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(71) Applicant: **Sojecka, Nicola**
42-200 Czeszochowa (PL)

(72) Inventor: **Sojecka, Nicola**
42-200 Czeszochowa (PL)

(74) Representative: **Korbela, Anna**
ul. Kilinskiego 30 lok. 2
42-202 Czeszochowa (PL)

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(54) **METHOD FOR MAKING CANDLE FILLING AND METHOD FOR MAKING AND REPRODUCING A CANDLE WITH FILLING**

(57) The subject of the invention is a method for making candle filling and a method for making and reproducing a candle with filling.

The developed method for making candle filling assumes the production of a filling from a mixture of substances such as soy wax or beeswax or rapeseed wax or palm wax or paraffins or stearin or paraffin gel or other natural waxes, or their modifications or mixtures, which constitute from 1% to 100 % of filling weight. The mixture is heated to a temperature ranging from 35°C to 95°C until it liquefies. The heated, liquefied mixture is then gradually sprayed onto the metal surface. The metal surface is cooled to a temperature at least 5°C lower than the temperature of the liquefied mixture. The liquefied mixture changes its state of matter from liquid to solid, and the resulting granules of various sizes and shapes constituting the loose filling (1) are moved to collective packaging by gravity or mechanically, preferably using a feeder.

Method for making and reproducing a candle with a filling of a mixture of substances such as soy wax or beeswax or rapeseed wax or palm wax or paraffins or stearin or paraffin gel or other natural waxes or their modifications or mixtures which constitute from 1% to 100% by weight filling, consists in pouring loose filling (1) into the casing (2). Then, at least one wick (3) is inserted vertically into the loose filling. The wick (3) is adjusted so that after burning or being charred this wick (3) can be removed from the loose filling (1) together with the melted loose filling (1) stuck to it, i.e. particles of loose filling (1), which combine with each other under the influence of flame and temperature or which stick to the wick (3). Then, loose filling (1) is poured into the casing (2), and at least one wick (3) is inserted essentially vertically.

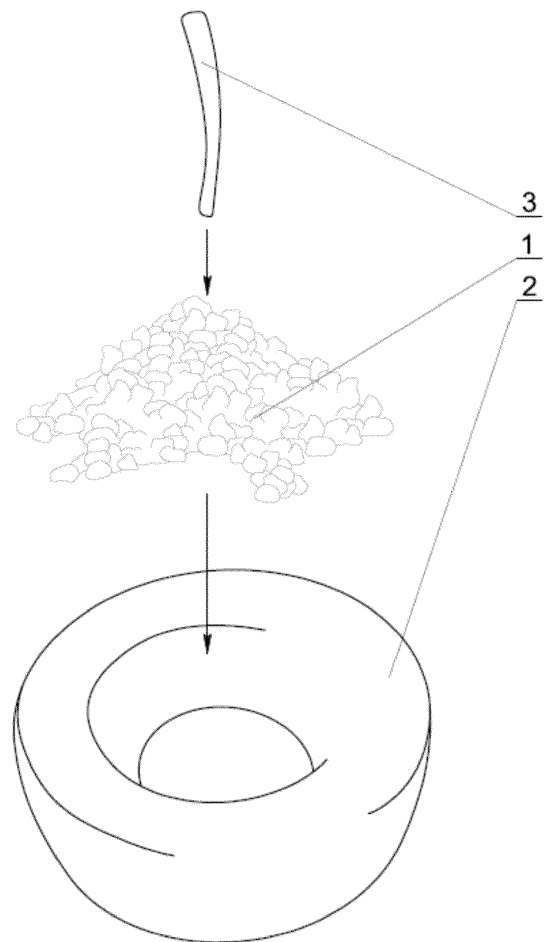


Fig. 1

Description

[0001] The subject of the invention is a method for making candle filling and a method for making and reproducing a candle with filling. The developed filling is used for the production of candles, grave lights, lanterns, and other illuminating decorative elements. The candles themselves are excellent for interior decoration and can serve as ambient lighting. The solution according to the invention will be suitable for the decorative industry, interior furnishings, grave lights, as well as in advertising and other industries where candles are used as a light source or decoration. The subject of the application also includes a candle with filling in a candle or grave light casing, as well as in other containers that can be used for this purpose (such as a favourite cup, vase, can, saucer, glass pane, or tile).

