

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Richmond Division**

ORALIC SUPPLIES INC.,

Plaintiff,

v.

Civil Action No. 3:22cv623

JIANG HUANG,

Defendant.

ORDER

This matter comes before the Court on Plaintiff Oralic Supplies Inc.'s ("Oralic") Motion to Modify Order (the "Motion"). (ECF No. 11.) On December 20, 2022, the Court granted Oralic's Motion for Alternative Service Pursuant to 35 U.S.C. § 293 and ordered Oralic to effectuate service of its Complaint through four means, one of which being "by publication in a newspaper of general circulation, such as The International New York Times." (ECF No. 7, at 2.) Plaintiff now requests "to modify the Court's Order allowing for service through publication in a newspaper of general circulation to include publication through Global Legal Notices . . . [which is] a company that specializes in the service of legal documents by publication worldwide. (ECF No. 11, at 1.) Plaintiff seeks this modification because it contends that it "has reached out to multiple publications, including the New York Times, but has not been able to locate an individual able to publish an international notice that includes the summons, complaint, and Order, as required." (ECF No. 11, at 1.)

Upon due consideration, and because service by publication is one of four methods through which Oralic must effectuate service, the Court GRANTS the Motion. (ECF No. 11.)

The Court ORDERS Oralice to serve the Summons and Complaint in this action, together with a copy of this Order and the December 20, 2022 Order, on Huang using the following means:

1. By publication in a newspaper of general circulation, such as The International New York Times, or by publishing internationally with Global Legal Notices (<https://globallegalnotices.com>);
2. By certified mail at Huang's United States Patent and Trademark correspondence address: True Shepherd, LLC, 516 N. Diamond Bar Blvd., #310, Diamond Bar, CA 91765;
3. By email to Huang's known patent agent, Mr. Andrew Cheng, using the email trueshepherdllc@gmail.com; and
4. By certified mail to Huang's known counsel, Michael Poropat, at Stockman & Poropat, PLLC, 371 Sunrise Highway, Lynbrook, NY 11563.

The Court DIRECTS the Clerk to send a copy of this Memorandum Order to all counsel of record.

It is SO ORDERED.

Date: 01/26/2023
Richmond, Virginia



M. Hannah Lauck
United States District Judge

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Richmond Division**

ORALIC SUPPLIES INC.,

Plaintiff,

v.

Civil Action No. 3:22cv623

JIANG HUANG,

Defendant.

ORDER

This matter comes before the Court on Plaintiff Oralic Supplies Inc.'s ("Oralic") Motion for Alternative Service Pursuant to 35 U.S.C. § 293 (the "Motion"). (ECF No. 6.) For the reasons that follow, the Court will grant the Motion.

Oralic brings this case seeking a "declaration that United States Patent No. [11,253,052]¹ (the '052 Patent')[, owned by Defendant Jiang Huang,] is invalid and/or not infringed by the manufacture, use, sale, offer for sale[, or importation of Plaintiff's products." (ECF No. 6, at 1.) Due to Huang's status as a patentee not residing in the United States, Huang's failure to designate an agent for service of process, and pursuant to 35 U.S.C. § 293, Oralic asks this Court to permit service by alternative means. (ECF No. 6, at 1–2.)

Under § 293, "[e]very patentee not residing in the United States may file in the Patent and Trademark Office a written designation stating the name and address of a person residing within the United States on whom may be served process or notice of proceedings affecting the patent or rights thereunder." 35 U.S.C. § 293. If no person has been designated, "the United States

¹ In the Motion, Plaintiff states the patent number is 11,253,085. However, the Complaint and accompanying exhibits address Patent No. 11,253,052. The Court confirmed the correct patent at issue is Patent No. 11,253,052.

District Court for the Eastern District of Virginia shall have jurisdiction and summons shall be served by publication or otherwise as the court directs." *Id.*

According to records filed with the Patent and Trademark Office, Jiang Huang resides in China. Additionally, Oralic indicates Jiang Huang has not designated an agent for service of process. (ECF No. 6, at 1.) Accordingly, under § 293, the Court finds that Jiang Huang may be served by publication or otherwise.

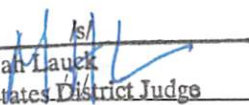
The Court therefore GRANTS the Motion. (ECF No. 6.) The Court ORDERS that Oralic may serve the Summons and Complaint in this action, together with a copy of this Order, on Huang using the following means:

1. By publication in a newspaper of general circulation, such as The International New York Times;
2. By certified mail at Huang's United States Patent and Trademark correspondence address: True Shepherd, LLC, 516 N. Diamond Bar Blvd., #310, Diamond Bar, CA 91765;
3. By email to Huang's known patent agent, Mr. Andrew Cheng, using the email trueshepherdllc.com; and
4. By certified mail to Huang's known counsel, Michael Poropat, at Stockman & Poropat, PLLC, 371 Sunrise Highway, Lynbrook, NY 11563.

The Court DIRECTS the Clerk to send a copy of this Memorandum Order to all counsel of record.

It is SO ORDERED.

Date: 12/20/2022
Richmond, Virginia



M. Hannah Lauck
~~United States District Judge~~
M. Hannah Lauck
United States District Judge

AO 440 (Rev. 06/12) Summons in a Civil Action

UNITED STATES DISTRICT COURT
for the
Eastern District of Virginia

ORALIC SUPPLIES INC.

Plaintiff(s)

v.

JIANG HUANG

Defendant(s)

Civil Action No. 3:22-cv-00623-MHL

SUMMONS IN A CIVIL ACTION

To: (Defendant's name and address) JIANG HUANG

SEE ATTACHED ORDER FOR SERVICE DETAILS - SERVICE of Summons to be attempted by four different methods.

A lawsuit has been filed against you.

Within 21 days after service of this summons on you (not counting the day you received it) — or 60 days if you are the United States or a United States agency, or an officer or employee of the United States described in Fed. R. Civ. P. 12 (a)(2) or (3) — you must serve on the plaintiff an answer to the attached complaint or a motion under Rule 12 of the Federal Rules of Civil Procedure. The answer or motion must be served on the plaintiff or plaintiff's attorney, whose name and address are:

Bradley T. Edgington, Esq.
Fox Rothschild LLP
500 Grant Street, Suite 2500
Pittsburgh, PA 15219

If you fail to respond, judgment by default will be entered against you for the relief demanded in the complaint. You also must file your answer or motion with the court.

CLERK OF COURT

Date: 12/28/2022

Handwritten signature of the Clerk or Deputy Clerk

Signature of Clerk or Deputy Clerk



AO 440 (Rev. 06/12) Summons in a Civil Action (Page 2)

Civil Action No. 3:22-cv-00623-MHL

PROOF OF SERVICE

(This section should not be filed with the court unless required by Fed. R. Civ. P. 4 (l))

This summons for *(name of individual and title, if any)* _____
was received by me on *(date)* _____.

I personally served the summons on the individual at *(place)* _____
_____ on *(date)* _____; or

I left the summons at the individual's residence or usual place of abode with *(name)* _____
_____, a person of suitable age and discretion who resides there,
on *(date)* _____, and mailed a copy to the individual's last known address; or

I served the summons on *(name of individual)* _____, who is
designated by law to accept service of process on behalf of *(name of organization)* _____
_____ on *(date)* _____; or

I returned the summons unexecuted because _____; or

Other *(specify)*:

My fees are \$ _____ for travel and \$ _____ for services, for a total of \$ _____ 0.00 .

I declare under penalty of perjury that this information is true.

Date: _____

Server's signature

Printed name and title

Server's address

Additional information regarding attempted service, etc:

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION**

ORALIC SUPPLIES INC.,)	
)	
Plaintiff,)	
)	Civil Case No. _____
v.)	
)	
JIANG HUANG,)	
No. 146, Shimenkou, Xinmin Village,)	
Shangli Town, Shangli Country)	
Pingxiang, Jiangxi, China)	
)	

Defendant.

COMPLAINT FOR DECLARATORY JUDGMENT

Plaintiff Oralic Supplies, Inc. (“Plaintiff”) files this complaint for declaratory judgment against Defendant Jiang Huang (“Defendant”).

NATURE OF ACTION

1. This is an action for declaratory judgment of patent invalidity and non-infringement. Plaintiff seeks a declaration that United States Patent No. 11,253,052 (“the ’052 Patent”) is invalid and/or not infringed by the manufacture, use, sale, offer for sale or importation of Plaintiff’s products.

THE PARTIES

2. Plaintiff is a California corporation with a principal place of business in Diamond Bar, California.

3. Upon information and belief, Defendant owns the ’052 Patent and is a resident of Pingxiang, China.

JURISDICTION AND VENUE

4. This is an action for declaratory judgment arising under the Declaratory Judgment Act, 28 U.S.C. §§ 2201 and 2202, the patent laws of the United States, Title 35 U.S.C. § 1 *et seq.* and Rule 57 of the Federal Rules of Civil Procedure.

5. This Court has subject matter jurisdiction over this matter pursuant to 28 U.S.C. §§ 1331, 1338(a), 1391(b)(3), 2201, 2202, and/or 1400(b).

6. An immediate, real, and justiciable controversy exists between Plaintiff and Defendant as to whether (a) Plaintiff is making, using, or selling products that infringe the '052 Patent, and (b) the '052 Patent is invalid and unenforceable. As set forth below, this controversy arises from Defendant's infringement assertions against Plaintiff. Because this action presents an actual controversy with respect to the unenforceability and invalidity of the '052 Patent, this Court may grant the declaratory relief sought pursuant to 28 U.S.C. §§ 2201 and 2202.

