(54) COSMETIC APPLICATOR

(57) Cosmetic applicator with a bristle-bearing core which holds in position a plurality of bristles - being preferably curved and, if curved, in the same direction - which become increasingly longer when viewed along a circumferential direction of the core, wherein the elongated length of the bristles along said circumferential direction of the core becomes longer every 90° by a factor of 1.6 +/- a tolerance factor T.
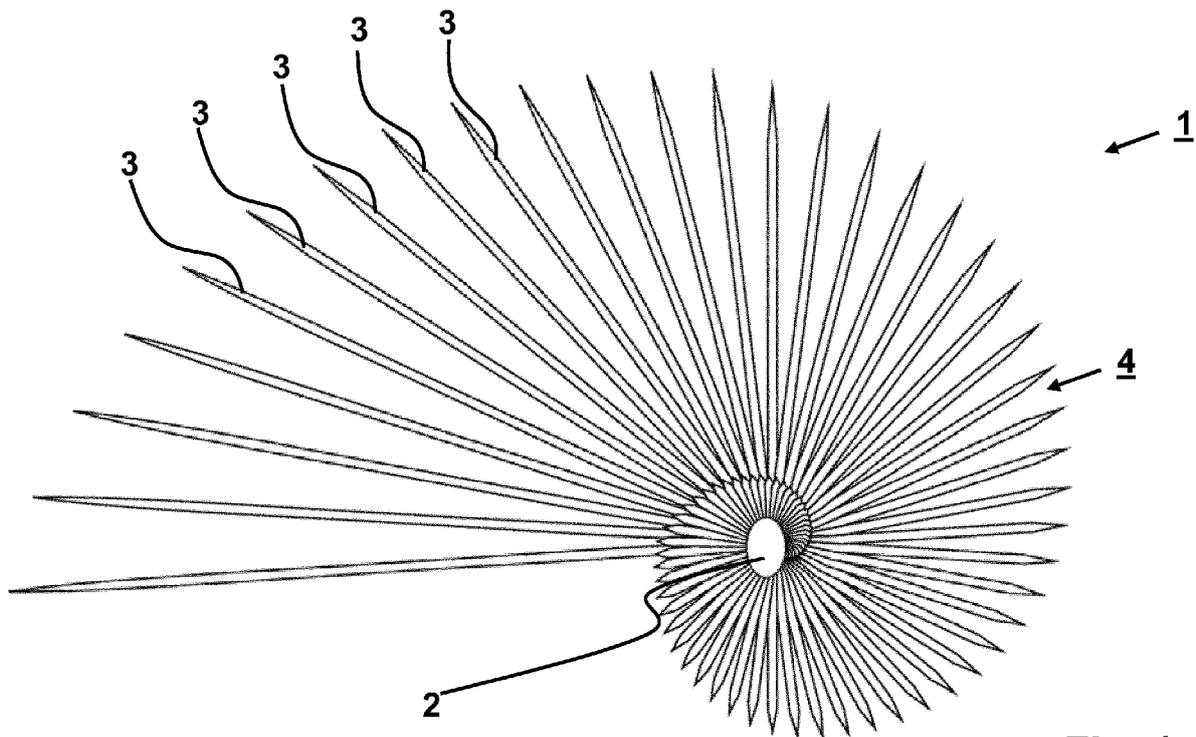
Fig. 1

EP 4 573 966 A1

Description

FIELD OF INVENTION

[0001] The invention relates to a cosmetic applicator according to the generic term of claim 1.

TECHNICAL BACKGROUND

[0002] Cosmetic applicators are mostly used to apply mass to a surface to be applied. The mass can be a cosmetic mass, a pharmaceutical mass, a dental mass or something else. Often, cosmetic applicators are applicators for applying cosmetic mass in form of mascara to the eyelashes.

