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- **BUCKEL, Charles T.**
Valley City, OH Ohio 44280 (US)
- **DE RENZO, Dennis P.**
Concord Township, OH Ohio 44077 (US)

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(74) Representative: **Siepmann, Felix et al**
Abitz & Partner
Patentanwälte mbB
Arabellastraße 17
81925 München (DE)

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(71) Applicant: **Swimc, LLC**
Cleveland, OH 44115 (US)

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(72) Inventors:
• **LAMBERTSON, Michael C.**
Aurora, OH Ohio 44202 (US)

(54) **BRUSH WITH ALTERNATE ROWS OF ANGLED TUFTS**

(57) A brush may include a first row of tufts and a second row of tufts. The tufts in the first row may be angled in a first direction while the tufts in the second row may be angled in a second direction that is different from the first direction.

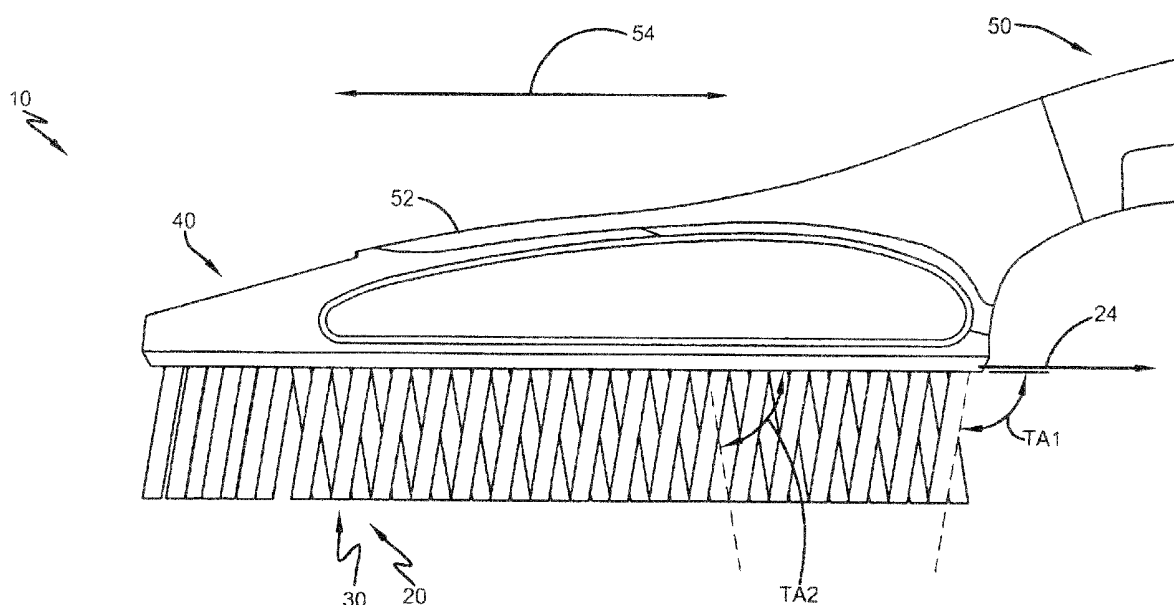


FIG. 1

Description

[0001] This application claims priority to U.S. Serial No. 61/358,693, entitled BRUSH WITH ALTERNATE ROWS OF ANGLED BRISTLES, filed June 25, 2010, which is incorporated herein by reference.

I. Background

A. Field of Invention

[0002] The present invention relates generally to brushes, and more specifically to brushes having some rows of tufts angled forward and other rows of tufts angled backward.

B. Description of the Related Art

[0003] Numerous types and styles of brushes are known. Typically, brushes include a tuft holder having tufts that extend at right angles from the tuft holder.

[0004] It is also known, as shown in FIGURE 7, to provide a wire brush 200 having a tuft holder 202 with tufts 204, some of which that extend at non-right angles. This known arrangement uses two grouping of tufts 206, 208, where each grouping uses tufts that are splayed or flared, as shown.

[0005] While known brush tuft arrangements generally work well for their intended purposes, what is needed is a brush that provides better performance than known brushes.

II. Summary

[0006] According to one embodiment of this invention, a brush may comprise: a tuft holder; a primary operation axis; a first row of tufts that: is substantially parallel to the primary operation axis; and, comprises at least first and second tufts; and, a second row of tufts that: is substantially parallel to the primary operation axis; and, comprises at least first and second tufts. The first tuft in the first row: extends from the tuft holder; and, is angled at a first tuft angle within a first plane that is parallel to the primary operation axis with respect to a second plane that is perpendicular to the first plane and parallel to the primary operation axis. The first tuft may be angled at a forward acute angle that is between, in one embodiment, 60 degrees and 87 degrees, inclusively, and in another embodiment, 75 degrees and 87 degrees, inclusively. The second tuft in the first row: extends from the tuft holder; and, is angled at a second tuft angle within the first plane with respect to the second plane. The second tuft may be angles at a forward acute angle that is between, in one embodiment, 60 degrees and 87 degrees, inclusively, and in another embodiment, 75 degrees and 87 degrees, inclusively. The first tuft in the second row: extends from the tuft holder; and, is angled at a third tuft angle within the first plane with respect to the second plane.

The third tuft may be angled at a backward acute angle that is, in one embodiment, between 60 degrees and 87 degrees, inclusively, and in another embodiment, between 75 degrees and 87 degrees, inclusively. The second tuft in the second row: extends from the tuft holder; and, is angled at a fourth tuft angle within the first plane with respect to the second plane. The fourth tuft may be angled at a backward acute angle that is, in one embodiment, between 60 degrees and 87 degrees, inclusively, and in another embodiment, between 75 degrees and 87 degrees, inclusively.

[0007] According to another embodiment of this invention, a brush may comprise: a tuft holder; a primary operation axis; a first row of tufts that comprises at least first and second tufts that extend from the tuft holder; and, a second row of tufts that comprises at least first and second tufts that extend from the tuft holder. The first and second row of tufts may be substantially parallel to the primary operation axis. The first tuft of the first row and the first tuft of the second row may form an X-shape when viewed from a position that is perpendicular to the primary operation axis. The second tuft of the first row and the second tuft of the second row may form an X-shape when viewed from a position that is perpendicular to the primary operation axis.

