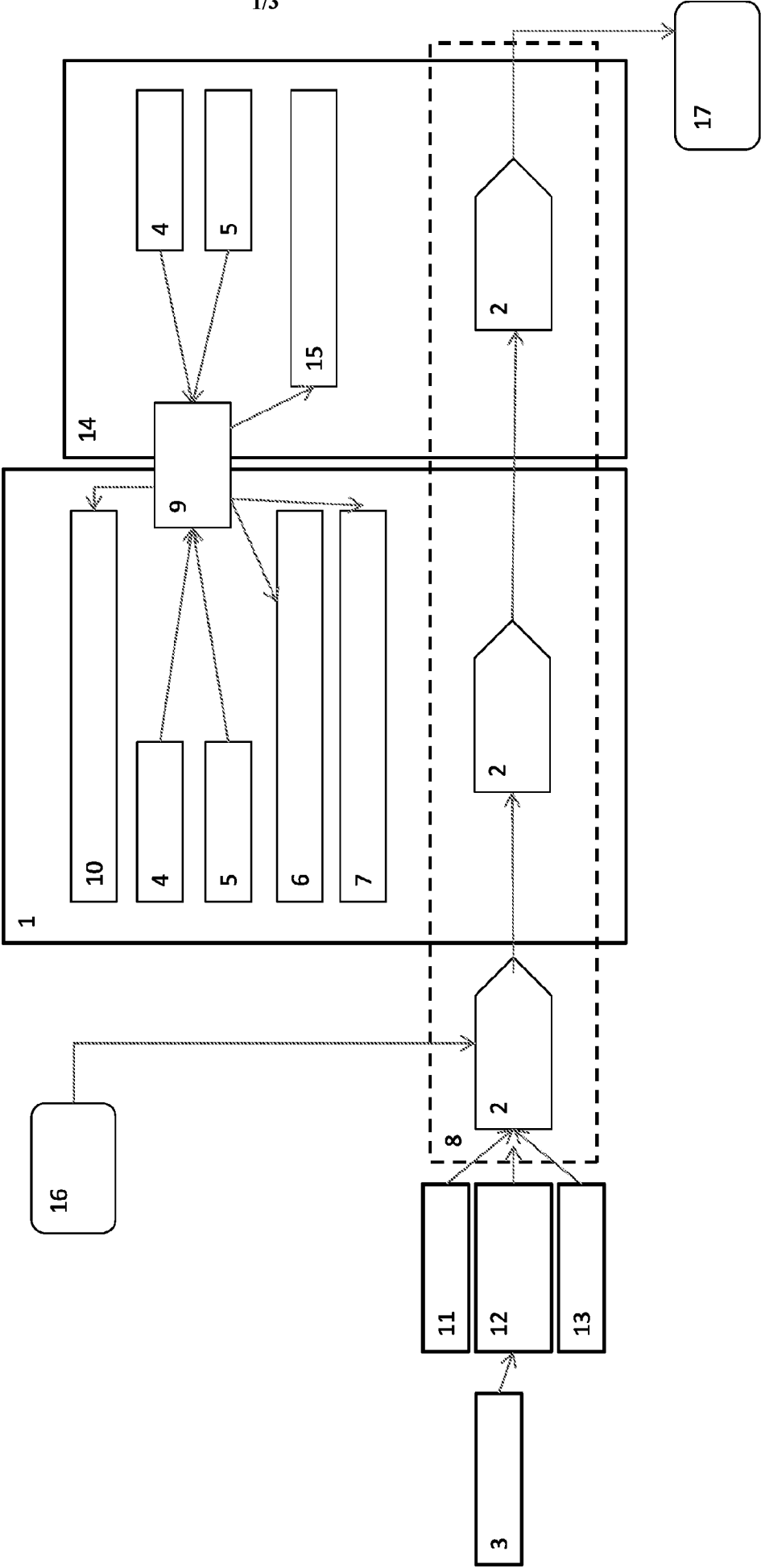
**8.** Mode of operation of the organized system and composite device according to the previous claims further characterized by a difference in the ambient conditions of the hollow and non-hollow parts of the  
75 marking tool (2), which, through the dispersion devices that facilitate the dispersion of elements useful to vary ambient conditions (7) and through the temperature variation provided by the machinery for temperature variation (15), allows an increased expansion of the product in the part corresponding to the negative space of the marking (13), a  
80 faster solidification of the part in relief and a chromatic differentiation.

