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(54) **ANIMAL TOOTH BRUSH**

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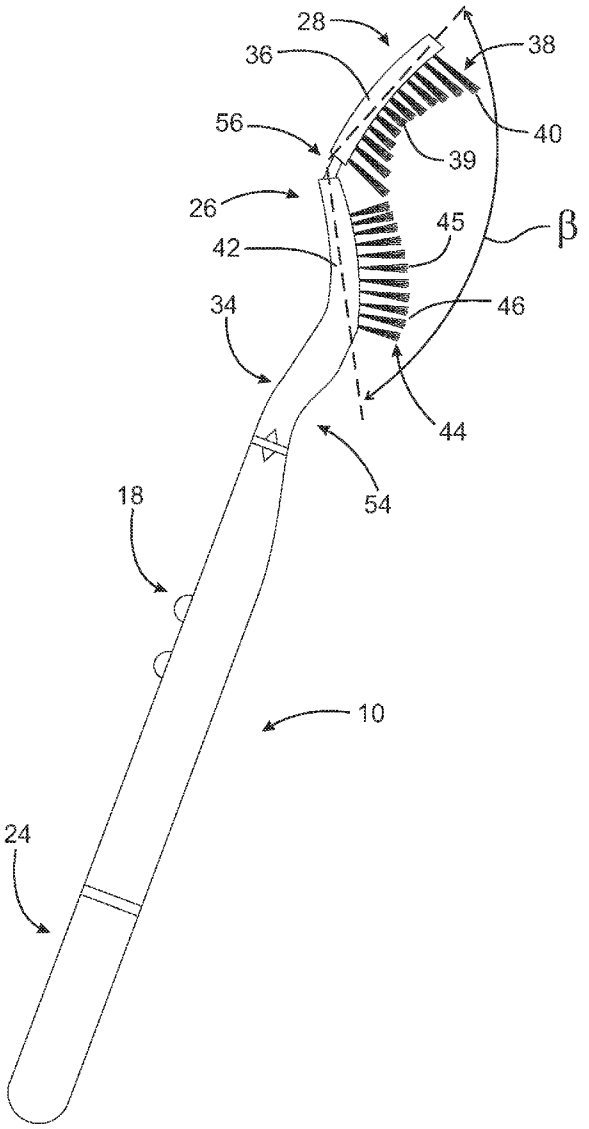
(57) **ABSTRACT**

A tooth cleaning apparatus adapted to clean a set of teeth of an animal. The apparatus includes a handle portion having a vibration inducer, a controller for the vibration inducer and a power source, wherein the handle is arranged to enclose the vibration inducer, the controller and the power source. The apparatus further includes a head portion having a brush segment including at least two brush heads, each of the at least two brush heads has a plurality of brushes adapted to simultaneously clean a quadrant of the set of teeth, a distal brush head of the at least two brush heads has a concave plurality of brushes and a proximal brush head of the at least two brush heads has a convex plurality of brushes.



