A painting brush

There is provided a decorating painting brush head comprising a ferrule and a filament cluster. The ferrule comprises a brush handle receiving end and a filament cluster emerging end. The filament cluster comprises a retained end and a free end. The retained end of the cluster is retained in the ferrule by a setting block. The filament cluster includes a filament-only region at the emerging end of the ferrule, and the emerging end of the ferrule comprises a constriction for shaping the filament cluster towards the free end.
The present invention relates to a painting brush and a method of making a paintbrush.

A paintbrush is a handheld tool used to apply paint or sealers to paintable surfaces. The brush includes: a filament comprising a stack of bristles for picking up paint; a ferrule that is typically a metal band that holds the filament and a handle together and gives the brush strength; one or more spacer plugs within the ferrule which help the filament sits tightly in the brush and creates a reservoir for paint; epoxy resin to lock the filament; and a handle which provides comfort and good balance.

In one aspect the present invention provides a decorating painting brush head comprising a ferrule and a filament cluster, the ferrule comprising a handle receiving end and a cluster emerging end, one end of the cluster being set into a setting block, the block extending in the ferrule to a level towards the emerging end, the level being spaced from the emerging end to define a filament-only region in the ferrule, the ferrule being tapered from the handle receiving end to the cluster emerging end and pushing the filament-only region of the cluster inwards, whereby to cause the cluster to taper beyond the emerging end.

The present invention also provides a ferrule as described herein.

In some embodiments the ferrule is tapered along substantially the entire length thereof. The taper may be beyond the emerging end.

A further aspect provides a decorating painting brush head comprising a ferrule and a filament cluster, the filament cluster being retained in the ferrule by a resin block, in which the filament cluster tapers towards the free end thereof.

In some embodiments the cluster tapers in width. Alternatively or additionally clusters may taper in depth.

A further aspect provides a painting brush head comprising a ferrule and a filament cluster, the ferrule comprising a handle receiving end and a filament cluster emerging end, the filament cluster comprising a retained end and a free end, the retained end of the cluster being retained in the ferrule by a setting block, the filament cluster including a filament-only region at the emerging end of the ferrule, and the emerging end of the ferrule comprising a constriction for shaping the filament cluster towards the free end.

The decorating paint brush may be, for example, a wallpaper brush, a painting brush (such as an emulsion brush, a masonry brush, a gloss brush, a creosoting brush, a shed & fence brush) a dusting brush or a pasting brush.

A further aspect provides a painting brush head comprising a ferrule and a filament cluster, the ferrule comprising a handle receiving end and a cluster emerging end, one end of the cluster being set into a setting block, the block extending in the ferrule to a level at the emerging end, the level being spaced from the emerging end, the emerging end of the ferrule being shaped to push the section of the cluster in the ferrule and beyond the setting block inwards, whereby to cause the cluster to taper beyond the emerging end.

A further aspect provides a painting brush head comprising a ferrule and a filament cluster, the filament cluster being retained in the ferrule by a resin block, the block extending in the ferrule to a point spaced from the emerging end thereof so that the ferrule extends beyond the resin level the emerging end of the ferrule constricting the cluster below the resin level to cause tapering of the cluster.

A further aspect provides a painting brush head comprising a ferrule for receiving a handle and a filament, the filament being fixed at one end by a setting blocking comprising a resin block and one or more plugs, the setting block extending in the ferrule to a level towards the emerging end, the level being spaced from the emerging end thereof to define a ferrule extension through which the filament extends, the ferrule being shaped so that the ferrule extension causes convergence of the filament.

The filament cluster may have a generally quadrilateral section, for example the cluster may have a generally rectangular section.

In some embodiments the cluster tapers in width. Alternatively or additionally clusters may taper in depth.

The ferrule may be a band, for example a metal band (such as steel).

In some embodiments the ferrule is formed from a strip of material.

The ferrule may be tapered along at least part of at least one dimension, for example along its length or across its width.

The setting block may, for example, be a monolithic block formed from resin and may further comprise one or more spacer plugs.

The present invention also provides a paintbrush comprising a head as described herein.

Also provided is a decorating painting brush head ferrule for receiving a filament cluster, the ferrule comprising a handle receiving end and a cluster emerging end, the ferrule being tapered from the handle receiving end to the cluster emerging end such that, in use, the ferrule can push a filament cluster inwards, whereby to cause the cluster to taper beyond the emerging end.

In some embodiments the ferrule is tapered along substantially the entire length thereof. The taper may be constant.

The present invention also provides a ferrule as described herein.

The present invention also provides a method of making a paintbrush as described herein.