[0008] According to yet another embodiment of this invention, a brush may comprise: a tuft holder; a primary operation axis; a handle that extends from the tuft holder substantially along the primary operation axis; a first linear row of tufts that comprises at least first, second, and third tufts that are formed of a metal and that extend from the tuft holder; and, a second linear row of tufts that comprises at least first, second, and third tufts that are formed of a metal and that extend from the tuft holder. The first and second rows of tufts are substantially parallel to the primary operation axis. The first tuft of the first row and the first tuft of the second row form an X-shape when viewed from a position that is perpendicular to the primary operation axis. The second tuft of the first row and the second tuft of the second row form an X-shape when viewed from a position that is perpendicular to the primary operation axis. The third tuft of the first row and the third tuft of the second row form an X-shape when viewed from a position that is perpendicular to the primary operation axis.

[0009] One advantage of this brush is that the angled brushes perform better scrubbing action.

[0010] Still other benefits and advantages of the invention will become apparent to those skilled in the art to which it pertains upon a reading and understanding of the following detailed specification.

III. Brief Description of the Drawings

[0011] The invention may take physical form in certain parts and arrangement of parts, embodiments of which will be described in detail in this specification and illustrated in the accompanying drawings which form a part

hereof and wherein:

FIGURE 1 is a side view of a brush, according to one embodiment of the invention.

FIGURE 2 is a perspective side view of the brush shown in FIGURE 1.

FIGURE 3 is a bottom view of the brush shown in FIGURE 1.

FIGURE 4 is an end perspective view of another brush, according to one embodiment of the invention.

FIGURE 5 is a bottom perspective view of the brush shown in FIGURE 4.

FIGURE 5 is a side perspective view of the brush shown in FIGURE 4.

FIGURE 7 is a side perspective view off a prior art wire brush.

IV. Detailed Description of the Invention

[0012] Referring now to the drawings wherein the showings are for purposes of illustrating embodiments of the invention only and not for purposes of limiting the same, and wherein like reference numerals are understood to refer to like components, FIGURES 1-3 show a brush 10 having rows of tufts 30, a tuft holder 40, and a handle 50. A tuft 30 can include one or more filaments or bristles 20. The specific number of filaments or bristles used to make up one tuft 30 can be any number chosen by a person of ordinary skill in the art. The filaments or bristles may be made from a variety of natural materials or fibers or from synthetic materials including, for non-limiting examples, nylon or polyester. For the embodiment shown, the filaments are formed of a relatively stiff metal and thus the brush 10 may be considered to be a wire brush. Wire brushes, as is well known to those of skill in the art, are generally intended for use in scraping undesired materials, such as paint or rust, off of a surface. After the undesired materials are removed, if desired, the now clean surface may be painted, stained or otherwise treated. In one specific embodiment, the bristles 20, and thus the tufts 30, are formed of stainless steel. Each tuft 30 can be secured to the tuft holder 40 with a staple, a wire, a screw, adhesive, epoxy or any other fastening means chosen by a person of ordinary skill in the art. In one embodiment, a handle 50 may extend from the tuft holder 40. In another embodiment, the tuft holder 40 is itself used as a handle. It may have one or more textured regions 52 for this purpose.

[0013] With continuing reference to FIGURES 1-3, the brush 10 may have a primary operation axis 54. The primary operation axis is the axis along which the brush

performs best as it is moved over the surface it is being used on. For the embodiment shown, the handle 50 extends from the tuft holder 40 along the primary operation axis 54. The tufts 30 may be arranged in rows 60. The number, type, and shape of rows can be any chosen with the sound judgment of a person of skill in the art. For the embodiment shown, the brush 10 may include five predominately linear rows 60 of tufts 30 with two outside rows 62, two intermediate rows 64, and one middle row 66. The rows 60 may be parallel to the primary operation axis 54, as shown. The distal end of the two outside rows 62 may have a section that is curvilinear, as shown.

[0014] With reference now to FIGURE 2, to better discuss the orientation of the tufts 30 within the rows 60, note that the nearest outside row 62 is (except the distal portion) within a plane 22 that is parallel to the primary operation axis 54. Note also plane 24 which is perpendicular to the plane 22 and parallel to the primary operation axis 54. Each row similarly is within a plane that is parallel to the primary operation axis 54 and perpendicular to the plane 24. As shown in FIGURE 1, the tufts 30 in the visible outside row 62 are angled at a tuft angle TA1. Tuft angle TA 1 is considered a forward angle because the distal end of the tuft 30 is more forward (toward the distal end of the brush 10) than the base of the tuft 30 (where it extends from the tuft holder 40). The tufts 30 in the visible intermediate row 64 are angled at a tuft angle TA2. Tuft angle TA2 is considered a backward angle because the distal end of the tuft 30 is more backward (toward the proximal, handle end of the brush 10) than the base of the tuft 30 (where it extends from the tuft holder 40). It was discovered that this alternate angled arrangement of the tufts 30 in neighboring rows 60 provides improved performance when the brush 10 is used along its primary operation axis 54. The intermediate and outside rows 64, 62 may, in one embodiment, be similarly angled. Thus in this embodiment the positioning and angling of the tufts 30 are mirror imaged around a longitudinal axis parallel to the primary operation axis 54.

