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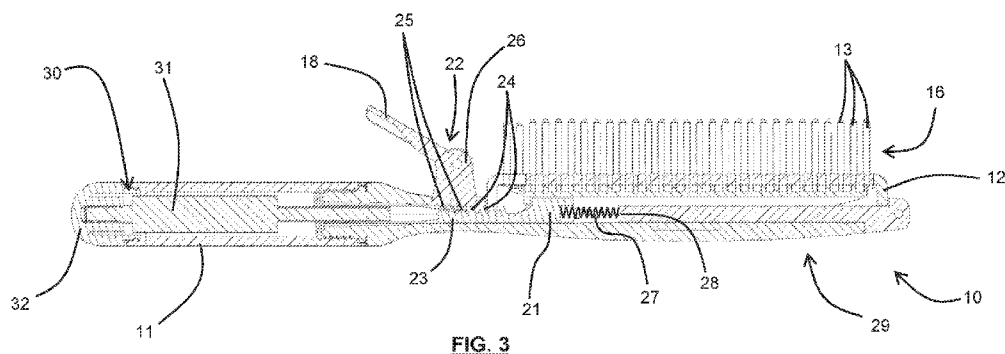


FIG. 3

(57) Abstract: A brush for styling hair, the brush comprising a bristle bed and a plurality of bristles, each projecting from the bristle bed to a respective free end. The bristles are arranged so as to form one or more longitudinally extending inner rows of bristles disposed between two longitudinally extending outer rows of bristles. The brush also includes an actuator, actuatable to move the one or more inner rows of bristles and/or outer rows of bristles in the longitudinal direction to provide relative longitudinal movement between the one or more inner row of bristles and the two outer rows of bristles. Each row of bristles has a bristle spacing distance defined as the longitudinal distance between a pair of adjacent bristles of the row, and the actuator is configured so that, when actuated, the relative longitudinal movement of the one or more inner rows and the two outer rows is over a distance that is greater than the bristle spacing distance of at least one of the rows.

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A HAIRBRUSH

Technical Field

The present disclosure relates to a brush for styling hair.

Background

5 Brushes are a well-known tool for styling hair. Typically a hairbrush includes a handle, a bristle bed mounted to the handle and a plurality of bristles that extend from the bristle bed. In use, the brush is held so that the bristles penetrate a tress of hair, and then moved along the tress of hair so that the bristles pass between strands of hair.

As may be appreciated, when a user moves the brush in this way, tension can be applied to the
10 hair due to friction between the bristles of the brush and the hair passing between the bristles. In some cases, this tension is desirable and can be utilised in styling the hair. As an example, when combined with heat and/or moisture (e.g. via a hair dryer), applying tension can be beneficial in straightening hair strands.

However, different styling techniques benefit from different amounts of tension applied to the
15 hair. Further, the moisture in hair being styled can affect the optimal amount of tension to achieve effective styling (e.g. typically lower tension is optimal for wet hair and higher tension is optimal for dry hair). Likewise, the tension applied to hair by a given brush will vary depending on characteristics of the hair being styled (e.g. hair type, thickness, etc.). This means that a single brush may not be suitable for a range of users having different hair types, and/or may not
20 be suitable for a range of styling techniques.

The present disclosure has been devised in light of the above considerations.

Summary

In a first aspect there is provided a brush for styling hair, the brush comprising:

 a bristle bed;

25 a plurality of bristles, each projecting from the bristle bed to a respective free end, the bristles arranged so as to form one or more longitudinally extending inner rows of bristles disposed between two longitudinally extending outer rows of bristles; and

 an actuator, actuatable to move the one or more inner rows of bristles and/or outer rows of bristles in the longitudinal direction to provide relative longitudinal movement between
30 the one or more inner rows of bristles and the two outer rows of bristles;

 wherein each row of bristles has a bristle spacing distance defined as the longitudinal distance between a pair of adjacent bristles of the row, and the actuator is configured so

that, when actuated, the relative longitudinal movement of the one or more inner rows and the two outer rows is over a distance that is greater than the bristle spacing distance of at least one of the rows.

5 In use the brush is positioned so that the bristles penetrate a user's hair, and so that strands of hair extend between the bristles. A user can actuate the actuator to move the one or more inner rows of bristles longitudinally relative to the outer rows of bristles. Doing so causes the strands of hair between the bristles to be pulled by the bristles of the inner row to form a serpentine/tortuous path in a transverse direction (substantially perpendicular to the longitudinal direction) across the bristle bed. In turn, this increases the friction between the hair strands and
10 the bristles, and thus tension can be applied to the hair when the brush is moved along the hair (e.g. in a direction away from a user's scalp).

Beneficially, increasing friction and tension in this way can be less damaging to a user's hair than, for example, clamping the hair (which may cause damage to the hair to the large forces applied over minimal area).

15 Further, as should be appreciated, movement of the bristles in an opposite longitudinal direction (returning them to their original position) reduces tension and allows a user to vary tension for styling and to more easily remove the brush from their hair. Likewise, the ability to release tension can avoid hair being caught in the bristles, which could potentially damage a user's hair.

For the avoidance of doubt, the bristle spacing distance is the minimum distance between two
20 bristles. In other embodiments, however, the spacing distance may be the distance between the centres of two bristles (i.e. the distance between the central axes of the bristles).