7. Upon information and belief, this Court has personal jurisdiction over Defendant at least in part because Defendant owns the '052 Patent and has listed as the correspondence address of record with the United States Patent and Trademark Office an address of 516 N. Diamond Bar Blvd., #310, Diamond Bar, CA. This address is a shipping and mailbox center and is not an address at which Defendant or a person affiliated with Defendant can be found to effectuate service. Accordingly, this Court has personal jurisdiction pursuant to 35 U.S.C. § 293.

8. Venue is appropriate in this Court pursuant to 28 U.S.C. § 1391(b)(2) and/or (3) and 35 U.S.C. § 293 because a substantial portion of the events or omissions giving rise to the claim occurred in this forum and were directed at residents of this forum and because defendant is subject to this Court's personal jurisdiction.

FACTUAL BACKGROUND

A. Plaintiff Orallic Supplies Inc.

9. Plaintiff provides quality oral and facial care products under the BrushMo® brand, which are sold primarily through online retailers like Amazon.com. Plaintiff's products include replacement toothbrush heads for electric toothbrushes and replacement facial cleansing brush heads.

10. Each of Plaintiff's products sold through Amazon.com are given a unique Amazon Standard Identification Number ("ASIN"). For example, Plaintiff sells the "Brushmo Replacement Toothbrush Heads Compatible with Sonicare Electric Toothbrush Pack" under the ASIN B00NN07IMW ("the 'IMW ASIN"). A true and correct copy of the Amazon.com product listing for the 'IMW ASIN is attached hereto as **Exhibit A**. As shown in Exhibit A, the 'IMW ASIN was first available for sale on Amazon.com on September 17, 2014. (Ex. A at 4.)

B. United States Patent No. 11,253,052 ("the '052 Patent")

11. The '052 Patent is entitled "Electrical Toothbrush Head in Secure Contact Engagement with Vibration Core," was filed on September 18, 2021, and issued on February 22, 2022. The '052 Patent was prosecuted by Andrew C. Cheng, who is registered with the USPTO and uses an address located in Diamond Bar, CA. A true and correct copy of the '052 Patent is attached hereto as **Exhibit B**.

12. Upon information and belief, Plaintiff holds title to the '052 Patent. The '052 Patent lists Jiang Huang as the sole inventor and applicant. No assignments for the '052 Patent are recorded with the USPTO.

13. The '052 Patent includes ten claims, including one independent claim and 9 dependent claims. Claim 1 is directed to an electrical toothbrush head in secure contact with a vibration core and includes several limitations. (See Ex. B at 10:1-12:46.)

C. Defendant's Acts Comprising Actual Controversy

14. On Friday, August 26, 2022, Amazon provided a notice to Plaintiff that the patent owner of the '052 Patent submitted a report to Amazon that stated that the 'IMW ASIN infringes the '052 Patent. Amazon indicated that a failure to promptly resolve this dispute may result in the removal of its product listing and/or a loss of its Amazon.com selling privileges. The Amazon notice identified Michael Poropat, a partner at the law firm of Stockman & Poropat, PLLC, as the contact for the '052 Patent owner.

15. On Saturday, August 27, 2022, counsel for Plaintiff, Jim Singer, sent a letter to Mr. Poropat. The letter requested Defendant immediately contact Amazon and withdraw its complaint for multiple reasons. First, the '052 Patent claims require features not present in the 'IMW ASIN. Second, the 'IMW ASIN has been for sale since at least September 2014 and the internal structure of the 'IMW ASIN has not changed since at least 2017. Therefore, the letter explained that not only could there be no infringement but even if there was infringement, the 'IMW ASIN is invalidating prior art. The letter requested a reply no later than Monday, August 29, 2022, which provided (i) confirmation the infringement complaint has been withdrawn, (ii) a copy of communications with Amazon withdrawing the complaint, and (iii) confirmation that Defendant will refrain from frivolous assertions of infringement or other actions against Plaintiff and its products in the future. A true and correct copy of the August 27, 2022, letter is attached hereto as **Exhibit C**.

16. As of the filing of this complaint, neither Plaintiff nor Plaintiff's counsel has received a response from the Defendant or Mr. Poropat.

17. Defendant's allegations that Plaintiff infringes the '052 Patent as well as Defendant's refusal to confirm otherwise creates an actual case or controversy regarding the validity and alleged infringement of the '052 Patent. In addition, Defendant's allegations, made

to online marketplace platforms like Amazon, threaten actual and imminent injury to Plaintiff, including at least harm to reputation and the ability to continue to make sales on said platforms.

18. Plaintiff continues to deny that it infringes the '052 Patent and further states that each claim of the '052 Patent is invalid.

FIRST CLAIM FOR RELIEF
(Non-Infringement of U.S. Patent No. 11,253,052)

19. Plaintiff restates the foregoing paragraphs as if fully set forth herein.

20. The '052 Patent includes only one independent claim, which is reproduced below.

The remaining claims, claim 2-10, all depend, directly or indirectly, on claim 1. Therefore, all limitations of claim 1 must be met for there to be infringement of any claim of the '052 Patent.

Claim 1:

An electrical toothbrush head for being in secure contact engagement with a vibration core, comprising a toothbrush body, the toothbrush body being provided, in a lower part thereof, with an insertion compartment that has a bottom opening, an insertion piece being inserted through the bottom opening and disposed in the insertion compartment, the insertion piece being provided, in a lower part thereof, with a core channel into which the vibration core in a flat form is insertable, the insertion piece being formed, in a bottom thereof, with an insertion opening in communication with the core channel;

the insertion piece being provided in a sidewall thereof with a sideway slot, the sideway slot penetrating to outside of the insertion piece and the core channel, an elastic bar that is integrally formed as one piece and elastically swingable being arranged in the sideway slot, the elastic bar being arranged to extend in an axial direction of the core channel, an upper end of the elastic bar being fixedly connected to the sidewall of the insertion piece, a lower end of the elastic bar being arranged in a movable manner;

the core channel having an inner surface that forms a contact engagement surface arranged to face the elastic bar, the contact engagement surface extending smoothly in the axial direction of the core channel, the elastic bar having a middle portion that bulges and curves toward the core channel to form a curved section, a contact engagement spacing being present between the curved section and the contact engagement surface, the contact engagement spacing being formed in a middle of the core channel, the contact engagement spacing being smaller than a thickness of the vibration core when the elastic bar is in an original state;

the vibration core including two core side surfaces that are opposite to each other, such that when the vibration core is inserted into the core channel through the insertion opening of the insertion piece, the vibration core extends through the contact engagement spacing to set the contact engagement surface in contact and pressing engagement with one of the core side surfaces of the vibration core, through surface engagement there between, another one of the core side surfaces of the vibration core being in contact and pressing engagement with the curved section and pushing the elastic bar to elastically deform away from the contact engagement surface; and

an outside surface of the curved section surrounding and defining a curved trough, the curved trough being completely filled with a single-piece elastic filler block, the elastic filler block contacting and pressing an inside surface of the insertion compartment and being in a compressed state.

21. In order to infringe claim 1 of the '052 Patent, an electrical toothbrush head is required to have every one of the above limitations, which includes an “elastic bar” which must be “integrally formed as one piece and elastically swingable” and which must have (i) an “upper end” that is “fixedly connected to the sidewall of the insertion piece,” (ii) a “middle portion” that “bulges and curves toward the core channel” that causes the elastic bar to elastically deform when the vibration core is inserted into the toothbrush head, and (iii) a “lower end” that is “arranged in a movable manner.” The elastic bar 103 is depicted in Figure 4, reproduced below:

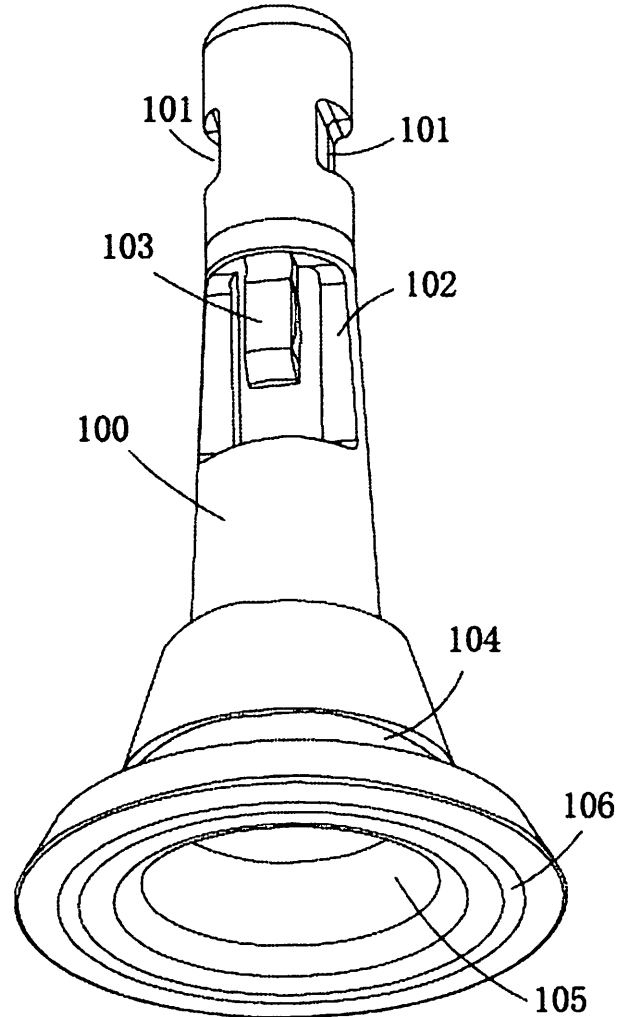


Fig.4

(Ex. B at FIG. 4.)