[0003] Regardless of the purpose for which the mass is applied and to which area, applicators currently in use - especially applicators for applying mascara - are often very similar in design. The middle section of the applicator has bristles that protrude radially outwards and are used to apply the mascara to a large area of the lashes. On the free end of the applicator are further - usually smaller - bristles, which are used for the "fine work", for example targeted application and styling of individual lashes. As mentioned, only individual lashes or only a small area of lashes can be treated this way and it is often very cumbersome and uncomfortable. In general, there is no really variable application behavior of ordinary applicators, as there are usually only these two "operation modes" mentioned, which often also cannot be carried out ideally.

OBJECT OF THE INVENTION

[0004] Accordingly, it is the object of the invention to provide an applicator with a variable application behavior.

SOLUTION ACCORDING TO THE INVENTION

[0005] A solution to this problem is provided by the main claim.

[0006] Here, a cosmetic applicator with a bristle-bearing core holding in position a plurality of bristles is proposed. These bristles are preferably curved. If the bristles are curved, then all the bristles are curved in the same direction.

[0007] Furthermore, the bristles become increasingly longer when viewed along a circumferential direction of the core. The cosmetic applicator according to the invention is characterized in that the elongated length of the bristles along said circumferential direction of the core becomes longer every 90° by a factor of 1.6 +/- a tolerance factor T.

[0008] Said tolerance factor T in some cases can be a value of up to +/- 2 mm, but preferably lower.

[0009] The "elongated length" in case of straight bristles is the normal bristle length from the base of the bristle up to the free tip of the bristle. In case of curved bristles, it

is the stretched length of the bristle and equivalently again the length from the base of the bristle up to the free tip of the bristle.

[0010] In order to explain how the length of the bristles is increasing, an example of a cosmetic applicator according to the invention should be explained.

[0011] First of all, the start is usually with the shortest bristle; in the case of the example with an elongated length of 2 mm.

[0012] Ideally, a bristle which is offset to this first bristle by 90° in the circumferential direction on the core is then about 2 mm * 1.6 = 3.2 mm long (elongated length).

[0013] A bristle that is offset by 180° to the first bristle then has an elongated length of approximately 3.2 mm * 1.6 = 5.12 mm.

[0014] A bristle that is offset by 270° to the first bristle then has an elongated length of approximately 5.12 mm * 1.6 = 8.19 mm.

[0015] A bristle that is offset by 360° to the first bristle then has an elongated length of approximately 8.19 mm * 1.6 = 13.1 mm.

[0016] A bristle that is offset by 450° to the first bristle then has an elongated length of approximately 13.1 mm * 1.6 = 21.0 mm and so on.

[0017] The tolerance factor T must always be applied to each of these values.

[0018] This means overall, that an applicator with variable application behavior - depending on the rotational position of the applicator - can be provided.

[0019] A point is the core is not arranged symmetrically within the bristle set. That way the bristle set is not wiped symmetrically but in a very individual manner

[0020] The inventive applicator presents on its one circumferential side a row or set of very long bristles the freely protrude to the outside. This row or set of bristles forms a special comb-like structure that is the most wiped portion of the applicator. That effectively helps to curl and to separate the lashes.

[0021] On the other hand, the opposite bristles are very short. In most cases these bristles are wiped significantly less intensive. So, these bristles are very effective in transferring cosmetic mass to the lashes or dental mass to the teeth.

PREFERRED DESIGN OPTIONS OF THE INVENTION

[0022] A preferred design option is that the tolerance factor T = +/-0.4 mm, better the tolerance factor T = +/- 0.3 mm and ideally the tolerance factor T= +/- 0.15 mm. Therefore, a constant application behavior can be provided.

[0023] Furthermore, it is preferred that the bristles are slightly curved over their entire length, so that their longitudinal bristle axis changes its direction by less than 70° and preferably by less than 45°, more ideally by less than 35°. The curved bristles help with the application of the cosmetic mass and also help to form the lashes. But the curvature of the bristles mostly should not be too big in

order to provide a natural result after the application of the cosmetic mass.

[0024] It is also preferred that the elongated length of the bristles increases as seen along the circumferential direction. So, not only the bristles that are offset by 90°, but also the bristles in between become increasingly longer. The bristles preferably become longer continuously or essentially continuously in the sense that at least in the vast majority of cases a bristle whose base point is further advanced in the circumferential direction is longer than the bristles preceding it in the circumferential direction with its base point. Therefore, the cosmetic applicator can be rotated during the application of mass and it distributes the mass and forms the lashes constantly during the rotation.