Optional features of the first aspect will now be set out. These are applicable singly or in any combination with any aspect.

25 In some embodiments the one or more inner rows may be static (and the outer rows may be moveable longitudinally). In other embodiments, the outer rows may be static (and the one or more inner rows may be moveable longitudinally). In a further embodiment, neither the inner nor outer rows may be static. Instead, in such embodiments, both the inner rows and outer rows may be moveable longitudinally, but at a different rate to one another (i.e. so as to provide relative movement).

30 As set forth above, the longitudinal movement is over a distance that is greater than the bristle spacing distance of at least one of the rows. Thus, for example, the longitudinal movement may be over a distance that is greater than the bristle spacing distance of one or both of the outer rows. Alternatively, or additionally, the longitudinal movement may be over a distance that is greater than the bristle spacing distance of at least one of the one or more inner rows.

The brush may comprise more than three longitudinally extending rows of bristles. The brush, for example, may comprise e.g. exactly seven longitudinally extending rows of bristles. The brush may comprise e.g. exactly five longitudinally extending rows of bristles. The use of the relative movement of the bristles to provide tension may allow the brush to have fewer

5 longitudinally extending rows of bristles than would be required (to provide the same amount of tension) with a brush that does not include longitudinally moveable bristles.

The rows of bristles may be substantially parallel to one another.

The transverse spacing between the rows of bristles may be sufficient to permit hair to pass therebetween (e.g. when pulled due to relative movement of the rows of bristles). For example,
10 the transverse spacing between the one or more inner rows of bristles and each of the two outer rows of bristles may be greater than 0.5 mm, or greater than e.g. 1 mm, or greater than e.g. 2 mm.

The bristle bed may comprise one or more stationary portions. The bristle bed may comprise a moveable portion. In some embodiments, the two outer rows of bristles may be affixed to the
15 one or more stationary portions and the inner row of bristles may be affixed to the moveable portion. In other embodiments the inner row of bristles may be affixed to the stationary portion and the two outer rows of bristles may be affixed to the moveable portion.

The actuator may be operatively connected to the moveable portion such that, when actuated, the moveable portion is moved (e.g. slides) in a longitudinal direction from a first position to a
20 second position. For example, the actuator may comprise a button or a trigger that can be depressed to move the moveable portion in the longitudinal direction.

The brush may comprise a handle (e.g. a cylindrical handle). The handle may extend longitudinally from the bristle bed (the handle may be elongate in the longitudinal direction).

The bristle bed may form part of a head of the brush, and the handle may extend from the head
25 of the brush. The head of the brush (brush head) may be elongate in the longitudinal direction.

A central (longitudinal) axis of the handle (or at least a substantial length of the handle) may be offset from a central axis of the head of the brush. For example, the central axis of the handle may be offset in a direction of extension of the bristles from the bristle bed. Thus, the handle may comprise a bend at an end adjacent to the bristle bed. The actuator may be disposed on
30 or adjacent to this bend.

The actuator (e.g. comprising button or trigger) may be disposed at an end of the handle proximate to the bristle bed (and head of the brush). This may allow a user to actuate the actuator with their thumb while gripping the handle.

The actuator may be provided on a side of the brush from which the bristles project. In other
35 embodiments, the actuator may be provided on a side of the brush that is opposite to the side

from which the bristles project. The actuator may be configured such that actuation of the actuator comprises movement of the actuator in an inward direction towards a central axis of the handle.

Movement of the moveable portion from the first position to the second position may be movement in a direction away from the handle (and thus away from a user's hand in use). In other embodiments, movement of the moveable portion from the first position to the second position may be movement in a direction towards the handle (i.e. towards a user's hand when holding the brush in normal use).

Each bristle of each outer row may be transversely aligned with a bristle of the other of the outer rows (e.g. forming transversely aligned pairs of outer bristles). In the first position, one or more of the bristles of the or each inner row may be transversely aligned with a bristle of each outer row. In other words, the bristles may be arranged such that in the first position they define gaps/channels that extend transversely across the bristle bed for receipt of strands of hair.

The moveable portion may comprise a slideably mounted rack and the actuator may comprise a pivotably mounted pinion. The pinion may be engageable with the rack such that actuating the actuator (e.g. depressing the button or trigger) causes longitudinal movement of the rack. For example, each of the rack and pinion may comprise teeth that meshingly engage so that actuating the actuator slides the rack longitudinally.

The brush may comprise biasing means configured to bias the moveable portion into the first position. The biasing means may comprise a compression spring. The compression spring may extend between the moveable portion and the stationary portion (e.g. a stop element forming part of the stationary portion).

The brush may comprise a limiter configured to limit the extent of the relative movement of the inner row and the two outer rows in response to actuation of the actuator. That is, the limiter may limit total travel of the inner row (or outer rows) in response to a single (full) actuation of the actuator. In practical terms, this may limit the tension applied by the brush when a user fully actuates the actuator (e.g. fully depresses the button or the trigger).

The limiter may be adjustable to alter the extent of the relative movement of the inner row and the two outer rows in response to actuation (e.g. full actuation) of the actuator. The limiter may abut the moveable portion when the moveable portion is in the first position. The longitudinal position of the limiter may be adjustable to adjust the first position of the moveable portion.