22. According to the '052 Patent's specification, the elastic bar 103 is arranged to extend in an axial direction of the core channel 115, and an upper end of the elastic bar 103 is fixedly connected to the sidewall of the insertion piece 100, while a lower end of the elastic bar 103 is arranged in a movable manner. (Ex. B at 5:20-35.) The elastic bar's upper portion 109, bulging and curved middle portion, and unaffixed, movable lower portion can also be seen in Figure 7, reproduced below (with annotations in red):

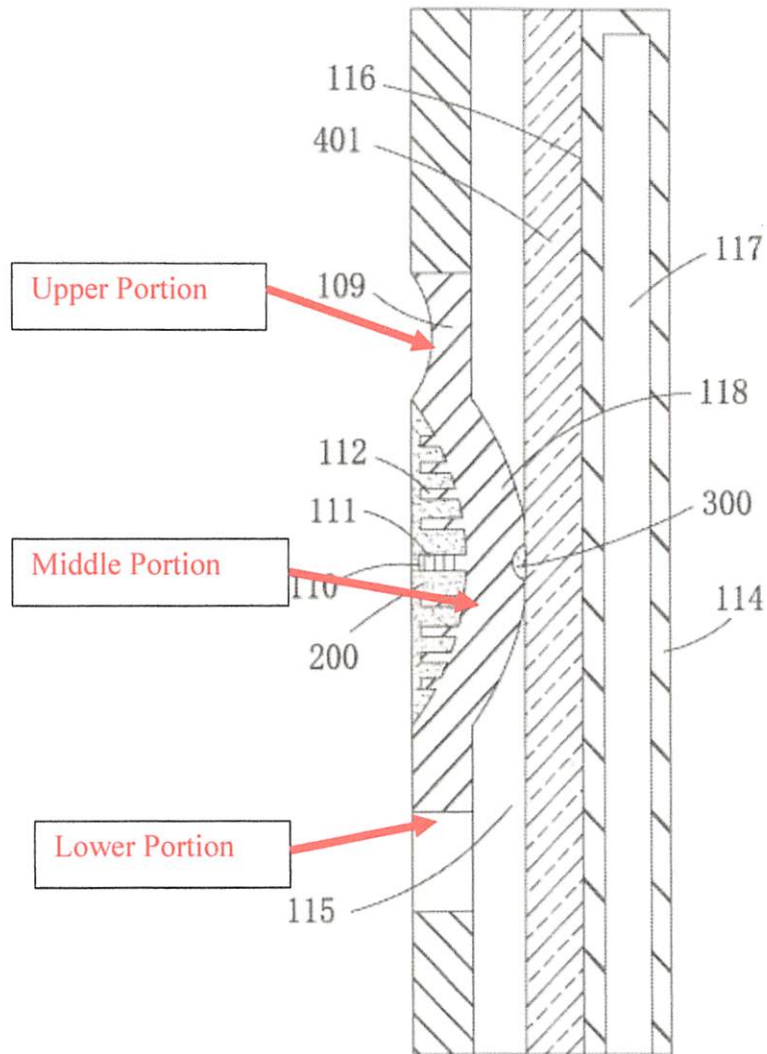


Fig.7

(Ex. B. at FIG. 7.)

23. The 'IMW ASIN does not include every limitation of claim 1 of the '052 Patent. For example, the 'IMW ASIN does not include the claimed elastic bar.

24. As seen in the photograph below, the 'IMW ASIN consists of a toothbrush head, which includes a removable coupling member (pictured left):



25. The coupling member does not include an elastic bar that is elastically swingable, has a middle portion that “bulges and curves toward the core channel,” and has a lower end that is arranged in a movable manner.



26. As seen in the photographs above, the ‘IMW ASIN’s coupling member has walls that extend the length of a core or channel, but none that are affixed on one end and arranged in a movable manner on the opposite end. Indeed, the walls are fixed—and thus immovable—on both ends. Further, there is no portion of a wall or bar that both bulges and curves toward the center core or channel. A simple examination of the readily available and inexpensive product would have confirmed no infringement.

27. Despite this fact, Defendant has asserted and continues to assert a claim of infringement of the ‘052 Patent.

28. Moreover, the ‘IMW ASIN is readily accessible and affordable. Indeed, anyone—including Defendant—can order a pack of 8 toothbrush heads for less than \$18.00 and expect to receive the order in less than a week. This leads to only two possible conclusions. First, this suggests that Defendant has failed to conduct a reasonable pre-suit investigation. Had Defendant done so, it would have quickly recognized that the ‘IMW ASIN does not and cannot infringe any

valid claim of the '052 Patent. Second, this additionally or alternatively suggests that Defendant is asserting claims of infringement knowing such claims are untrue and/or has willfully blinded itself to such knowledge and is asserting claims of infringement without any basis. Therefore, Defendant's actions in raising this dispute warrant attorney's fees under 35 U.S.C. § 285.

29. Plaintiff expressly reserves the right to assert additional grounds of non-infringement after having the ability to conduct discovery and the Court has construed the claims.

30. Plaintiff seeks a declaratory judgment that making, using, offering to sell, selling, and importing Plaintiff's products, including the 'IMW ASIN, does not and will not infringe any valid claim of the '052 Patent.

SECOND CLAIM FOR RELIEF

(Invalidity of U.S. Patent No. 11,253,052)

31. Plaintiff restates the foregoing paragraphs as if fully set forth herein.

32. An actual and substantial controversy has arisen and now exists between the parties concerning the validity of the '052 Patent.

33. Claims 1-10 of the '052 Patent are invalid because the purported inventions therein fail to meet the conditions of patentability specified in 35 U.S.C. §§ 101 et seq. including but not limited to 35 U.S.C. §§ 102, 103, and 112, and non-statutory common law doctrines.

34. Without limiting the grounds of invalidity that will be asserted in this action, at least claim 1 of the '052 Patent is invalid under 35 U.S.C. § 112. For example, claim 1 requires an insertion piece that has a sideways slot "penetrating to outside of the insertion piece and the core channel." (Ex. B. at 10:13-15.) Neither the specification or the claims explain how a slot (or empty space) can penetrate anything. Further, there is no description or explanation for how a

slot (or empty space) located on an insertion piece can penetrate to the “outside” of that insertion piece or what constitutes the “outside” of the insertion piece. Likewise, there is no description or explanation for how a slot (or empty space) located on an insertion piece can penetrate to the “outside” of a core channel (a separate and distinct empty space) or what constitutes the “outside” of a channel (or empty space).

35. Therefore, the '052 Patent is indefinite, lacks written description, and/or lacks enablement.

36. By way of further example and without limiting the grounds of invalidity that will be asserted in this action, at least claim 1 of the '052 Patent is invalid under 35 U.S.C. §§ 102 and/or 103 based on previously available products, patents, and publications.

37. For example, United States Patent No. 9,724,180 (“the '180 Patent”), entitled “Brush Head for Electric Toothbrush,” which was filed on January 6, 2017, and the 'IMW ASIN, either alone or in combination, render at least claim 1 of the '052 Patent invalid as anticipated or obvious. A true and correct copy of the '180 Patent is attached as **Exhibit D**.

38. The '180 Patent discloses an electric toothbrush head having a toothbrush body with a coupling member (or insertion piece). (*See* Ex. D at FIGS. 1-2.) The coupling member includes an aperture 34 (or sideways slot). The coupling member also includes a resilient wall 38 (elastic bar). Figure 2 of the '180 Patent could suggest to a person of ordinary skill in the art that the resilient wall includes an end that is attached, another end that is either fixed or movable, and a raised portion 40 (middle portion) that includes a surface that bulges and curves toward the mounting channel 32 (core channel). The '180 Patent further teaches a drive shaft of an electric toothbrush (vibration core) that is inserted into the coupling member and engages with the

surfaces of the coupling member, including the raised portion 40, which causes a secure connection between the drive shaft and coupling member. (See Ex. D at 2:34-4:42.)

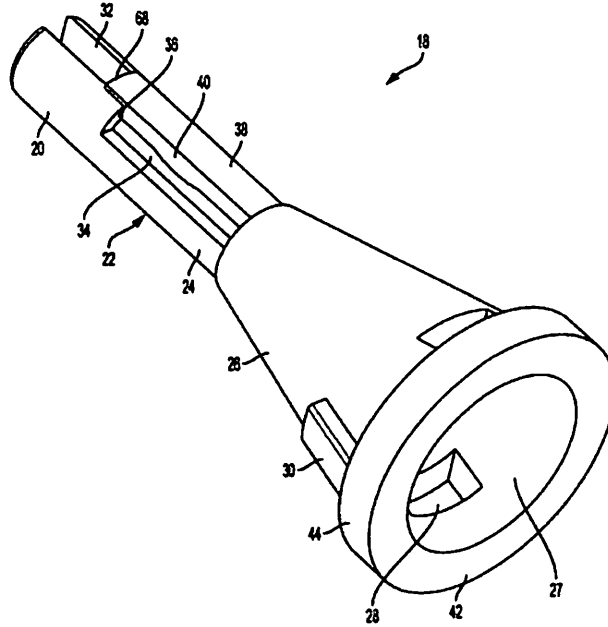


FIG. 2

39. The 'IMW ASIN also discloses a toothbrush head with a coupling member configured to receive a drive shaft of an electric toothbrush, where the coupling member includes one or more surfaces that securely engages with the drive shaft.

