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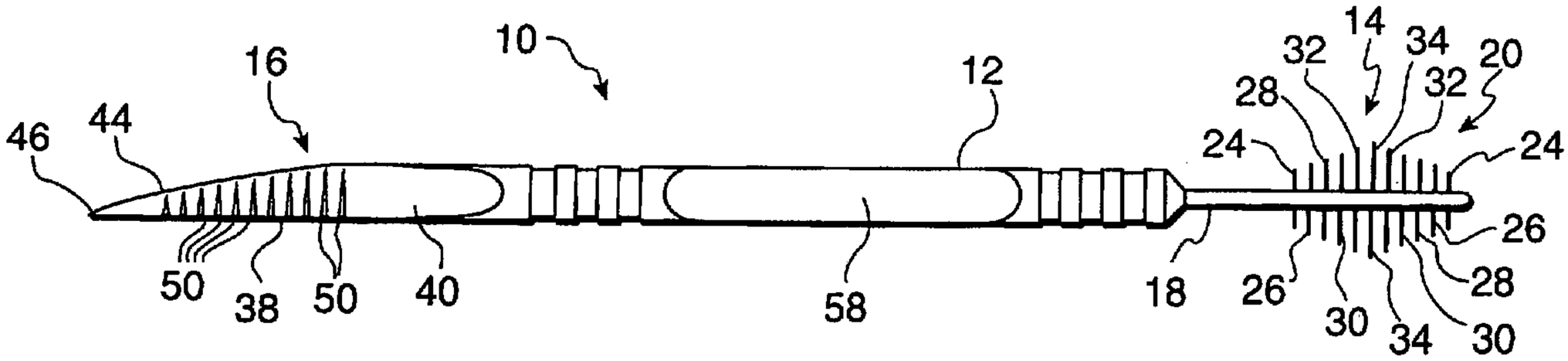
(54) Title: ORAL HYGIENE IMPLEMENT



(57) Abrégé/Abstract:
A one-piece thermoplastic oral hygiene implement (10) includes a central (12) grip having an interproximal brush (14) projecting from one end. The (14) brush includes an axial calamus (18) having a planar fishbone array of graduated length bristles (20). Extending from the opposite end of the grip (12) is a pick comprising a tapered wedge (16). Lateral flanks (40,42) of the wedge (16) include an array of spaced discrete transverse ribs (50). The interproximal brush (14) and the pick are selectively employed to remove plaque, incipient calculus, food debris and the like from proximal surfaces and interproximal areas as well as for cleansing periodontal pockets and for gingival stimulation.

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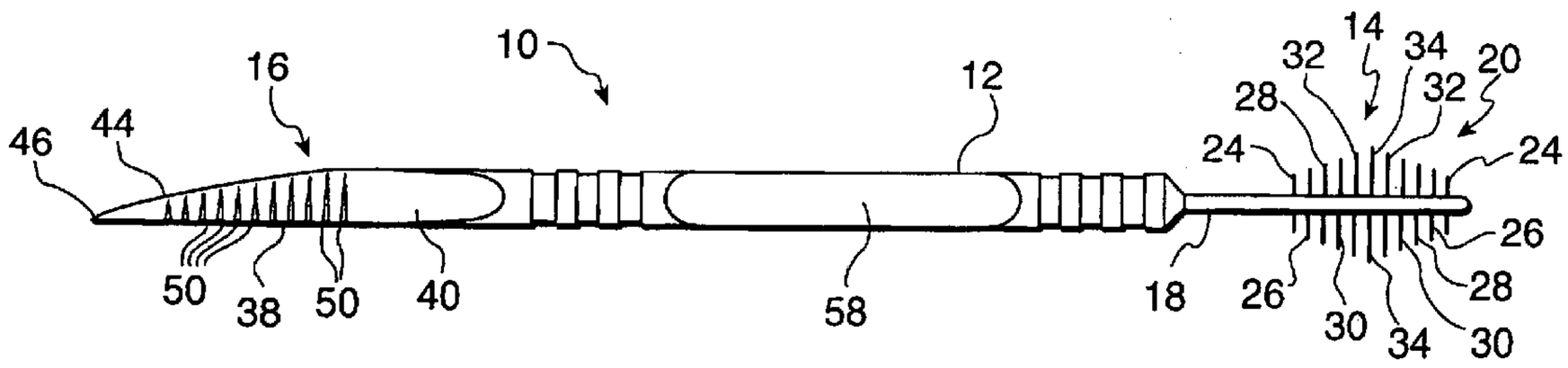

(57) Abstract: A one-piece thermoplastic oral hygiene implement (10) includes a central (12) grip having an interproximal brush (14) projecting from one end. The (14) brush includes an axial calamus (18) having a planar fishbone array of graduated length bristles (20). Extending from the opposite end of the grip (12) is a pick comprising a tapered wedge (16). Lateral flanks (40,42) of the wedge (16) include an array of spaced discrete transverse ribs (50). The interproximal brush (14) and the pick are selectively employed to remove plaque, incipient calculus, food debris and the like from proximal surfaces and interproximal areas as well as for cleansing periodontal pockets and for gingival stimulation.