The bristles may be substantially rigid. The bristles may be flexible (e.g. more flexible than the bristle bed, brush head, and/or handle). The bristles may be formed of plastic or metal.

Each bristle may comprise a smooth (free of any abrupt discontinuities) outer circumferential surface, which may be devoid of split lines (i.e. protruding lines formed in some manufacturing

processes). This may avoid or reduce any damage to hair as tension is applied to the hair by movement of the rows of bristles.

In some embodiments, at least some of the bristles may comprise split lines, but the split lines may be located so as not to come into contact with hair when the actuator is actuator. Thus, for example, the split line may be provided on a region of each bristle that trails in movement in use (i.e. when moved longitudinally by actuation of the actuator).

In some embodiments each bristle of at least one row of bristles (e.g. an inner row) may have a cross-sectional shape that has a width (in the transverse direction) that is greater than a thickness (in the longitudinal direction). The cross-sectional shape may, for example, be elliptical, rectangular, obround, etc.

Respective free ends of the bristles may be arranged such that a reference surface intersecting the free ends is concave. That is, the tips of the bristles may collectively form a concave shape. The reference surface may be concave along two orthogonal axes. In use, the free ends of the bristles may contact a user's head as the brush is moved along a user's hair. Configuring the bristles such that their free ends form a concave shape may provide a more comfortable experience for the user because the free ends may better conform to the shape of a user's head.

Each bristle may be mounted to the bristle bed by a resilient mounting element (e.g. formed of rubber). This may allow the bristles to move when they contact a user's head, so as to allow some conformance to the shape of a user's head (i.e. providing for more comfortable use).

At least some of the bristles may be heated bristles. For example, the brush may comprise a heater configured to heat at least some of the bristles. The heater may be configured to heat at least one of the inner and outer rows of bristles. The heater may be configured to heat the row(s) of static bristles. The heated bristles may be formed of a heat conductive material (e.g. metal). The heater may be in thermal communication with the heated bristles. The brush may comprise a power supply for supplying power to the heater. For example, the power supply may be a battery. The battery may be disposed in the handle.

The brush may comprise heated bristles (as described above) and non-heated bristles. Each heated bristle may have a greater cross-sectional area than each non-heated bristles. Each heated bristle may be shorter in length (i.e. length being in the direction of extension from the bristle bed) than each non-heated bristle.

In some embodiments (in addition to, or alternatively to, heated bristles) the brush may comprise an outlet configured to discharge hot air onto hair passing between the bristles. The outlet may be in fluid communication with a heater (e.g. the heater as discussed a above).

In a second aspect there is provided a brush for styling hair, the brush comprising:

a bristle bed;

a plurality of bristles, each projecting from the bristle bed to a respective free end, the bristles arranged so as to form one or more longitudinally extending inner rows of

5 bristles disposed between two longitudinally extending outer rows of bristles; and

an actuator, actuatable to move the one or more inner row of bristles and/or outer rows of bristles in the longitudinal direction from:

a first position in which each bristle of the inner row of bristles is on a first longitudinal side of a corresponding bristle of one of the outer rows; to

10 a second position in which each bristle of the inner row of bristles is on a second longitudinal side, opposite to the first longitudinal side, of the corresponding bristle.

In other words, the actuator is actuatable to move each inner bristle to and past a corresponding outer bristle. This creates the C- or W-shape, or tortuous/serpentine shape, in the hair strands
15 as previously described and allows the application of tension to the hair.

The brush of the second aspect may optionally comprise one or more of the features of the brush described above with respect to the second aspect (i.e. including one or more optional features described above).

Brief Summary of the Figures

20 Embodiments will now be discussed with reference to the accompanying figures in which:

Figure 1 is a perspective view of a brush for styling hair;

Figures 2A and 2B are schematic top views illustrating movement of bristles of the brush of Figure 1

Figure 3 is a side section view of the brush of Figure 1;

25 Figure 4 is a top view of the brush of Figure 1;

Figure 5 is a side view of a portion of a variation of the brush of Figure 1;

Figure 6 is a side view illustrating a variation of the actuator of the brush of Figure 1;

Figure 7 is a section view illustrating an example of how a bristle of the brush of Figure 1 may be mounted to the bristle bed;

30 Figure 8 is a side view showing bristles that are arranged in an alternative manner to those of Figure 1; and

Figure 9 is a schematic top view showing a variation of the bristles of Figure 1 in which some of the bristles are heated.

Detailed Description

Aspects and embodiments will now be discussed with reference to the accompanying figures.

5 Further aspects and embodiments will be apparent to those skilled in the art.

Figures 1, 3 and 4 illustrate a brush 10 comprising an elongate cylindrical handle 11 mounted to a bristle bed 12 forming part of a head 29 of the brush 10. A plurality of bristles 13 project from the bristle bed 12. In particular, each bristle 13 projects from a proximal end 14, adjacent to the bristle bed 12, to a respective free end 15 (distal from the bristle bed 12).

10 The bristles 13 are arranged to form eleven longitudinally extending rows 16, 17 of bristles 13. In particular, the brush 10 includes five moveable rows 16 (the movement of which will be described in further detail below) that are arranged in an alternating manner with six static rows 17. Each moveable row 16 of bristles 13 can be considered to be an inner row 16 of bristles 13 provided between two outer (static) rows 17 of bristles 13.