40. A person of ordinary skill in the art would find each and every element of claim 1 of the '052 Patent expressly or inherently disclosed in the '180 Patent and/or 'IMW ASIN. A person of ordinary skill in the art would also be motivated to look to each reference as both are in the same art and would suggest how to best configure a coupling member of an electric toothbrush head to the drive shaft of an electric toothbrush.

41. Also, Defendant's suggestion that the 'IMW ASIN infringes the '052 Patent further supports a finding that the '052 Patent is invalid. Specifically, the 'IMW ASIN was on sale and publicly available for several years prior to the filing of the '052 Patent. While Plaintiff

disagrees that the 'IMW ASIN infringes the '052 Patent, if Defendant replies with an assertion that the 'IMW ASIN infringes the '052 Patent's claims, such an assertion would admit that claims are anticipated by the 'IMW ASIN, since the 'IMW ASIN has been sold and was publicly available well prior to the filing of the '052 Patent in 2021.

42. Plaintiff expressly reserves the right to assert additional grounds of invalidity after having the ability to conduct discovery and the Court has construed the claims.

43. Plaintiff seeks a declaratory judgment that each claim of the '052 Patent is invalid.

JURY DEMAND

44. Pursuant to the Federal Rule of Civil Procedure 38(b), Plaintiff demands a trial by jury of all issues so triable.

PRAYER FOR RELIEF

WHEREOF, Plaintiff seeks judgment be entered in Plaintiff's favor and against

Defendants:

- (a) Declaring each claim of the '052 Patent invalid;
- (b) Declaring the manufacture, use, sale, offer of sale, or importation of Plaintiff's products, including the 'IMW ASIN, do not infringe any valid claim of the '052 Patent;
- (c) Enjoining Defendant from enforcing the '052 Patent;
- (d) A finding that this case is exceptional under 35 U.S.C. § 285;
- (e) An order awarding attorneys' fees, costs, and expenses incurred in connection with this action to Plaintiff; and
- (f) An order awarding such other and further relief as this Court deems just and proper.

Dated: September 13, 2022

/s/Bradley T. Edgington

Bradley T. Edgington (VSB No. 94736)

Fox Rothschild LLP

500 Grant Street, Suite 2500

Pittsburgh, PA 15219

Telephone: (412) 391-1334

Facsimile: (412) 391-6984

bedgington@foxrothschild.com

Counsel for Plaintiff Oralic Supplies Inc.

EXHIBIT A

Hello Select your address All B00nn07IMW

Hello, sign in Account & Lists Returns & Orders 0

All Back to School Off to College Best Sellers Amazon Basics Customer Service

prime THURSDAY NIGHT FOOTBALL 54:03:59

Health & Personal Care Household Supplies Vitamins & Diet Supplements Baby & Child Care Health Care Sports Nutrition Sexual Wellness

93,173

Health & Household > Oral Care > Toothbrushes & Accessories > Powered Toothbrushes & Accessories > Toothbrush Replacement Heads Sponsored



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Brand	Brushmo
Color	Standard
Size	8 Count (Pack of 1)
Material	Nylon
Item	Soft
Firmness	
Description	

About this item

- **EFFECTIVE GUM HEALTH IMPROVE:** Our standard toothbrush heads are proven to reduce gingivitis much better than a manual toothbrush.
- **HIGH COMPATIBILITY:** Snap-on system fits 2 Series Plaque Control, 3 Series Gum Health, DiamondClean, EasyClean, FlexCare, FlexCare+, FlexCare Platinum. HealthyWhite and HydroClean Brush Handles.
- **8 PACK INCLUDES:** 8 Plaque Removal Replacement heads.
- Our toothbrush heads are made at the high health and safety standard of oral hygiene technology.
- **REMINDER BRISTLES:** blue reminder bristles will fade when a

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\$14.71 (\$1.84 / Count)

FREE delivery: **Monday, Sep 19** on orders over \$25.00 shipped by Amazon.

Ships from: Amazon

Sold by: Brushmo Official

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5% 10%

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Save 5% now and up to 10% on repeat deliveries.

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Get it Monday, Sep 19

In Stock.

Qty: 1

Deliver every:

6 months (Most common)

Set Up Now

Auto-deliveries sold by Brushmo Official and Fulfilled by Amazon

Add to List

Have one to sell?

[Sell on Amazon](#)

10% off coupon



Futulkyus Toothbrush Replacement...

2,880

\$16⁹⁵ prime

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Roll over image to zoom in

replacement is needed, usually three months.

Additional Details



Small Business
This product is from a small business brand. Support small.

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Amazon's Choice



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16 Count (Pack of 1)
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Total price: **\$89.65**

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- This item:** Brushmo Replacement Toothbrush Heads Compatible with Sonicare Electric Toothbrush 8 Pack **\$14.71** (\$1.84/Count)
- Philips Sonicare 4100 Power Toothbrush, Rechargeable Electric Toothbrush with Pressure Sensor, White HX3681/23 **\$49.97** (\$49.97/Count)
- Philips Sonicare 1100 Power Toothbrush, Rechargeable Electric Toothbrush, White Grey HX3641/02 **\$24.97** (\$24.97/Count)

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743

\$25.00 (\$25.00/Count)



Replacement Heads Compatible with Philips Sonicare 10 Pack, MRYUESG Electric...

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\$17.99 (\$1.80/Count)



OralClass Replacement Toothbrush Heads for Philips Sonicare, Medium to Soft Electri...

237

\$11.47 (\$1.43/Count)



BrightDeal Replacement Heads for Philips Sonicare ProtectiveClean 4100 5100 6100 Di...

448

\$18.59 (\$3.10/Count)



Replacement Toothbrush Heads Compatible with Philips Sonicare: Electric Brush Heads...

1,547

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WARNING:

CHOKING HAZARD -- Children under 8 yrs. can choke or suffocate on uninflated or broken balloons. Adult supervision required. Keep uninflated balloons from children. Discard broken balloons at once.

Product Description

Brushmo Official

Brushmo believes that bright smiles are a right, not a luxury. Our toothbrushes combine the latest research with the best design, materials, and manufacturing to leave your mouth perfectly clean.

DuPont

Our toothbrushes are made with DuPont filaments, which for more than 70 years, has been recognized as the apex of quality in the oral care synthetic filament industry.

End-Rounded bristles

End-rounded nylon bristles provide important benefits for toothbrushes when cleaning soft tissue. With end-rounded bristles, plaque on tooth surfaces can be effectively removed while providing holistic care to both the teeth and gums.

High band recovery

Bend recovery is the ability of a material to return to its original shape after deformation. Brushmo toothbrush filaments enjoy a high level of bend recovery.

A brush head that fits multiple handles

Snap-on system designed for 2 Series Plaque Control, 3 Series Gum Health, DiamondClean, FlexCare, FlexCare+, FlexCare Platinum, HealthyWhite, EasyClean, Powerup, HydroClean.

Whiter teeth with regular brushing

Brushing at least twice a day will help to keep dental biofilm from developing on your teeth, enhancing the natural whiteness of your teeth.

Covers more tooth surface

Designed for optimal cleaning of teeth and improvement in gum health.

Reminder bristles

When the time comes to change your brush head. Our indicator bristles will fade so as to let you know.

Easy installation

Simple, Snap-on installation.



	Brushmo BM928	Brushmo BM668	Brushmo BM668BK	Brushmo BM938	Brushmo BM628	Brushmo BM618
Consumer Benefit	Superior Plaque Control	Advanced Whitening	Advanced Whitening	Optimal Gum Health	Compact Brush Head	Deep Clean
Product Feature	Effectively remove plaque and tartar accumulated on teeth surfaces	Diamond shine bristles effectively remove stain on teeth surfaces for a brighter smile	Diamond shine bristles effectively remove stain on teeth surfaces for a brighter smile	Soft bristles for sensitive teeth and gums	Easily focuses on unapproachable teeth & gum areas, for smaller mouths and people with braces.	Curved designed surface provides exceptional cleaning deep between teeth surfaces and gums
Pack Size	8 pack	8 pack	8 pack	8 pack	8 pack	8 pack
Type	Full	Full	Full	Full	Compact	Standard
Bristle Softness	Medium	Medium to hard	Medium to hard	Medium to Soft	Medium	Medium
Snap-on System	✓	✓	✓	✓	✓	✓
Screw-on System						
Sonicare DiamondClean/ 2 Series Plaque Control/ Sonicare 3 Series Gum Health/ EasyClean	✓	✓	✓	✓	✓	✓
FlexCare/ FlexCare+/ FlexCare Plantinum/ HealthyWhite/ HydroClean Handles	✓	✓	✓	✓	✓	✓
Advance/ CleanCare/ Elite/ Essence/ Xtreme Handles						

Product details





Is Discontinued By Manufacturer : No
Product Dimensions : 8.5 x 3.5 x 1 inches; 2.6 Ounces
Item model number : 858431005084
Date First Available : September 17, 2014
Manufacturer : Brushmo
ASIN : B00NN07IMW
Best Sellers Rank: #730 in Health & Household (See Top 100 in Health & Household)
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Sold By	Brushmo Official	Amazon.com	Amazon.com	Amazon.com
Brand Name	Brushmo	OOAK	OOAK	OOAK
Color	Standard	Coral	Black	White
Item Firmness Description	Soft	Soft	Soft	Soft
Material	Nylon	—	—	—
Number of Pieces	8	—	—	—
Size	8 Count (Pack of 1)	—	—	2 Pack

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Videos for this product

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Important information

Ingredients

1

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3 star	6%
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1 star	6%

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Top reviews

Top reviews from the United States

E. Eason

Best brush head yet!