[0015] With reference now to FIGURES 1-3, tuft angles TA1, TA2 can be any chosen with the sound judgment of a person of skill in the art. Note that the tuft angles are expressed as acute angles. In one embodiment, the tuft angles are between 60 degrees and 87 degrees, inclusively, and in another embodiment, 75 degrees and 87 degrees, inclusively. In still another embodiment, the tuft angles are between 80 degrees and 85 degrees, inclusively. While all the tufts 30 in the outside row 62 are shown to be angled at the same tuft angle TA 1, it is also contemplated to have different tuft angles for the tufts 30 in the outside row 62. Similarly, while all the tufts 30 in the intermediate row 64 are shown to be angled at the same tuft angle TA2, it is also contemplated to have different tuft angles for the tufts 30 in the intermediate row 64. While the tuft angle TA 1 is shown to be at the same angle as the tuft angle TA2, it is also contemplated to have TA1 and TA2 at different angles. If the tufts 30 in neighboring rows 60 are arranged as shown, they form

an X-shape when viewed from a position that is perpendicular to the primary operation axis 54 (as shown in FIGURE 1). Of course the spacing and arrangement of the tufts 30 can be such that, in another embodiment, the use of tuft angles TA1 and TA2 do not form an X-shape. The tufts 30 in the middle row 66, may be at right angles with respect to the plane 24. Thus, they are shown to have a tuft angle of 90 degrees. It is also contemplated to arrange the tufts 30 in the middle row 66 at forward or backward angles.

[0016] With continuing reference to FIGURES 1-3, it is also contemplated to provide one or more of the tufts for any of the rows to have an inward angle (the distal end of the tuft 30 is more toward the inside of the brush 10 than the base of the tuft 30) or an outward angle (the distal end of the tuft 30 is more toward the outside of the brush 10 than the base of the tuft 30) if desired.

[0017] With reference now to FIGURES 4-6, another embodiment brush 10 is shown. This brush 10 includes tufts 30 arranged in rows 60. The brush 10 may include an outside row 70, which can extend around at least a portion of the perimeter of the tuft holder 40. The brush 10 may include an inside row 72 positioned adjacent the outside row 70. The outside row 70 may angle out at between 75 degrees and 85 degrees inclusively measured from a horizontal plane on the tuft holder 40. In a specific embodiment, the outside row 70 may angle out at approximately 82.5 degrees. The intermediate row 72 may angle out at between 75 degrees and 89 degrees inclusively measured from a horizontal plane on the tuft holder 40. In a specific embodiment, the outside row 70 may angle out at approximately 86.2 degrees.

[0018] With continuing reference to FIGURES 4-6, the brush 10 may include a center field of rows 74 adjacent the inside row 72. The center field 74 may include one or more rows 60 of tufts 30. The rows 60 may extend along the longitudinal axis of the brush 10, along the transverse axis of the brush 10, or any direction including, but not limited to, diagonal. The tufts 30 may be arranged so the rows 60 extend along two axes, for one non-limiting example, along both the longitudinal and transverse axes. In one embodiment, the center field includes nine rows 60 of tufts 30. One row 60 is angled towards a first end 16 of the brush 10 and the adjacent row 60 is angled towards a second end 18 of the brush. In one specific embodiment, the center field 74 includes nine rows 60 with the first, third, fifth, seventh, and ninth rows 60 angled approximately 81 degrees toward the first end 16, measured from a horizontal plane on the tuft holder 40; and the second, fourth, sixth, and eighth rows 60 angled approximately 81 degrees toward the second end 18, measured from a horizontal plane on the tuft holder 40.

[0019] With reference now to all the FIGURES, many variations of the brushes 10, 10 are contemplated with some variations including a layout of adjacent rows of tufts angled in alternate directions. Within each row 60, the tufts 30 can be substantially parallel to each other or the tufts 30 may have various other configurations. For

one non-limiting example, the tufts 30 within a row 60 may all be angled towards the front 16 of the brush, but at different angles. For another non-limiting example, the tufts 30 may all be angled towards the front 16 of the brush and one side of the brush at substantially the same angle. For another non-limiting example, the tufts 30 may all be angled towards the rear 18 of the brush at substantially the same angle, but at different angles to the sides of the brush. A first row 60 may have many different configurations, and an adjacent second row 60 may have a mirror configuration of the first row 60. The second adjacent row may be substantially parallel to the first row or the adjacent row may be offset at an angle to the first row.

[0020] Numerous embodiments have been described, hereinabove. It will be apparent to those skilled in the art that the above methods and apparatuses may incorporate changes and modifications without departing from the general scope of this invention. It is intended to include all such modifications and alterations in so far as they come within the scope of the appended claims or the equivalents thereof.

Claims

1. A brush comprising:

a tuft holder;
 a primary operation axis;
 a first row of tufts that: is substantially parallel to the primary operation axis; and, comprises at least first and second tufts;
 a second row of tufts that: is substantially parallel to the primary operation axis; and, comprises at least first and second tufts;
 wherein the first tuft in the first row: extends from the tuft holder; and, is angled at a first tuft angle within a first plane that is parallel to the primary operation axis with respect to a second plane that is perpendicular to the first plane and parallel to the primary operation axis;
 wherein the first tuft angle is a forward acute angle that is between 60 degrees and 87 degrees, inclusively;
 wherein the second tuft in the first row: extends from the tuft holder; and, is angled at a second tuft angle within the first plane with respect to the second plane;
 wherein the second tuft angle is a forward acute angle that is between 60 degrees and 87 degrees, inclusively;
 wherein the first tuft in the second row: extends from the tuft holder; and, is angled at an third tuft angle within the first plane with respect to the second plane;
 wherein the third tuft angle is a backward acute angle that is between 60 degrees and 87 de-

grees, inclusively; and,
 wherein the second tuft in the second row: extends from the tuft holder; and, is angled at a fourth tuft angle within the first plane with respect to the second plane;
 wherein the fourth tuft angle is a backward acute angle that is between 60 degrees and 87 degrees, inclusively.

2. The brush of claim 1 further comprising:

a third row of tufts that: is substantially parallel to the primary operation axis; and, comprises at least first and second tufts; and,
 wherein each tuft in the third row: extends from the tuft holder; and, is angled at a right tuft angle within a third plane that is parallel to the primary operation axis with respect to the second plane; wherein the right tuft angle is substantially 90 degrees.