[0025] It is furthermore preferred that the smallest rectangle framing the cross-section of the cosmetic applicator - without intersecting it -, which results from a projection of its core and its bristle trim onto a plane perpendicular to the longitudinal axis of the core, is a rectangle which is composed exclusively of squares whose edge lengths increase according to the Fibonacci sequence. In a less strict sense this condition can be met, too, if at least 80% better at least 90% and ideally essentially all of the bristles of a new, not used applicator are fully positioned within the said smallest rectangle.

[0026] It is also preferred that the bristle trim is formed from bristles of different hardness, preferably such that bristles with a greater elongated length are harder than bristles with a shorter elongated length. Therefore, a preferred application behavior can be achieved.

[0027] It is also preferred that the bristle trim is formed from bristles of different bristle base diameters, preferably in such a way that bristles with a greater elongated length have a greater bristle base diameter than bristles with a smaller elongated length. Therefore, a preferred application behavior can be achieved.

[0028] Furthermore, it is preferred that the core consists of at least two wires twisted together, which hold filaments clamped between them, which form the bristles. This facilitates the manufacture of the applicator.

[0029] It is also preferred that the base area of each bristle, with which it merges into the core, is spatially separated from the base areas of the surrounding bristles. That facilitates the manufacture of the applicator, especially when injection moulding is the manufacturing process of choice. The spatial separation of the base areas is already achieved, when the bristle bases do not touch, but preferably there is an imaginary circle around the base point of the bristle, which protrudes at least 0.5 mm beyond the circumference of the bristle at the base. The base point is the point at which the axis of a bristle intersects the surface of the core.

[0030] It is also preferred that the bristles taper conically from the bristle base into the free bristle tip. Therefore, a preferred application behavior can be achieved.

[0031] It is furthermore preferred that the bristles all or at least predominantly have a constant diameter from the bristle base to the area of the free bristle tip. So, the bristles can either have no pointed tip at all or the tip is pointed, but then the tip area in length makes up less than 5% of the elongated length of the bristle.

[0032] It is also preferred that the free bristle tips have a single or double wedge-like (or chisel-like) pointing. The special profile of the bristle tips is preferably achieved by injection molding. In case of a wire core applicator the said feature is achieved by grinding and/or by asymmetrically inserting filaments of different lengths between the wire cores. The latter can also be produced with a fine cut/finish grinding at the end and is therefore already suitably preconfigured.

[0033] Further possible configurations, functions and advantages result from the dependent claims and/or the following description of the preferred embodiment and/or with reference to the figures.

FIGURE LIST

[0034]

Figure 1 shows a first embodiment of the cosmetic applicator with straight bristles in front view.

Figure 2 shows the first embodiment of Fig. 1 in three-dimensional view.

Figure 3 schematically shows a second embodiment of the cosmetic applicator with curved bristles in front view with the scheme of the Fibonacci sequence that the design of the cosmetic applicator follows.

PREFERRED EMBODIMENTS

[0035] Figure 1 and 2 show a first embodiment of the cosmetic applicator 1. This cosmetic applicator 1 according to the invention preferably is used to apply cosmetic mass, pharmaceutical mass or dental mass, but can also used for dental applications like interdental cleaning.

[0036] This cosmetic applicator 1 comprises a bristle-bearing core 2 which holds in position a plurality of bristles 3. This embodiment does have straight bristles 3, wherein the elongated length of the bristles 3 along a circumferential direction of the core 2 becomes longer every 90° by a factor of 1.6 +/- a tolerance factor T. The elongated length here is the length of a bristle 3 from its bristle base to its free tip. Said tolerance factor can be in some special cases T = +/- 0.5 mm. Preferably D the tolerance factor T = +/- 0.4 mm, better the tolerance factor T = +/- 0.3 mm and ideally the tolerance factor T= +/- 0.15 mm.