Reviewed in the United States on September 3, 2022

Verified Purchase

These are really comfortable to use due to the design of the bristles that puts a gentle protrusion or rise of bristles near the front. This ideal design makes it easier to clean the insides of front teeth and generally is a great improvement over SonicCare's overpriced brush heads. In my opinion, the brush filaments have just the right firmness — not too hard and not too soft. Will continue to buy these in a heartbeat.

Helpful

Report abuse

S. D.

Great find

Reviewed in the United States on August 30, 2022

Verified Purchase

I have been looking to replace the bristles on my toothbrush. The brand name ones were so expensive and you only received one or two. I purchased these on a whim, but I'm glad I did. They fit very well seeing as I have the older model, and I got so many. The bristles are great, not hard like some other brands. I will buy again and recommend them if they fit your model. I am happy with the purchase.

2 people found this helpful

Helpful

Report abuse

Barah Gardner

Great for the price

Reviewed in the United States on August 28, 2022

Verified Purchase

They don't fit perfectly and you really need to push to get it on the toothbrush handle but honestly for the price, worth every penny!

One person found this helpful

Helpful

Report abuse

Lonnie C.

A great replacement choice...I think.

Reviewed in the United States on August 16, 2022

Verified Purchase

Up until recently I had no issues with the replacement heads, I have had no issues. Unfortunately I think my brush handle is beginning to meet its death so the cleaning ability of the replacement heads has diminished. Again, otherwise no complaints!

J C from Norwalk

Yeah

Reviewed in the United States on September 6, 2022

Verified Purchase

It wasn't te worst purchase I've made.

Daniel Barreto

Not as good as the original

Reviewed in the United States on August 7, 2022

Verified Purchase

Listen for the price you can't complain but they aren't as good as the official ones from Philips. However they are fine for the price and do their job. My only complain is it feels like it's looser compared to the original. Like the Philips ones do a better job at carrying the vibrations.

One person found this helpful

JBVette2003

Cost effective replacement toothbrush for the Sonic electric toothbrush system.

Reviewed in the United States on September 9, 2022

Verified Purchase

This is a very cost effective replacement for the original sonic toothbrush heads.

Bruce Batman

They work

Reviewed in the United States on September 4, 2022

Verified Purchase

The title pretty much sums it up. Great value for sure. Much cheaper than buying name brand.

One person found this helpful

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Mik38

verletzt mein Zahnfleisch außerdem made in china

Reviewed in Germany on June 21, 2022

Verified Purchase

Ich nutze sonst nur die Bürsten von ebay aber wollte mal aufgrund der guen Bewertungen das Produkt ausprobieren.

Auf den ersten Blick ist alles ok, aber ich habe beim Ersten Putzen gleich gemerkt das mein Zahnfleisch angegruiffen wird und blutet, was ich sonst nie habe.

Ich dachte ich gewöhne mich noch dran, aber dabei hab ich auhc gemerkt wie die Borsten

auseinander gehen nach wenigen Tagen, daher kann auch nur eine schlechte Bewertung für die Langlebigkeit geben und das ich Verletzungen davon getragen habe.
Keine Empfehlung.

One person found this helpful

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 Manuel

Einmal benutzt und kaputt. Ist in mehrere Teile gefallen und damit unbrauchbar

Reviewed in Germany on June 14, 2022


Verified Purchase



2 people found this helpful

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 Bernd

Wie beschrieben


Reviewed in Germany on August 10, 2022

Verified Purchase

Ersatz wie beschrieben

Report abuse

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 doug morris

They are not compatible with the Philips sonicare tooth brush

Reviewed in Canada on August 25, 2022

Verified Purchase

Was not compatible with the sonicare tooth brush

Report abuse

 Ralf Szczepan

Super weich und preiswert

Reviewed in Germany on September 11, 2022

Vine Customer Review of Free Product ([What's this?](#))

Zuerst: sie passen und sie funktionieren bei meinem Sonic Sonicare.

Dann: sie sind sehr weich, doch das ist vielleicht auch gut so.

Sie sind in der Form einfach gehalten ohne weitere Raffinessen.

Sie sind weiß. Mein Sonicare ist schwarz, für Ästheten ist das ein Problem, für die Funktion nicht.


Sie sind sehr preiswert.

Report abuse


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- Shipping Rates & Policies
- Amazon Prime
- Returns & Replacements
- Manage Your Content and Devices
- Your Recalls and Product Safety Alerts
- Amazon Assistant
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English United States

Amazon Music Stream millions of songs

Amazon Advertising Find, attract, and engage customers

Amazon Drive Cloud storage from Amazon

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AbeBooks Books, art & collectibles

ACX Audiobook Publishing Made Easy

Alexa Actionable Analytics for the Web

Sell on Amazon Start a Selling Account

Amazon Business Everything For Your Business

Amazon Fresh Groceries & More Right To Your Door

Amazon Global Ship Orders Internationally

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Amazon Ignite Sell your original Digital Educational Resources

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Book Depository Books With Free Delivery Worldwide

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Amazon Photos Unlimited Photo Storage Free With Prime

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EXHIBIT B



(12) **United States Patent**
Huang

(10) **Patent No.:** US 11,253,052 B2
(45) **Date of Patent:** Feb. 22, 2022

(54) **ELECTRICAL TOOTHBRUSH HEAD IN SECURE CONTACT ENGAGEMENT WITH VIBRATION CORE**

(71) Applicant: **Jiang Huang, Pingxiang (CN)**

(72) Inventor: **Jiang Huang, Pingxiang (CN)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **17/478,914**

(22) Filed: **Sep. 18, 2021**

(65) **Prior Publication Data**

US 2022/0000253 A1 Jan. 6, 2022

(51) **Int. Cl.**

A61C 17/22 (2006.01)
A46B 5/00 (2006.01)
A46B 9/04 (2006.01)
A46B 13/02 (2006.01)
A61C 17/34 (2006.01)

(52) **U.S. Cl.**

CPC *A46B 5/0095* (2013.01); *A46B 9/04* (2013.01); *A46B 13/023* (2013.01); *A61C 17/3481* (2013.01)

(58) **Field of Classification Search**

CPC *A46B 5/0095*; *A46B 9/04*; *A46B 13/023*; *A61C 17/222*; *A61C 17/22*

See application file for complete search history.

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15/22.1

* cited by examiner

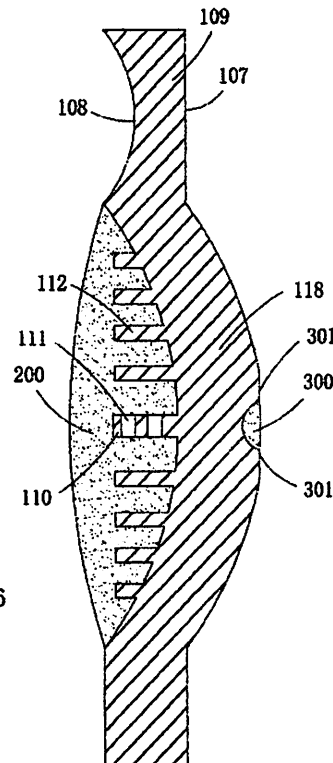
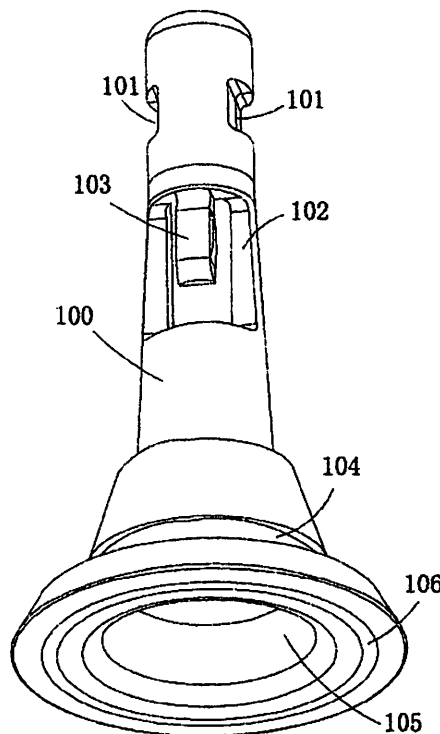
Primary Examiner — Shay Karls

(74) *Attorney, Agent, or Firm* — Andrew C. Cheng

(57) **ABSTRACT**

An electrical toothbrush head includes a toothbrush body and an insertion piece that includes a core channel and a sideways slot in which an elastic bar is arranged. The core channel has a contact engagement surface. The elastic bar has a curved section. When the vibration core is inserted into the core channel, the contact engagement surface and the curved section respectively contact and engage with core side surfaces of the vibration core, and the elastic bar is pushed to elastically deform away from the contact engagement surface. When the electrical toothbrush head and the toothbrush handle are combined, the vibration core is clamped between the contact engagement surface and the curved section and the elastic bar deforms outward and the elastic filler block is compressed, such that the elastic filler block and the elastic bar cause the curved section to be in elastic engagement with the vibration core.