[0002] Candle and grave light inserts vary in composition, size, quality, burning time, and price. The most important distinguishing features of these inserts are the materials used in their production, the type of wick, and the method of mounting the wick in the candle casing. The market predominantly offers oil-based and paraffin-based inserts for grave lights. The most commonly used materials for making decorative candles intended for home use include paraffin, stearin, paraffin gel, beeswax, palm wax, rapeseed wax, soy wax, other natural waxes, or their modifications or mixtures.

[0003] Whereas, oil-based inserts for grave lights contain a combination of oils, typically petroleum-derived (paraffins), with a butter-like consistency. They are made from a mixture of paraffin and oils, or waxes, which extends the burning process. In high temperatures, the oil-based insert literally melts owing to the addition of oil, usually palm oil. The oil-based insert also burns at a very low temperature.

[0004] Paraffin inserts are much more popular due to their low production costs. This factor promotes both, mass production and the diversity of these types of inserts. When lit, a paraffin insert exhibits a more liquid-like consistency and adapts well to various weather conditions.

[0005] The fundamental difference between a paraffin candle and an oil candle lies in their composition. A paraffin candle does not crumble during transport or storage, whereas an oil candle insert can melt at high temperatures, which adversely affects its storage,

[0006] There are various types of wicks and different known methods of securing them, such as wooden wicks or cotton wicks coated with an impregnant. Known wicks are encased in a stabilizing metal sheet, typically adhered to the bottom of the casing primarily to prevent the wick from shifting during the pouring of the liquefied filling. This allows for stabilizing the wick inside the vessel.

[0007] Traditional candles known so far, due to the melting and heating of the insert, should be placed on surfaces resistant to temperature. Typically, they should not burn for more than four hours. It is also important not to allow the candle to burn all the way to the end.

[0008] There are also known candles and grave lights where the wick has been replaced with artificial light, such as an LED bulb. This type of solution uses electrical energy as a light source, and the absence of the rapid oxidation accompanying a flame does not generate high temperatures, thus minimizing the risk of burns.

[0009] Thus, there is a solution known from the Polish invention with exclusive rights number Pat.203361 (application date 31.05.2002) titled "*Microcrystalline paraffin, method for making microcrystalline paraffin, and application of microcrystalline paraffin*". According to the invention, microcrystalline paraffins have a high molecular weight and therefore high boiling points. Up to now, they have been obtained from residual mineral oil through vacuum distillation, primarily during the production of lubricating oil (residual waxes) and from sediments of mineral oil formed during its transportation, storage, and processing in a highly complex and expensive multi-stage process. This process typically involves deasphalting, solvent extraction, dewaxing, deoiling, and refinement steps. Deoiled microcrystalline paraffin contains impurities such as sulphur, nitrogen and oxygen compounds, which are odoriferous and range in colour from dark yellow to dark brown. Depending on further applications, the paraffin undergoes refining processes such as bleaching (for industrial use) or hydrotreatment (for use in food and pharmaceutical industries).

[0010] Microcrystalline paraffins are primarily used as components in paraffin or wax mixtures. They are typically used in mixtures up to 5%. They increase the solidification and melting temperatures of these mixtures and improve their flexibility and oil-binding capacity. They are commonly used for producing waxes for impregnation, coating, and laminating in packaging and textile industries. Additionally, they are used in hot melt adhesives and sealants, pharmaceutical and cosmetic products, and chewing gum. Furthermore, they are applied in liquid compounds for casting, cables (especially in plastics), candles, rubber gum, and in the rubber tire industry. They are also used in protective, anti-slip, and anti-corrosive compositions.

[0011] The first patent claim of patent No. 203361 states that microcrystalline paraffin obtained through catalytic hydroisomerization at temperatures above 200°C from FT paraffin is characterized by having a carbon chain length ranging from 20 to 105. At 25°C, it exhibits at least a semi-solid consistency with a needle penetration of less than 100 x 10⁻¹ mm, measured according to DIN 51579.