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ORAL HYGIENE IMPLEMENT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to oral hygiene and more particularly to an implement for prophylaxis of interproximal surfaces and for gingival stimulation.

2. Antecedents of the Invention

While routine brushing has constituted a principal factor in oral hygiene regimens, brushing has been effective only with respect to tooth surfaces accessible to the bristles, i.e. lingual, labial, buccal, occlusal and incisal surfaces.

Dental floss and toothpicks have been relied upon for cleansing interproximal areas. Dental floss was often difficult to use, especially when attempting to cleanse or clear interproximal surfaces of tightly abutting teeth. One was required to grip and tension a span of floss and force the tensioned floss toward the dentogingival junction. When the taught floss passed beyond the abutting proximal surfaces, there was a tendency for the floss to snap and impact against the gingivae, causing lacerations, trauma and irritation.

Further, when one attempted to remove the floss by pulling toward the occlusal plane, the danger of unseating a tooth restoration, such as a crown, was presented.

Wooden toothpicks posed different disadvantages. The shape of wooden toothpicks were generally dictated by manufacturing considerations, rather than function. The absorbent nature of wood posed problems with respect to contamination and wood presented the potential danger of splintering.

Molded plastic toothpicks, such as that disclosed in U.S. Patent Des. 382,368, offered the advantage of a wedge projection for clearing interproximal spaces combined with a unitary interproximal brush. There was a need, however, for more effective removal of food debris, plaque, materia alba, insipient calculus and the like from interproximal areas while reducing potential injury to gingivae.

SUMMARY OF THE INVENTION

A molded thermoplastic oral hygiene implement includes a central grip having an interproximal brush at one end and a tapered wedge at its other end.

The interproximal brush includes an axial calamus having a planar array of graduated length bristles. The graduated length bristles are suitable for cleaning interproximal spaces and periodontal pockets as well as for stimulating gingival surfaces while minimizing trauma.

The tapered wedge includes a transversely curved spine and opposed lateral flanks, with each flank having an array of spaced transverse trihedral ribs. The sharp edges of the ribs are effective for the removal of materia alba, pellicle, plaque, insipient calculus, food debris and the like from proximal and interproximal surfaces when the implement is manipulated within an interproximal space with a reciprocal axial motion. The curved spine reduces potential for gingival trauma.

The grip is generally cylindrical in shape with, however, a pair of side panels lying in planes parallel to a common axial plane of the bristles and the tapered wedge. The side panels serve as gripping faces and assist a user in orienting both the interproximal brush and the tapered wedge.

From the foregoing compendium, it will be appreciated that it is an aspect of the present invention to provide an oral hygiene implement of the general character described which is not subject to the disadvantages of the antecedents of the invention aforementioned.

A feature of the present invention is to provide an oral hygiene implement of the general character described which is well suited for oral hygiene applications.

A consideration of the present invention is to provide an oral hygiene implement of the general character described which is simple to use.

Another aspect of the present invention is to provide an oral hygiene implement of the general character described which is relatively low in cost.

A further feature of the present invention is to provide an oral hygiene implement of the general character described which is well suited for efficient mass production fabrication.

Another consideration of the present invention is to provide an oral hygiene implement of the general character described which is effective for gingival stimulation.

To provide an oral hygiene implement of the general character described which reduces the potential for soft tissue injury is a further aspect of the present invention.

Another feature of the present invention is to provide an oral hygiene implement of the general character described which facilitates the removal of food particles from interproximal areas.

To provide an oral hygiene implement of the general character described which is effective for the removal of plaque and incipient calculus is a still further consideration of the present invention.

Yet a further aspect of the present invention is to provide an oral hygiene implement of the general character described having an interproximal brush with a planar fishbone array of graduated length bristles.

Yet another feature of the present invention is to provide an oral hygiene implement of the general character described having a grip which facilitates the effective positioning of both a tapered wedge and an interproximal brush.

A still further consideration of the present invention is to provide an oral hygiene implement of the general character described which is well suited for the removal of materia alba.