10 Claims, 8 Drawing Sheets



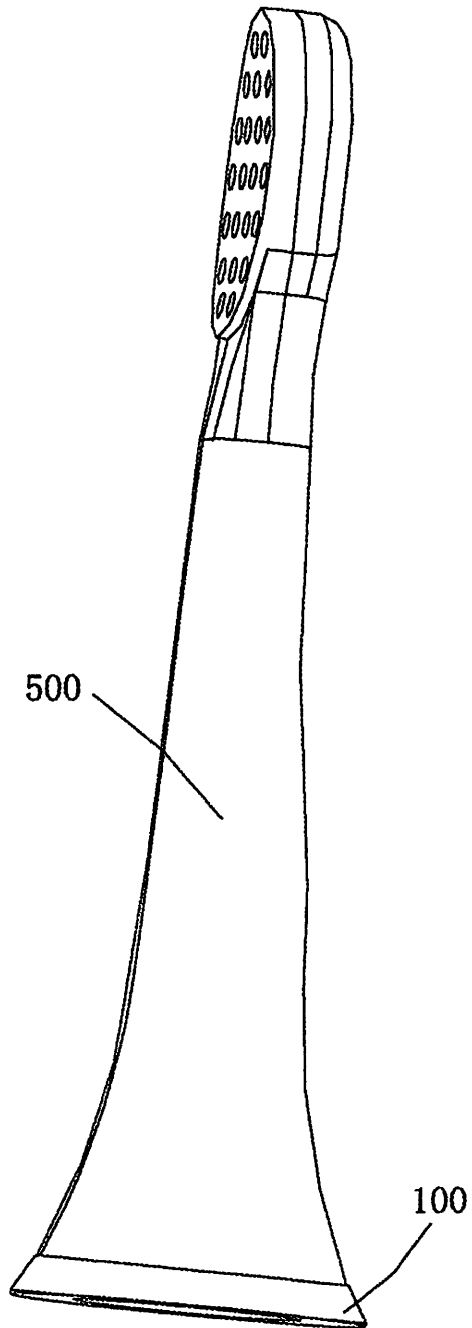


Fig.1

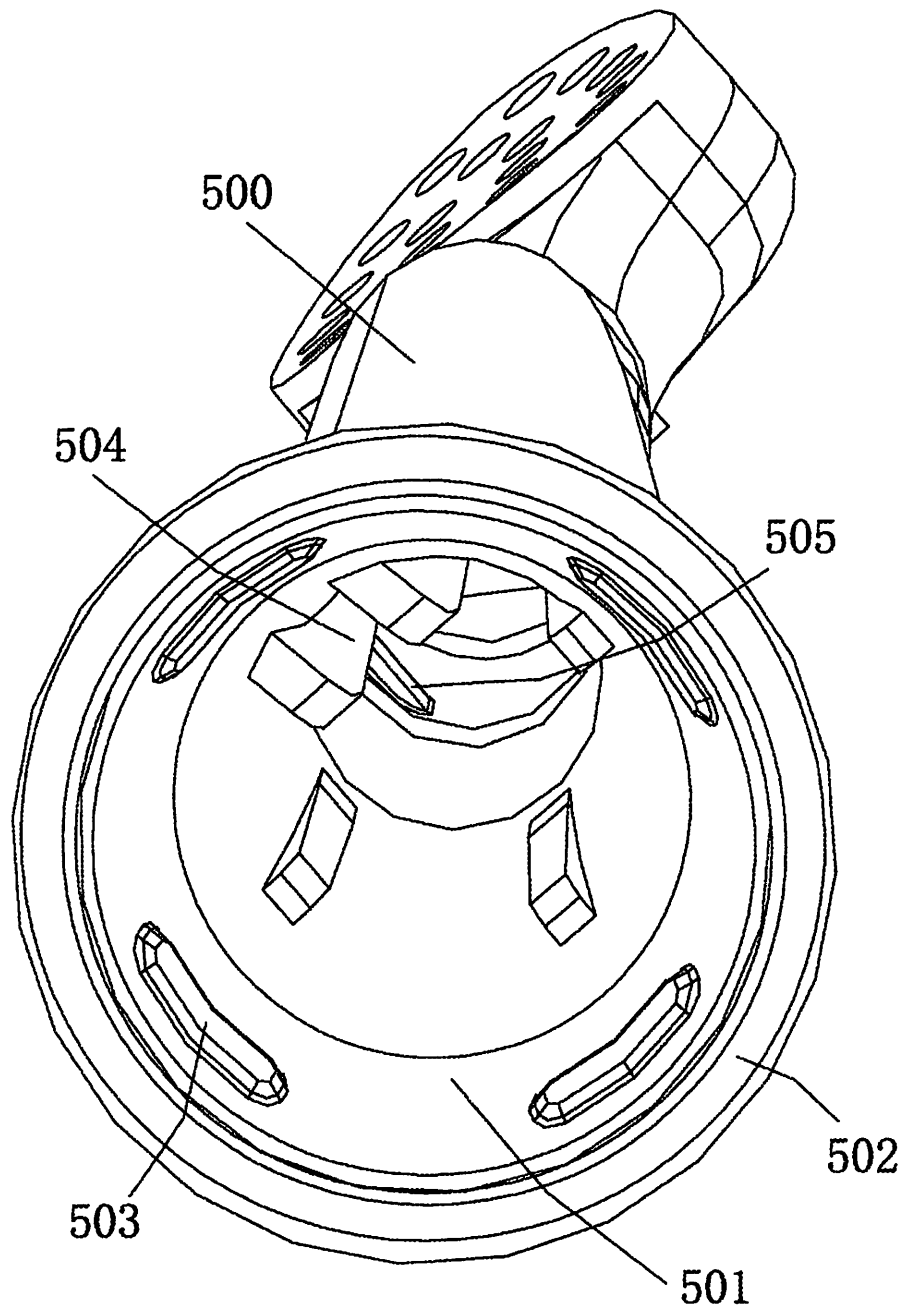


Fig.2

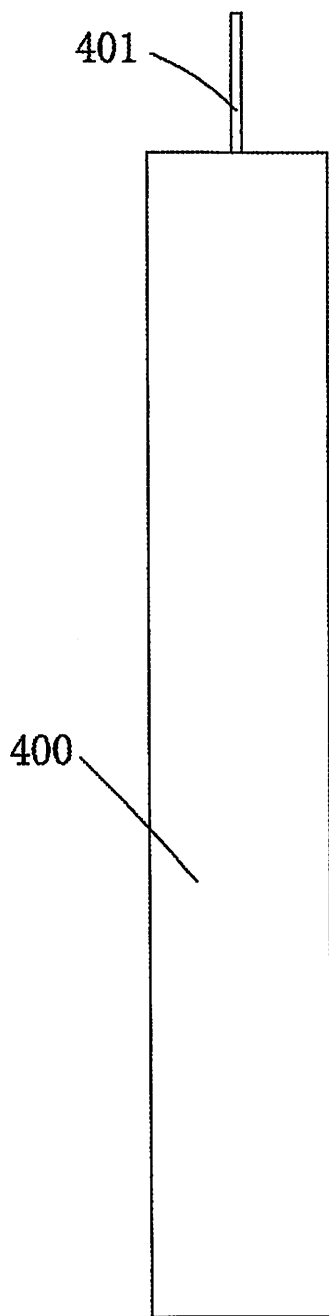


Fig.3

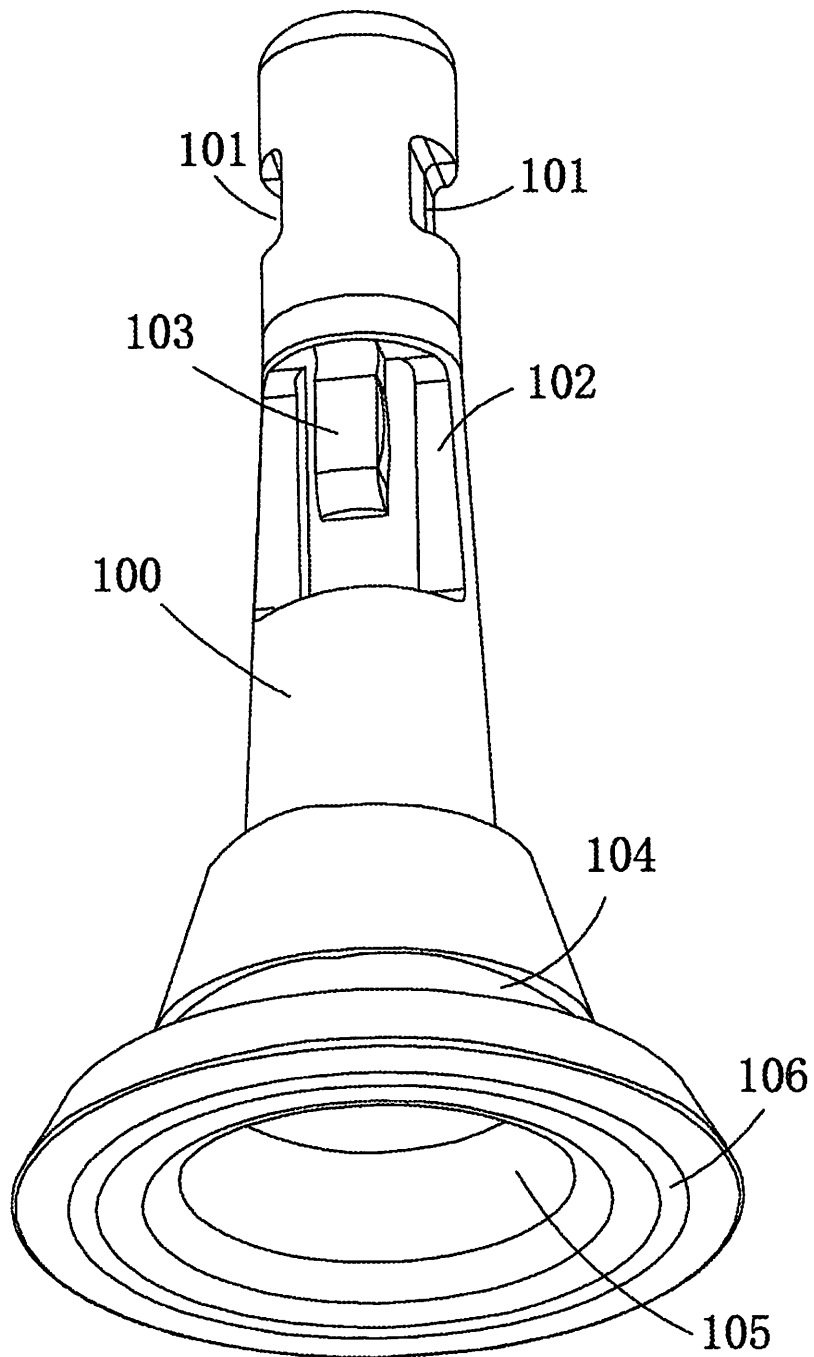


Fig.4

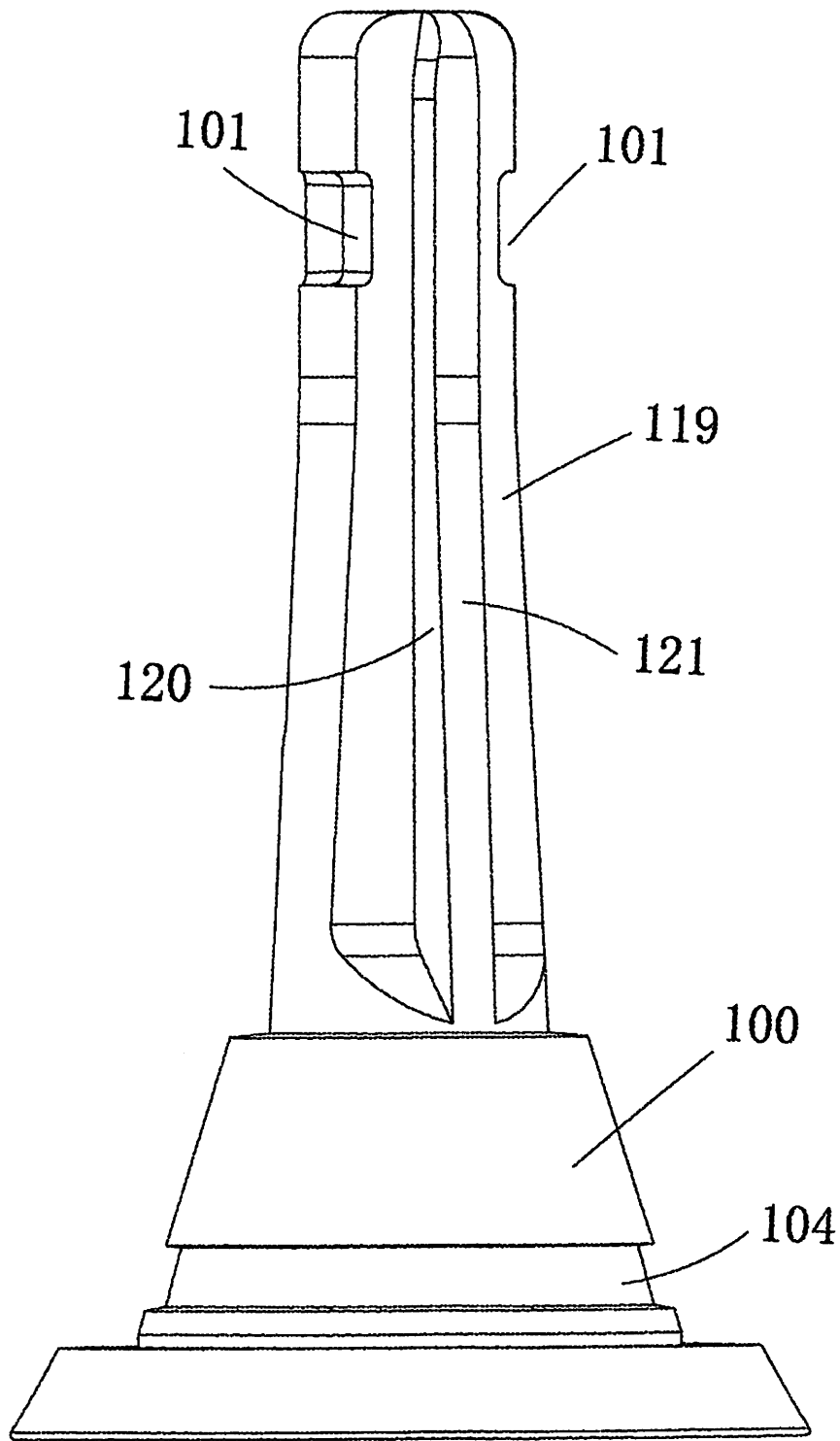


Fig.5

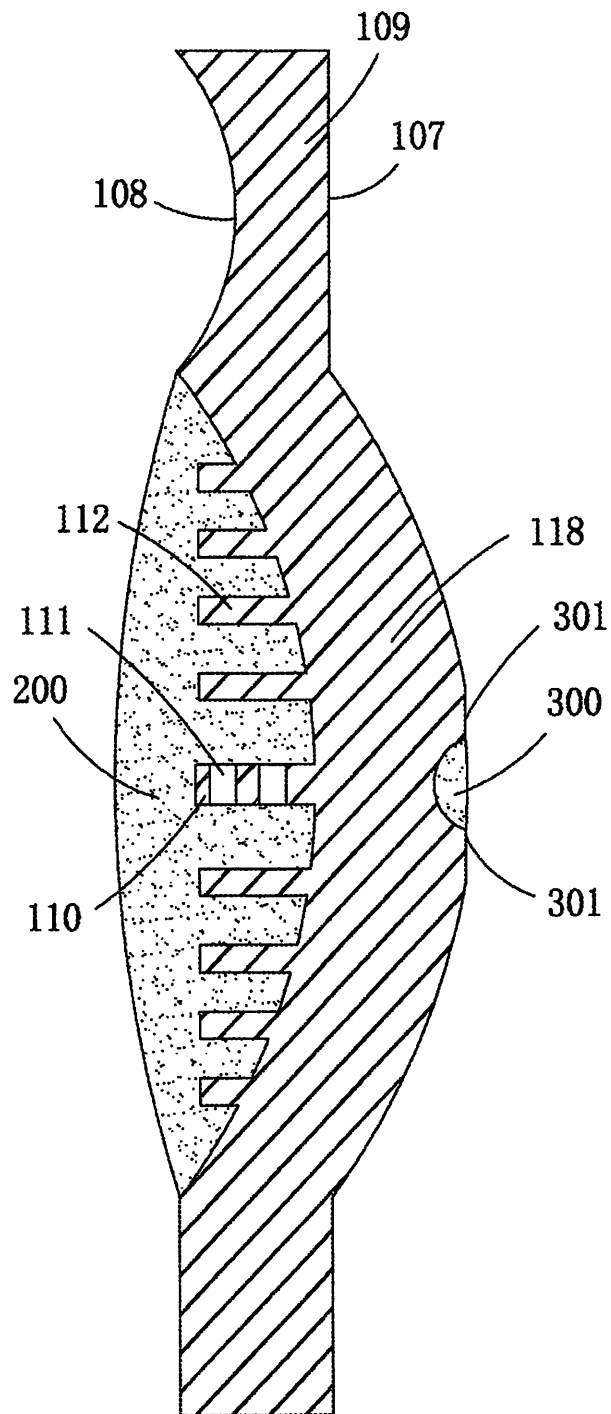


Fig.6

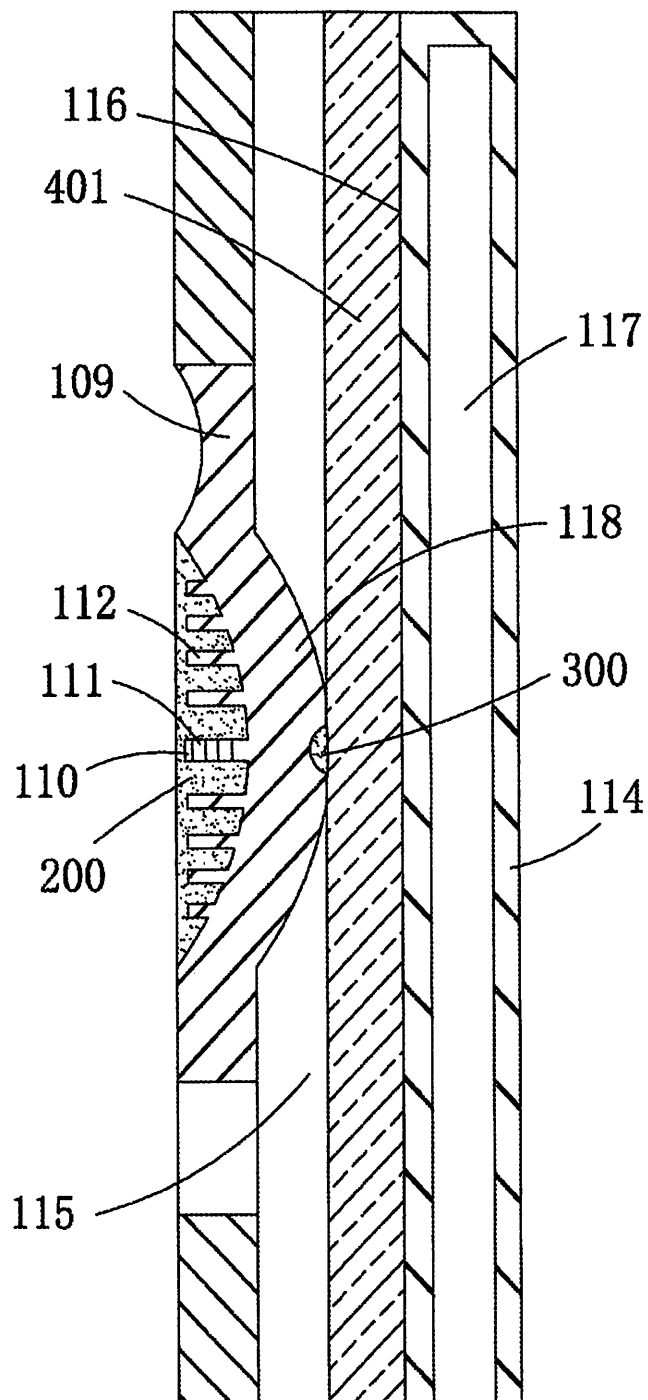


Fig.7

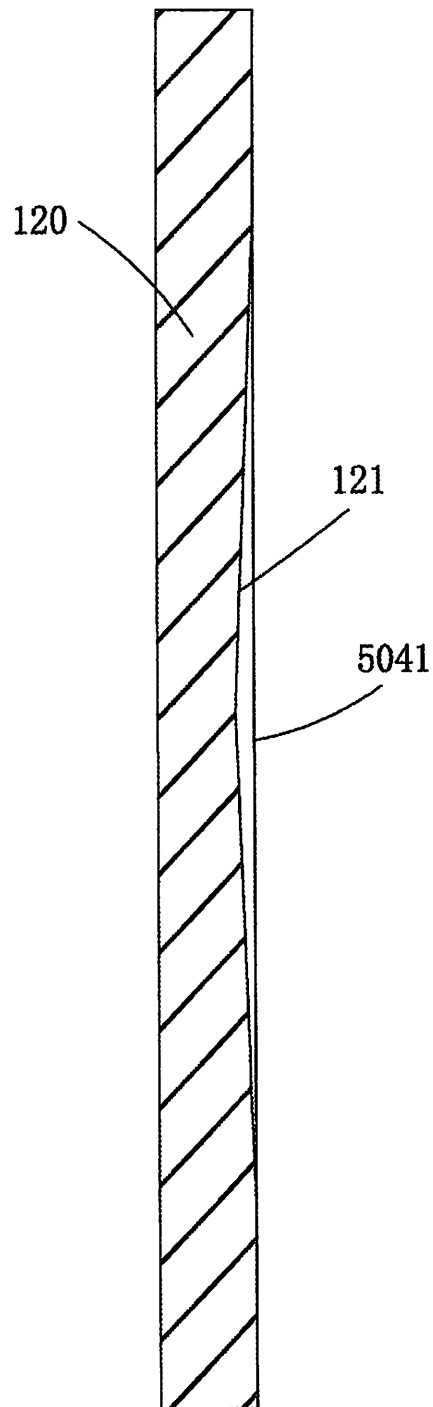


Fig.8

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**ELECTRICAL TOOTHBRUSH HEAD IN
SECURE CONTACT ENGAGEMENT WITH
VIBRATION CORE**

FIELD OF THE INVENTION

The present invention relates generally to the technical field of electrical toothbrushes, and more particularly to an electrical toothbrush head that is in secure contact engagement with a vibration core.

DESCRIPTION IF THE RELATED ART

With the continuous heightening of living standard, electrical toothbrushes have been gaining popularity in the market. An electrical toothbrush uses fast rotation or vibration of a vibration core to induce high frequency vibration in the brushing head of the toothbrush head by which tooth paste is instantaneously decomposed into fine foaming that goes deeply into gaps between teeth for cleaning. On the other hand, the vibration of the bristles helps enhance oral cavity blood circulation and also provide an effect of massaging to the gingival tissues.

An electrical toothbrush is made up of a toothbrush handle and a toothbrush head. The toothbrush handle includes a vibration core arranged at a top thereof. The toothbrush head is formed, in an interior thereof, with a core channel having a bottom opening. The toothbrush head is provided with bristles. The vibration core of the toothbrush handle is inserted, from bottom to top, into the core channel of the toothbrush head, and the vibration core is set in contact engagement with the core channel. In this way, high frequency vibration of the vibration core can drive the bristles of the toothbrush head to vibrate in order to achieve an effect of brushing teeth with the bristles.

In the known art, when the toothbrush handle is brought into mating engagement with the toothbrush head, the vibration core of the toothbrush handle is inserted into the core channel and direct contact engagement between the vibration core and an inside surface of the core channel help realize transmission of vibration. However, since the contact engagement between the vibration core and the inside surface of the core channel is in firm contact and the engagement may not be stable and secure so as to affect the transmission of vibration between the vibration core and the toothbrush head.

SUMMARY OF THE INVENTION