In Table I three different types of ferrule formed in accordance with the present invention are described.
Jointly and laterally, whereas version 2 is parallel longitudinally but tapers laterally and version 3 is parallel laterally but tapers longitudinally.

In some embodiments the ferrule is tapered longitudinally and/or latitudinally.

In some embodiments part of the ferrule is additionally inwardly shaped (for example crimped) to exert a shaping force on the filament.

In some embodiments a "blade" shape filament is formed in which the filament converges to a highly controllable edge.

In such embodiments a resin block, together with brush plugs, are mounted above the end of a shaped (converging) ferrule. This allows the protruding ferrule to exert inward pressure without the plugs and resin from preventing the filament from being forced inward i.e. there is no mechanical restriction at the end of the ferrule so that the ferrule can influence the direction in which bristles extend (which would not be the case if the resin and plugs were positioned conventionally at the end of a ferrule).

In some embodiments the setting block is mounted at least 7mm below the end of the ferrule.

The sizes of brushes used for painting and decorating are given in millimetres (mm) or inches (in), which refers to the width of the head. Common sizes are:

- 10 mm, 20 mm, 40 mm, 50 mm, 60 mm, 70 mm, 80 mm, 90 mm, 100 mm.
- ½ in, ¼ in, ⅛ in, ⅜ in, % in, ¼ in, ⅝ in, ⅜ in, ⅝ in, ⅞ in.
and varnishes, while synthetic brushes may be better for water-based paints as the bristles do not expand when wetted.  

[0031] Brush handles may be made of wood or plastic, while ferrules are metal (for example nickel-plated steel).  

[0032] A method of forming a brush head in accordance with the present invention may include some/all of the following steps:

- ferrule formation from a metal blank  
- grabbing of a filament knot/volume of bristles  
- shove the filament knot/bristle stack partially into the ferrule, through the lower end of the ferrule  
- insert one or more spacer plugs into the filament knot  
- patting the base of the filament knot so it is flush with the lower end of the ferrule  
- pouring resin into the lower end of the ferrule

[0033] Different aspects and embodiments of the invention may be used separately or together.  

[0034] Further particular and preferred aspects of the present invention are set out in the accompanying independent and dependent claims. Features of the dependent claims may be combined with the features of the independent claims as appropriate, and in combination other than those explicitly set out in the claims.  

[0035] The present invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:

- Figure 1 is a section of a paintbrush formed in accordance with the present invention;  
- Figures 2 to 8 illustrate a method of forming a brush head in accordance with the present invention;  
- Figure 9 shows a paint brush head formed according to an embodiment of the present invention;  
- Figures 10 to 14 show perspective, front, side and plan views of a ferrule forming part of the head of Figure 9;  
- Figure 15 shows a blank from which the ferrule of Figures 10 to 14 is formed;  
- Figure 16 shows a paint brush head formed according to an embodiment of the present invention;  
- Figures 17 to 21 show perspective, front, side and plan views of a ferrule forming part of the head of Figure 16;  
- Figure 22 shows a blank from which the ferrule of Figures 17 to 21 is formed;  
- Figure 23 shows a paint brush head formed according to an embodiment of the present invention;  
- Figures 24 to 28 show perspective, front, side and plan views of a ferrule forming part of the head of Figure 23;  
- Figure 29 shows a blank from which the ferrule of Figures 24 to 28 is formed;  
- Figures 30 to 34 show a decorating painting brush formed in accordance with the present invention;  
- Figures 35 to 38 show a brush formed in accordance with the present invention;  
- Figures 39 to 43 show a ferrule forming part of the brush of Figures 35 to 38;  
- Figures 44 to 47 show a brush formed according to the present invention;  
- Figures 48 to 52 show a ferrule forming part of the brush of Figures 44 to 47; and  
- Figures 53 and 54 show a side and front view of a ferrule formed in accordance with the present invention.

[0036] The example embodiments are described in sufficient detail to enable those of ordinary skill in the art to embody and implement the systems and processes herein described. It is important to understand that embodiments can be provided in many alternate forms and should not be construed as limited to the examples set forth herein.  

[0037] Accordingly, while embodiment can be modified in various ways and take on various alternative forms, specific embodiments thereof are shown in the drawings and described in detail below as examples. There is no intent to limit
to the particular forms disclosed. On the contrary, all modifications, equivalents, and alternatives falling within the scope of the appended claims should be included. Elements of the example embodiments are consistently denoted by the same reference numerals throughout the drawings and detailed description where appropriate.

[0038] Unless otherwise defined, all terms (including technical and scientific terms) used herein are to be interpreted as is customary in the art. It will be further understood that terms in common usage should also be interpreted as is customary in the relevant art and not in an idealised or overly formal sense unless expressly so defined herein.