Other aspects, features and considerations in part will be obvious and in part will be pointed out hereinafter.

With these ends in view, the invention finds embodiment in the various combinations of elements, arrangements of parts and series of steps by which the aforesaid aspects, features and considerations and certain other aspects, features, and considerations are attained, all with reference to the accompanying drawings and the scope of which will be more particularly pointed out and indicated in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings in which is shown one of the various possible exemplary embodiments of the invention,

FIG. 1 is a top plan view of an oral hygiene implement constructed in accordance with and embodying the invention and illustrating a central grip having an interproximal brush

extending from one end and a tapered wedge extending from its other end,

FIG. 2 is a front elevational view of the oral hygiene implement showing an array of transverse trihedral ribs extending along a flank of the wedge,

FIG. 3 is an enlarged scale end view illustrating the tapered wedge and transverse trihedral ribs extending from opposed flanks of the wedge,

FIG. 4 is an enlarged scale side view of the interproximal brush end of the implement and illustrating an axial calamus and a planar array of integral bristles,

FIG. 5 is an enlarged scale partial view of a portion of the tapered wedge shown in FIG. 1 and better illustrating the transverse trihedral ribs, and

FIG. 6 is an enlarged scale sectional fragmentary perspective view through the tapered wedge, with the section being taken substantially along the line 6--6 of FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawings wherein like numerals have been employed to denote like components throughout, the reference numeral 10 denotes generally an oral hygiene implement constructed in accordance with and embodying the invention. The oral hygiene implement includes a central generally barrel shaped grip 12. Projecting axially from one end of the grip 12 is an interproximal brush 14, while a tapered wedge 16 extends axially from the opposite end of the grip 12. In accordance with the invention, the oral hygiene implement 10 is fabricated of one piece molded thermoplastic construction.

With attention now directed to FIG. 1, FIG. 2 and FIG. 4, it will be noted that the interproximal brush 14 includes an axial calamus 18 and a planar, substantially symmetrical

array 20 of flexible bristles. The array 20 of bristles lies substantially in a single plane 22. As best illustrated in FIG. 2, the array 20 is of a substantially fishbone or rhombus profile and includes leading and trailing bristles 24 having the shortest length, intermediate bristles 26, 28, 30 and 32 of progressively longer lengths and central bristles 34 of maximum length.

The calamus 18 has a length in the order of 10 – 15 mm. to facilitate complete extension through posterior interproximal spaces. Further, the trailing bristles 24 are spaced from the end of the grip 12 a distance of approximately 4mm. to 5mm. As such, substantially all of the bristles can traverse through a posterior interproximal space and engage lingual tooth surfaces.

The diameter of the calamus is in the order of 0.5 mm to 0.8 mm and preferably tapers from a grip end or base diameter of approximately 0.7 mm. to a tip diameter of approximately 0.5 mm, thus assuring passage through interproximal spaces.

The bristles 24 through 34 are soft and flexible and preferably have a thickness or diameter in the order of 0.2 mm and may taper from a diameter of 0.2 mm at the calamus 18 to 0.1 mm at their distal ends.

By way of example, each leading and trailing bristle 24 projects from the calamus 18 a distance of approximately 0.7mm while the central bristles 34 project from the calamus 18 a distance of approximately 1.7mm.

At the opposite end of the grip 12, the tapered wedge 16 is configured with a profile similar to that of a knife and projects from the end of the grip approximately 2 cm.

The wedge 16 includes a straight spine 38 having a curved peripheral surface, as

shown in FIG. 6. The curved surface reduces the tendency for gingival laceration, irritation, trauma, etc. The tapered wedge 16 includes a pair of sloped lateral flanks 40, 42, which intersect along a defined edge 44. The edge 44 slopes to a pointed tip 46, which constitutes the juncture of the edge 44 and the transversely curved spine 38.

As will be noted from an examination of FIG. 5 and FIG. 6, the maximum transverse width of the spine 38 extends slightly beyond the corresponding distance between the flanks 40, 42. Sloped shoulders 46, 48 extend outwardly from the bases of the flanks to the curved spine 38.

Pursuant to the invention, an array of transverse trihedral ribs 50 project from each of the flanks 40, 42. Each rib 50 is configured with a pair of tapered side walls 52, 54 which intersect along a scraping edge 56. The side panels 52, 54 of the trihedral ribs 50 extend from the flanks 40, 42 at points spaced from the edge 44. The trihedral ribs terminate at a base which is formed at a juncture with the shoulders 46, 48. The scraping edges 56 project laterally slightly beyond the width of the spine 38 at the base of the trihedral ribs.