[0037] Preferably, the elongated length of the bristles 3 increases as seen along the circumferential direction continuously. Furthermore, in this embodiment the bristles 3 have substantially the same diameter and the bristles 3 taper conically from the bristle base into the free bristle tip.

[0038] In Fig. 1 said circumferential direction is shown. From the core 2 the first, shortest bristle 3 exemplarily protrudes from the right side of the core 2 with the circumferential direction shown.

[0039] Ideally, a bristle 3 which is offset to this first bristle 3 by 90° in the circumferential direction on the core 2 is then longer by the factor 1.6 in comparison to that first bristle 3 with the tolerance factor T.

[0040] A bristle 3 that is offset by 180° to the first bristle 3 then has an elongated length that is longer than the first bristle 3 by the factor 1.6 * 1.6 = 2.56 with the tolerance factor T added or subtracted to each extension by 1.6.

[0041] A bristle 3 that is offset by 270° to the first bristle 3 then has an elongated length that is longer than the first bristle 3 by the factor 1.6 * 1.6 * 1.6 = 4.1 with the tolerance factor T added or subtracted to each extension by 1.6.

[0042] This scheme then goes on for every 90° and so on.

[0043] This "spiraling scheme" can go on for 540° as it is shown in Fig. 1. But it is also possible for cosmetic applicators 1 to have a scheme like that for 180° or 270° or even more than 540°. It is preferred that the end value is a multiple of 90, but it is also possible, that the end value is not a multiple of 90. Overall, it is preferred that this "spiral" turns at least 180° and at most 720°.

[0044] Fig. 2 shows he whole cosmetic applicator 1 in three-dimensional view. In this figure the whole bristle trim 4 around the core 2 can be seen. Here, it becomes clear that all the bristles 3 in one row are preferably designed the same.

[0045] Figure 3 furthermore shows a second embodiment of the cosmetic applicator 1 with curved bristles in front view and said circumferential direction again with the scheme of the Fibonacci sequence that the design of the cosmetic applicator 1 preferably follows. The cosmetic applicator preferably has the same or some of the properties as the cosmetic applicator 1 in the first embodiment. Just the bristles 3 are preferably curved. The bristles 3 are curved in the same direction and become increasingly longer when viewed along a circumferential direction of the core 2 as shown in Fig. 3.

[0046] From the core 2 the first, shortest bristle 3 exemplarily protrudes from the top of the core 2 with the circumferential direction shown.

[0047] Ideally, a bristle 3 which is offset to this first bristle 3 by 90° in the circumferential direction on the core 2 is then longer with its elongated length by the factor 1.6 in comparison to that first bristle 3 with the tolerance factor T.

[0048] A bristle 3 that is offset by 180° to the first bristle 3 then has an elongated length that is longer than the first bristle 3 by the factor 1.6 * 1.6 = 2.56 with the tolerance factor T added or subtracted to each extension by 1.6.

[0049] A bristle 3 that is offset by 270° to the first bristle 3 then has an elongated length that is longer than the first bristle 3 by the factor 1.6 * 1.6 * 1.6 = 4.1 with the tolerance factor T added or subtracted to each extension by 1.6.

[0050] This scheme then goes on for every 90° and so on.

[0051] The bristles 3 are slightly curved over their entire length, so that their longitudinal bristle axis changes its direction by less than 70° and preferably by less than 45°, more ideally by less than 35°.

[0052] The scheme of the Fibonacci sequence is explicitly shown in Fig. 3 with the squares, the rectangular the squares are forming and the envelope line that connects the free tips of the bristles 3. The smallest rectangle framing the cross-section of the cosmetic applicator 1, which results from a projection of its core 2 and its bristle trim 4 onto a plane perpendicular to the longitudinal axis of the core 2 - as shown in Fig. 3 - is a rectangle which is composed exclusively of squares whose edge lengths increase according to the Fibonacci sequence.

