(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 576 571 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
08.06.2022 Bulletin 2022/23

(21) Application number: **18763839.0**

(22) Date of filing: **13.02.2018**

(51) International Patent Classification (IPC):
A46B 9/06 *(2006.01)* ***A46B 9/02*** *(2006.01)*
A46D 1/00 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A46B 9/06; A46B 9/028; A46D 1/00;
A46B 2200/202

(86) International application number:
PCT/SE2018/050131

(87) International publication number:
WO 2018/164622 (13.09.2018 Gazette 2018/37)

(54) PAINT BRUSH COMPRISING A MONOFILAMENT BLEND OF THREE DIFFERENT TYPES OF BRISTLES

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PINCEAU COMPRENANT UN MÉLANGE MONOFILAMENT DE TROIS TYPES DE POILS DIFFÉRENTS

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **07.03.2017 SE 1750254**
04.07.2017 SE 1750872

(43) Date of publication of application:
11.12.2019 Bulletin 2019/50

(60) Divisional application:
21172727.6 / 3 884 808
22157424.7

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Description

TECHNICAL FIELD

[0001] The present invention relates to a paint brush comprising a bristle/monofilament blend of three different types of bristles/monofilaments.

BACKGROUND ART

[0002] Paint brushes are usually made of bristles, wherein the bristles form a bristle pack or bundle or brush head, respectively, which is able to hold therein paint by adhesion as well as by capillary forces. When painting the brush head is pressed onto the surface to be painted by the hand of the operator. Thereby, the bristles are bent and the paint being held between the bristles is forced to flow out of the brush head as it is moved along the surface to be painted.

[0003] Bristles may be natural or synthetic filaments, wherein synthetic filaments, i.e. monofilaments, can be produced from a wide variety of thermoplastic polymers, in a wide variety of configurations including solid and hollow, and in a wide variety of cross-sections, including circular, oval, triangular, trilocular, tetralocular, lobate, or may contain multiple voids. Much work has been done in the trade to improve paint pickup and paint release of paint brushes by experimenting with blends of different polymers, configurations, and cross-sections, in many cases, aiming to synthetically copy or simulate features of natural fibres/filaments.

[0004] Paint brushes consisting of two types of bristles are known from US2007192977 and EP3023031, wherein the first type of bristles is thin and long and the second type of bristles is thick and short. The known paint brush is used to obtain a higher surface quality when painting with a modern paint having just a small content of volatile organic components or even no volatile organic components.

SUMMARY OF THE INVENTION

[0005] It is, accordingly, an object of the present invention to overcome deficiencies of the prior art, such as indicated above.

[0006] It is another object to provide an improved paint brush monofilament blend having an improved stability, paint pickup and paint release.

[0007] It is a further object of the present invention to provide a synthetic filament blend useful in the manufacture of paint brushes and having an improved stability, paint pickup and paint release.

[0008] It is a further object of the present invention to provide a synthetic filament blend for outdoor painting.

[0009] Another object of the present invention is to provide a synthetic filament blend of filaments in which at least one of the filaments comprises features that differ from prior art natural filaments or which features prior art natural filaments even lack. According to the invention a paint brush is provided comprising a handle having at its one end a bristle carrier and a plurality of bristles/monofilaments fastened in the bristle carrier, which plurality of bristles/monofilaments comprises a first type, a second type and a third type of bristles/monofilaments, wherein the first type of bristles/monofilaments has a thickness that is larger than the thickness of the second type of bristles/monofilaments and a thickness that is larger than the thickness of the third type of bristles/monofilaments, and the third type of bristles/monofilaments has a length that is larger than the length of the first type of bristle/monofilament and a length that is larger than the length of the second type of bristle/monofilament, wherein the second type of bristle/monofilaments has a thickness that is smaller than the thickness of the third type of bristle/monofilament.

[0010] Hereby the paint brush comprises three different types of bristles or monofilaments with different dimensions, which dimensions are at least two different lengths and three different thicknesses of the bristles or monofilaments.

[0011] Hereby an increased paint pickup may be obtained compared to a paint brush wherein the second type of bristles/monofilaments has a thickness that is equal to or larger than the thickness of the third type of bristle/monofilament.

[0012] In yet another aspect of the invention the second type of bristles/monofilaments has a thickness that is smaller than the thickness of the third type of bristle/monofilament. Hence, an increased wearability may be obtained compared to a paint brush wherein the second type of bristles/monofilaments has a thickness that is equal to or larger than the thickness of the third type of bristle/monofilament.

[0013] In still another aspect of the invention the second type of bristles/monofilaments has a thickness that is smaller than the thickness of the third type of bristle/monofilament. Hence, enhanced flexibility/optimised stiffness of the bristle/monofilament mixture may be obtained compared to a paint brush having the second bristle/monofilament type with a thickness that is equal to or larger than the thickness of the third type of bristle/monofilament.

[0014] In the context of the present invention under the term "monofilament" there is understood an elongated flexible body having a first end and a second end, i.e. a bristle. The first end is part of a root section where the bristle or monofilament is contained in and/or fastened in a bristle carrier. The second end of the bristle or monofilament forms a free tip which usually contacts a surface to be coated with paint. The second end is part of the tip section of the monofilament or bristle.

[0015] By "thickness" throughout this application is meant the average diameter of the bristle or monofilament, the major axis of an oval bristle/monofilament, or in general the maximum cross-sectional dimension of the bristle/monofilament. In case of tapered bristles/monofil-

aments, the "thickness" relates to the thickness of the root section of the bristles/monofilaments.

[0016] The monofilaments may be produced from a wide variety of thermoplastic polymers, such as polyamides, polyesters and/or polyolefins.