3. The brush of claim 1 further comprising:

a third row of tufts that: is substantially parallel to the primary operation axis; and, comprises at least first and second tufts;
 a fourth row of tufts that: is substantially parallel to the primary operation axis; and, comprises at least first and second tufts;
 wherein the first tuft in the third row: extends from the tuft holder; and, is angled at an fifth tuft angle within a third plane that is parallel to the primary operation axis with respect to the second plane;
 wherein the fifth tuft angle is a forward acute angle that is between 60 degrees and 87 degrees, inclusively;
 wherein the second tuft in the third row: extends from the tuft holder; and, is angled at a sixth tuft angle within the third plane with respect to the second plane;
 wherein the sixth tuft angle is a forward acute angle that is between 60 degrees and 87 degrees, inclusively;
 wherein the first tuft in the fourth row: extends from the tuft holder; and, is angled at an seventh tuft angle within a fourth plane that is parallel to the primary operation axis with respect to the second plane;
 wherein the seventh tuft angle is a backward acute angle that is between 60 degrees and 87 degrees, inclusively; and,
 wherein the second tuft in the fourth row: extends from the tuft holder; and, is angled at an eighth tuft angle within the fourth plane with respect to the second plane;
 wherein the eighth tuft angle is a backward acute angle that is between 60 degrees and 87 de-

grees, inclusively.

4. The brush of claim 1 wherein:

the first and second tuft angles are substantially the same; and, the third and fourth tuft angles are substantially the same,
 or
 wherein the first, second, third, and fourth tuft angles are substantially the same,
 or
 wherein the first, second, third, and fourth tuft angles are between 75 degrees and 87 degrees, inclusively.

5. The brush of claim 1 wherein:

the brush further comprises a handle that extends from the tuft holder substantially along the primary operation axis,
 and/or
 wherein the first and second tufts in the first row and the first and second tufts in the second row are formed of stainless steel.

6. A brush comprising:

a tuft holder;
 a primary operation axis;
 a first row of tufts that comprises at least first and second tufts that extend from the tuft holder;
 a second row of tufts that comprises at least first and second tufts that extend from the tuft holder;
 wherein the first and second row of tufts are substantially parallel to the primary operation axis;
 wherein the first tuft of the first row and the first tuft of the second row form an X-shape when viewed from a position that is perpendicular to the primary operation axis; and,
 wherein the second tuft of the first row and the second tuft of the second row form an X-shape when viewed from a position that is perpendicular to the primary operation axis.

7. The brush of claim 6 further comprising:

a third row of tufts that: is substantially parallel to the primary operation axis; and, comprises at least first and second tufts; and,
 wherein each tuft in the third row: extends from the tuft holder; and, is angled at a right tuft angle within a first plane that is parallel to the primary operation axis with respect to a second plane that is perpendicular to the first plane and parallel to the primary operation axis;
 wherein the right tuft angle is substantially 90 degrees.

8. The brush of claim 7 further comprising:

a fourth row of tufts that comprises at least first and second tufts that extend from the tuft holder; a fifth row of tufts that comprises at least first and second tufts that extend from the tuft holder; wherein the fourth and fifth row of tufts are substantially parallel to the primary operation axis; wherein the first tuft of the fourth row and the first tuft of the fifth row form an X-shape when viewed from a position that is perpendicular to the primary operation axis; and, wherein the second tuft of the fourth row and the second tuft of the fifth row form an X-shape when viewed from a position that is perpendicular to the primary operation axis.

9. The brush of claim 8 wherein:

the first, second, third, fourth and fifth rows of tufts are positioned from a first side of the tuft holder to a second side of the tuft holder in the following order: the first row; the second row; the third row; the fourth row; and, the fifth row, preferably wherein:

the first and second tufts of the first row and the first and second tufts of the fifth row have a forward acute tuft angle; and, the first and second tufts of the second row and the first and second tufts of the fourth row have a backward acute tuft angle, preferably wherein:

the forward acute tuft angle for each of the first and second tufts of the first row and the first and second tufts of the fifth row is between 75 degrees and 87 degrees, inclusively; and, the backward acute tuft angle for each of the first and second tufts of the second row and the first and second tufts of the fourth row is between 75 degrees and 87 degrees, inclusively.

10. The brush of claim 9 wherein:

a handle extends from the tuft holder substantially along the primary operation axis and, all the tufts are formed of stainless steel.

11. A brush comprising:

a tuft holder;
a primary operation axis;
a handle extends from the tuft holder substantially along the primary operation axis;
a first linear row of tufts that comprises at least

first, second, and third tufts that are formed of a metal and that extend from the tuft holder;
a second linear row of tufts that comprises at least first, second, and third tufts that are formed of a metal and that extend from the tuft holder; wherein the first and second row of tufts are substantially parallel to the primary operation axis; wherein the first tuft of the first row and the first tuft of the second row form an X-shape when viewed from a position that is perpendicular to the primary operation axis; wherein the second tuft of the first row and the second tuft of the second row form an X-shape when viewed from a position that is perpendicular to the primary operation axis; and, wherein the third tuft of the first row and the third tuft of the second row form an X-shape when viewed from a position that is perpendicular to the primary operation axis.

12. The brush of claim 11 further comprising:

a third linear row of tufts that: is substantially parallel to the primary operation axis; and, comprises at least first, second, and third tufts that are formed of a metal; and, wherein each tuft in the third row: extends from the tuft holder; and, is angled at a right tuft angle within a first plane that is parallel to the primary operation axis with respect to a second plane that is perpendicular to the first plane and parallel to the primary operation axis; wherein the right tuft angle is substantially 90 degrees.

13. The brush of claim 12 further comprising:

a fourth linear row of tufts that comprises at least first, second, and third tufts that extend from the tuft holder and are formed of a metal;
a fifth linear row of tufts that comprises at least first, second, and third tufts that extend from the tuft holder and are formed of a metal; wherein the fourth and fifth row of tufts are substantially parallel to the primary operation axis; wherein the first tuft of the fourth row and the first tuft of the fifth row form an X-shape when viewed from a position that is perpendicular to the primary operation axis; wherein the second tuft of the fourth row and the second tuft of the fifth row form an X-shape when viewed from a position that is perpendicular to the primary operation axis; and, wherein the third tuft of the fourth row and the third tuft of the fifth row form an X-shape when viewed from a position that is perpendicular to the primary operation axis.