[0012] There is a solution known from another Polish invention description with application number P.397066 (application date 21.11.2011) titled "*Method for producing candles in containers and a candle in container*". According to the invention, the method for producing candles in containers involves filling rigid containers with a combustible mixture

made from paraffin, animal fat, and additives such as dyes and fragrances, with a wick placed in the mixture. The method is characterized by gradually mixing melted animal fat (5-30% by weight of the product) with a deodorizing mixture based on plant aldehyde (0.05-1% by weight of the final product) until the undesired odour of the fat disappears. Thus, the refined fat is then mixed with paraffin (68-94.95% by weight of the final product) to achieve a homogeneous combustible mixture. The invention also covers a candle in a container.

[0013] There is a solution known from another Polish invention description with application number P.406244 (application date 25.11.2013) titled "*Method for wick fixing in the candle container*". The subject of the invention is a mechanical method for securing the wick, which is tightened into a slot formed in the appropriately shaped bottom of the container. In one variant, the wick is adhered by threading it through holes in the container's bottom, pouring adhesive into the recess of the bottom from the underside, and then cutting the wick.

[0014] There is a solution known from another Polish invention description with application number P.349064 (application date 07.08.2001) titled "*Flame-producing candle*". The subject of this invention is a flame-producing candle designed to produce a flame colour different from the natural yellow flame colour. Preferably, the colours include green, red, blue, etc. The flame colourant in the candle can be a structural element of the candle, such as the wick, or an additional component made from elements or chemical compounds that colour the flame to the desired hue. It is possible to create a candle that produces a multi-coloured or changing flame. The candle is equipped with an appropriate colourant in the form of a wick saturated with the chosen element or chemical compound that colours the flame (preferably green, red, blue). The fuel is mixed with a solid, liquid, or gaseous colourant. Thermal excitation of the colourant atoms causes the flame to glow in the selected colour.

[0015] Wax sold for candle or grave light production is often available in granular form (flakes and shavings). However, to create a proper insert, the wax needs to be melted and poured into a solid form that includes the embedded wick. During the use of the candle or grave light, the filling material melts again and evaporates into the surroundings. As the wick burns, a noticeable reduction in the amount of filling material can be observed.

[0016] Existing solutions, depending on the materials used for candle insert production, can generate harmful volatile substances, posing a safety risk to users.

[0017] The aim of the developed solution is to create a filling that allows for easy refilling of candle, grave lights or lanterns casings, or of any other container, as well as to create a solution that enables easy shaping of candles, grave lights, lanterns, or any desired shape. The aim was also to develop a solution that is safe for humans, environmentally friendly, and allows for free arrangement of the indoor and outdoor space. The invention aims to develop a filling that is more economical.

[0018] The essence of the developed method for producing candle filling, made from a mixture of substances such as soy wax, beeswax, rapeseed wax, palm wax, paraffin, stearin, paraffin gel, or other natural waxes, their modifications, or mixtures, comprising 1% to 100% of the filling mass, involves heating this mixture to a temperature range of 35°C to 95°C until it liquefies. The heated, liquefied mixture is then gradually sprayed onto a metal surface cooled to a temperature at least 5°C lower than the liquefied mixture temperature. The liquefied mixture undergoes a phase change from liquid to solid. The resulting granules of varying sizes and shapes, constituting granular filling, are then collected into collective packaging either gravitationally or mechanically, preferably using a feeder.

[0019] Preferably, fragrance substances or extracts are added to the liquefied mixture in an amount ranging from 0 ml to 270 ml or from 0 g to 200 g per 1000 ml of liquefied mixture.

[0020] Typically, a dye or pigment is added to the liquefied mixture in an amount ranging from 0 to 270 ml or from 0 g to 200 g per 1000 ml of liquefied mixture.

[0021] Typically, solid particulate substances such as sand, small pebbles, glass particles, glitter, etc., are added to the liquefied mixture in an amount ranging from 0.01% to 5% relative to the total mass of the liquefied mixture.

[0022] The surface onto which the cooling mixture is typically sprayed is naturally cooled, either by atmospheric conditions or by an additional cooling system.

[0023] Typically, the surface onto which the cooling mixture is sprayed is inclined at an angle of at least 5° to 30°.

[0024] Thus, the essence of the method for making and reproducing a candle with filling made from a mixture of substances such as soy wax, beeswax, rapeseed wax, palm wax, paraffin, stearin, paraffin gel, or other natural waxes, or their modifications or mixtures, comprising 1% to 100% of the filling mass, involves filling the casing with loose filling. Subsequently, at least one wick is vertically inserted into the loose filling, designed so that after burning or overheating, the wick along with adhered melted loose filling particles can be removed from the loose filling. These loose filling particles adhere to the wick due to the flame and temperature, or reattach to the wick. Then, more loose filling is added into the casing, into which essentially at least one wick is inserted vertically.