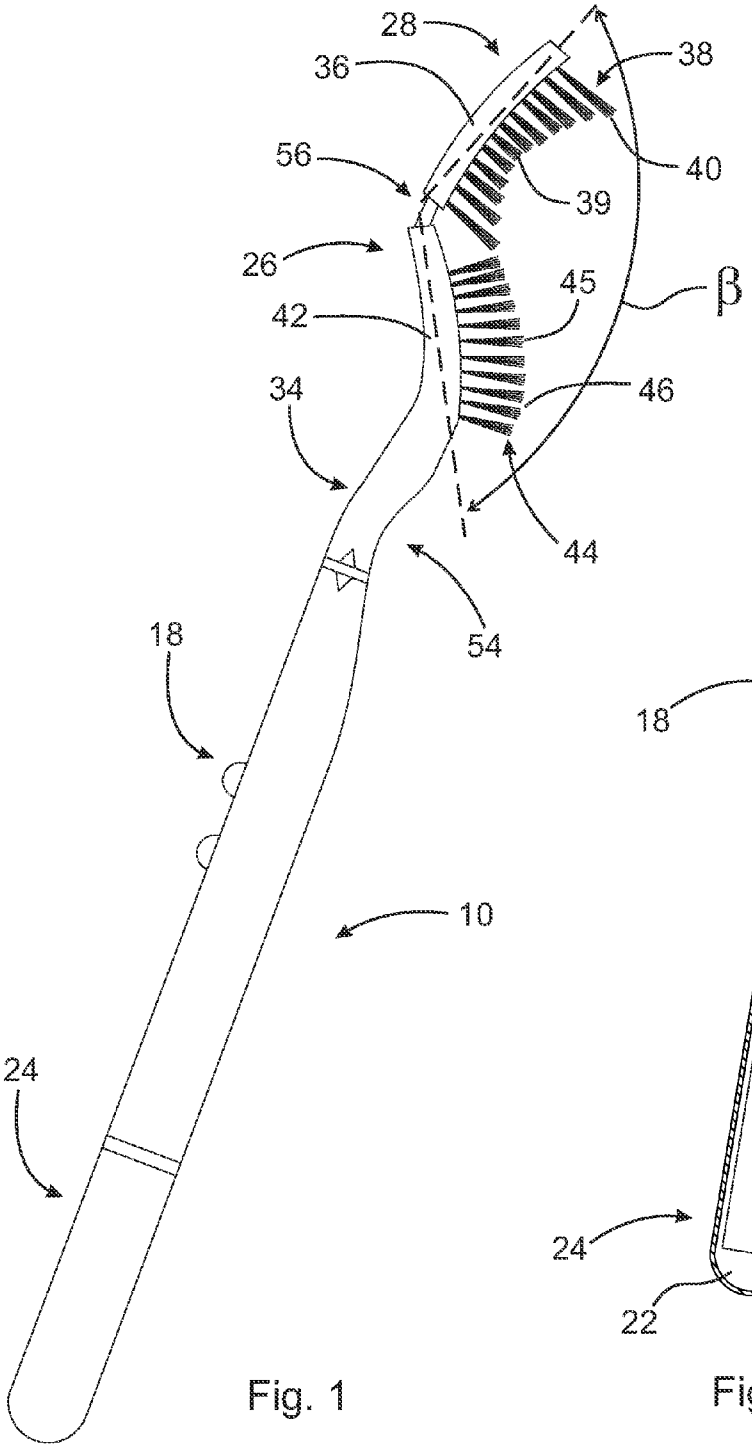


Fig. 1

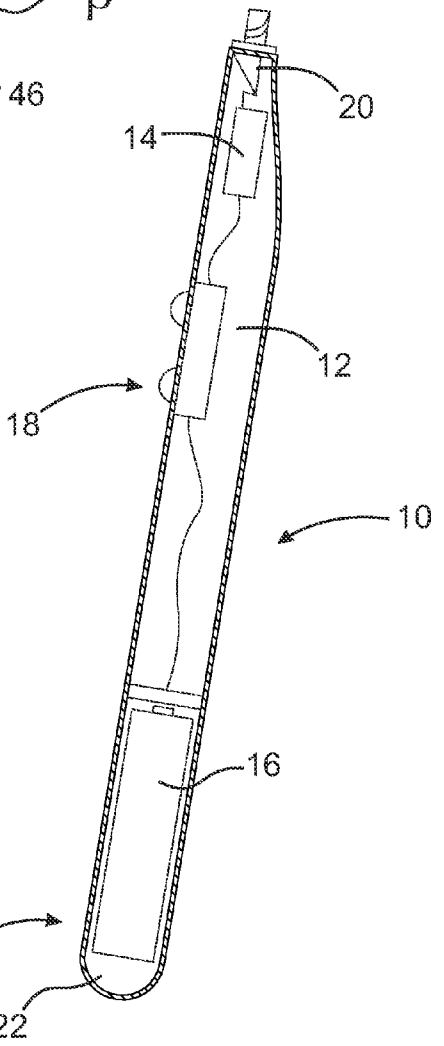


Fig. 2

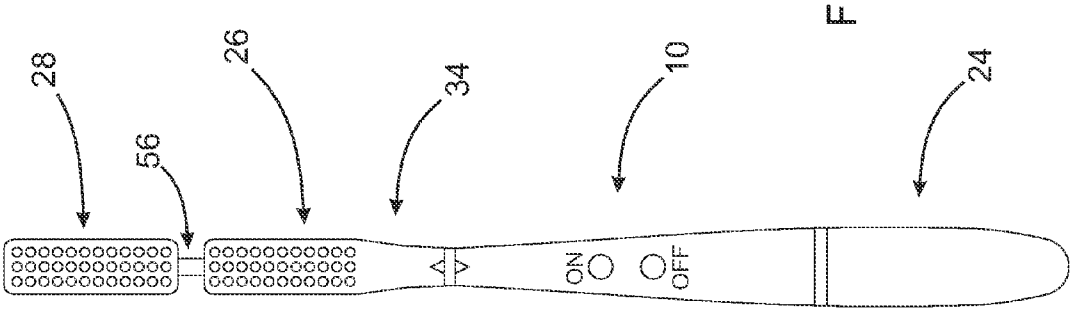


Fig. 4

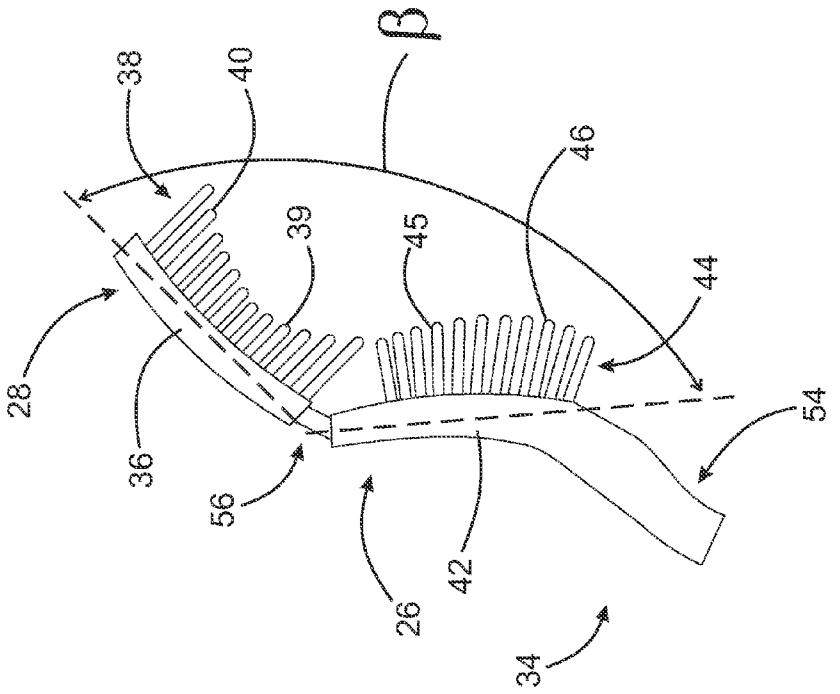


Fig. 3

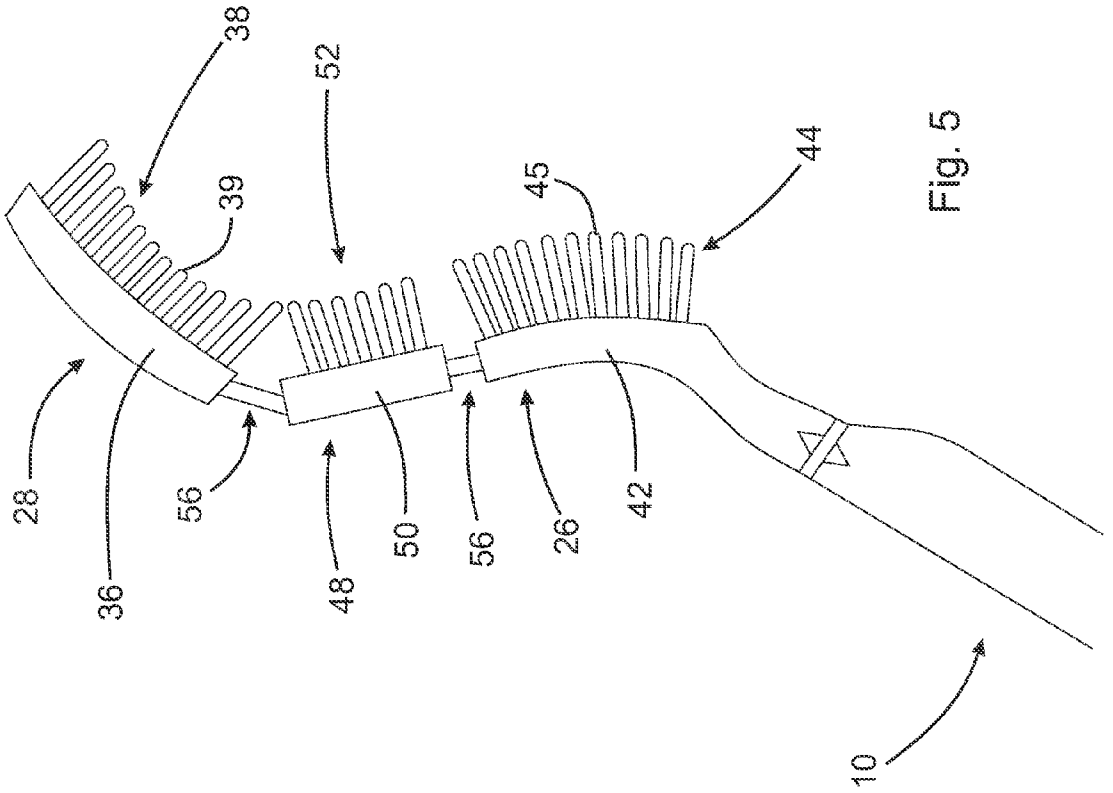


Fig. 5

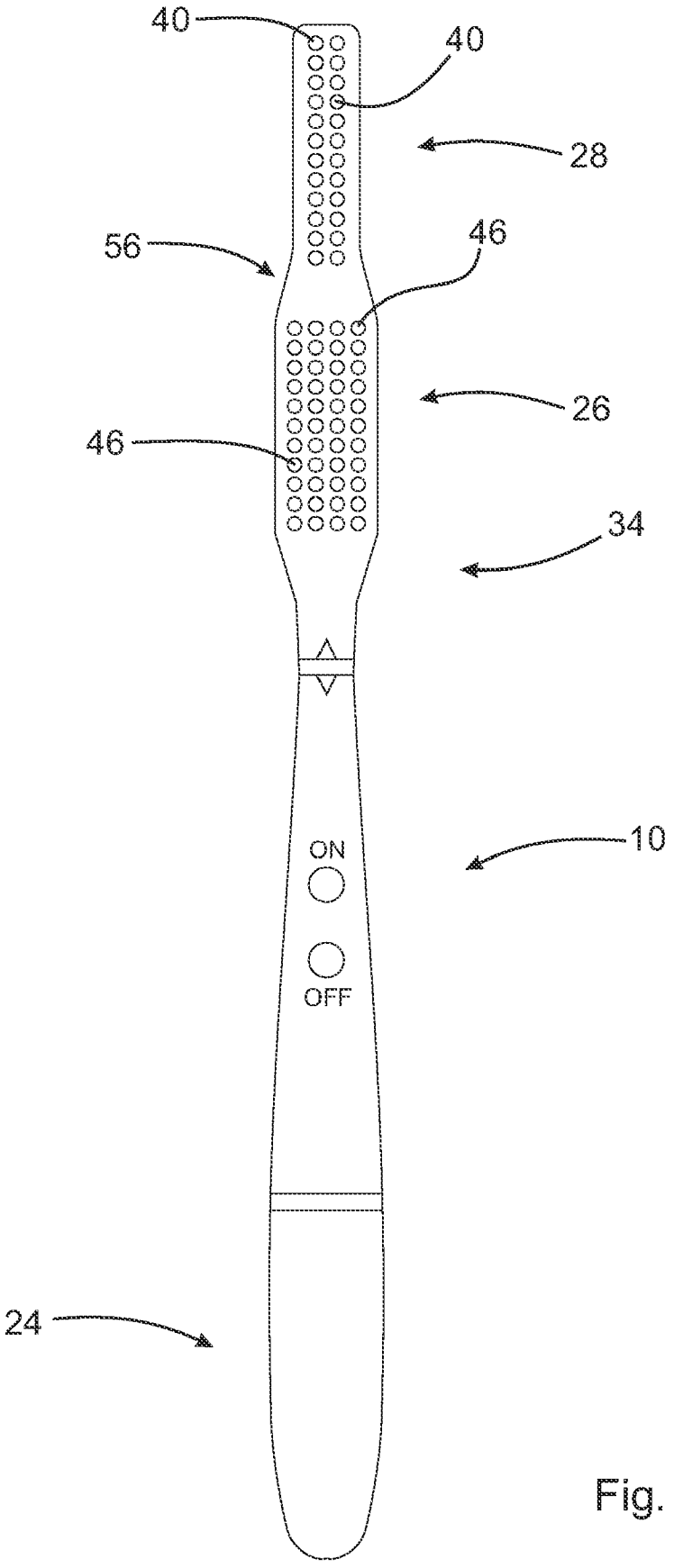


Fig. 6

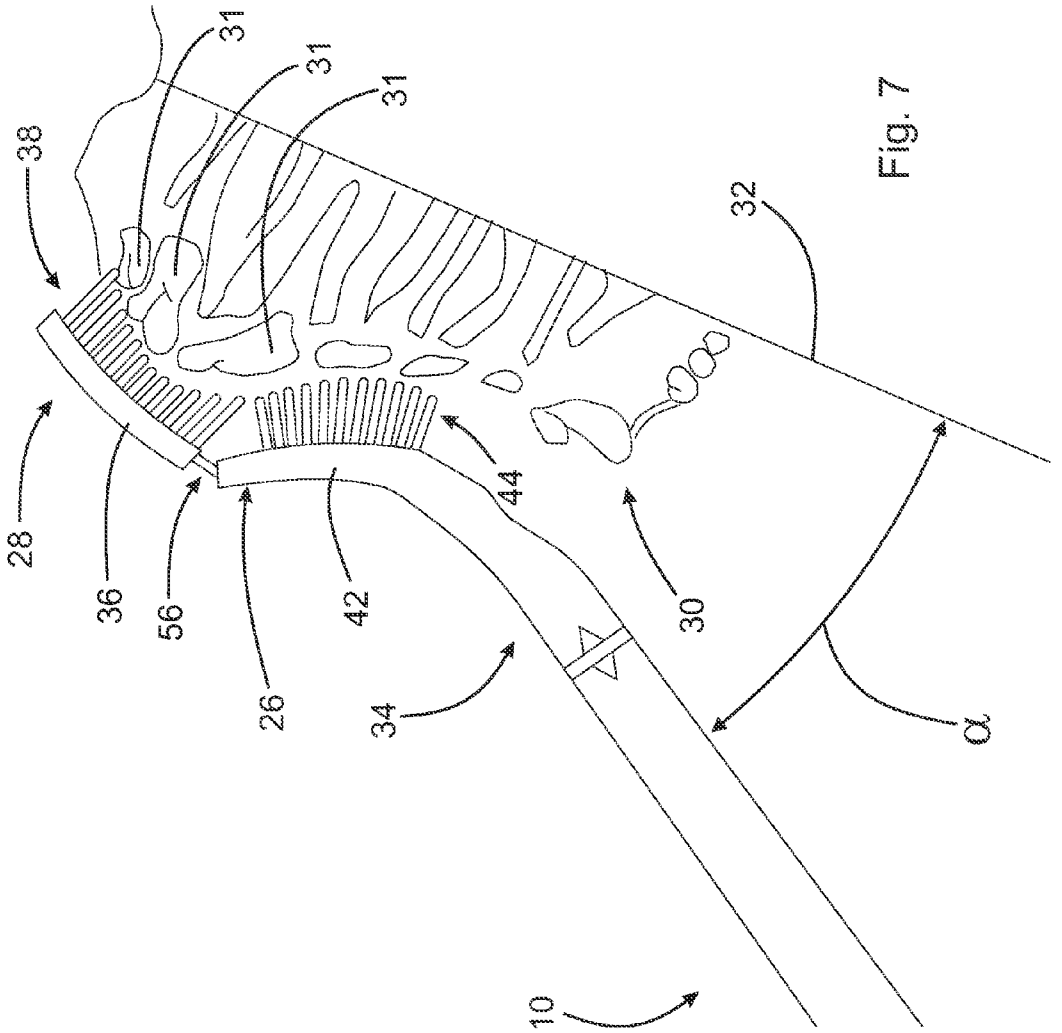


Fig. 7

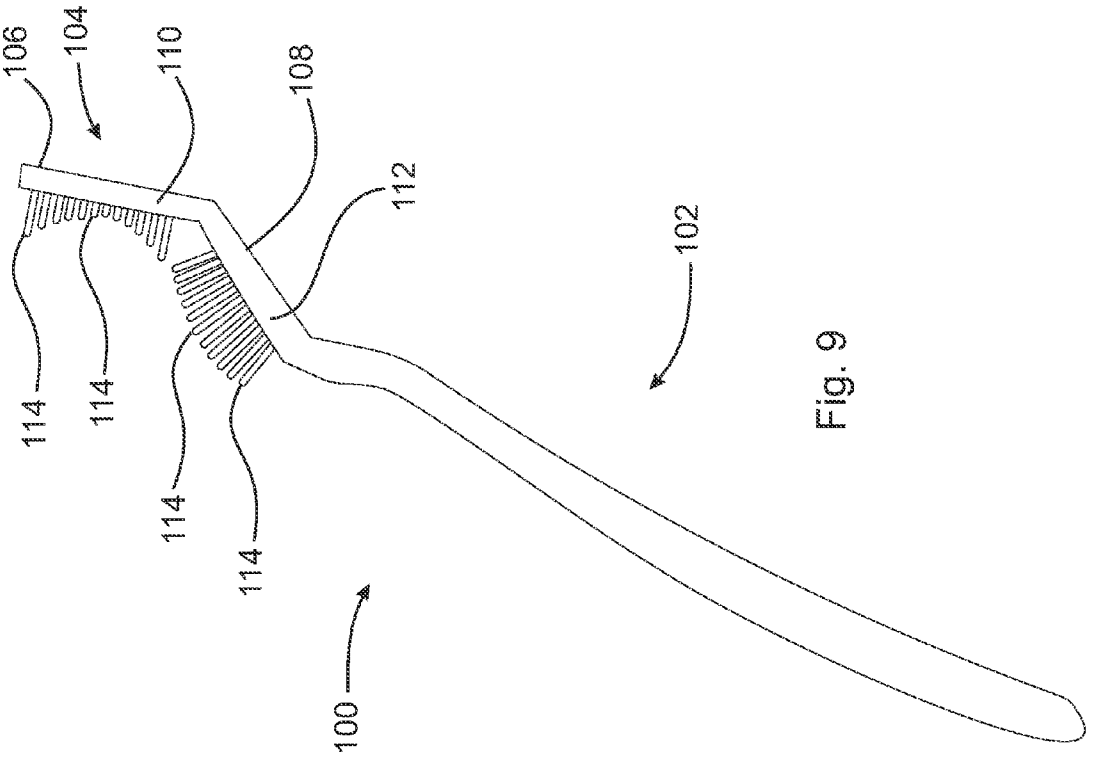

106
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Fig. 9

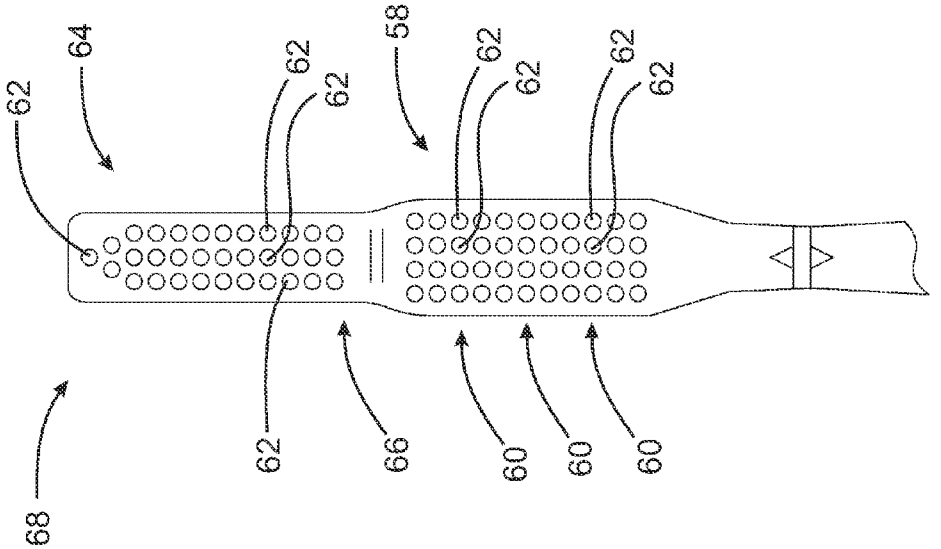
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Fig. 8

ANIMAL TOOTH BRUSH

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims the benefit under 35 U.S.C. §119(e) of U.S. Provisional Patent Application No. 61/380,425, filed Sep. 7, 2010, which application is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The invention broadly relates to veterinary tooth brushes, more specifically to a veterinary tooth brush having a plurality of brush heads, and even more particularly to a veterinary tooth brush with two or more brush heads arranged in series to simultaneously clean a quadrant of a set of teeth of an animal.

BACKGROUND OF THE INVENTION