Spacing between the trihedral ribs 50 is in the order of 0.8 mm which is preferably greater than the maximum width of the trihedral ribs 50, to provide ample area for the lodgment of scraped material such as, plaque, materia alba, pellicle, food debris and insipient calculus for removal from the oral cavity with the implement 10.

With attention now directed to FIG. 1 and FIG. 2, it should be noted that the grip 12 is generally cylindrical, except for a pair of parallel indented planar side panels 58, 60. The side panels 58, 60 lie in planes parallel to the axial plane 22. Accordingly, one may hold the

implement 10 with the side panels 58, 60 grasped between a thumb and forefinger and will know the orientation of the bristle array 20 and the tapered wedge 16 for insertion into an interproximal space without having to examine the implement or requiring a mirror.

It should also be noted that the tapered fishbone or rhomboid profile of the bristle array 20 assures that the shortest leading and trailing bristles 24 are the first to engage the interproximal space, followed by progressively larger bristles when insertion into the interproximal space as well as when withdrawing therefrom. Thus, the effort required for insertion and withdrawal is minimized while at the same time, the prospect of gingival injury is reduced.

At the tapered wedge 16, the reciprocal axial motion within an interproximal space results in successive spaced scraping edges 56 of the trihedral ribs 50 contacting and scraping opposed proximal surfaces defining the interproximal space and removing from such surfaces plaque, materia alba, food debris, etc. The scraped matter accumulates in the spaces between adjacent trihedral ribs.

While any of a number of thermoplastics may be utilized for injection molding the one-piece oral hygiene implement 10, it has been found that polyoxymethylene (POM) copolymer such as Tepcon M450 available from Polyplastics Taiwan Co., Ltd. is well suited for implementation in the present invention and assures adequate flexibility while maintaining the fine definitions of the interproximal bristles.

Thus it will be seen that there is provided an oral hygiene implement which achieves

the various aspects, features and considerations of the present invention and is well suited to meet the conditions of practical usage.

Since various possible embodiments might be made of the present invention and since various changes might be made in the exemplary embodiment set forth herein without departing from the spirit of the invention, is to be understood that all matter herein described or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described the invention, there is claimed as new and desired to be secured by Letters Patent:

1. An oral hygiene implement, the implement comprising a grip and an interproximal brush, the brush including an axial calamus and a planar array of bristles extending transversely therefrom, successive bristles of the array being of graduated lengths, the implement being unitarily formed of one piece molded thermoplastic construction.

2. An oral hygiene implement as constructed in accordance with claim 1 wherein the axial calamus includes a distal end, at least one bristle of the array being positioned adjacent the distal end, at least one other bristle of the array being spaced from the distal end, the bristles intermediate the at least one bristle and the at least one other bristle being of progressively longer lengths.

3. An oral hygiene implement as constructed in accordance with claim 2 wherein at least one further bristle of the array is positioned along the calamus between the at least one other bristle and the grip, the bristles of the array intermediate the one other bristle and the one further bristle being of progressively shorter lengths.

4. An oral hygiene implement as constructed in accordance with claim 3 wherein the bristles of the array extend in opposite directions from the calamus, whereby the array of bristles assumes a fishbone profile.

5. An oral hygiene implement as constructed in accordance with claim 1 wherein the bristles of the array include at least one first bristle positioned adjacent the distal end of the calamus and at least one last bristle spaced from the distal end of the calamus, the last

bristle being spaced from the grip a distance of between 4 mm and 5 mm, whereby substantially all bristles of the array can extend completely through posterior interproximal spaces and engage lingual tooth surfaces.

6. An oral hygiene implement as constructed in accordance with claim 1 wherein the implement is molded of polyoxymethylene copolymer.

7. An oral hygiene implement as constructed in accordance with claim 4 wherein the bristles of the array include at least one first bristle positioned adjacent the distal end of the calamus and at least one last bristle spaced from the distal end of the calamus, the last bristle being spaced from the grip a distance of between 4 mm and 5 mm, whereby substantially all bristles of the array can extend completely through posterior interproximal spaces and engage lingual tooth surfaces.

8. An oral hygiene implement as constructed in accordance with claim 1 further including a tapered wedge pick, the tapered wedge pick extending axially from the grip, the interproximal brush extending from one end of the grip and the tapered wedge extending from the other end of the grip.

9. An oral hygiene implement as constructed in accordance with claim 8 wherein the grip is generally cylindrical in shape.

10. An oral hygiene implement as constructed in accordance with claim 9 wherein the grip further includes a pair of parallel side panels, the side panels being planar.