14. The brush of claim 13 wherein:

the first, second, third, fourth and fifth rows of tufts are positioned from a first side of the tuft holder to a second side of the tuft holder in the following order: the first row; the second row; the third row; the fourth row; and, the fifth row; the first and second tufts of the first row and the first and second tufts of the fifth row have a forward acute tuft angle; and, the first and second tufts of the second row and the first and second tufts of the fourth row have a backward acute tuft angle.

15. The brush of claim 14 wherein:

the forward acute tuft angle for each of the first and second tufts of the first row and the first and second tufts of the fifth row is between 80 degrees and 85 degrees, inclusively; and, the backward acute tuft angle for each of the first and second tufts of the second row and the first and second tufts of the fourth row is between 80 degrees and 85 degrees, inclusively.

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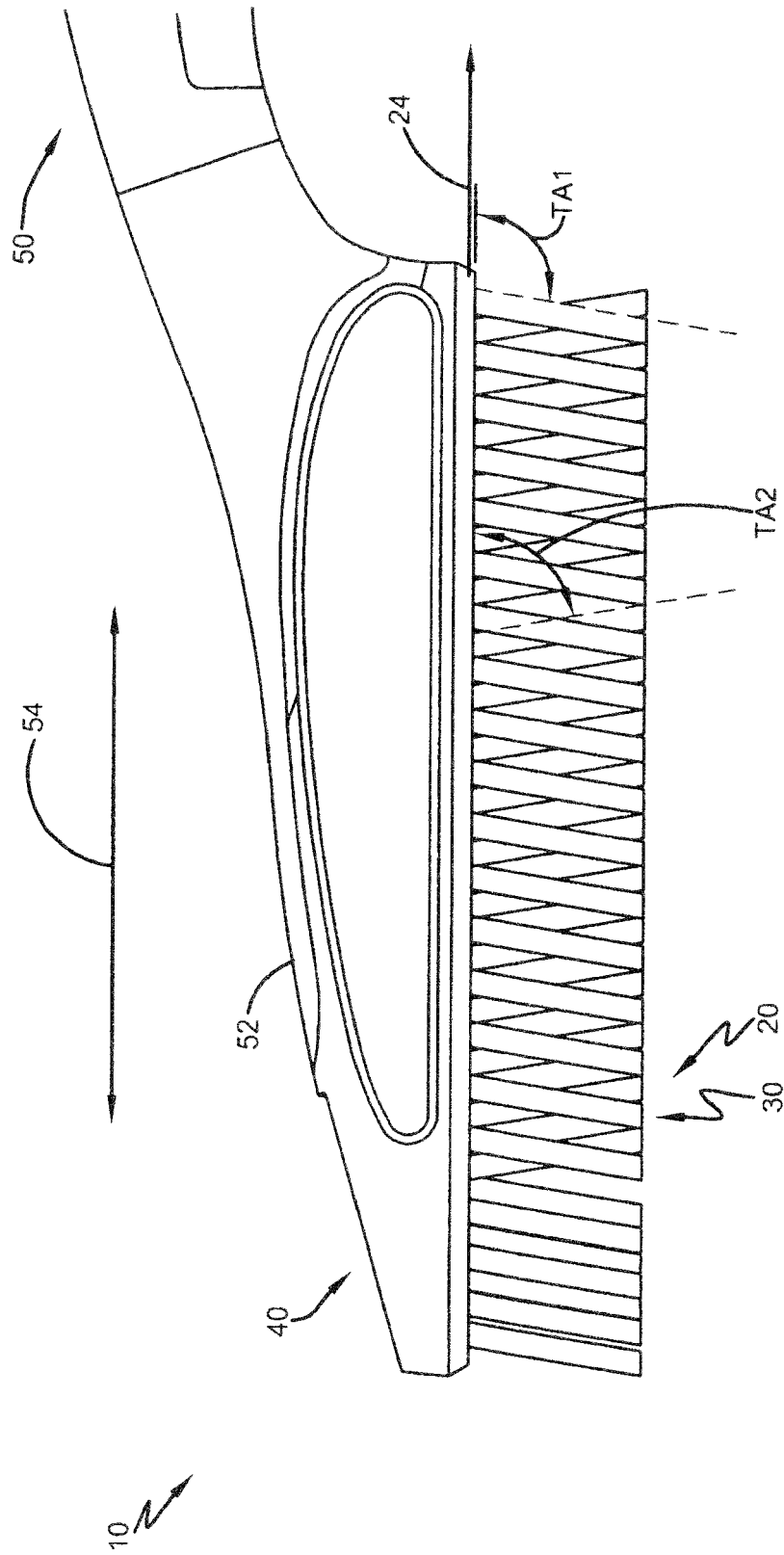
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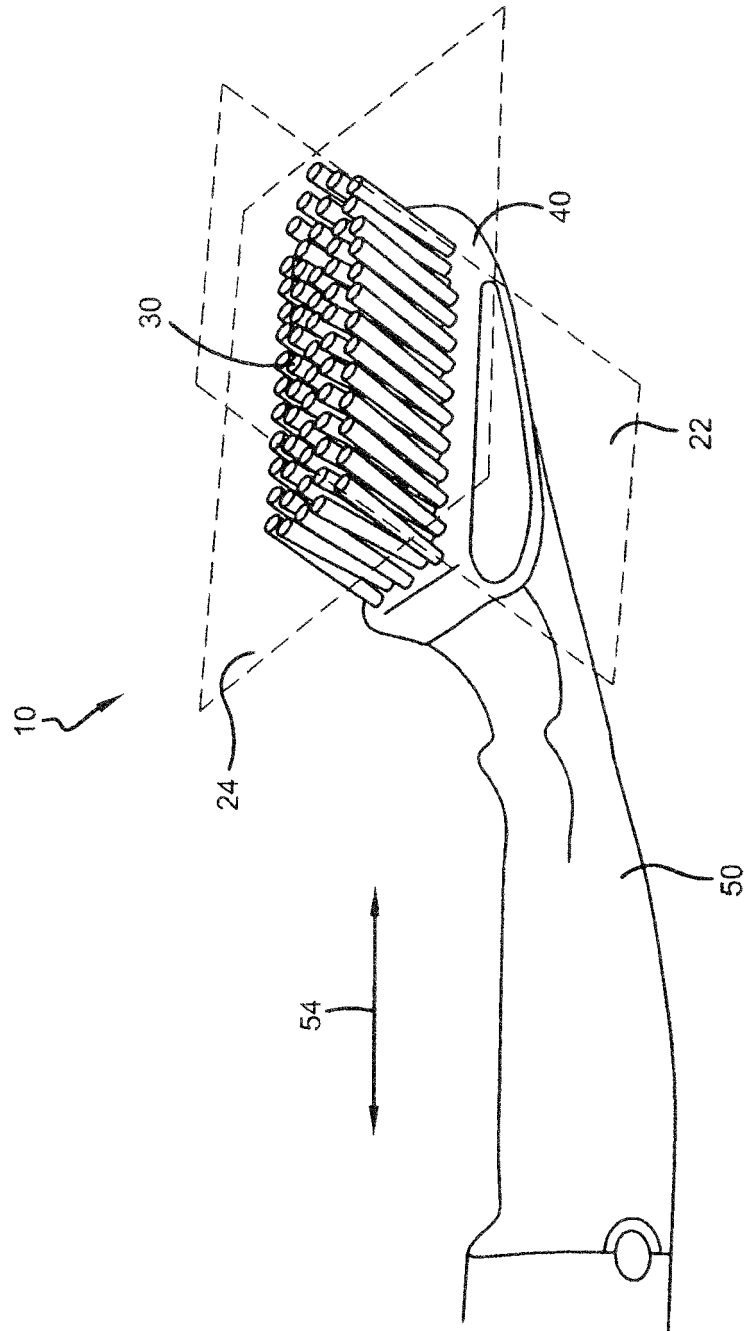