[0017] The plurality of monofilaments is fastened or contained in the bristle carrier such that essentially all adjacent bristles or monofilaments are in contact with each other. The monofilaments form a pack, bundle or bristle head, respectively. The pack is a continuum where essentially all monofilaments are in contact.

[0018] The three types of monofilaments may be distributed approximately uniformly within the pack, bundle or bristle head.

[0019] Hereby is provided an improved paint brush monofilament/bristle blend having an improved stability, paint pickup and paint release while giving a smooth, dense top finishing/coating and evenly distributed paint coverage of the surface that is painted.

[0020] In an aspect of the invention the thickness of the first type of monofilament is at least 1,75 times the thickness of the second and/or third type of monofilaments.

[0021] In an aspect of the invention one or more of the first, second and/or third type of monofilament is hollow. In an aspect of the invention one or more of the first, second and/or third type of monofilament has a structured outer surface. In an aspect of the invention one or more of the first, second and/or third type of monofilament is flagged.

[0022] The hollow monofilaments may comprise one or more longitudinal cavities extending at least partly from the second end of the monofilament toward the first end of the monofilament, i.e. be internally hollow. The one or more longitudinal cavities may extend along a part of the length of the monofilament or along the whole length of the monofilament.

[0023] The advantage of hollow monofilaments is an improved paint pick up.

[0024] Furthermore, hollow monofilaments may have a larger thickness without increasing the weight and material costs per monofilament significantly.

[0025] Another advantage with a mix of monofilaments comprising monofilaments with a large thickness is an increased wear resistance, both depending on the larger amount of material due to the larger volume/surface area of a thicker monofilament compared to a thinner one and the higher stiffness of a thicker monofilament. This being of particular advantage when painting for example rough planks and unplanar boards. Another advantage with a mix of monofilaments comprising monofilaments with a large thickness is that these monofilaments contribute more to the total stability of the bristle of the paint brush, which opens up for that the other monofilaments in the mix can be softer.

[0026] The structured surface may comprise a plurality of voids or other suitable uneven structures, and/or the monofilament. The structured surface may for example be corrugated.

[0027] The advantage of the structured surface is an improved paint pick up.

[0028] Flagging may be applied to the tip section of the monofilaments, wherein the tip section is split into a plurality of thinner tip sections.

[0029] The advantage of flagged monofilaments is an improved surface finish of the painted surface.

[0030] In an aspect of the invention the first and/or second and/or third type of monofilaments is made of polyester. The first type of monofilament may be made of polyester, and/or the second type of monofilaments may be made of polyester and/or the third type of monofilament may be made of polyester. An advantage with using polyester is its lower cost compared to other material used, for example Nylon.

[0031] All three types of monofilaments may be made from the same material, such as polyester. In this case the monofilament blend has a uniform physico-chemical behaviour with respect to a paint or a solvent.

[0032] In an aspect of the invention the first and/or second and/or third type of monofilaments is tapered.

[0033] A tapered and/or flagged monofilament can be achieved by means of mechanical or chemical tipping. Mechanical tipping can be achieved by passing the monofilament over a rotating grindstone. Chemical tipping can be achieved by dipping an end portion of a monofilament bundle or the bristle pack into a treating solution, such as a caustic base.

[0034] By "tipping" is hereby meant any processing or finish treatment suitable to be applied to the tip section of the monofilament, such as tapering and flagging.

[0035] In an aspect of the invention at least one or more of the second or third type of monofilaments are solid.

[0036] In an aspect of the invention the plurality of monofilaments comprises between 15 to 30% of the first type of monofilaments, between 15 to 40% of the second type of monofilaments and between 35 to 65% of the third type of monofilaments of the total number of monofilaments.

[0037] In an aspect of the invention the plurality of monofilaments comprises between 22 to 28% of the first type of monofilaments, between 32 to 38% of the second type of monofilaments and between 37 to 43% of the third type of monofilaments of the total number of monofilaments.

[0038] Alternatively the plurality of monofilaments comprises between about 20 to 25% of the first type of monofilaments, between about 20 to 35% of the second type of monofilaments and between about 40 to 60% of the third type of monofilaments of the total number of monofilaments.

[0039] In another alternative the plurality of monofilaments comprises about 25% of the first type of monofilaments, about 35% of the second type of monofilaments and about 40% of the third type of monofilaments of the total number of monofilaments.

[0040] The first and second type of monofilaments may

constitute the base monofilaments of the paint brush. Wherein the first type of monofilament has a greater thickness and may have a higher stiffness than the second and third type of monofilaments for stability and durability, i.e. to laterally support the second and third type of monofilaments and keep them in an essentially upright position and improve the paint release of the paint brush. The second type of monofilaments may be a functional monofilament for paint pick up and paint release, e.g. enabled by having a structured surface. The third type of monofilaments may fill up the empty space between the base monofilaments and be longer and thinner for obtaining an even paint finish. According to an aspect, the thickness of the first type of monofilaments is equal or larger than 0.3 mm. In an aspect of the invention the thickness of the first type of monofilaments is between 0.3 to 0.4 mm. This is an aspect of the invention which departs from the idea of trying to simulate natural fibres that is common in the industry. The thickness is larger than the thickness of common natural fibres. By using monofilaments that is thicker than 0.3 mm a number of new features are obtained in the mix of monofilaments besides the ones below, such as enhanced wearability while not compromising flexibility/stiffness that increase paint pickup and release and improve surface smoothing and coverage.

[0041] In an aspect of the invention the thickness of the second type of monofilaments is between 0.15 to 0.3 mm. In an aspect of the invention the thickness of the third type of monofilaments is between 0.15 to 0.3 mm.