[0003] Regular brushing of the teeth is important in maintaining the oral and general health of humans and animals alike. Plaque accumulates on the surfaces of dogs' and cats' teeth in the same manner as in humans. Some distinct differences do occur though. For instance, the tongue side of a dog's teeth is self-cleansing. Actions such as chewing and panting remove plaque on the inner surfaces of the teeth. Consequently, these surfaces do not need to be cleaned routinely by the owner. Also, often only the cheek side surfaces are available to be cleaned as the tongue sides are difficult to access. Further, plaque accumulates at different rates and concentrations in different areas of the mouth. The maxillary teeth in the back of the mouth near the cheek side salivary glands accumulate plaque the fastest and the canine teeth, also known as the fangs, accumulate minimal plaque. The upper back molars are the most important teeth for breaking down food, whereas the canine teeth are used only for tearing. In addition, the maxillary teeth for a dog and cat are not arranged in a general arch form as in humans. The back most teeth are inset with respect to the teeth in front of them creating an S-shaped arrangement of the maxillary teeth. Finally, there is tremendous variation in the size of canine jaws. The size differences can be divided into three groups, i.e., small, medium and large. The importance of daily home oral care for animals has been well documented. There has been a long-felt need for an animal tooth brush that is effective in reaching the plaque prone teeth and is user-friendly for the pet owner.

[0004] Many devices have been created in an attempt to facilitate effective and proper cleaning of teeth, for example, U.S. Pat. Nos. 4,031,587; 4,738,001; 5,570,487; 5,791,007; 6,807,703; and, 7,383,603. Each of the devices disclosed in these patents suffers from defects and/or shortcomings that render them ineffective, such as complexity of design, improper angulation, insufficient force protection, etc. Thus, each device fails to meet the needs and constraints described above.

BRIEF SUMMARY OF THE INVENTION

[0005] The present invention is a tooth brush which assists a person in brushing an animal's teeth. In an embodiment, the present invention broadly comprises a tooth cleaning apparatus adapted to clean a set of teeth of an animal. The apparatus includes a handle portion having a vibration inducer, a controller for the vibration inducer and a power source, wherein the handle is arranged to enclose the vibration inducer, the controller and the power source. The apparatus further includes a head portion having a brush segment including at least two brush heads, each of the at least two brush heads has a plurality of brushes adapted to simultaneously clean the set of teeth, e.g., a quadrant of teeth. A distal brush head of the at least two brush heads has a plurality of brushes forming a concave surface and a proximal brush head of the at least two brush heads has a plurality of brushes forming a convex surface. In some embodiments, the handle portion is angled with respect to the surface of the brushes such that as the at least two brush heads are applied to the set of teeth, the handle portion is angled away from a midline of the animal's mouth by an angle of approximately 30-45 degrees. This arrangement protects the user from getting bitten by the animal. In some embodiments, the handle portion has a general ergonomic shape to conform to the user's hand.