15 To effect movement of the moveable rows 16, the brush 10 includes an actuator 22 comprising a button 18 provided at an end of the handle 11 proximate to the bristle bed 12. When the button 18 is depressed, the moveable rows 16 of bristles 13 move in the longitudinal direction relative to the static rows 17, along longitudinally extending tracks 20 (in the form of slots) formed in the bristle bed 12. This movement is best illustrated with reference to Figures 2A and
20 2B.

Figures 2A and 2B schematically depict a portion of three rows 16, 17 of the bristles 13. Two of these rows 16, 17 are static (outer) rows 17 and the other is a moveable (inner) row 16, positioned between the static rows 17. In Figure 2A, the button 18 is in a first position, which is its resting position (i.e. not depressed). In this position the bristles 13 of each row 16, 17 are
25 transversely aligned with corresponding bristles 13 of the other rows 16, 17 (although, in other embodiments this may not be the case). Thus, transversely extending channels are formed in which transversely extending strands of hair 19 can be received.

In Figure 2B, the button 18 is in its second position, in which it has been depressed by a user. Depressing the button has caused the moveable row 16 of bristles 13 to move longitudinally
30 relative to the static rows 17 by a distance M. This distance M is greater than a bristle spacing S between adjacent bristles 13 of a given row 16, 17 of bristles. As is evident from Figure 2B, one result of this movement is that the hair received between the bristles 13 is pulled into a "C" shape about the bristles 13 of the moveable row 16. That is, each strand of hair is forced to follow a tortuous path through the bristles 13. This increases the tension applied to the hair as
35 the brush 10 is moved along the hair. As may be appreciated the larger the distance M, the

more tension the bristles 13 apply to the hair. In this way, a user can control the amount of tension applied to the hair, which increases the versatility of the brush 10 (e.g. allowing the brush 10 to perform effectively with different hair types and/or allowing a larger variety of styling techniques to be used).

- 5 Figure 3, in particular, illustrates how movement of the moveable rows 16 is achieved. As is evident from this figure, each moveable row 16 of bristles 13 is mounted to a moveable portion 21 of the brush 10. The moveable portion 21 is slideably mounted within the brush 10 and includes a rack 23 disposed at an end of the moveable portion 21 opposite to the end from which the bristles 13 project. The rack 23 includes teeth 24 that meshingly engage with
10 corresponding teeth 25 provided on a pinion 26 of the actuator 22. The pinion 26 is pivotably mounted to the handle 11 such that when the button 18 is depressed by a user, the teeth 25 of the pinion 26 engage the teeth 24 of the rack 23 to move the moveable portion 21 (and moveable rows 16) in the longitudinal direction (towards an end of the bristle bed 12 that is distal from the handle 11).
- 15 The brush 10 further includes a biasing means 27 in the form of a compression spring. A first end of the biasing means 27 abuts the moveable portion 21 and an opposite second end of the biasing means 27 abuts a stop surface 28 forming part of the head 29 of the brush 10 (defining a stationary portion to which the static rows 17 of bristles 13 are mounted). When the button 18 is depressed by a user, and the moveable portion 21 moves from the first position to the second
20 position, the biasing means 27 is compressed from its natural state. The bias of the biasing means 27 is such that it urges the stop surface 28 and moveable portion 21 apart, so as to urge the moveable portion 21 to return to the first position. Thus, when a user releases the button 18 in use, the moveable portion 21 returns to the first position (under the force of the biasing means) and the button 18 returns to its undepressed position.
- 25 The brush 10 also includes a limiter 30, which is configured to limit the extent of the movement of the moveable portion 21. The limiter 30 includes an elongate body 31 that is threadedly engaged with a rotatable adjustment wheel 32 disposed at an end of the handle 11. The elongate body 31 extends into the handle 11 from the adjustment wheel, towards the head 29 of the brush 10. When the moveable portion 21 is in the first position (when the button 18 is not
30 depressed), a proximal end of the elongate body 31 (the end closest to the head 29 of the brush 10) abuts against the moveable portion 21, preventing further movement of the moveable portion 21 towards the handle 11. In other words, the limiter 30 sets the position of the moveable portion 21 when the button 18 is not depressed.

The threaded engagement between the adjustment wheel 32 and the elongate body 31 is such
35 that when the wheel 32 is rotated (about the longitudinal axis), the elongate body 31 of the limiter 30 moves away from or towards the moveable portion 21. In this way, the limiter 30 is

adjustable so as to adjust the position of the moveable portion 21 when the button 18 is not depressed. Consequently, adjustment of the limiter 31 alters the total distance the moveable portion 21 travels in response to a single full press of the button 18. This may be beneficial for a user wishing to customise the amount of tension applied (under a full press of the button 18)

5 for applying a particular styling and/or for a particular hair type.

Figures 5 to 9 illustrate variations of the embodiment described above and shown in Figure 1 to 4. In Figure 5, the button 18 is of a different type to that of the previous embodiment. In particular, the button 18 is slideably mounted to the handle 11 (rather than pivotably mounted). Further, the handle 11 includes a bend (at which the button 18 is located) such that a central
10 axis of a portion forming a substantial length of the handle 11 is offset from a central axis of the head 29 of the brush 10. The offset of the portion of the handle is in the same direction as that in which the bristles 13 extend from the bristle bed 12.