[0042] The first type of monofilaments is the thickest and optionally the shortest monofilaments of the three types of monofilaments to obtain stability between the plurality of monofilaments.

[0043] In an aspect of the invention the length of the first type of monofilaments is between 55 to 70 mm, the length of the second type of monofilaments is between 60 to 70 mm and the length of the third type of monofilaments is between 65 to 80 mm.

[0044] The third type of monofilaments is the longest. The second type of monofilaments is the thinnest monofilaments of the three types of monofilaments.

[0045] In an aspect of the invention the plurality of monofilaments comprises three types of monofilaments having three different lengths.

[0046] According to the invention the plurality of monofilaments comprises three types of monofilaments having three different thicknesses.

[0047] The plurality of monofilaments may comprise three types of monofilaments having three different lengths and three different thicknesses.

[0048] The benefits of the invention depend on the varying dimensions, such as length and thickness of the three different bristles or monofilaments and the specific mixture of them giving a synergy effect as explained above and in the following. Hence, this creates a surface painting area or volume of the paint brush comprising a protruding zone of filaments with increasing lengths mixed with shorter monofilaments and a supporting zone of filaments with decreasing lengths mixed with longer monofilaments. A supporting zone of shorter filaments encircling a protruding zone of longer monofilaments and vice versa accomplishes the lateral support. The mixture of monofilaments is in some aspects also blended/mixed such that sub-zones are created where groups of the three differing monofilaments are evenly distributed in patches over the whole brush head.

[0049] This inventive mix of filaments also accomplish an optimised combination of softness and stiffness lengthwise of the bundle of filaments with a softer "top" section or free end section contacting the surface to be painted and a stiffer "bottom" section or end section fixed to the handle. Hence, the softer, more pliable "top" creates surprisingly good surface coverage and smoothness when supported from the "bottom" and up along the length of each filament and the "stiffer" or less bendable "bottom" section creates a surprisingly good and even "pumping-out" effect of the paint during each paint stroke without being too stiff making the paint stroke too heavy or arduous for the painter.

[0050] One advantage with the above inventive blend of synthetic monofilaments is that the degree of packing or compaction of the different monofilaments when mixing them together during collection/accumulation of them is higher making a more dense monofilament blend and bundle by being able to gather more monofilaments per area unit compared to prior art as thinner monofilaments fill up the "empty" space between thicker ones. Hence, the more monofilaments per area unit the more paint pick-up. Surprisingly, this blend of monofilaments with three different thicknesses makes it possible to have more soft thinner filaments as the thickest ones are made thicker than hitherto known in the art, accomplishing an optimal mix of filaments achieving an unforeseen synergetic effect as explained above.

[0051] Another advantage is that the second type of monofilaments can be chosen among synthetic standard monofilaments, i.e. commonly used monofilaments on the market, meaning the cost for the above inventive blend of synthetic monofilaments is lower and the vulnerability of such monofilaments being out of stock and/or delivered late/too late are lessened/decreased.

BRIEF DESCRIPTION OF THE DRAWINGS

[0052] The invention will now be explained in further details with reference to the drawings showing an aspect thereof.

Fig. 1a-c shows a paint brush having monofilaments of three different lengths and two or three different thicknesses.

Fig. 2a-c shows a paint brush having monofilaments of two different lengths and two or three different thicknesses.

Fig. 3a-b shows a paint brush having monofilaments of respectively three and two different lengths and wherein the second type of monofilaments are thinner than the third type of monofilaments according to the invention.

DETAILED DESCRIPTION

[0053] The present invention relates to a paint brush 1 comprising a plurality of monofilaments, i.e. a bundle, mixture or blend of monofilaments, comprising three types of monofilaments 21, 22, 23 having different dimensions.

[0054] Figs. 1a-3b shows a paint brush 1 according to the disclosure. Referring to Fig. 1a and 2a, a paint brush 1 according to the disclosure is illustrated wherein the paint brush 1 comprises a handle 10, a bristle carrier 20 and a plurality of bristles or monofilaments 21, 22, 23. The plurality of monofilaments 21, 22, 23 forms a bristle pack/bundle or brush head which is attached to the handle 10 and/or bristle carrier 20 by means of an adhesive 30 (shown in Figs. 1b-c, 2b-c and 3a-b) or any other suitable fastening means. The bristle carrier 20 may be a ferrule. The paint brush 1 is of a "T"-form with an essentially flat or plane configuration. The paint brush head may be of cylindrical shape, e.g. a shape being symmetrically formed along/around its longitudinal axis. The handle 10 has its monofilament/bristle carrier or ferrule 20 attached to one end of the handle 1. Paint brush handles 10, ferrules 20 and methods of securing a paint brush head in a ferrule are known in the art.

[0055] The monofilament blend comprise three different types of monofilaments 21, 22, 23, i.e. a first type 23, a second type 22 and a third type 21 of monofilaments. The three types of monofilaments 21, 22, 23 have different dimensions, which dimensions are at least two different lengths and at least two different thicknesses, preferably three different thicknesses of the monofilaments 21, 22, 23.