[0025] Typically, the loose filling is poured onto a casing that is flat or essentially flat, or essentially concave, or is an element with an outer edge slightly higher.

[0026] Typically, the wick is saturated or coated with a substance that emits a coloured flame.

[0027] The advantage of the solution according to the invention is the fact that when the wick burns, only a small amount of the surrounding loose filler, which is located directly around the wick, melts. The filling obtained by the method

according to the invention is therefore calorific and efficient. The significant majority of the loose filling can be reused multiple times as a filling for a candle that can be easily reproduced (by replenishing with new loose filling to the initial volume). Loose filling that is further away from the wick does not absorb temperature because there is air between the granules, acting as an insulator. This characteristic prevents the loose filling, which is away from the wick, from heating up and isolates the flame temperature, thereby preventing the candle casing from heating up. Consequently, there is no need to place the candle on temperature-resistant surfaces. The solution obtained by the method according to the invention reduces the risk of burns when transporting candles, grave lights or lanterns.

[0028] Since only part of the loose filling constituting the filling of the candle casing melts when the wick is burned and burns to a minimum, it burns in the container to a lesser extent than fillings known from the state of the art. The substances inhaled by the user in previously known solutions are limited. The substances released during the burning of the candle, developed according to the invention, are composed of natural substances, and are therefore harmless to the human body. The proposed loose candle filling is therefore healthier for both humans and the environment (does not cause air pollution).

[0029] Another advantage of the solution according to the invention is that a significant part of the candle does not degrade during burning. Both the candle casing, the wick, and the loose filling can be used multiple times, making the proposed solution cheaper and more environmentally friendly (it does not contribute to the production of waste, such as disposable candle casings or grave lights). For example, the wick can be shortened or turned over, while the candle casing (made of glass or synthetic material, for instance) can be refilled with loose filling. The loose filling itself, due to its nature, can be used in various types of casings, adapting to their shape, similarly to how liquids conform to container shapes. Furthermore, the presented solution obtained by the method according to the invention does not require a container to make a candle, grave light, or lantern insert. Loose filling can also be placed on a flat surface, such as glass, a plate, or a base, allowing for the arrangement of a cone-shaped loose substance without the risk of it spilling or damaging the surface (as long as the flat surface on which the cone is placed remains in a horizontal position).

[0030] In the developed solution, known methods for stabilizing the wick (e.g. stabilizing plates or adhesive tapes or glue) can also be omitted. The loose filling effectively stabilizes the wick during the use of the candle or grave light, so it is sufficient to insert the wick into the loose filling.

[0031] The subject of the invention has been further illustrated in an exemplary embodiment in the drawing, in which:

- Fig. 1 - shows a diagram of making your own candle using a loose substance, wick and casing,
- Fig. 2 - shows an axonometric view of the loose substance placed in the candle casing with the wick,
- Fig. 3 - shows an axonometric view of a burning candle,
- Fig. 4 - shows a view of the loose substance with the wick embedded in it.

[0032] The subject of the invention is a method for producing candle filling, specifically a loose filling 1 made from a mixture of substances such as soy wax, beeswax, rapeseed wax, palm wax, paraffin, stearin, paraffin gel, or other natural waxes, or their modifications or mixtures, which constitute from 1% to 100% of the mass of the loose filling 1.

[0033] The mixture is heated to a temperature ranging from 35°C to 95°C to liquefy it. Preferably, fragrant substances or extracts, or a dye or pigment are added to the liquefied mixture to obtain the desired colour, which is added in any proportion to obtain the planned aesthetic effect. Both the dye or the pigment are added in quantities corresponding to 0 to 270 ml or 0 to 200 g per 1000 ml (1 litre) of the liquefied mixture.

[0034] The fragrant extracts are added later, at a strictly defined temperature, for example, between 30°C and 80°C (depending on the type of chosen fragrance). The extracts are added in quantities corresponding to 0 to 270 ml or 0 to 200 g per 1000 ml (1 litre) of the liquefied mixture.