FIG. 2

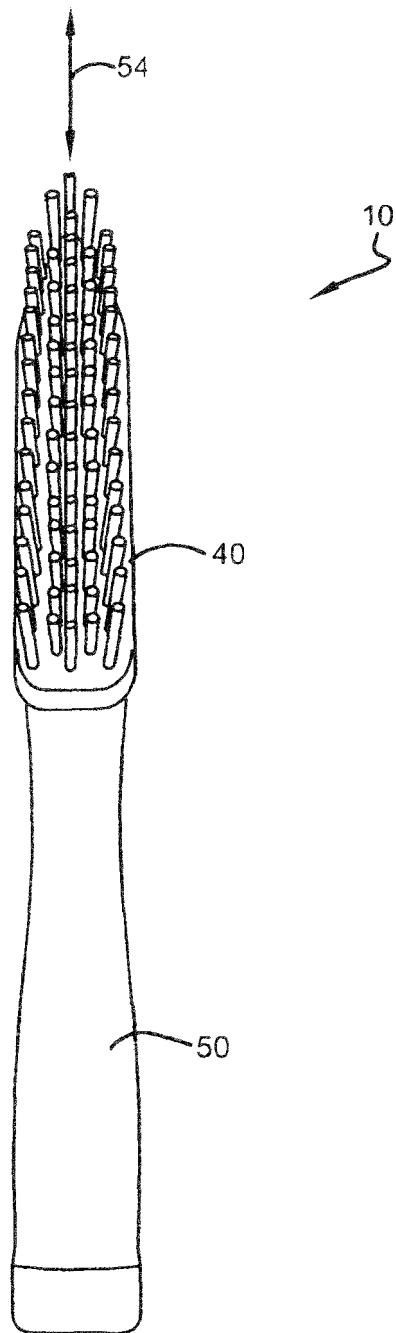


FIG. 3

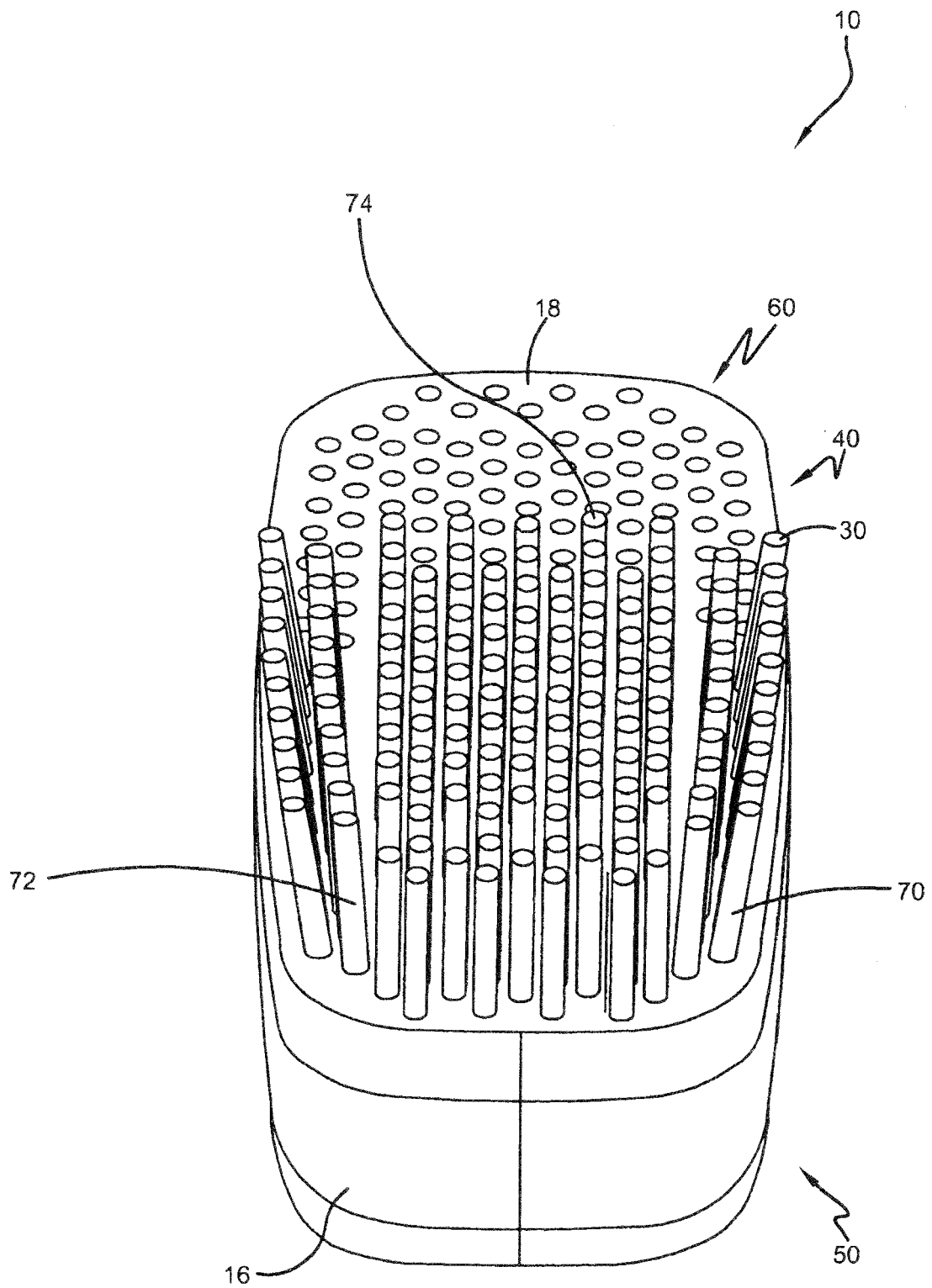


FIG. 4