Figure 6 illustrates an even further variation of the actuator, which in this case comprises a button 18 is on an opposite side of the brush 10 to the bristle bed 12. As per the previous
15 embodiments, the button 18 is disposed at an end of the handle 11 that is proximate to the bristle bed 12 (and head 29 of the brush 10).

Figure 7 shows how the bristles 13 may be mounted to the bristle bed 12. In particular, a resilient mounting element 33 mounts each bristle 13 to the bristle bed 12 such that each bristle 13 can move (in a direction parallel to the length of the bristle) relative to the bristle bed 12.

20 This can be helpful in allowing the bristles 13 to conform to a user's head in use (e.g. in the absence of a flexible bristle bed, which can be difficult to implement in combination with moveable bristles).

Another means for providing bristles 13 that conform to a user's head is illustrated in Figure 8. In this variation, the bristles 13 are arranged such that their free ends 15 form a concave shape
25 (i.e. define a concave reference surface, indicated by the dashed line). As may be appreciated, this concave shape may be provided along a single axis (e.g. longitudinal or transverse) or may be provided along two orthogonal axes (e.g. in both the longitudinal and transverse directions).

Figure 9 schematically illustrates a variation in which the two static rows 17 of bristles 13' are heated bristles, which are heated by a heater (not shown) forming part of the brush 10. The
30 heater may be an electric heater powered by a battery disposed in the handle 11. The heated bristles 13' may be formed of a thermally conductive material (such as a metal) and may be in thermal communication with the heater. As shown in Figure 9, the heated bristles 13' are larger in cross-sectional area than, and are further apart than, the non-heated bristles 13. Although not apparent from Figure 9, the heated bristles 13' may also be shorter than the non-
35 heated bristles 13. This may ensure that the heated bristles 13' do not come into contact with a user's head in use.

The exemplary embodiments set forth above are considered to be illustrative and not limiting. Various changes to the described arrangements may be made without departing from the spirit and scope of the invention.

As an example, in the above described embodiments, the brush includes seven longitudinally extending rows of the bristles. In other embodiments, the brush may include fewer
5 longitudinally extending rows of bristles (e.g. three rows or five rows).

For the avoidance of any doubt, any theoretical explanations provided herein are provided for the purposes of improving the understanding of a reader. The inventors do not wish to be bound by any of these theoretical explanations.

10 Any section headings used herein are for organizational purposes only and are not to be construed as limiting the subject matter described.

Throughout this specification, including the claims which follow, unless the context requires otherwise, the word “comprise” and “include”, and variations such as “comprises”, “comprising”, and “including” will be understood to imply the inclusion of a stated integer or step or group of
15 integers or steps but not the exclusion of any other integer or step or group of integers or steps.

It must be noted that, as used in the specification and the appended claims, the singular forms “a,” “an,” and “the” include plural referents unless the context clearly dictates otherwise. Ranges may be expressed herein as from “about” one particular value, and/or to “about” another particular value. When such a range is expressed, another embodiment includes from the one
20 particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by the use of the antecedent “about,” it will be understood that the particular value forms another embodiment. The term “about” in relation to a numerical value is optional and means for example +/- 10%.

Claims:

1. A brush for styling hair, the brush comprising:

a bristle bed;

a plurality of bristles, each projecting from the bristle bed to a respective free end, the
5 bristles arranged so as to form one or more longitudinally extending inner rows of
bristles disposed between two longitudinally extending outer rows of bristles; and

an actuator, actuatable to move the one or more inner rows of bristles and/or outer rows
of bristles in the longitudinal direction to provide relative longitudinal movement between
the one or more inner row of bristles and the two outer rows of bristles;

10 wherein each row of bristles has a bristle spacing distance defined as the longitudinal
distance between a pair of adjacent bristles of the row, and the actuator is configured so
that, when actuated, the relative longitudinal movement of the one or more inner rows
and the two outer rows is over a distance that is greater than the bristle spacing distance
of at least one of the rows.

- 15 2. A brush according to claim 1 wherein the inner row is static or the two outer rows are static.

3. A brush according to claim 1 or 2 wherein the bristle bed comprises one or more stationary
portions and a longitudinally moveable portion, and wherein:

20 the two outer rows of bristles are affixed to the one or more stationary portions and the
inner row of bristles is affixed to the moveable portion; or