[0035] Preferably, solid powdered substances such as sand, small pebbles, glass particles, or glitter are also added to the liquefied mixture in amounts from 0.01% to 5% of the total mass of the resulting mixture. These additions impart different physical and chemical properties to the obtained mixture.

[0036] The heated, liquefied mixture (e.g., the heated wax mixture) is gradually sprayed onto a surface that is at least 5°C cooler than the liquefied mixture as a result of which (due to the temperature difference) the state of the liquefied mixture changes and returns from the liquid state to the solid state, which results in the formation of granules of various sizes and shapes constituting a loose filling 1.

[0037] The selection of the temperature of the heated mixture and the temperature of the surface onto which the heated mixture is sprayed depends on the types of waxes used, their melting points, and their solidification points. The resulting granules of loose filling 1 then fall, for example, onto a conveyor, from where they are further transported (either by gravity or mechanically) to collective containers for packaging.

[0038] Preferably, the surface that is at least 5°C cooler than the liquefied mixture is made of metal and is cooled either naturally (by atmospheric factors) or with an additional cooling system. This surface is inclined at an angle of at least 5° to 30°, which allows easier, automatic (only under the influence of gravity forces) sliding of the loose filling 1 into a collective packaging enabling storage and further packaging of the loose filling 1.

[0039] The subject of this application also includes a method for making and reproducing a candle with loose filling 1 (obtained by the method described above). The loose filling 1, being a mixture of base ingredients such as soy wax, beeswax, rapeseed wax, palm wax, paraffin, stearin, paraffin gel, or other natural waxes, or their modifications or mixtures, preferably also containing fragrant substances or extracts, dyes or pigments, or solid powdered substances such as sand, small pebbles, glass particles, or glitter, is poured into the casing 2 of a candle.

[0040] The developed loose filling 1, obtained by the method that is the subject of the invention, serves as the filling for the casing 2 of a candle, grave light, or lantern. The casing 2 can be transparent, made of any material, in any colour, and can have any shape. The casing 2 can also have decorative elements in the form of grooves, protrusions, or other elements embedded in its surface.

[0041] The casing 2 of the candle can have the shape of any container with side walls, but it can also be a flat surface or an element with only a slightly raised outer edge.

[0042] A wick 3 is vertically inserted into the loose filling 1. The wick 3 is not permanently attached to the casing 2 or embedded in the loose filling 1. The wick 3 can be woollen, cotton, or wooden. The wick 3 can be saturated or coated with a substance that, during burning, allows for a different flame colour, such as green or purple.

[0043] The casing 2 is not necessary for the proper functioning of the candle, grave light, or lantern, and the loose filling 1 along with wick 3 can serve as a light source.

[0044] Multiple wicks 3 can be inserted into a casing 2 with a large radius.

[0045] After the wick 3 burns out or becomes charred, it is removed from the loose filling 1 along with a small amount of melted loose filling 1 particles, i.e. particles of the loose filling 1 which combine with each other under the influence of the flame and temperature, but also stuck to the wick 3. Subsequently, loose filling 1 is added to the casing 2 to replenish it, and a new wick 3 is inserted vertically (alternatively, the same wick 3, inverted, trimmed, or cleaned). The size of the surface area and dimensions of the melted loose filling depend on the thickness and other parameters of the wick 3 used.

Examples of loose filling 1 embodiment:

[0046] in addition, embodiments describing the amounts of substances used when making loose filling 1 are presented in the table below.

Loose filling 1:	Example I	Example II	Example III	Example IV	Example V
Soy wax	-	50%	60%	90%	-
Beeswax	90%	-	-	-	-
Rapeseed wax	10%	25%	-	4%	45%
Palm wax	-	5%	28%	-	45%
Paraffin	-	-	2%	-	-
Stearin	-	-	-	-	2%
Paraffin gel	-	-	-	3%	-
Fragrance substance/extract	-	-	5%	1,5%	3%
Dye/pigment	-	-	-	0,5%	5%

Solid powdered substances, e.g., sand, small pebbles, glass particles, glitter	-	20% (sand)	5% (glass particles)	1% (glitter)	-
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The list of elements:

[0047]

1. loose filling,
2. casing,

3. wick.