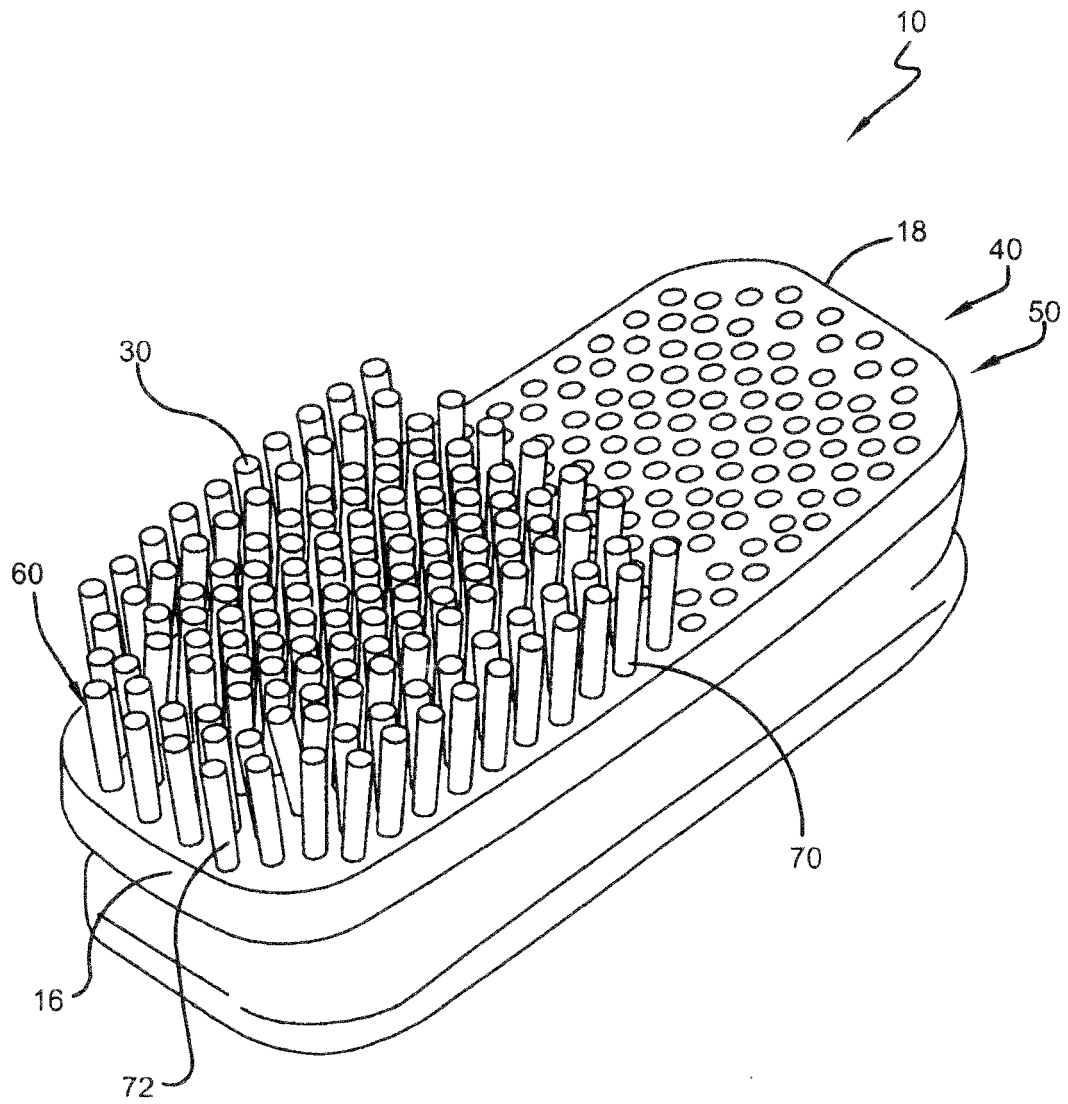


FIG. 5

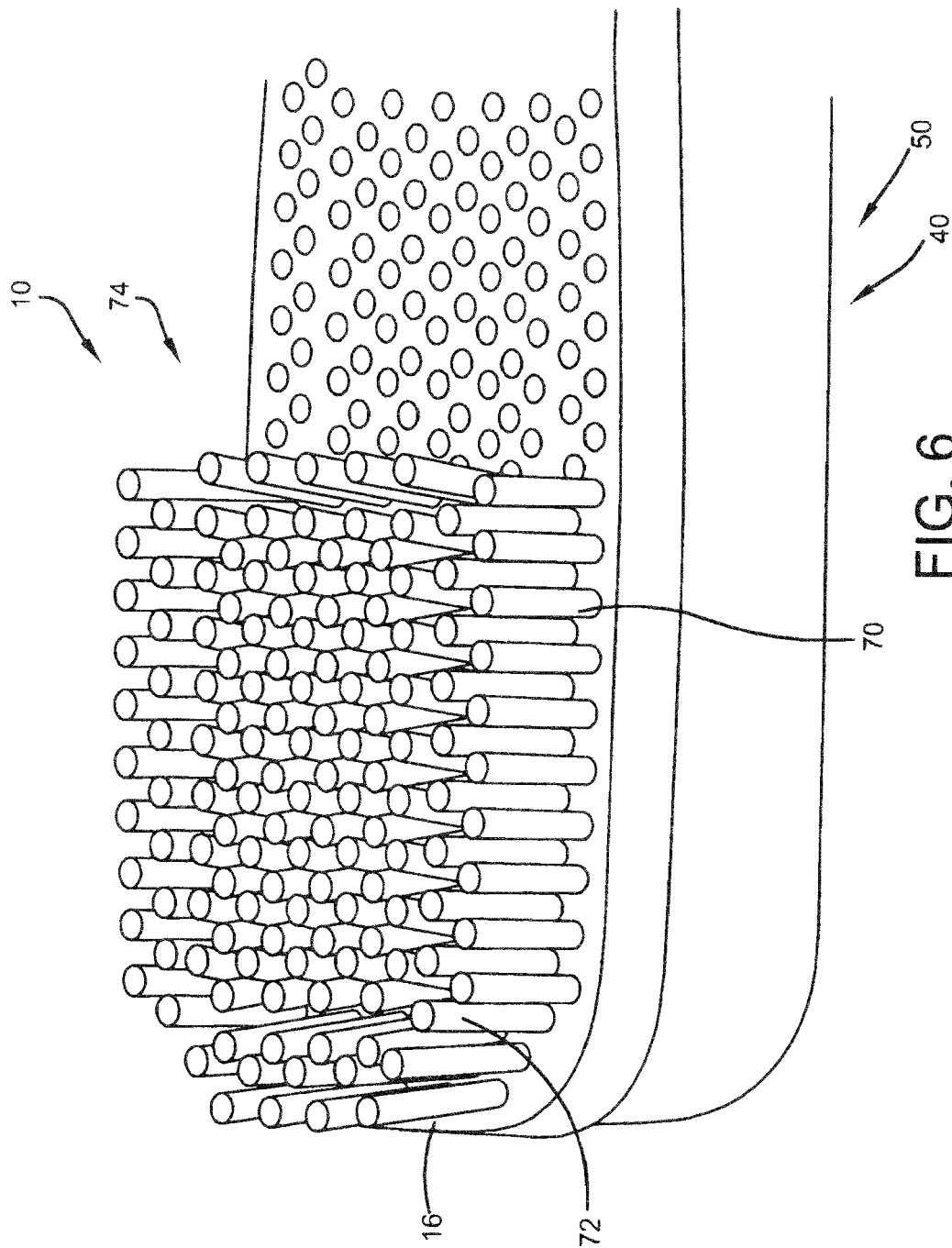


FIG. 6

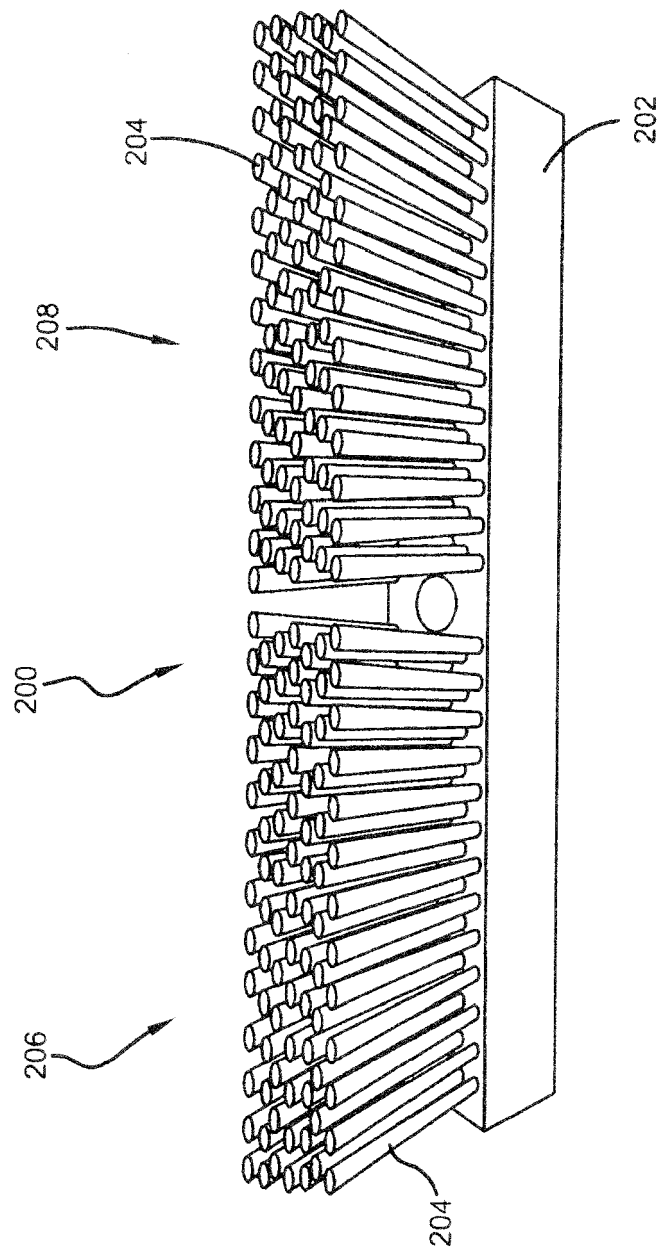


FIG. 7
PRIOR ART

REFERENCES CITED IN THE DESCRIPTION

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