[0056] Referring to Fig. 1a-c and 3a, the three types of monofilaments 21, 22, 23 may each have a different length, i.e. the monofilaments have three different lengths. The first type of monofilaments 23 being the shortest monofilaments in the blend of monofilaments, the third type of monofilaments 21 being the longest monofilaments in the blend of monofilaments and the second type of monofilaments 22 having a length between the length of the first and third type of monofilaments 23, 21. Referring to Fig. 2a-c and 3b, the three types of monofilaments 21, 22, 23 may have two different lengths. The third type of monofilaments 21 being the longest monofilaments in the blend of monofilaments and the second and first type of monofilaments 22, 23 having the same length being the shortest monofilaments in the blend of monofilaments, i.e. being shorter than the third type of monofilaments 21. Referring to Fig. 1b, 2b, 3a and 3b, the three types of monofilaments 21, 22, 23 may have three different thicknesses. As shown in figure Fig. 1b and 2b, the third type of monofilaments 21 being the thinnest monofilaments in the blend of monofilaments, the first type of monofilaments 23 being the thickest monofilaments in the blend of monofilaments and the second type of monofilaments 22 having a thickness between the thickness of the first and third type of monofilaments 23, 21. According to the invention and as shown in Fig. 3a and 3b, the second type of monofilaments 22 being the thinnest monofilaments in the blend of monofilaments, the first type of monofilaments 23 being the thickest monofilaments in the blend of monofilaments and the third type of monofilaments 21 having a thickness between the thickness of the first and second type of monofilaments 23, 22. In particular, the shorter monofilaments or bristles surround at least partly the longer monofilaments or bristles and thereby laterally and vertically support the longer bristles in order to keep them upright and make them stiffer than when they "stand alone".

[0057] Referring to Fig. 1c and 2c, the three types of monofilaments 21, 22, 23 may have two different thicknesses. The third and second type of monofilaments 21, 22 having the same thickness and being the thinnest monofilaments in the blend of monofilaments and the first type of monofilaments 23 being the thickest monofilaments in the blend of monofilaments, i.e. being thicker than the third and second type of monofilaments 21, 22.

[0058] The present invention provides a mixture or blend of monofilaments 21, 22, 23 for a paint brush 1, such that the paint brush 1 comprises a tuft/paint head which optimises the number of monofilaments and the type of monofilament contacting the surface to be painted. This optimises the area of effective painting surface of the paint brush by optimising the number of softer monofilaments 21, 22 in contact with the surface during painting. This is accomplished by the shorter thicker monofilaments 23 supporting the longer softer ones 21 when they are deformed and/or bent such that a larger number of softer monofilaments are kept in engagement with the surface during painting as compared to prior art brush heads. The softness of the third and second type of monofilaments 21, 22 is accomplished by a smaller thickness and/or longer length than the first type of monofilaments 23 being shorter and/or thicker. This accomplishes a better paint coverage during and after painting. This accomplishes a smoother surface of the painted one during and after painting. This gives a pliable but not too soft or stiff paint brush for better ergonomics as it gives resistance but less rebound during painting. Moreover, this inventive mix of three different monofilaments means that when painting the dynamically changing shape or bending of monofilaments and the bundle of monofilaments achieves an unexpected and more optimal pliability of the paint brush.

[0059] In other aspects of the invention, the plurality of monofilaments 21, 22, 23 comprises a first type 23, a second type 22 and a third type 21 of monofilaments, wherein the first type of monofilaments 23 has a thickness

that is larger than the thickness of the second type of monofilaments 22 and the first type of monofilaments 23 has a thickness that is larger than the thickness of the third type of monofilaments 21; the second type of monofilaments 22 has a thickness that is smaller than the thickness of the third type of monofilament 21, and the third type of monofilaments 21 has a length that is larger than the length of the first type of monofilament 23 and the third type of monofilaments 21 has a length that is larger than the length of the second type of monofilament 22. In an aspect, the first type of monofilaments 23 has a thickness that is larger than any one of the thickness of the second type of monofilaments 22 or the thickness of the third type of monofilaments 21. In an aspect, the first type of monofilaments 23 has a thickness that is larger than either of the thickness of the second type of monofilaments 22 and the thickness of the third type of monofilaments 21. In an aspect, the first type of monofilaments 23 has a thickness that is smaller than the sum of the thicknesses of the second type of monofilaments 22 and the third type of monofilaments 21. In an aspect not in accordance to the claimed invention, the first type of monofilaments 23 has a thickness that is smaller than the sum of the thicknesses of the second type of monofilaments 22 and the third type of monofilaments 21 but a thickness that is larger than any one of the thickness of the second type of monofilaments 22 or the thickness of the third type of monofilaments 21. In one more aspect, the first type of monofilaments 23 has a thickness that is larger than any one of the thickness of the second type of monofilaments 22 or the thickness of the third type of monofilaments 21 and also larger than the sum of the thicknesses of the second type of monofilaments and the third type of monofilaments.

[0060] According to an aspect, the thickness of the first type of monofilaments 23 is equal or larger than 0.3mm. In an aspect of the invention the thickness of the first type of monofilaments 23 is between 0.3 to 0.4 mm, such as 0.35 mm. In an aspect of the invention the thickness of the second type 22 of monofilaments is between 0.15 to 0.3 mm, such as 0.18 or 0.20 mm. In an aspect of the invention the thickness of the third type 21 of monofilaments is between 0.15 to 0.3 mm, such as 0.20 or 0.22 mm. The thicknesses are diameters if the monofilaments have circular cross-section and/or the thicknesses are measured either at the free or top end of any monofilament and/or the root end of any monofilament. The root end is closest to and/or fastened to the handle 10. In case the bristles/monofilaments are tapered, flagged or otherwise processed at the free or top end, the thicknesses are measured at the root section of the bristles/monofilaments.

[0061] In an aspect of the invention the plurality of monofilaments comprises between 15 to 30% of the first type of monofilaments 23, between 15 to 40% of the second type of monofilaments 22 and between 35 to 65% of the third type of monofilaments 21 of the total number of monofilaments.

[0062] In an aspect of the invention the plurality of monofilaments comprises between 22 to 28%, such as 25%, of the first type of monofilaments 23, between 32 to 38%, such as 35%, of the second type of monofilaments 22 and between 37 to 43%, such as 40%, of the third type of monofilaments 21 of the total number of monofilaments.