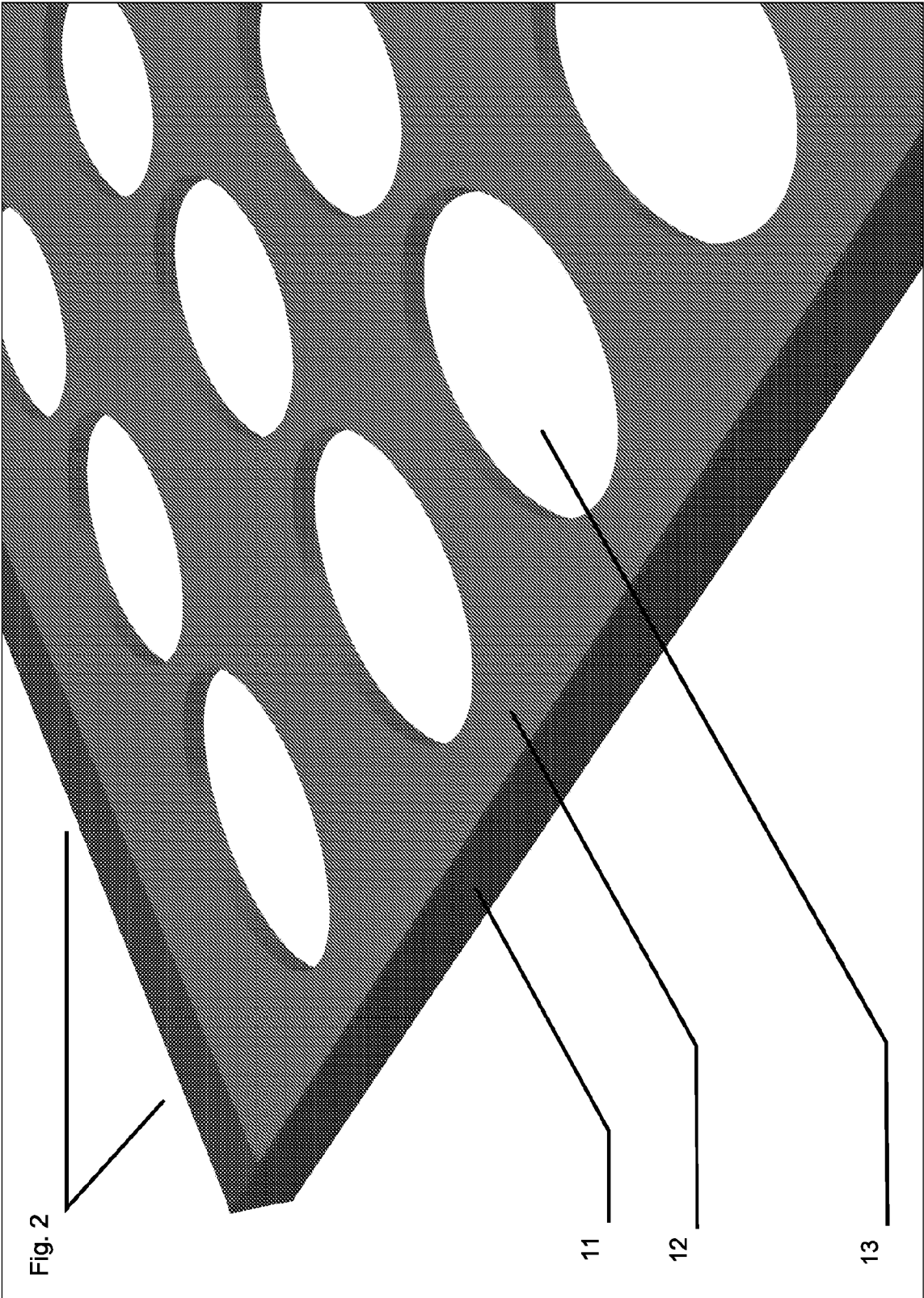
**9.** Mode of operation of the organized system and composite device according to the previous claims further characterized by the fact that the increased hydration resulting from the combined first and second stages allows to obtain an increased chromatic difference between the  
85 part in relief and the rest of the product, caused by the thermal differential between different physical bodies, characterized by the marking tool (2) and the product (16) coming out of the negative space

of the marking (13) created by the stamping tool (3) in at least an area of said marking tool (2).