An objective of the present invention is to provide an electrical toothbrush head that is in firm contact engagement with a vibration core in order to overcome the problem that the contact engagement between the electrical toothbrush head and the vibration core is insecure.

The present invention is implemented as follows. An electrical toothbrush head for being in secure contact engagement with a vibration core comprises a toothbrush body, the toothbrush body being provided, in a lower part thereof, with an insertion compartment that has a bottom opening, an insertion piece being inserted through the bottom opening and disposed in the insertion compartment, the insertion piece being provided, in a lower part thereof, with a core channel into which the vibration core in a flat form is insertable, the insertion piece being formed, in a bottom thereof, with an insertion opening in communication with the core channel;

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the insertion piece being provided in a sidewall thereof with a sideways slot, the sideways slot penetrating to outside of the insertion piece and the core channel, an elastic bar that is integrally formed as one piece and elastically swingable being arranged in the sideways slot, the elastic bar being arranged to extend in an axial direction of the core channel, an upper end of the elastic bar being fixedly connected to the sidewall of the insertion piece, a lower end of the elastic bar being arranged in a movable manner;

the core channel having an inner surface that forms a contact engagement surface arranged to face the elastic bar, the contact engagement surface extending regularly and smoothly in an axial direction of the core channel, the elastic bar having a middle portion that bulges and curves toward the core channel to form a curved section, a contact engagement spacing being present between the curved section and the contact engagement surface, the contact engagement spacing being formed in a middle of the core channel, the contact engagement spacing being smaller than a thickness of the vibration core;

the vibration core including two core side surfaces that are opposite to each other, such that when the vibration core is inserted into the core channel through the insertion opening of the insertion piece, the vibration core extends through the contact engagement spacing to set the contact engagement surface in contact and pressing engagement with one of the core side surfaces of the vibration core, through surface engagement therebetween, another one of the core side surfaces of the vibration core being in contact and pressing engagement with the curved section and pushing the elastic bar to elastically deform away from the contact engagement surface; and