[0053] Overall, a cosmetic applicator 1 according to the invention can be manufactured - as already mentioned - by at least two wires twisted together, which hold filaments clamped between them, which form the bristles 3. Additionally or alternatively, the cosmetic applicator 1 or parts of it can also be manufactured by injection molding and/or 3D printing. Possible materials therefore can be Acrylonitrile Butadiene Styrene (ABS), Nylon, High density Polyethylene (HDPE), Low density Polyethylene (LDPE), Polycarbonate (PC), Polyoxymethylene (POM), Acrylic (PMMA), Thermoplastic Polyurethane (TPU), Thermoplastic Rubber (TPR) and/or Polypropylene (PP) or others.

REFERENCE LIST

[0054]

1   Cosmetic applicator
2   Core
3   Bristle
4   Bristle trim

T   Tolerance factor

Claims

1.   Cosmetic applicator (1) with a bristle-bearing core (2) which holds in position a plurality of bristles (3) - being preferably curved and, if curved, in the same direction - which become increasingly longer when viewed along a circumferential direction of the core (2), **characterized in that** the elongated length of the bristles (3) along said circumferential direction of the core (2) becomes longer every 90° by a factor of 1.6 +/- a tolerance factor T.

2.   Cosmetic applicator (1) according to claim 1, **characterized in that** the tolerance factor T = +/- 0.4 mm, better the tolerance factor T = +/- 0.3 mm and ideally the tolerance factor T= +/- 0.15 mm.

3.   Cosmetic applicator (1) according to one of the pre-

ceding claims, **characterized in that** the bristles (3) are slightly curved over their entire length, so that their longitudinal bristle axis changes its direction by less than 70° and preferably by less than 45°, more ideally by less than 35°.

4. Cosmetic applicator (1) according to one of the preceding claims, **characterized in that** the elongated length of the bristles (3) increases as seen along the circumferential direction.

5. Cosmetic applicator (1) according to one of the preceding claims, **characterized in that** the smallest rectangle framing the cross-section of the cosmetic applicator (1), which results from a projection of its core (2) and its bristle trim (4) onto a plane perpendicular to the longitudinal axis of the core (2), is a rectangle which is composed exclusively (description: at least 85% better substantially) of squares whose edge lengths increase according to the Fibonacci sequence.

6. Cosmetic applicator (1) according to one of the preceding claims, **characterized in that** the bristle trim (4) is formed from bristles (3) of different hardness, preferably such that bristles (3) with a greater elongated length are harder than bristles (3) with a shorter elongated length.

7. Cosmetic applicator (1) according to one of the preceding claims, **characterized in that** the bristle trim is formed from bristles (3) of different bristle base diameters, preferably in such a way that bristles (3) with a greater elongated length have a greater bristle base diameter than bristles (3) with a smaller elongated length.

8. Cosmetic applicator (1) according to one of the preceding claims, **characterized in that** the core (2) consists of at least two wires twisted together, which hold filaments clamped between them, which form the bristles (3).

9. Cosmetic applicator (1) according to one of claims 1 to 7, **characterized in that** the base area of each bristle (3), with which it merges into the core (2), is spatially separated from the base areas of the surrounding bristles (3) .

10. Cosmetic applicator (1) according to one of the preceding claims, **characterized in that** the bristles (3) taper conically from the bristle base into the free bristle tip.

11. Cosmetic applicator (1) according to one of the preceding claims, **characterized in that** the bristles (3) all or at least predominantly have a constant diameter from the bristle base to the area of the free bristle tip.

12. Cosmetic applicator (1) according to one of the preceding claims, **characterized in that** the free bristle tips have a single or double wedge-like pointing.