90

Fig.1





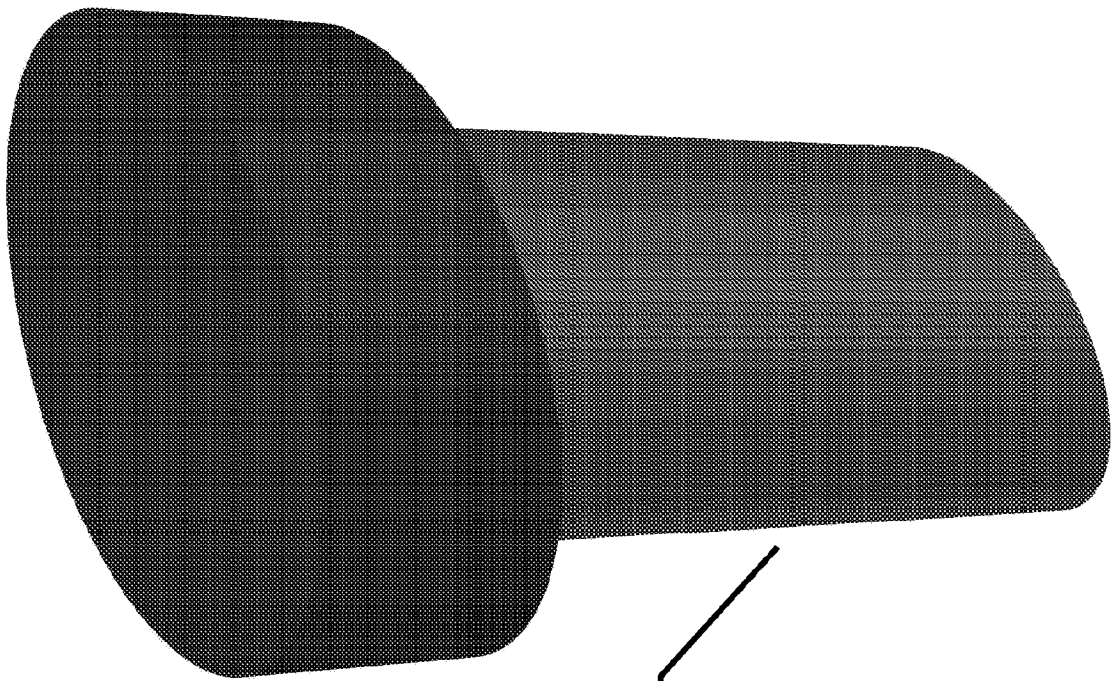


Fig. 3

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| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>INV. A21C11/00      A21B3/15      A21C13/02<br>ADD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                 |                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| According to International Patent Classification (IPC) or to both national classification and IPC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                 |                                                                                                                               |
| <b>B. FIELDS SEARCHED</b><br>Minimum documentation searched (classification system followed by classification symbols)<br>A21C A21B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                 |                                                                                                                               |
| 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)<br>EPO-Internal, WPI Data                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                 |                                                                                                                               |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                 |                                                                                                                               |
| Category*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Citation of document, with indication, where appropriate, of the relevant passages                                                              | Relevant to claim No.                                                                                                         |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | EP 0 954 973 A2 (WERNER & PFLEIDERER<br>LEBENSMITT [DE])<br>10 November 1999 (1999-11-10)<br>figures 1-3<br>paragraphs [0016] - [0031]<br>----- | 1-9                                                                                                                           |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | US 2005/095334 A1 (MESSINA SALVATORE [US])<br>5 May 2005 (2005-05-05)<br>figures 1-2<br>paragraphs [0028] - [0033]<br>-----                     | 1-9                                                                                                                           |
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| <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: 45%;"> <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<br><br><div style="text-align: center; font-size: 1.2em;">15 April 2019</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                 | Date of mailing of the international search report<br><br><div style="text-align: center; font-size: 1.2em;">24/04/2019</div> |
| Name and mailing address of the ISA/<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040,<br>Fax: (+31-70) 340-3016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                 | Authorized officer<br><br><div style="text-align: center; font-size: 1.2em;">De Meester, Reni</div>                           |

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International application No  
PCT/IT2019/050022

| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                                           |                       |
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