[0039] Referring now to the drawings several embodiments of the present invention are further described. The figures are not necessary drawn to scale, and in some instances the drawings may have been exaggerated or simplified for illustrative purposes only. One of ordinary skill in the art will appreciate the many possible applications and variations of the present invention based on the following examples of possible embodiments of the present invention. Where present, measurements are shown only by way of example and are non-limiting.

[0040] In Figure 1a paintbrush generally indicated 10 is shown.
[0041] The paintbrush 10 comprises a handle 15 and a brush head 12 comprising a ferrule 20, a setting block 22 including a resin block 25 and spacer plugs 30, and a filament 35.
[0042] The handle 15 (formed from, for example, wood or a plastics material) is secured to the ferrule by pins 40.
[0043] The ferrule 20 is a metal band open at both end 21, 22.
[0044] The filament 35 comprises a stack of a plurality of bristles 36 (natural and/or synthetic) set into the resin block 25 at one end. The filament extended out of an upper end 21 of the ferrule. The spacer plugs 30 are set into the resin block and serve help the filament sit tightly in the brush and create a reservoir for paint in use.

[0045] It will be noted that the resin block and plugs are positioned so that the ferrule extends beyond them and this defines a shaping section 23 of the ferrule. In addition, it will be noted that the ferrule 20 is tapered, narrowing from the lower end 22 to the upper end 21. Because there is no mechanical restriction in the shaping section 23 the bristles are converged by the inward force on part of the bristles which are beyond the anchored roots and between the top of the resin block and the ferrule end 21. The result is that the filament converges towards its tip.

[0046] Figures 2 to 8 illustrate a method of machine-making of a decorating paintbrush head of the same general type as that shown in Figure 1.
[0047] In Figure 2 a ferrule blank 150 is shown and in this embodiment is a generally flat strip of steel with a trapezoidal shape.
[0048] The blank 150 is formed into a ferrule band 120 by shaping on a mandrel and then crimping. The blank is shaped and formed so that it tapers, narrowing in depth but not in width, as depicted in Figure 3 showing front and side views.
[0049] In Figure 4 a pre-set volume of bristles 136 is provided, which in this embodiment are synthetic.
[0050] The bristle stack is grabbed and pushed partially through the lower end 122 of the ferrule 120 (in this embodiment so that it is approximately 2/3 of the way in and 1/3 out), as shown in Figure 5 to start to form the filament 135. It will be noted that as the tip end 137 of the filament passes through the filament end 121 of the tapered ferrule it causes the bristles to converge.

[0051] Spacer plugs 130 are then inserted at the root end 136 of the filament 135. Because the filament is converged at the filament end of the ferrule this causes the root end of the filament to relax so that it is easier to insert the plugs.
[0052] The root end 136 of the filament 135 is then patted upwards to push it further through the ferrule until the root end reaches the filament end 122 (Figure 6). Because the filament is progressively converged by the filament end 121 this tightens the root end of the filament which helps to retain the plugs 130. It also helps to stop bristles falling out of the ferrule as it passes between workstations.
[0053] A clamp (not shown) then grabs the tip end 137 of the filament 135 and pulls it through the ferrule 120 to the position shown in Figure 7. It will be noted that the plugs 120 (buried in the filament) are positioned so that they are "high set" i.e. they are spaced from the ferrule end 121. In some embodiments the plugs are at least 7mm away from the free edge of the ferrule at the filament end.
[0054] Resin R is then poured through the ferrule end 122 and allowed to reach a final level 126 within the ferrule, which in this embodiment is approximately the same level as where the plugs extend to in the ferrule. Again it will be noted that the level 126 is spaced from the ferrule end 121. It has been found by the inventor that due to the tightening effect of the ferrule, a natural "dam" is formed in the bristle stack towards the filament end which stops the resin flowing further through the ferrule than desired i.e. it can be used to set the fill level. It has also been found that the tightened filament helps to reduce bristle loss during production (for example during resin pour).
[0055] The filament stack is selected to be larger than the ferrule end 121. Because the ferrule is tapered the filament easily passes through the end 122 and then as it passes through the end 121 it is caused to converge. The resin solidifies to a monolithic block 160 and locks the filament in the converged shape shown in Figure 8.
[0056] Figures 9 to 15 illustrate a ferrule 220 formed from a blank 250. The ferrule narrows in width and depth.
[0057] Figures 16 to 22 illustrate a ferrule 320 formed from a blank 350. The ferrule narrows in depth but not width.
[0058] Figures 23 to 29 illustrate a ferrule 420 formed from a blank 450. The ferrule narrows in depth and widens in width.
Figures 30 to 34 show a decorating painting brush 560 formed in accordance with the present invention and comprising a handle 565 and a brush head 512.