11. An oral hygiene implement as constructed in accordance with claim 8 wherein the tapered wedge pick includes a spine and a pair of sloped lateral flanks extending from the

spine, the flanks intersecting one another along an edge, the edge intersecting the spine at a pointed tip, the tapered wedge pick further including an array of transverse ribs projecting from each of the flanks, each rib including a scraping edge for engagement against proximal tooth surfaces.

12. An oral hygiene implement as constructed in accordance with claim 11 wherein each rib is configured with a pair of tapered side walls which intersect to define the scraping edge.

13. An oral hygiene implement as constructed in accordance with claim 11 wherein the spine includes a transversely curved peripheral surface, whereby gingival irritation is reduced.

14. An oral hygiene implement comprising a molded thermoplastic tapered wedge, the wedge including a spine, a pair of sloped lateral flanks extending from the spine, the flanks intersecting along an edge, the edge intersecting the spine at a pointed tip, an array of transverse trihedral ribs projecting from each of the flanks, each rib including a scraping edge for engagement against proximal tooth surfaces.

15. An oral hygiene implement as constructed in accordance with claim 14 wherein the spine includes a transversely curved peripheral surface, whereby gingival irritation is reduced.

16. An oral hygiene implement as constructed in accordance with claim 14 further including a sloped shoulder extending from each lateral flank to the spine.

17. An oral hygiene implement as constructed in accordance with claim 14 wherein each transverse trihedral rib includes a base, the scraping edges at the bases of

opposed transverse trihedral ribs extending transversely beyond the flanks a distance greater than the width of the spine.

18. A method of interproximal prophylaxis, the method comprising the steps of:

a) providing a molded thermoplastic pick having a flank and an array of spaced transverse ribs extending from the flank, with each rib having a scraping edge,

b) inserting the pick into an interproximal space, and

c) contacting an interproximal tooth surface with successive scraping edges of the array by axially moving the pick with a reciprocal motion.

19. A method of interproximal prophylaxis in accordance with claim 18 wherein the pick further includes an interproximal brush having an axial calamus and a planar array of bristles, with successive bristles of the array being of graduated lengths, the method comprising the further steps of:

d) axially registering the calamus with an interproximal space and

e) contacting interproximal surfaces with successive bristles of graduated lengths by moving the pick in a lingual direction.

20. A method of interproximal prophylaxis in accordance with claim 18 wherein steps d) and e) are performed prior to steps b) and c).