13. Cosmetic applicator (1) according to one of the preceding claims, **characterized in that** the elongated length of the bristles (3) along said circumferential direction of the core (2) becomes longer every 90° by a factor of 1.6 +/- a tolerance factor T and that this pattern goes on for overall at least 180 ° and at most overall 720°.
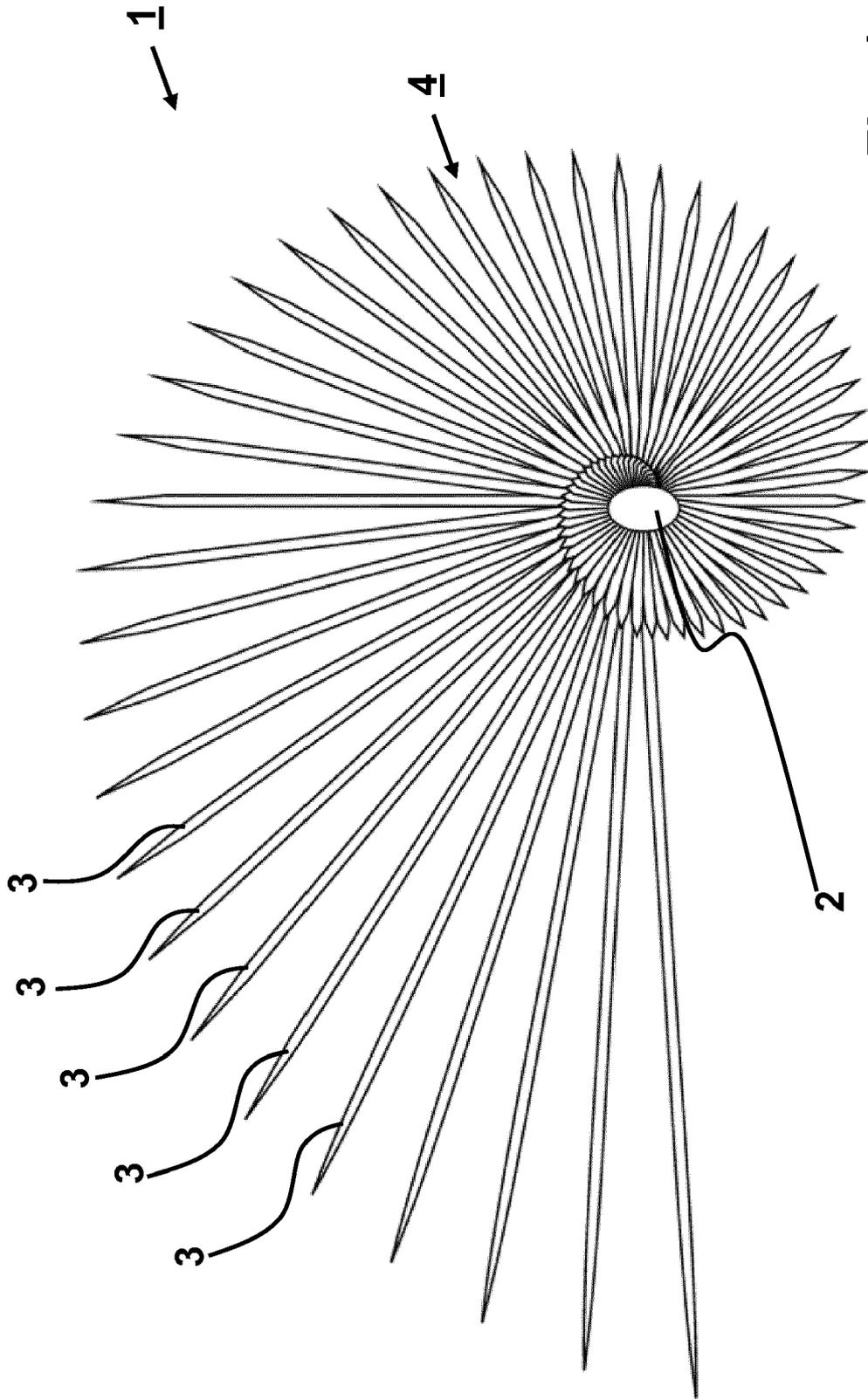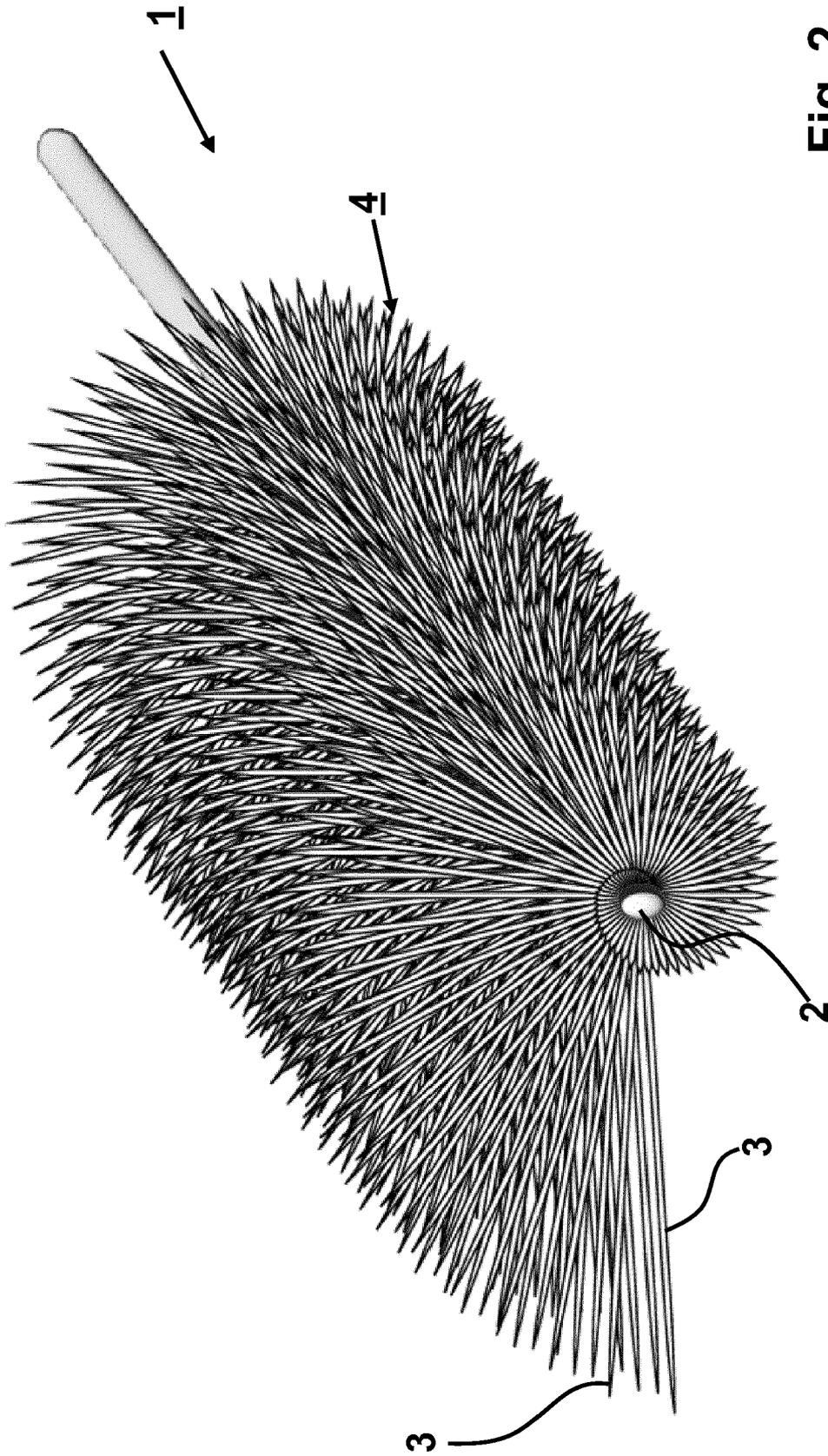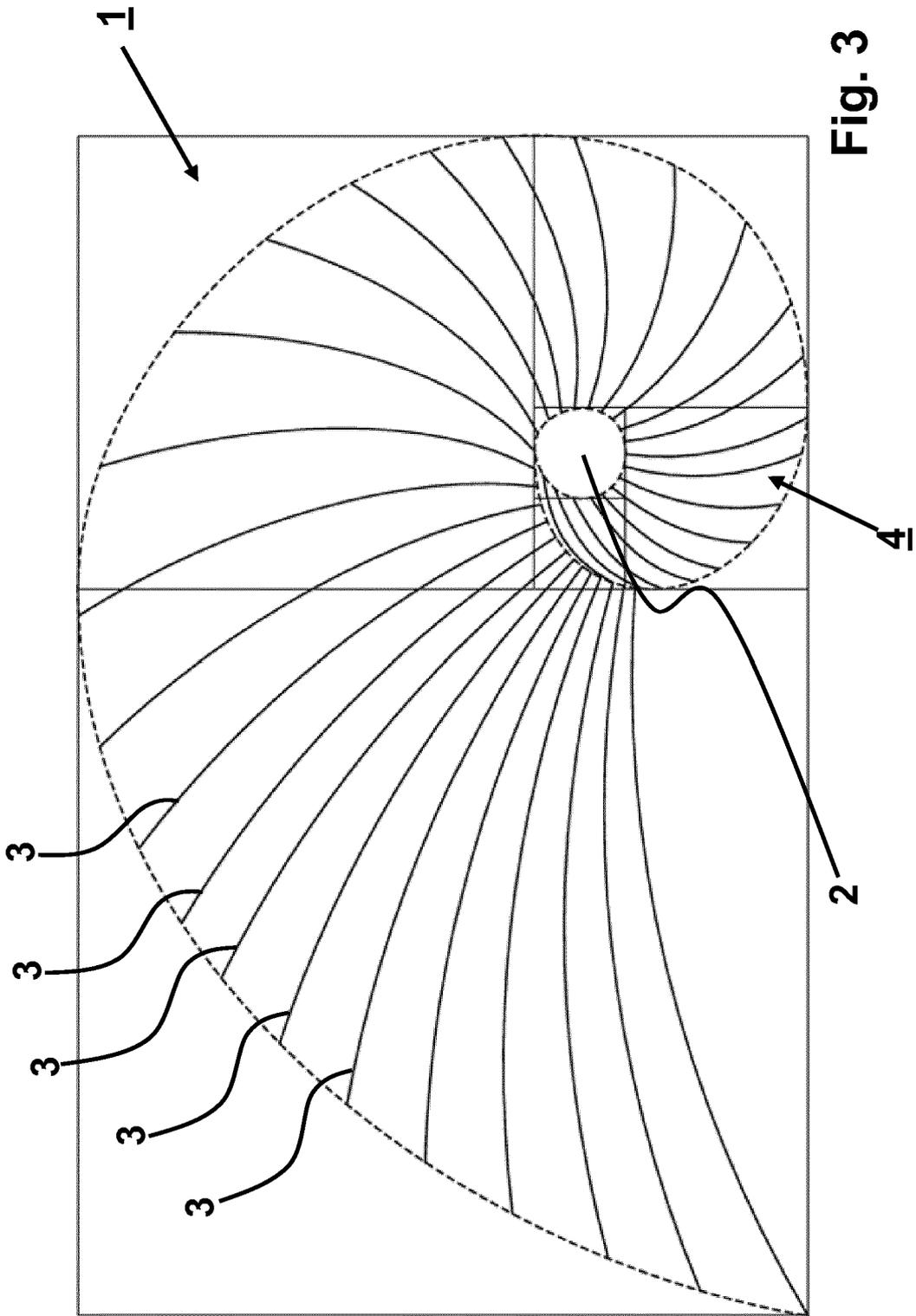
Fig. 1

Fig. 2

Fig. 3

EUROPEAN SEARCH REPORT

Application Number

EP 23 21 9243

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2016/360859 A1 (URESTI OSVALDO [FR] ET AL) 15 December 2016 (2016-12-15)	1-4,6-12	INV. A46B3/18
Y	* paragraphs [0040] - [0041]; figures 1-2	13	A46B9/02
A	*	5	A46D1/00

Y	US 2020/069038 A1 (LI CHUNHUA [US] ET AL) 5 March 2020 (2020-03-05) * paragraph [0066]; claim 1; figures 6-9 *	13	

A	US 2010/059080 A1 (GUERET JEAN-LOUIS H [FR]) 11 March 2010 (2010-03-11) * figures 2, 8b, 8c *	1-13	

TECHNICAL FIELDS SEARCHED (IPC)

A46B
A46D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 May 2024	Rossini, Marco

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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    document of the same category
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ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82