Claims

1. Method for making candle filling made from a mixture of substances such as soy wax or beeswax or rapeseed wax or palm wax or paraffins or stearin or paraffin gel or other natural waxes, or their modifications or mixtures, which constitute from 1% to 100% of the filling weight, where the mixture is heated to a temperature ranging from 35°C to 95°C until it liquefies, **characterized in that** the heated, liquefied mixture is gradually sprayed onto a metal surface, cooled to a temperature at least 5°C lower than the temperature of the liquefied mixture, the liquefied mixture changes its state from liquid to solid, and the resulting granules of various sizes and shapes constituting the loose filling (1) are moved to collective packaging by gravity or mechanically, preferably using a feeder.
2. Method for making candle filling, according to claim 1, **characterized in that** fragrance substances or extracts are added to the liquefied mixture in quantities ranging from 0 ml to 270 ml or from 0 g to 200 g per 1000 ml of liquefied mixture.
3. Method for making candle filling, according to claim 1 or 2, **characterized in that** a dye or pigment is added to the liquefied mixture in quantities ranging from 0 to 270 ml or from 0 g to 200 g per 1000 ml of liquefied mixture.
4. Method for making candle filling, according to claim 1 or 2 or 3, **characterized in that** loose solids are added to the liquefied mixture, such as, e.g., sand, small pebbles, glass particles, glitter, in an amount ranging from 0.01% to 5% relative to the total weight of the liquefied mixture.
5. Method for making candle filling, according to one of the claims 1 to 4, **characterized in that** the surface onto which the cooling mixture is sprayed is cooled naturally, i.e. by atmospheric factors or an additional cooling system.
6. Method for making candle filling, according to one of the claims 1 to 5, **characterized in that** the surface onto which the cooling mixture is sprayed is inclined at an angle of at least 5° do 30°.
7. Method of making and reproducing a candle with filling made from a mixture of substances such as soy wax, beeswax, rapeseed wax, palm wax, paraffin, stearin, paraffin gel, or other natural waxes, or their modifications or mixtures, constituting 1% to 100% by weight of the filling **characterized in that** the loose filling (1) is poured into a casing (2), and then at least one wick (3) is inserted vertically into the loose filling, the wick (3) being designed so that after burning or being charred, it can be removed from the loose filling (1) together with the melted loose filling (1) stuck to it, i.e., particles of the loose filling (1) which combine with each other under the influence of flame and temperature or adhered to the wick (3) and subsequently, additional loose filling (1) is added to the casing (2), into which at least one wick (3) is inserted essentially vertically.
8. Method for making and reproducing a candle, according to claim 7, **characterized in that** the loose filling (1) is placed on a casing (2) that is flat or essentially flat, or essentially concave, or is an element with an outer edge slightly higher.
9. Method for making and reproducing a candle, according to claim 7 or 8, **characterized in that** the wick (3) is saturated or coated with a substance emitting a coloured flame.