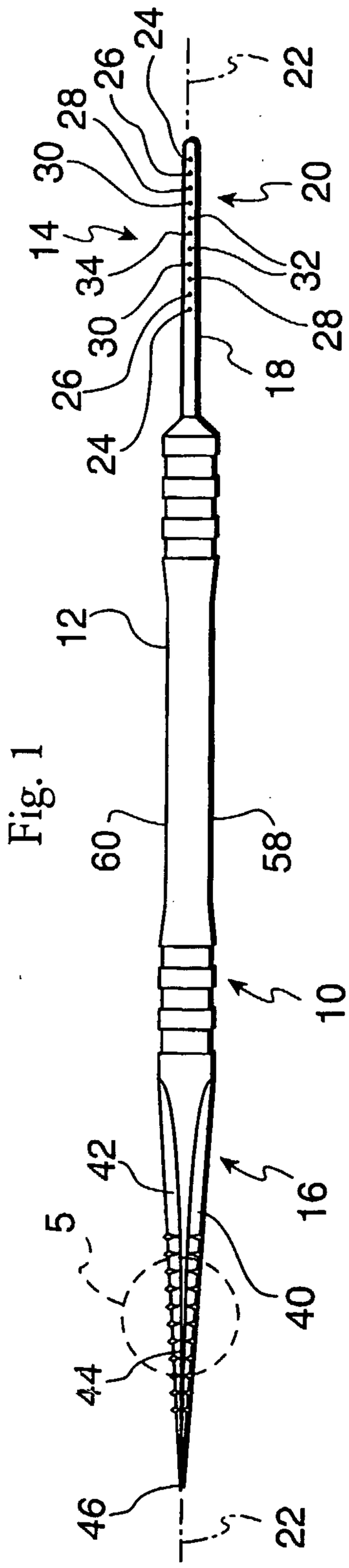

Fig. 1

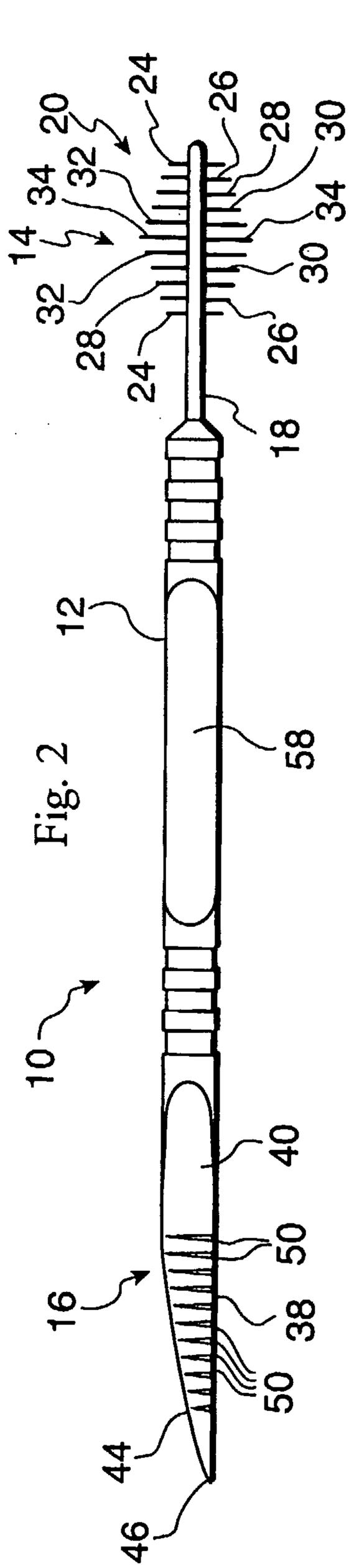

Fig. 2

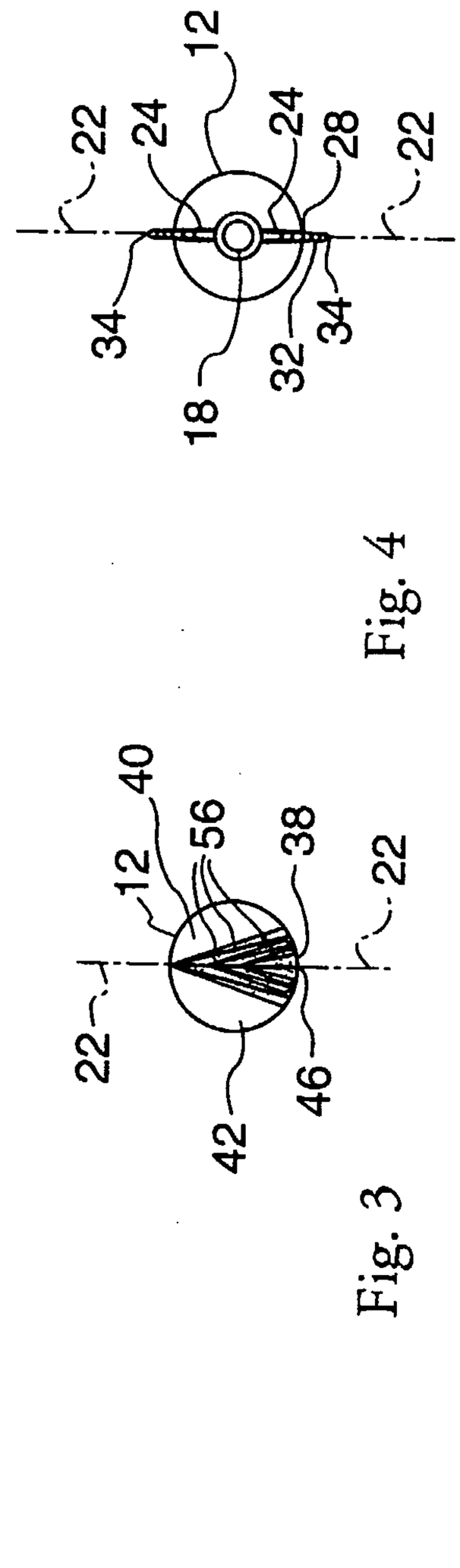

Fig. 4