[0063] In an aspect of the invention the length of the first type of monofilaments 23 is between 55 to 70 mm, such as 60 or 64 mm, the length of the second type of monofilaments 22 is between 60 to 70 mm, such as 64 mm, and the length of the third type of monofilaments 21 is between 65 to 80 mm, such as 70 or 71 mm.

[0064] In the drawings and specification, there have been disclosed exemplary embodiments. However, many variations and modifications can be made to these embodiments. Accordingly, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the embodiments being defined by the following claims.

Claims

1. Paint brush (1) comprising a handle (10) having at its one end a bristle carrier (20) and a plurality of monofilaments (21, 22, 23) fastened in the bristle carrier (20),

   which plurality of monofilaments (21, 22, 23) comprises a first type (23), a second type (22) and a third type (21) of monofilaments, wherein the first type of monofilaments (23) has a thickness that is larger than the thickness of the second type of monofilaments (22) and a thickness that is larger than the thickness of the third type of monofilaments (21), and
   the third type of monofilaments (21) has a length that is larger than the length of the first type of monofilament (23) and a length that is larger than the length of the second type of monofilament (22), **characterized in that** the second type of monofilaments (22) has a thickness that is smaller than the thickness of the third type of monofilament (21).

2. Paint brush according to claim 1, wherein the thickness of the first type of monofilament (23) is at least 1,75 times the thickness of the second and/or third type of monofilaments (22, 21).

3. Paint brush according to any preceding claim, wherein at least one of the first, second or third type of monofilament (23) is hollow.

4. Paint brush according to any preceding claim, wherein at least one of the first, second or third type

of monofilament (22) has a structured outer surface.

5. Paint brush according to any preceding claim, wherein at least one of the first, second or third type of monofilament (21) is flagged.

6. Paint brush according to any preceding claim, wherein the first and/or second and/or third type of monofilaments (21, 22 23) is made of polyester.

7. Paint brush according to any preceding claim, wherein the first and/or second and/or third type of monofilaments (21, 22, 23) is tapered.

8. Paint brush according to any preceding claim, wherein at least one or more of the second and/or third type of monofilaments (22, 21) are solid.

9. Paint brush according to any preceding claim, wherein the plurality of monofilaments comprises between 15 to 30% of the first type of monofilaments (23), between 15 to 40% of the second type of monofilaments (22) and between 35 to 65% of the third type of monofilaments (21) of the total number of monofilaments (21, 22, 23).

10. Paint brush according to claim 9, wherein the plurality of monofilaments comprises between 22 to 28% of the first type of monofilaments (23), between 32 to 38% of the second type of monofilaments (22) and between 37 to 43% of the third type of monofilaments (21) of the total number of monofilaments (21, 22, 23).

11. Paint brush according to any preceding claim, wherein the thickness of the first type of monofilaments (23) is equal or larger than 0.3 mm.

12. Paint brush according to any preceding claim, wherein the thickness of the first type of monofilaments (23) is between 0.3 to 0.4 mm

13. Paint brush according to any preceding claim, wherein, the thickness of the second and/or third type of monofilaments (22, 21) is between 0.15 to 0.3 mm.

14. Paint brush according to any preceding claim, wherein the length of the first type of monofilaments (23) is between 55 to 70 mm, the length of the second type of monofilaments (22) is between 60 to 70 mm and the length of the third type of monofilaments (21) is between 65 to 80 mm.

15. Paint brush according to any preceding claim, wherein the plurality of monofilaments comprise three types of monofilaments (21, 22, 33) having three different lengths.

Patentansprüche

1. Pinsel (1), umfassend einen Griff (10), der an seinem einen Ende einen Borstenträger (20) und eine Vielzahl von Monofilamenten (21, 22, 23) trägt, die in dem Borstenträger (20) befestigt sind,

   wobei die Vielzahl der Monofilamente (21, 22, 23) einen ersten Typ (23), einen zweiten Typ (22) und einen dritten Typ (21) von Monofilamenten umfasst, wobei
   der erste Typ von Monofilamenten (23) eine Dicke, die größer als die Dicke des zweite Typs von Monofilamenten (22) ist, und eine Dicke hat, die größer als die Dicke des dritten Typs von Monofilamenten (21) ist, und
   der dritte Typ von Monofilamenten (21) eine Länge, die größer als die Länge des ersten Typs von Monofilament (23) ist, und eine Länge hat, die größer als die Länge des zweiten Typs von Monofilament (22) ist, **dadurch gekennzeichnet, dass** der zweite Typ von Monofilamenten (22) eine Dicke hat, die kleiner als die Dicke des dritten Typs von Monofilament (21) ist.

2. Pinsel nach Anspruch 1, wobei die Dicke des ersten Typs von Monofilament (23) mindestens das 1,75-fache der Dicke des zweiten und/oder dritten Typs von Monofilamenten (22, 21) beträgt.

3. Pinsel nach einem der vorhergehenden Ansprüche, wobei mindestens einer von dem ersten, zweiten oder dritten Typ von Monofilament (23) hohl ist.

4. Pinsel nach einem der vorhergehenden Ansprüche, wobei mindestens einer von dem ersten, zweiten oder dritten Typ von Monofilament (22) eine strukturierte Außenoberfläche hat.

5. Pinsel nach einem der vorhergehenden Ansprüche, wobei mindestens einer von dem ersten, zweiten oder dritten Typ von Monofilament (21) gekennzeichnet ist.

6. Pinsel nach einem der vorhergehenden Ansprüche, wobei der erste und/oder zweite und/oder dritte Typ von Monofilamenten (21, 22, 23) aus Polyester gefertigt ist.