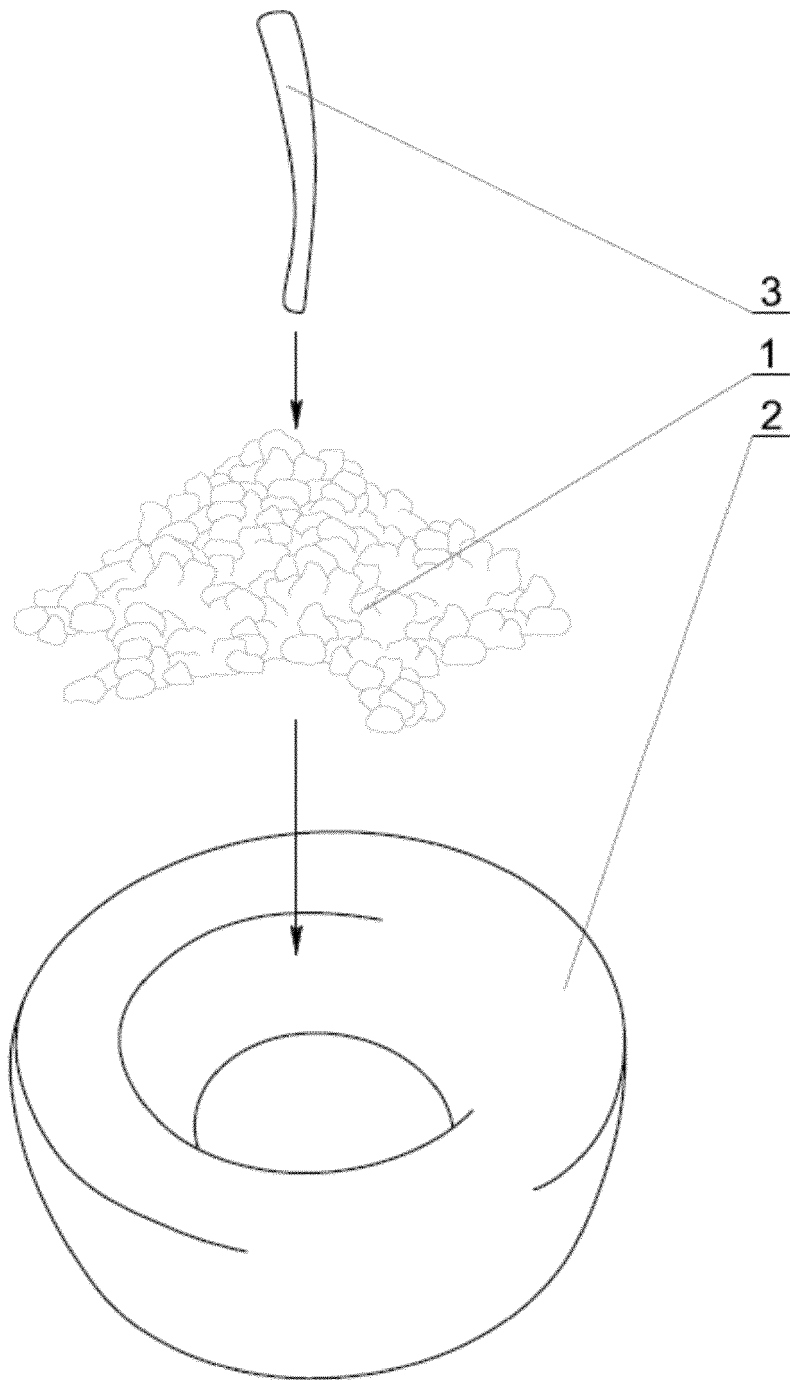


Fig. 1

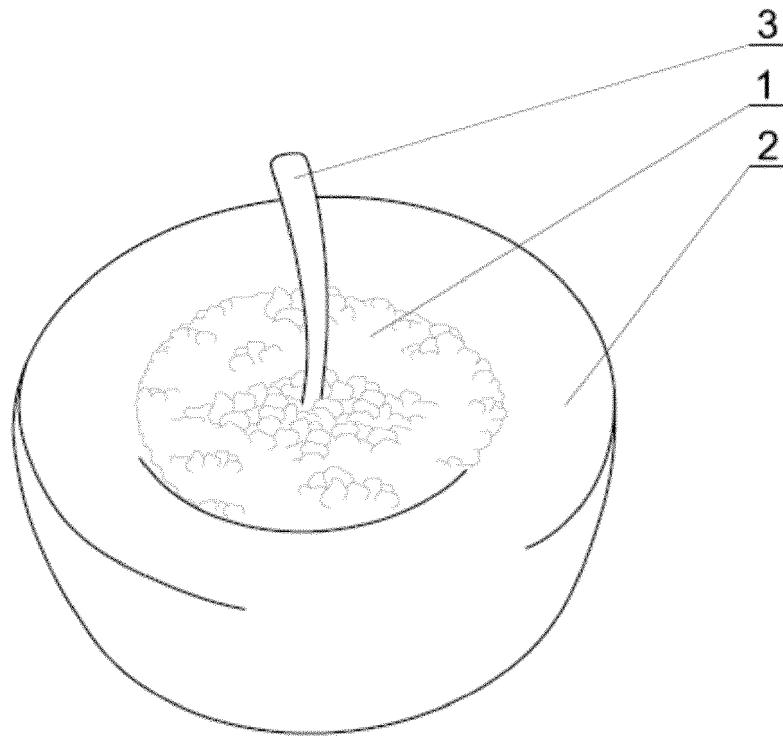


Fig. 2

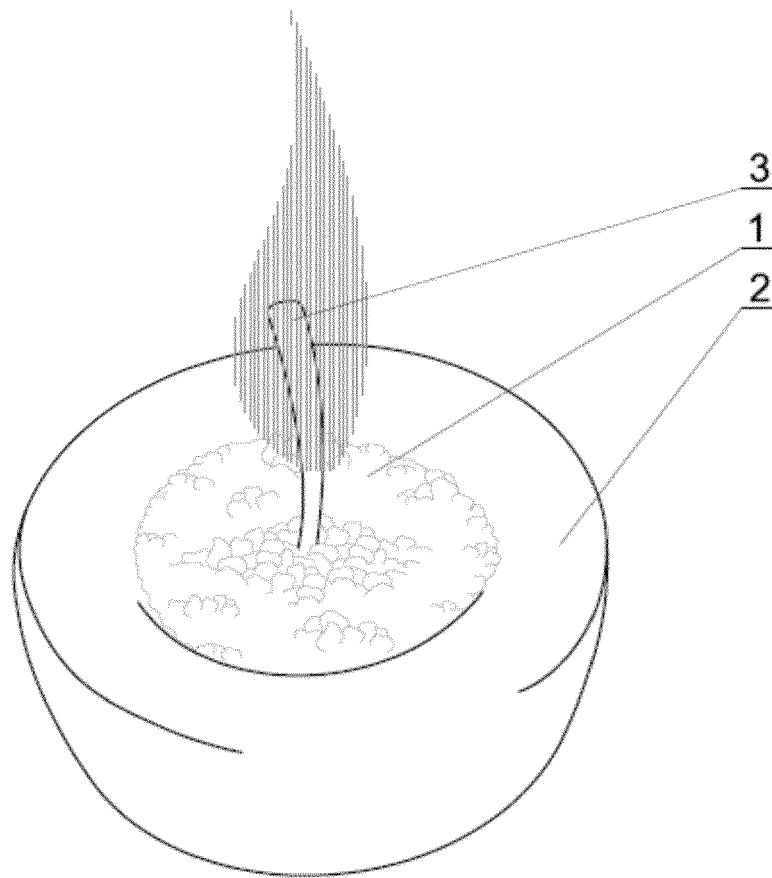


Fig. 3

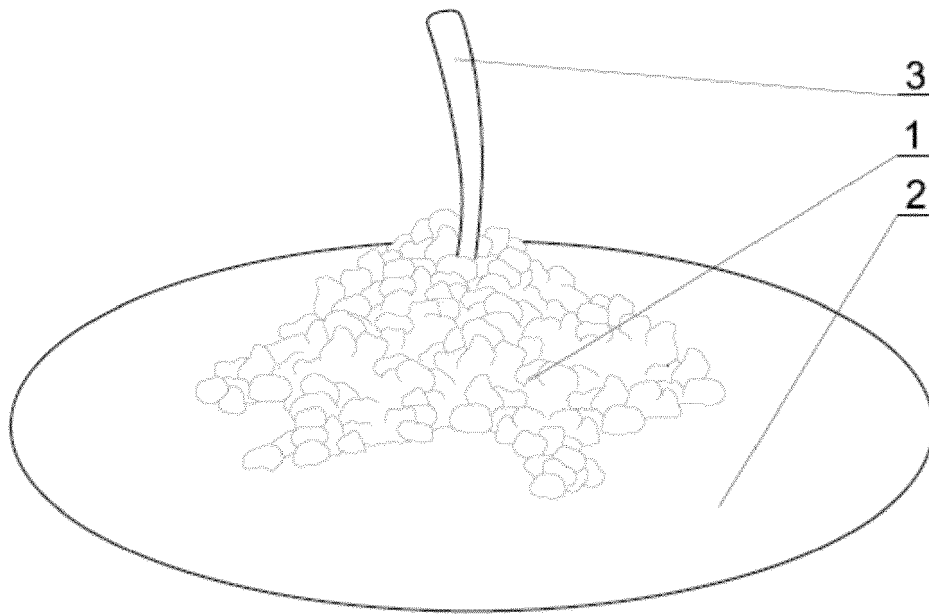


Fig. 4



EUROPEAN SEARCH REPORT

Application Number

EP 24 17 2235

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
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			TECHNICAL FIELDS SEARCHED (IPC)
			C11C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 16 August 2024	Examiner Alevisopoulos, S
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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