Fig. 3

Fig. 5

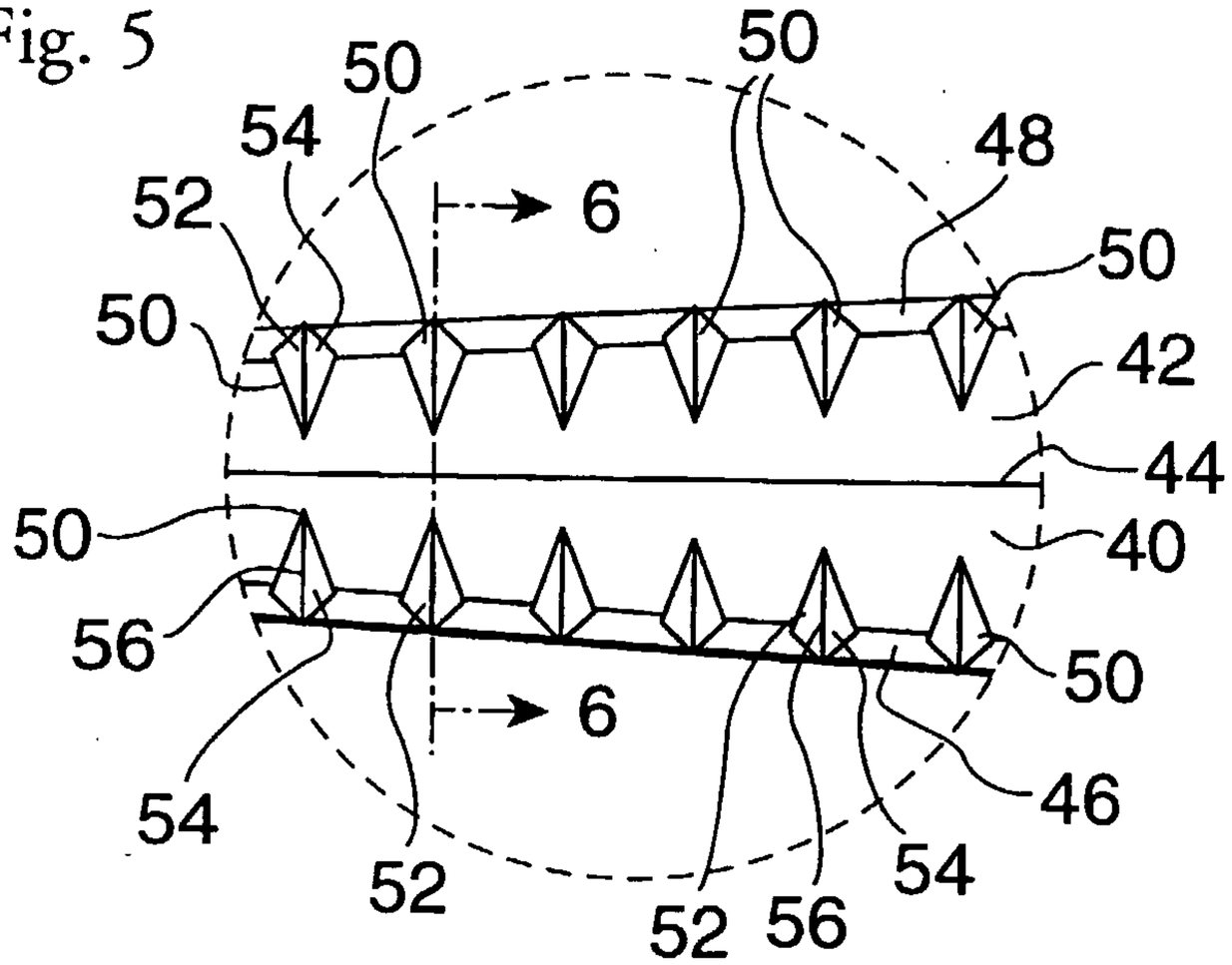
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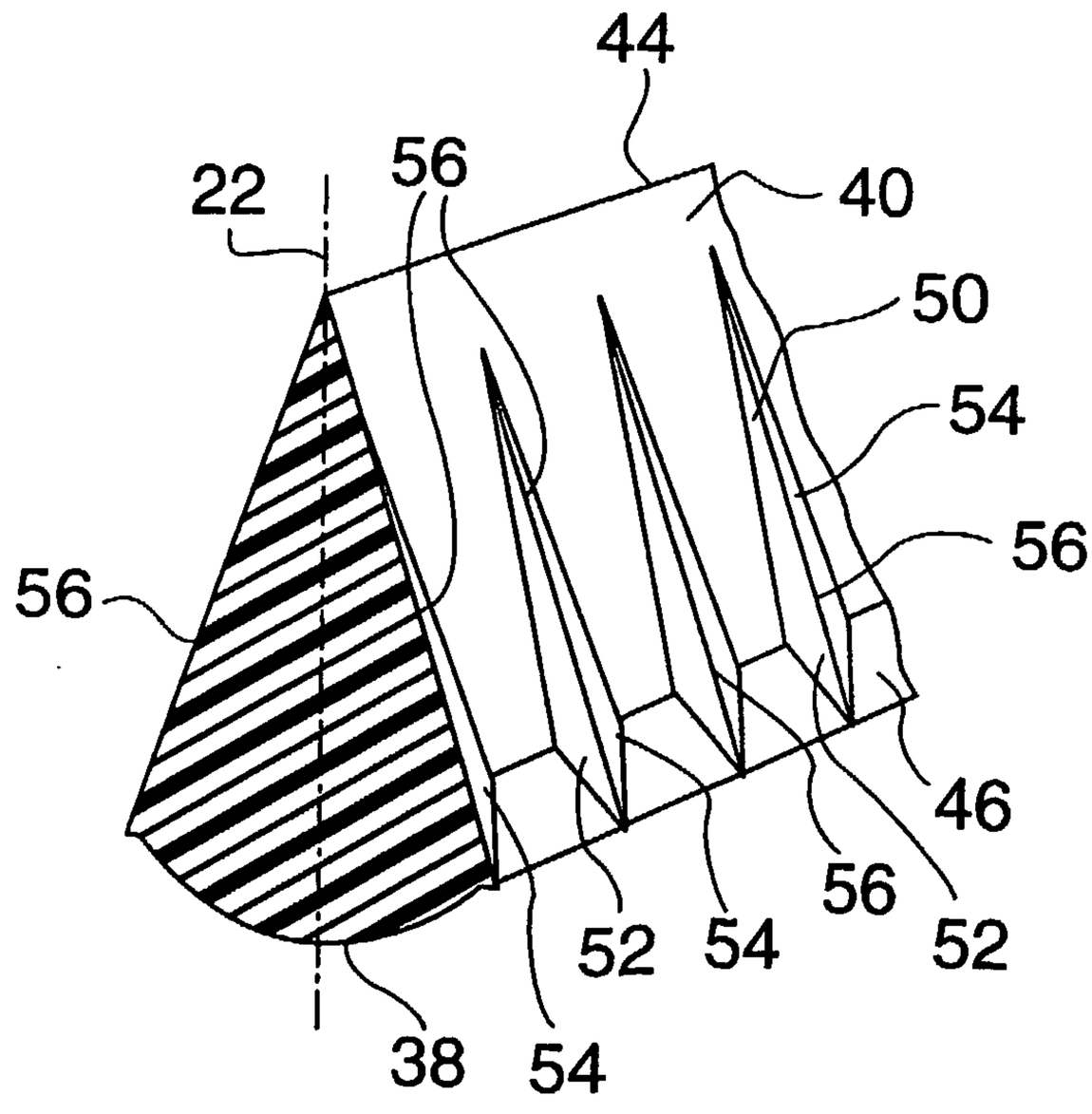