[0006] In some embodiments, the head portion includes a neck portion and the at least two brush heads. The at least two brush heads include a proximal brush head, i.e., closest to handle portion, and a distal brush head, i.e., furthest from the handle portion. The head portion is detachable from the handle, for example, by a simple twisting motion. The head portion includes at least two discreet brush heads attached to each other. In some embodiments, the proximal brush head is curvilinear outward, i.e., convex, and the distal brush head is curvilinear inward, i.e., concave. In addition to the curvilinear orientation, the distal brush head is held at an angle with respect to the proximal brush head. This is to conform to the S-shaped arrangement of the animal's posterior teeth. The distal brush head may be attached to the proximal brush head through a variety of connection types, e.g., a flexible, semi-flexible or rigid connection. This connection keeps the distal brush head at an angle with respect to the proximal brush head, i.e., a rest state angle. In some embodiments, with pressure, the distal brush head can open to an angle wider than the rest state angle relative to the proximal brush head. In some embodiments, each brush head is made of a plastic material with ultra soft nylon bristles to accommodate the sensitive gingival tissues of the animal. The brush heads, individually and/or in combination, may be made in different sizes, e.g., small, medium, and large, to account for the different jaw sizes of different breeds.

[0007] In an embodiment, the present invention broadly comprises a tooth cleaning apparatus adapted to clean a set of teeth of an animal. The apparatus includes a handle portion and a head portion. The head portion includes a brush segment having at least two brush heads. Each of the at least two brush heads includes a plurality of brushes adapted to simultaneously clean a quadrant of the set of teeth. A distal brush head of the at least two brush heads includes a concave plurality of brushes and a proximal brush head of the at least two brush heads includes a convex plurality of brushes.

[0008] In an embodiment, the present invention broadly comprises a brush head for a tooth brush. The brush head includes a brush segment having at least two brush heads. Each of the at least two brush heads includes a plurality of brushes adapted to simultaneously clean a quadrant of a set of teeth. A distal brush head of the at least two brush heads includes a concave plurality of brushes and a proximal brush head of the at least two brush heads includes a convex plurality of brushes.

[0009] It is a general object of the present invention to provide an animal tooth brush which facilitates the efficient and effective cleaning of an animal's set of teeth.

[0010] It is another general object of the present invention to provide an animal tooth brush which is safe to use so that chances of injury to both the animal and the tooth brush user are minimized.

[0011] These and other objects and advantages of the present invention will be readily appreciable from the following description of preferred embodiments of the invention and from the accompanying drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The nature and mode of operation of the present invention will now be more fully described in the following detailed description of the invention taken with the accompanying drawing figures, in which:

[0013] FIG. **1** is a side elevational view of an embodiment of a present invention tooth brush showing the angles of the brush heads with respect to each other and with respect to the handle;

[0014] FIG. **2** is a side elevational view of the handle portion of the tooth brush of FIG. **1** with the head portion removed showing the internal orientation of the motor and battery with the handle portion, and the locking connection between the handle portion and head portion;

[0015] FIG. **3** is a side elevational view of the head portion of the tooth brush of FIG. **1** showing the angular orientation of the brush heads having a flexible connection therebetween;

[0016] FIG. **4** is a front plan view of the present invention tooth brush of FIG. **1** showing an on/off switch and placement of a connection for the detachable head portion;

[0017] FIG. **5** is a side elevational view of an embodiment of a present invention head portion showing a three brush head arrangement having flexible connections therebetween;

[0018] FIG. **6** is a front plan view of an embodiment of a present invention head portion showing two brush heads with each brush head having a different width and different number of columns of brushes;

[0019] FIG. **7** is a top plan view showing a present invention animal tooth brush in use and further showing the angular relationship between the present invention tooth brush and a midline of an animal's jaw;

[0020] FIG. **8** is a front plan view of an embodiment of a present invention head portion showing two brush heads with each brush head having a varying number of columns of brushes along the length of each of the two brush heads; and,

[0021] FIG. **9** is an embodiment of a present invention animal tooth brush.

DETAILED DESCRIPTION OF THE INVENTION

[0022] At the outset, it should be appreciated that like drawing numbers on different drawing views identify identical, or functionally similar, structural elements of the invention. While the present invention is described with respect to what is presently considered to be the preferred aspects, it is to be understood that the invention as claimed is not limited to the disclosed aspects.

[0023] Furthermore, it is understood that this invention is not limited to the particular methodology, materials and modifications described and as such may, of course, vary. It is also understood that the terminology used herein is for the purpose of describing particular aspects only, and is not intended to limit the scope of the present invention, which is limited only by the appended claims.

[0024] Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood to one of ordinary skill in the art to which this invention belongs. Although any methods, devices or materials similar or equivalent to those described herein can be used in the practice or testing of the invention, the preferred methods, devices, and materials are now described.