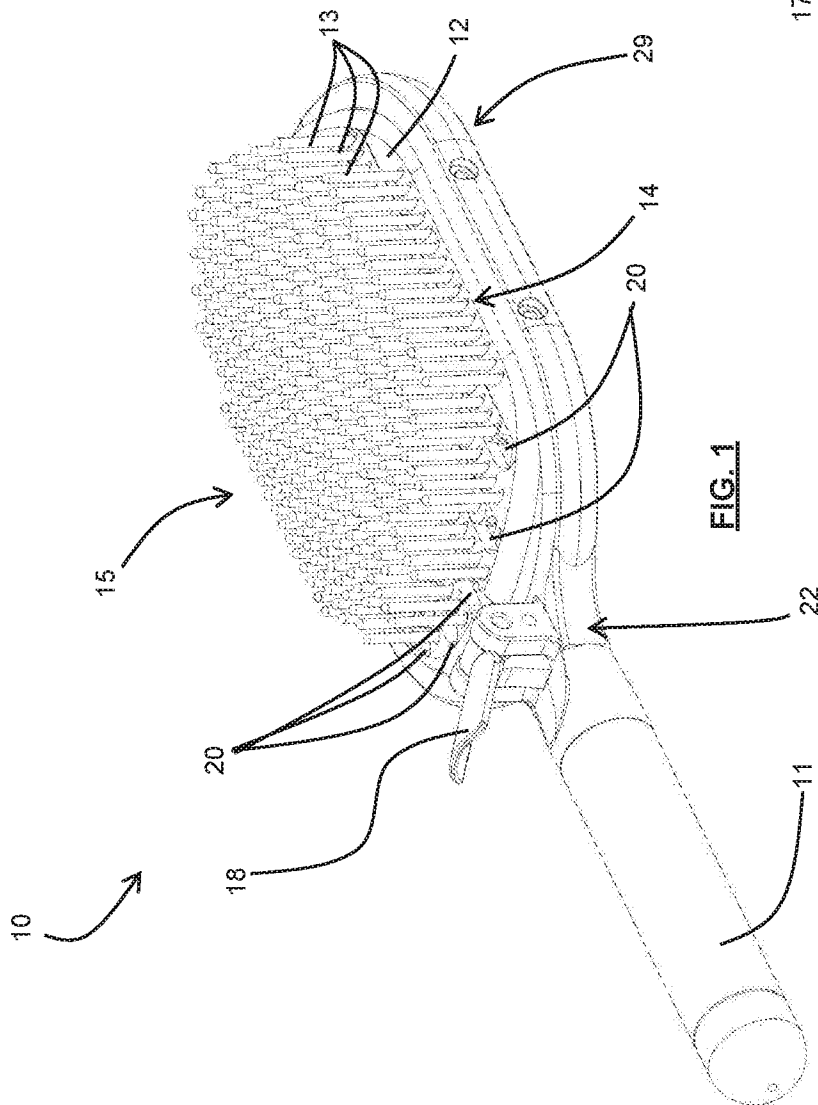
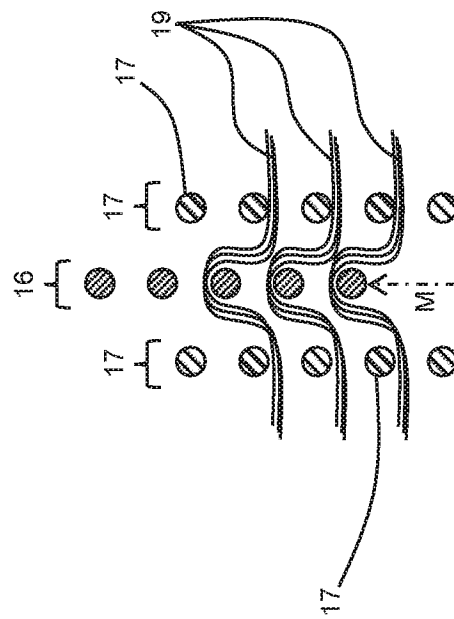
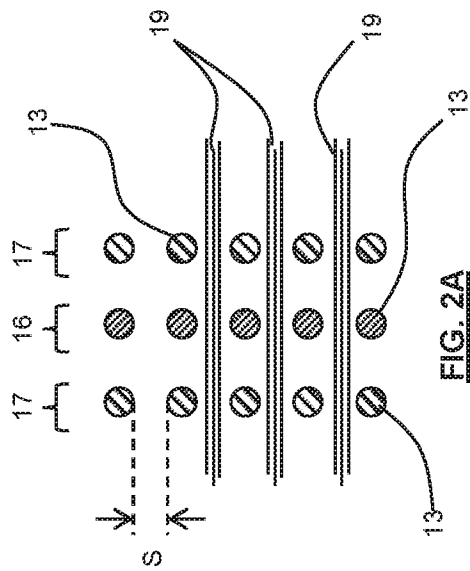
the one or more inner rows of bristles are affixed to the one or more stationary portions
and the two outer rows of bristles are affixed to the moveable portion.

- 25 4. A brush according to claim 3 wherein the actuator is operatively connected to the moveable
portion such that, when actuated, the moveable portion is moved in a longitudinal direction
from a first position to a second position.

5. A brush according to claim 4 comprising a handle that extends longitudinally from the bristle
30 bed, and wherein the actuator is disposed at an end of the handle proximate to the bristle
bed.

6. A brush according to claim 5 wherein movement of the moveable portion from the first
position to the second position is movement in a direction away from the handle.

7. A brush according to any one of claims 4 to 6 wherein the moveable portion comprises a slideably mounted rack and the button comprises a pivotably mounted pinion, each of the rack and pinion engageable so that actuating the actuator slides the rack longitudinally.
- 5 8. A brush according to any one of claims 4 to 7 comprising biasing means configured to bias the moveable portion into the first position.
9. A brush according to any one of the preceding claims comprising a limiter configured to limit the extent of the relative movement of the inner row(s) and the two outer rows in response
10 to actuation of the actuator, the limiter adjustable to adjust the extent of relative movement of the inner row(s) and the two outer rows.
10. A brush according to claim 9, when dependent on claim 4, wherein the limiter abuts the
15 moveable portion when in the first position, and wherein the longitudinal position of the limiter is adjustable to adjust the first position of the moveable portion.
11. A brush according to any one of the preceding claims wherein the free ends of bristles are arranged such that a reference surface intersecting the free ends is concave.
- 20 12. A brush according to claim 11 wherein the reference surface is concave along two orthogonal axes.
13. A brush according to any one of the preceding claims wherein each bristle is mounted to the bristle bed by a resilient mounting element.
- 25 14. A brush according to any one of the preceding claims wherein each bristle is flexible.
15. A brush according to any one of claims 1 to 13 wherein each bristle is rigid.
- 30 16. A brush according to any one of the preceding claims comprising a heater configured to heat the bristles of at least one of the inner and outer rows of bristles.