Fig. 6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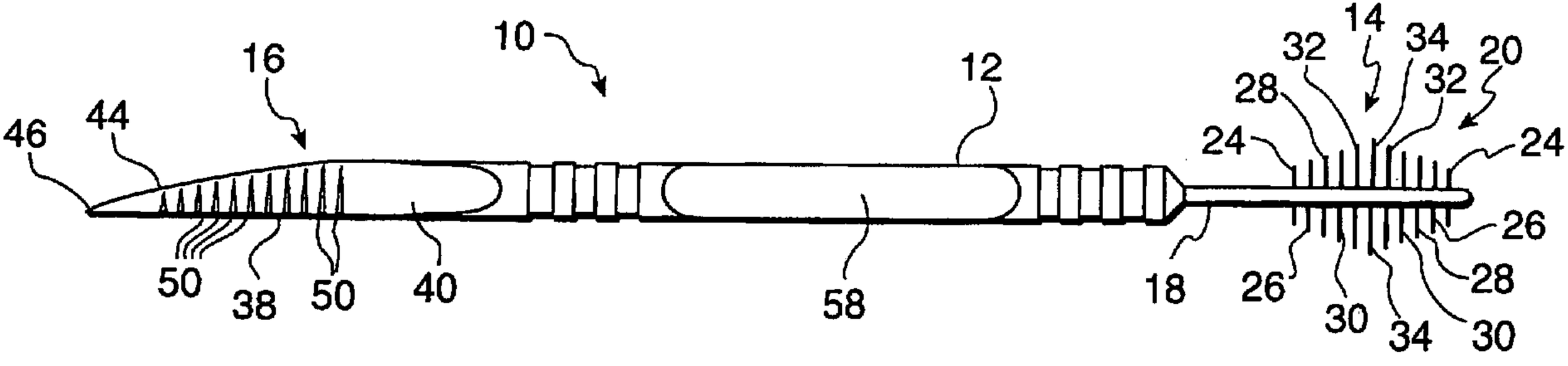
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