[0025] Adverting now to the figures, FIG. **1** shows an embodiment of a present invention animal tooth brush. The present invention toothbrush handle portion **10** comprises hollow plastic compartment **12** containing motor **14**, battery **16** and switch or controller **18**. Motor **14** has offset or asymmetric mass **20** which creates vibration while motor **14** is operating, i.e., induces vibration. In some embodiments, the vibration inducer is vibrationally isolated from the handle by surrounding the vibration inducer with a resilient material such as silicone. Battery **16** is housed in chamber **22** accessible by unscrewing terminal end **24** of the handle portion **10**. Battery **16** may be a primary battery, i.e., non-rechargeable, or a secondary battery, i.e., rechargeable. Switch **18** comprises an "ON" button and separate "OFF" button; however, one of ordinary skill in the art will appreciate that other switch configurations are also possible, and such variations are within the scope of the claimed invention. The overall dimensions of handle portion **10** are arranged to comfortably fit within the hand of a user, e.g., 12 centimeters in length and 2 centimeters in diameter. Handle portion **10** may be made of conventional materials in tooth brush manufacturing, for example, plastics.

[0026] Handle portion **10** is angled with respect to the at least two brush heads, e.g., brush heads **26** and **28**, such that as brush heads **26** and **28** are applied to teeth **30**, in particular, back molars **31**, handle portion **10** is angled away from midline **32** of the animal's head by an angle α, wherein α may be between 30-45 degrees (See FIG. **7**). This is so that the most distal brush head, i.e., brush head **28**, can more easily reach around to brush the back most teeth. Also, this arrangement provides protection against the animal biting the user's hand while cleaning its teeth. It should be appreciated that angles larger than 45 degrees may also be used, and such variations are within the scope of the claimed invention.

[0027] Head portion **34** comprises at least two brush heads, e.g., distal brush head **28** and proximal brush head **26**. Distal brush head **28** has backing member **36** which is curvilinear inwards such that brushes **38** made up of bristles **39** form a concave shape. Backing member **36** may be formed from any material known in the art, e.g., plastic, while bristles **39** may be formed from nylon material. Moreover, in some embodiments, backing member **36** may be linear, and such variations are within the scope of the claimed invention. In some embodiments, brush head **28** is narrow with respect to proximal brush head **26**, being only wide enough for two columns of bristle tufts **40**. Moreover, distal brush head **28** is angled inward with respect to proximal brush head **26**, i.e., angle β. Inward angle β may take a variety of values, e.g., approximately 120 degrees. Proximal brush head **26** comprises backing member **42** that is curvilinear outward so that brushes **44** made up of bristles **45** form a convex shape. Backing member **42** may be formed from any material known in the art, e.g., plastic, while bristles **45** may be formed from nylon material. Moreover, in some embodiments, backing member **42** may be linear, and such variations are within the scope of the claimed

invention. In some embodiments, proximal brush head **26** is wider than distal brush head **28** allowing for four columns of brushes **46**. Proximal and distal brush heads **26** and **28**, respectively, are arranged in series forming a relaxed "S" or "Z" shape. This is designed to conform to the "S" shape of the animal's row of teeth. It should be appreciated that regardless of the shape of backing members **36** and **42**, each of proximal brush head **26** and distal brush head **28** form curved surfaces, e.g., convex and concave, respectively. It should be further appreciated that the shapes of the proximal and distal brush heads may vary, e.g., both are convex, both are concave, or the proximal brush head is concave while the distal brush head is convex.

[0028] In some embodiments, a third intermediate brush head, e.g., brush head **48**, is affixed between proximal and distal brush heads **26** and **28**, respectively. In some embodiments, brush head **48** has a straight backing member, e.g., backing member **50**, and is wide enough to house 2-4 columns of brushes **52**. In other embodiments, brush head **48** is curvilinear inward or curvilinear outward. Brush head **48** may be rigidly, semi-flexibly or flexibly affixed between proximal and distal brush heads **26** and **28**, respectively.

[0029] Proximal brush head **26** is continuous with neck **54** of head portion **34**. Distal brush head **28** is affixed to proximal brush head **26** by connecting member **56**. In some embodiments, connecting member **56** is formed from a flexible material, while in other embodiments connecting member **56** is formed from a semi-flexible material and in still yet other embodiments, connecting member **56** is formed from a rigid material. This material, may be made of a thermoplastic elastomer, which in its relaxed state maintains distal brush head **28** at an angle with respect to proximal brush head **26**. With mild pressure, e.g., 2-4 Newtons, the connecting member **56** can extend thereby opening the angle to a larger angle. As the operator moves the brush along the teeth towards the front of the mouth, distal brush head **28** is allowed to flex and extend with respect to proximal brush head **26** thereby riding along the contours of the teeth. Depending on the force desired to alter the angle between the proximal and distal brush heads, a flexible or semi-flexible material may be used, i.e., the less force desired the more flexible the material.

[0030] In some embodiments, distal brush head **28** is solidly affixed to proximal brush head **26** and substantially no flexion/extension is possible. The fixed angle may be obtuse, e.g., 120 degrees.

[0031] In some embodiments, the bristles of both proximal and distal brush heads **26** and **28**, respectively, are made of nylon. The diameter may be 0.003-0.006 inches. Thus, such bristles will be in the "soft" range. The bristles are on average approximately 10 millimeters in length; however, the bristle lengths may vary depending on the desired surface curvature of the brush head.

[0032] In some embodiments, the distal and proximal brush heads comprise different numbers of brushes. For example, as shown in FIG. **8**, proximal brush head **58** comprises rows of brushes **60** where each row of brushes **60** comprises four brushes **62**, while distal brush head **64** comprises rows of brushes **60** where each row of brushes **60** comprises a varying number of brushes **62** along the length of distal brush head **64**. In other words, at first end **66** of distal brush head **64** there are three brushes **62** in each row of brushes, while at second end **68** of distal brush head **64** there is one brush **62** in the last row of brushes. Some of the rows of brushes between first end **66** and second end **68** of distal brush head **64** comprise two brushes **62**. It should be appreciated that other configurations of brushes are also possible, e.g., an alternating pattern of two brushes **62** and three brushes **62**, and such variations are within the scope of the claims. Furthermore, it should be appreciated that each brush **60** and **62** is formed by a plurality of bristles, e.g., nylon bristles.