The brush head 512 includes a distinctly shaped ferrule 520 manufactured by a distinctly different method of constructing the brush with the aim of having the resin (glue) set above the ferrule edge. By combining a highly set brush (as depicted) with a converging ferrule edge a converging filament cluster which resembles a blade is constructed.

Figures 35 to 38 show a brush 660 and a ferrule 620 (shown in further detail in Figures 39 to 43) forming part of the brush.

The ferrule 620 is parallel longitudinally but tapers laterally i.e. for a brush with a generally rectangular head when view in plan, it tapers from "back to front" (across its depth), and is not tapered from "side to side" (across its width).

In addition, at the "filament only" end 621 of the ferrule it includes an additional convergence feature, which in this embodiment is an inwardly crimped (otherwise otherwise bent) portion 624. The portion 624 may, for example, be formed by passing the ferrule through rollers.

Figures 44 to 47 show a brush 760 and a ferrule 720 (shown in further detail in Figures 48 to 52) formed according to a further embodiment. The ferrule 720 is similar to the ferrule 620, except that the degree of inward convergence at the filament end is slightly less.

Figures 53 and 54 show a side and front view of a ferrule 820 formed in accordance with the present invention. It will be seen that the ferrule tapers inwardly from a handle end 822 to a filament end 821. In addition, the filament end 821 "tightens" with an inwardly directed rim 824.

Although illustrative embodiments of the invention have been disclosed in detail herein, with reference to the accompanying drawings, it is understood that the invention is not limited to the precise embodiments shown and that various changes and modifications can be effected therein by one skilled in the art without departing from the scope of the invention.

**Claims**

1. A decorating painting brush head comprising a ferrule and a filament cluster, the ferrule comprising a handle receiving end and a cluster emerging end, one end of the cluster being set into a setting block, the block extending in the ferrule to a level towards the emerging end, the level being spaced from the emerging end to define a filament-only region in the ferrule, the ferrule being tapered from the handle receiving end to the cluster emerging end and pushing the filament-only region of the cluster inwards, whereby to cause the cluster to taper beyond the emerging end.

2. A brush head as claimed in claim 1, in which the filament cluster has a generally quadrilateral section.

3. A brush head as claimed in claim 1 or claim 2, in which the cluster has a generally rectangular section.

4. A brush head as claimed in any preceding claim, in which the cluster tapers in width.

5. A brush head as claimed in any preceding claim, in which the cluster tapers in depth.

6. A brush head as claimed in any preceding claim, in which the ferrule is a band.

7. A brush head as claimed in any preceding claim, in which the ferrule is formed from a strip of material.

8. A brush head as claimed in any preceding claim, in which the ferrule is tapered along at least part of at least one dimension.

9. A brush head as claimed in claim 8, in which the ferrule is tapered longitudinally and/or latitudinally.

10. A brush head as claimed in any preceding claim, in which the cluster emerging end of the ferrule is inwardly bent or crimped to exert a shaping force on the filament cluster.

11. A brush head as claimed in any preceding claim, in which the resin block further comprises one or more plugs.

12. A brush head as claimed in any preceding claim, in which the setting block is positioned at least 7mm below the cluster emerging end of the ferrule.

13. A decorating painting brush comprising a brush head as claimed in any preceding claim.
14. A decorating painting brush head ferrule for receiving a filament cluster, the ferrule comprising a handle receiving end and a cluster emerging end, the ferrule being tapered from the handle receiving end to the cluster emerging end such that, in use, the ferrule can push a filament cluster inwards, whereby to cause the cluster to taper beyond the emerging end.

15. A method of forming a decorating painting brush head comprising the steps of:

    - forming a ferrule from a metal blank, the ferrule comprising a handle receiving end and a cluster emerging end, the ferrule is tapered from the handle receiving end to the cluster emerging end;
    - providing a bristle filament knot;
    - inserting the bristle filament knot through the handle receiving end of the ferrule;
    - pouring resin into the handle receiving end of the ferrule to form a setting block into which one end of the filament knot becomes set, the setting block extending in the ferrule to a level towards the emerging end, the level being spaced from the emerging end to define a filament-only region in the ferrule; whereby
    - the tapered ferrule pushes the filament-only region of the cluster inwards to cause the cluster to taper beyond the emerging end.
FIG. 16
## DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Category</th>
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The present search report has been drawn up for all claims.

Place of search: The Hague

Date of completion of the search: 27 October 2016

 Examiner: Dal B6, Paolo

**CATEGORY OF CITED DOCUMENTS**

- X: particularly relevant if taken alone
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- A: technological background
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**CLASSIFICATION OF THE APPLICATION (IPC)**

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