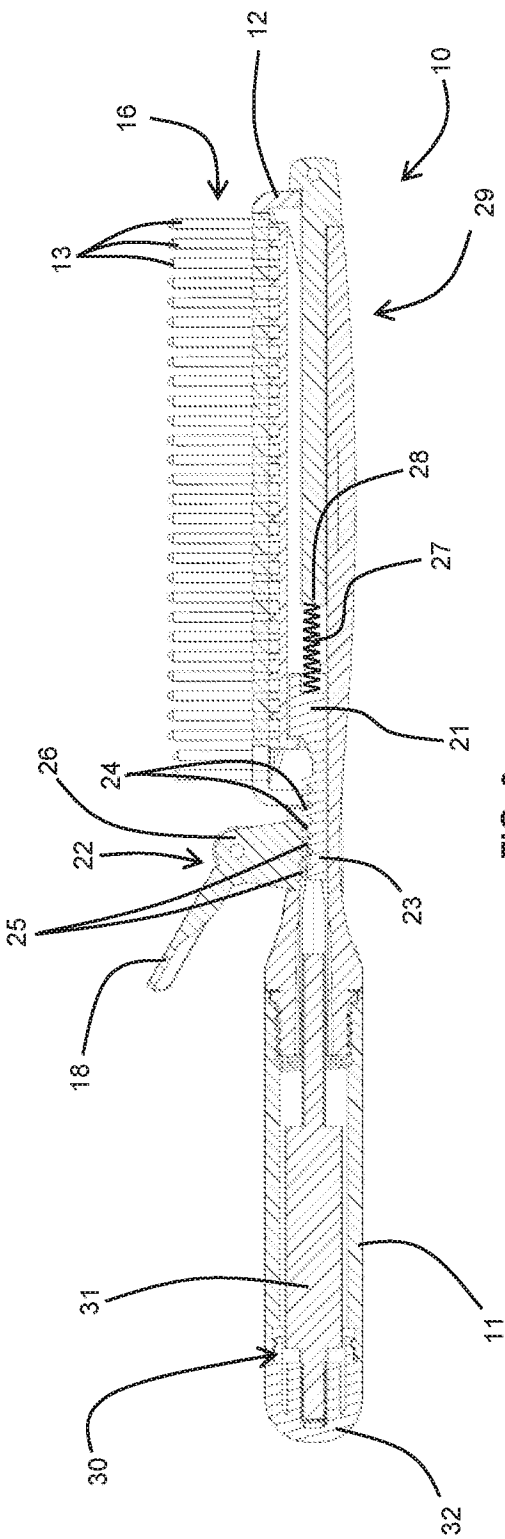


FIG. 3

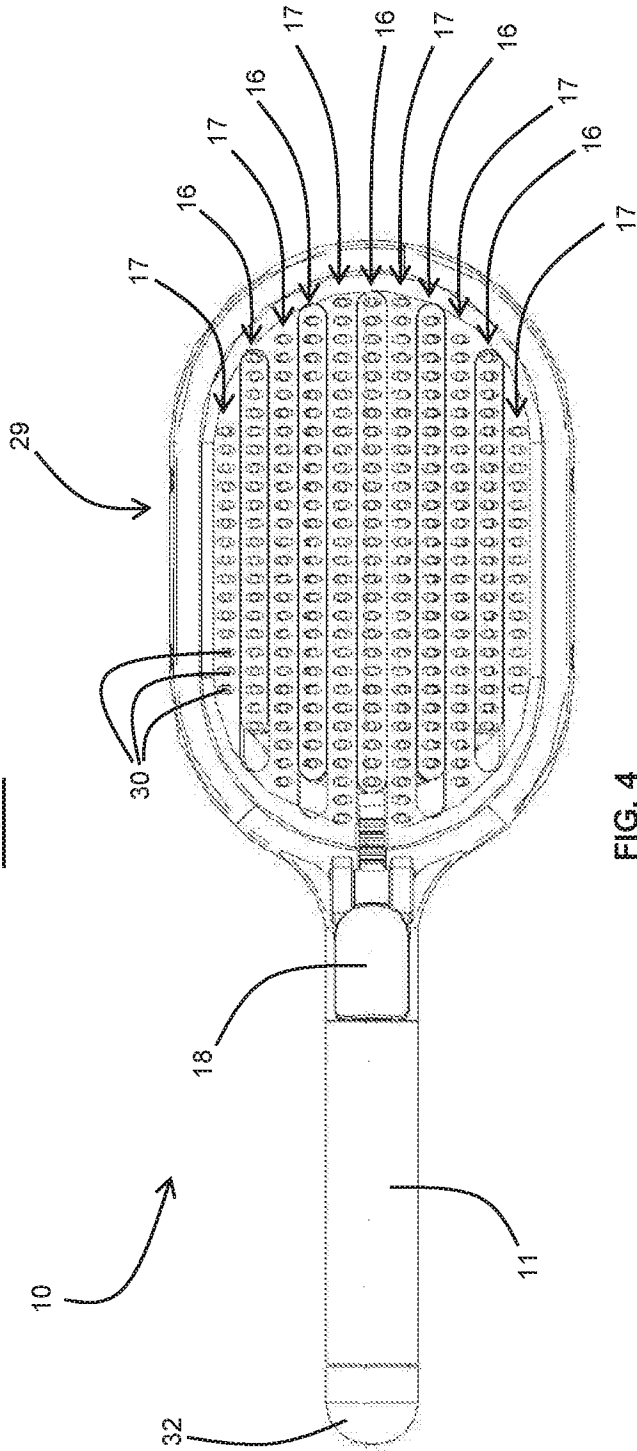
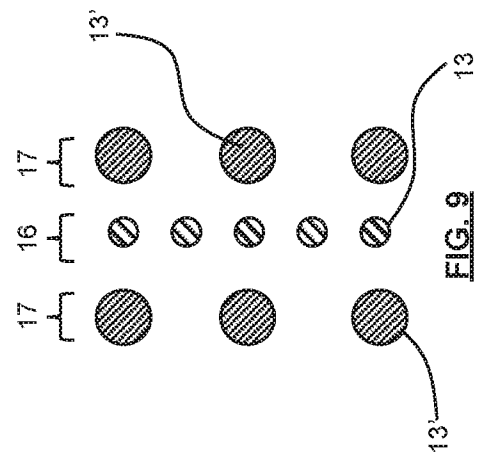
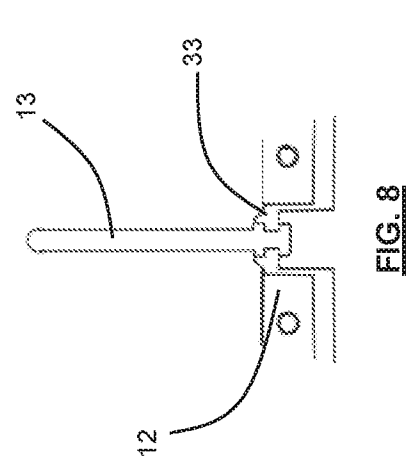
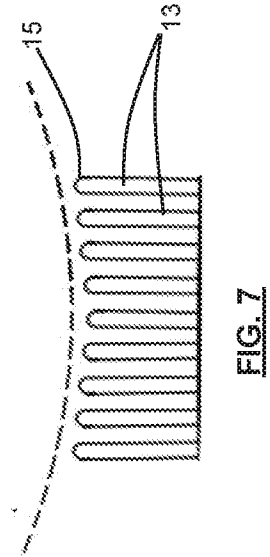
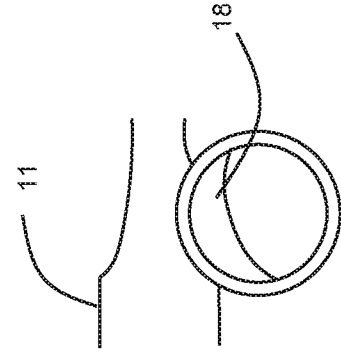
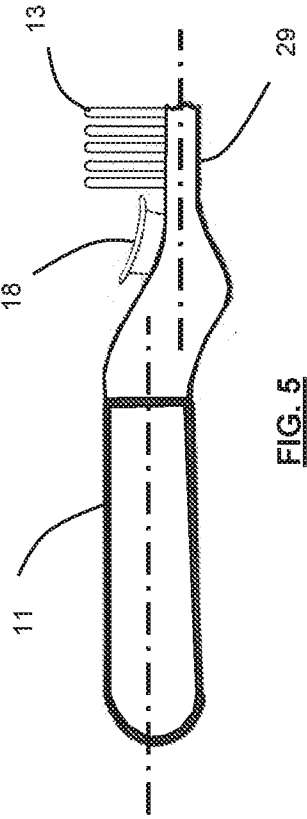


FIG. 4



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2023/061690

A. CLASSIFICATION OF SUBJECT MATTER INV. A46B9/02 ADD.				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED				
Minimum documentation searched (classification system followed by classification symbols) A46B A45D				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	WO 2016/014735 A1 (PROCTER & GAMBLE [US]) 28 January 2016 (2016-01-28) page 4, line 29 - page 5, line 2; figures -----	1-14		
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X	US 6 308 717 B1 (VRTARIC JOHN [US]) 30 October 2001 (2001-10-30) figures 2-3 ----- -/-	1		
<table><tr><td>☒ Further documents are listed in the continuation of Box C.</td><td>☒ See patent family annex.</td></tr></table>			☒ Further documents are listed in the continuation of Box C.	☒ See patent family annex.
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<table><tr><td>* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed</td><td>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family</td></tr></table>			* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family
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Date of the actual completion of the international search 1 February 2024		Date of mailing of the international search report 09/02/2024		
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Raybould, Bruce		

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International application No
PCT/IB2023/061690

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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