7. Pinsel nach einem der vorhergehenden Ansprüche, wobei der erste und/oder zweite und/oder dritte Typ von Monofilamenten (21, 22, 23) zulaufend ist.

8. Pinsel nach einem der vorhergehenden Ansprüche, wobei mindestens einer oder mehrere von dem zweiten und/oder dritten Typ von Monofilament (22, 21) massiv ist bzw. sind.

9. Pinsel nach einem der vorhergehenden Ansprüche, wobei die Vielzahl der Monofilamente zwischen 15 und 30 % des ersten Typs von Monofilamenten (23), zwischen 15 und 40 % des zweiten Typs von Monofilamenten (22) und zwischen 35 und 65 % des dritten Typs von Monofilamenten (21) von der Gesamtanzahl von Monofilamenten (21, 22, 23) umfasst.

10. Pinsel nach Anspruch 9, wobei die Vielzahl der Monofilamente zwischen 22 und 28 % des ersten Typs von Monofilamenten (23), zwischen 32 und 38 % des zweiten Typs von Monofilamenten (22) und zwischen 37 und 43 % des dritten Typs von Monofilamenten (21) von der Gesamtanzahl von Monofilamenten (21, 22, 23) umfasst.

11. Pinsel nach einem der vorhergehenden Ansprüche, wobei die Dicke des ersten Typs der Monofilamente (23) gleich oder größer als 0,3 mm ist.

12. Pinsel nach einem der vorhergehenden Ansprüche, wobei die Dicke des ersten Typs der Monofilamente (23) zwischen 0,3 und 0,4 mm liegt.

13. Pinsel nach einem der vorhergehenden Ansprüche, wobei die Dicke des zweiten und/oder dritten Typs der Monofilamente (22, 21) zwischen 0,15 und 0,3 mm liegt.

14. Pinsel nach einem der vorhergehenden Ansprüche, wobei die Länge des ersten Typs von Monofilamenten (23) zwischen 55 und 70 mm liegt, die Länge des zweiten Typs von Monofilamenten (22) zwischen 60 und 70 mm liegt, und die Länge des dritten Typs von Monofilamenten (21) zwischen 65 und 80 mm liegt.

15. Pinsel nach einem der vorhergehenden Ansprüche, wobei die Vielzahl der Monofilamente drei Typen von Monofilamenten (21, 22, 33) mit drei unterschiedlichen Längen umfasst.

Revendications

1. Pinceau (1) comprenant un manche (10) ayant à sa première extrémité un support de poils (20) et une pluralité de monofilaments (21, 22, 23) attachés dans le support de poils (20),

laquelle pluralité de monofilaments (21, 22, 23) comprend un premier type (23), un deuxième type (22) et un troisième type (21) de monofilaments, dans lequel
le premier type de monofilaments (23) a une épaisseur qui est plus grande que l'épaisseur du deuxième type de monofilaments (22) et une épaisseur qui est plus grande que l'épaisseur du troisième type de monofilaments (21), et
le troisième type de monofilaments (21) a une longueur qui est plus grande que la longueur du premier type de monofilaments (23) et une longueur qui est plus grande que la longueur du deuxième type de monofilaments (22), **caractérisé en ce que** le deuxième type de monofilaments (22) a une épaisseur qui est plus petite que l'épaisseur du troisième type de monofilaments (21).

2. Pinceau selon la revendication 1, dans lequel l'épaisseur du premier type de monofilaments (23) est égale à au moins 1,75 fois l'épaisseur du deuxième et/ou du troisième type de monofilaments (22, 21).

3. Pinceau selon une quelconque revendication précédente, dans lequel au moins un des premier, deuxième et troisième types de monofilaments (23) est creux.

4. Pinceau selon une quelconque revendication précédente, dans lequel au moins un des premier, deuxième et troisième types de monofilaments (22) a une surface extérieure structurée.

5. Pinceau selon une quelconque revendication précédente, dans lequel au moins un des premier, deuxième et troisième types de monofilaments (21) est effiloché.

6. Pinceau selon une quelconque revendication précédente, dans lequel le premier et/ou le deuxième et/ou le troisième type de monofilaments (21, 22, 23) sont constitués de polyester.

7. Pinceau selon une quelconque revendication précédente, dans lequel le premier et/ou le deuxième et/ou le troisième type de monofilaments (21, 22, 23) sont effilés.

8. Pinceau selon une quelconque revendication précédente, dans lequel au moins un ou plusieurs des deuxième et/ou troisième types de monofilaments (22, 21) sont pleins.

9. Pinceau selon une quelconque revendication précédente, dans lequel la pluralité de monofilaments comprend entre 15 et 30 % du premier type de monofilaments (23), entre 15 et 40 % du deuxième type de monofilaments (22) et entre 35 et 65 % du troisième type de monofilaments (21), sur le nombre total de monofilaments (21, 22, 23).

10. Pinceau selon la revendication 9, dans lequel la pluralité de monofilaments comprend entre 22 et 28 % du premier type de monofilaments (23), entre 32 et 38 % du deuxième type de monofilaments (22) et

entre 37 et 43 % du troisième type de monofilaments (21), sur le nombre total de monofilaments (21, 22, 23).

11. Pinceau selon une quelconque revendication précédente, dans lequel l'épaisseur du premier type de monofilaments (23) est égale ou supérieure à 0,3 mm.

12. Pinceau selon une quelconque revendication précédente, dans lequel l'épaisseur du premier type de monofilaments (23) se situe entre 0,3 et 0,4 mm.