[0033] In some embodiments, the present invention tooth brush is manual, i.e., having no motor, switch or battery. The head portion is substantially the same as the above described embodiments, e.g., with or without the flexible material between the plurality of brush heads. An embodiment of such a tooth brush is shown in FIG. **9**. Tooth brush **100** comprises handle portion **102** and head portion **104**. Handle portion **102** may take a variety of forms, e.g., linear, ergonomic, enlarged, etc., and such variations are within the scope of the claims. Head portion **104** may be integral with handle portion **102**, or alternatively, may be releasably secured to handle portion **102**, as described above. Head portion **104** comprises distal brush head **106** and proximal brush head **108**. As shown in FIG. **9**, distal brush head **106** and proximal brush head **108** may comprise substantially linear backing members **110** and **112**, respectively. Thus, the S-shaped arrangement of brushes **114** is formed by varying the lengths of brushes **114** such that the brushes collectively they form an S-shape.

[0034] Thus, it is seen that the objects of the present invention are efficiently obtained, although modifications and changes to the invention should be readily apparent to those having ordinary skill in the art, which modifications are intended to be within the spirit and scope of the invention as claimed. It also is understood that the foregoing description is illustrative of the present invention and should not be considered as limiting. Therefore, other embodiments of the present invention are possible without departing from the spirit and scope of the present invention.

What I claim is:

1. A tooth cleaning apparatus adapted to clean a set of teeth of an animal, the apparatus comprising:

a handle portion comprising a vibration inducer, a controller for the vibration inducer and a power source, wherein the handle is arranged to enclose the vibration inducer, the controller and the power source; and,

a head portion comprising a brush segment having at least two brush heads, each of the at least two brush heads comprises a plurality of brushes adapted to simultaneously clean a quadrant of the set of teeth, a distal brush head of the at least two brush heads comprises a concave plurality of brushes and a proximal brush head of the at least two brush heads comprises a convex plurality of brushes.

2. The tooth cleaning apparatus of claim **1** wherein the distal brush head comprises at least one column of brushes and the at least one column of brushes comprise nylon bristle tufts.

3. The tooth cleaning apparatus of claim **1** wherein the proximal brush head comprises at least one column of brushes and the at least one column of brushes comprise nylon bristle tufts.

4. The tooth cleaning apparatus of claim **1** wherein the vibration inducer is vibrationally isolated from the handle.

5. The tooth cleaning apparatus of claim **1** wherein the vibration inducer comprises a motor arranged to rotate an asymmetric mass.

6. The tooth cleaning apparatus of claim **1** wherein the controller for the vibration inducer comprises an on/off switch.

7. The tooth cleaning apparatus of claim **1** wherein the power source comprises at least one primary battery or at least one secondary battery.

8. The tooth cleaning apparatus of claim **1** wherein the set of teeth of the animal comprise back molars and the handle portion forms an angle of at least thirty degrees relative to a midline of a mouth of the animal as the at least two brush heads are applied to the back molars.

9. The tooth cleaning apparatus of claim **1** wherein the set of teeth of the animal comprise back molars and the handle portion forms an angle of at least forty degrees relative to a midline of a mouth of the animal as the at least two brush heads are applied to the back molars.

10. The tooth cleaning apparatus of claim **1** wherein the at least two brush heads form a generally S-shape.

11. The tooth cleaning apparatus of claim **1** wherein the brush segment comprises a flexible member arranged between the at least two brush heads, a semi-flexible member arranged between the at least two brush heads or a rigid member arranged between the at least two brush heads.

12. The tooth cleaning apparatus of claim **1** wherein the head portion is releasably secured to the handle portion.

13. A tooth cleaning apparatus adapted to clean a set of teeth of an animal, the apparatus comprising:

a handle portion; and,

a head portion comprising a brush segment having at least two brush heads, each of the at least two brush heads comprises a plurality of brushes adapted to simultaneously clean a quadrant of the set of teeth, a distal brush head of the at least two brush heads comprises a concave plurality of brushes and a proximal brush head of the at least two brush heads comprises a convex plurality of brushes.

14. The tooth cleaning apparatus of claim **13** wherein the distal brush head comprises at least one column of brushes and the at least one column of brushes comprise nylon bristle tufts.

15. The tooth cleaning apparatus of claim **13** wherein the proximal brush head comprises at least one column of brushes and the at least one column of brushes comprise nylon bristle tufts.

16. The tooth cleaning apparatus of claim **13** wherein the set of teeth of the animal comprise back molars and the handle portion forms an angle of at least thirty degrees relative to a midline of a mouth of the animal as the at least two brush heads are applied to the back molars.

17. The tooth cleaning apparatus of claim **13** wherein the set of teeth of the animal comprise back molars and the handle portion forms an angle of at least forty degrees relative to a midline of a mouth of the animal as the at least two brush heads are applied to the back molars.

18. The tooth cleaning apparatus of claim **13** wherein the at least two brush heads form a generally S-shape.

19. The tooth cleaning apparatus of claim **13** wherein the brush segment comprises a flexible member arranged between the at least two brush heads, a semi-flexible member arranged between the at least two brush heads or a rigid member arranged between the at least two brush heads.

20. A brush head for a tooth brush comprising:

a brush segment having at least two brush heads, each of the at least two brush heads comprises a plurality of brushes adapted to simultaneously clean a quadrant of a set of teeth, a distal brush head of the at least two brush heads comprises a concave plurality of brushes and a proximal brush head of the at least two brush heads comprises a convex plurality of brushes.

* * * * *