13. Pinceau selon une quelconque revendication précédente, dans lequel l'épaisseur du deuxième et/ou du troisième type de monofilaments (22, 21) se situe entre 0,15 et 0,3 mm.

14. Pinceau selon une quelconque revendication précédente, dans lequel la longueur du premier type de monofilaments (23) se situe entre 55 et 70 mm, la longueur du deuxième type de monofilaments (22) se situe entre 60 et 70 mm et la longueur du troisième type de monofilaments (21) se situe entre 65 et 80 mm.

15. Pinceau selon une quelconque revendication précédente, dans lequel la pluralité de monofilaments comprend trois types de monofilaments (21, 22, 33) ayant trois longueurs différentes.

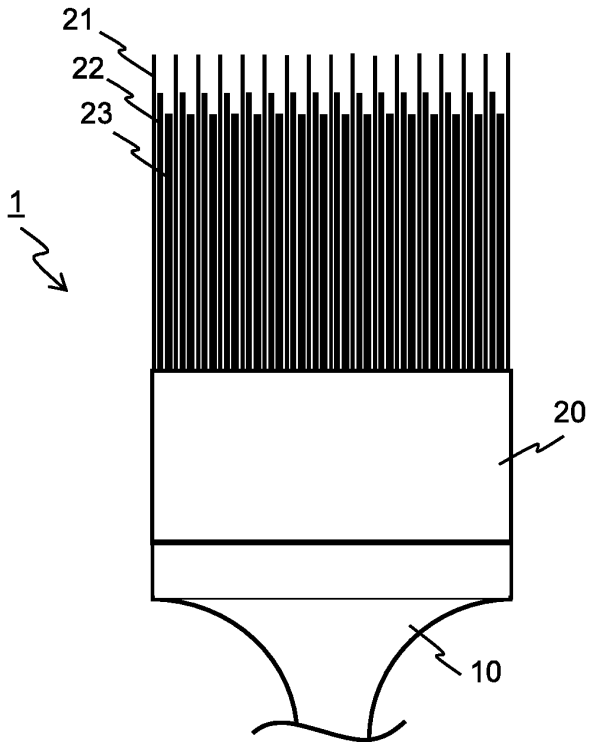


Fig. 1a

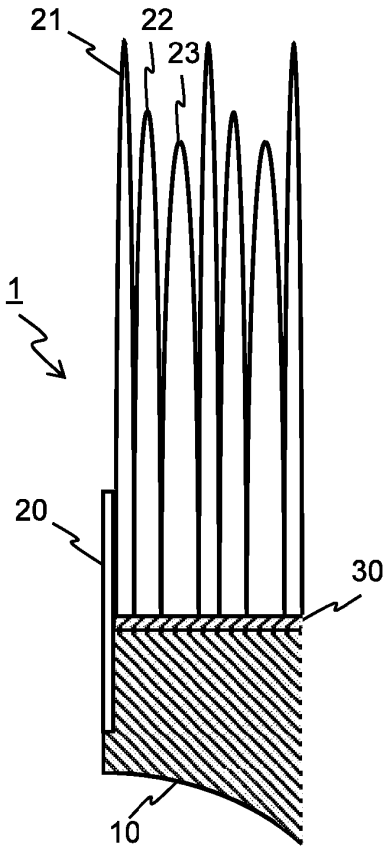


Fig. 1b

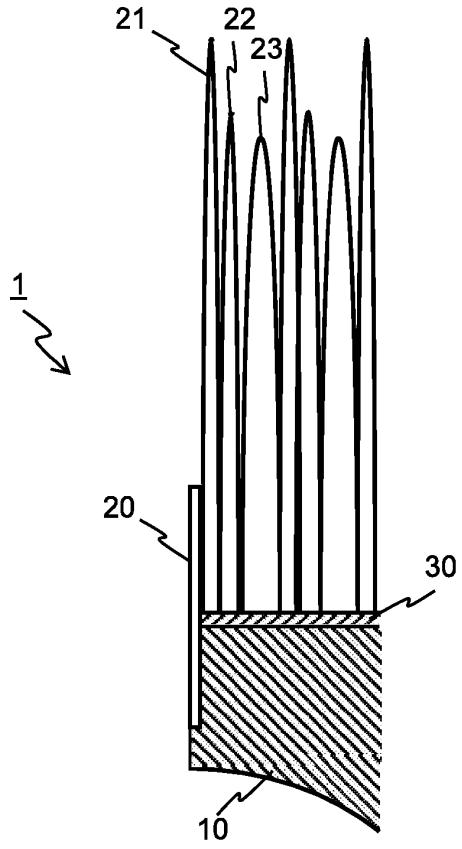


Fig. 1c

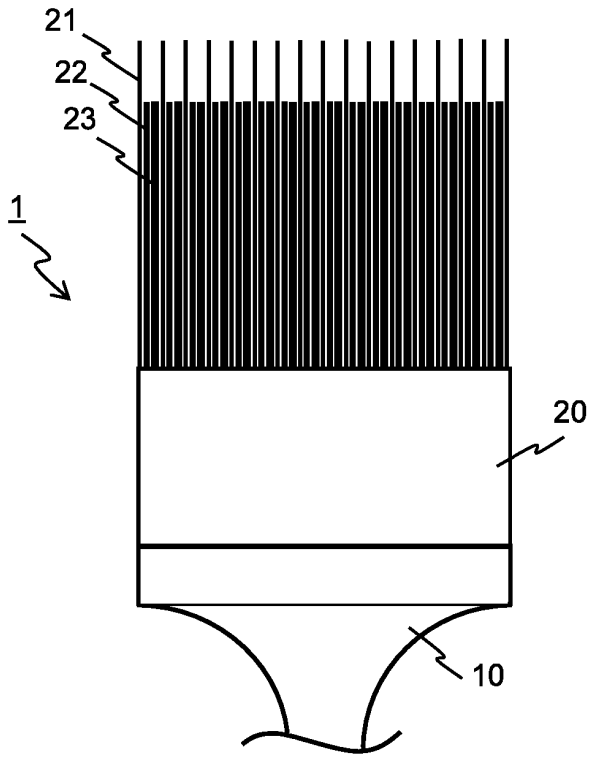


Fig. 2a

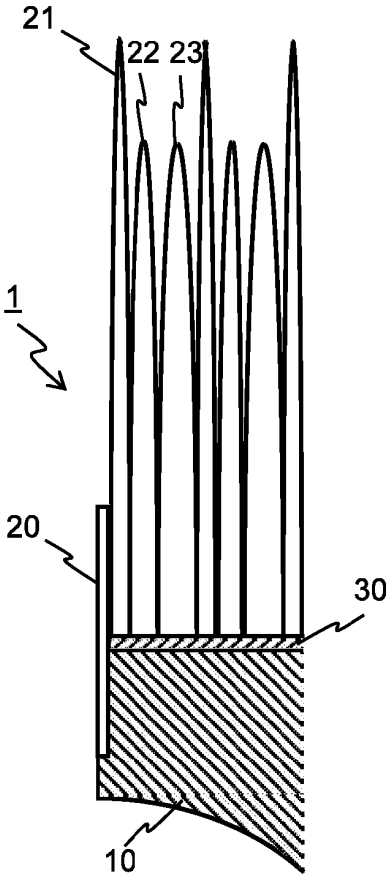


Fig. 2b

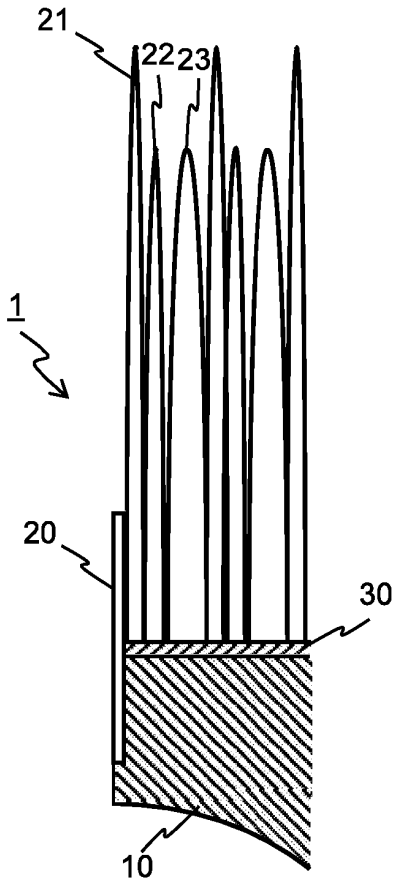


Fig. 2c

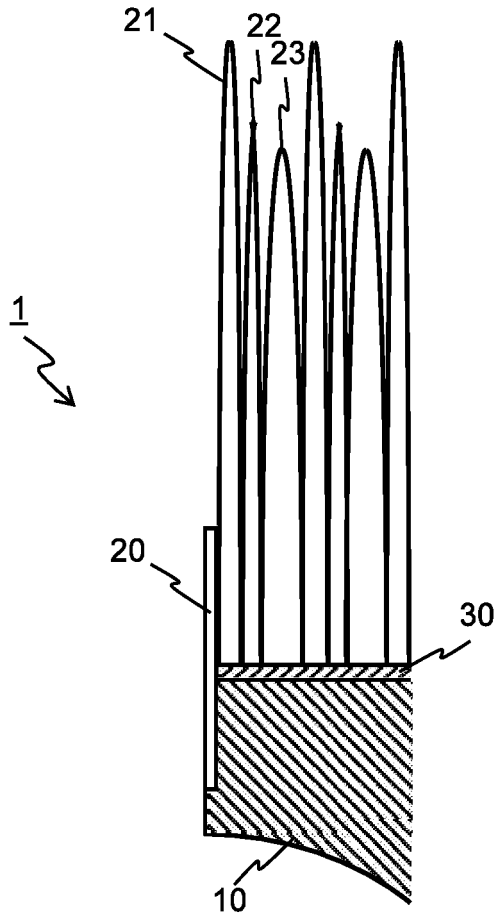


Fig. 3a

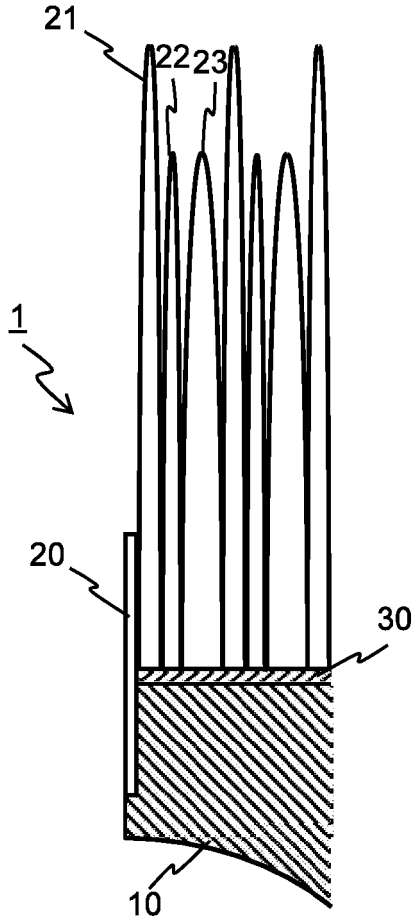


Fig. 3b

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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