an outside surface of the curved section surrounding and defining a curved trough, the curved trough being completely filled with a single-piece elastic filler block, the elastic filler block contacting and pressing an inside surface of the insertion compartment and being in a compressed state.

Further, the curved trough is provided therein with a constraint plate that is arranged horizontal, an inner end of the constraint plate being fixedly connected to a middle of the outside surface of the curved section, an outer end of the constraint plate extending toward an inside surface of the insertion compartment and forming a constraint spacing with respect to the inside surface of the insertion compartment, the elastic filler block covering and enclosing entirety of the constraint plate.

Further, the constraint plate divides the curved trough into two separation troughs that are respectively arranged at upper and lower sides, the elastic filler block filling up both of the two separation troughs, the constraint plate being formed with multiple penetration holes that extend longitudinally through the constraint plate, the elastic filler block filling up the multiple penetration holes.

Further, the separation troughs are provided therein with multiple horizontal pillars that are set horizontal, the multiple horizontal pillars being sequentially arranged at intervals in an axial direction of the core channel; the horizontal pillars have an inner end fixedly connected to the outside surface of the curved section, the horizontal pillars having an outer end extending toward the inside surface of the insertion compartment and being arranged to be spaced from the inside surface of the insertion compartment, the elastic filler block covering and enclosing the multiple horizontal pillars.

Further, the curved section has a curved side surface facing toward the contact engagement surface, a middle of the curved side surface being recessed in a direction away

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from the contact engagement surface to form a recessed groove, an interior of the recessed groove being filled up with a silicone rubber body; the curved side surface includes two planar pressing surfaces, the two planar pressing surfaces being respectively located on upper and lower sides of the recessed groove, the two planar pressing surfaces being each arranged in a manner of being flush with an outside surface of the silicone rubber body; when the vibration core is inserted into the core channel, the two planar pressing surfaces and the outside surface of the silicone rubber body are each contacting and pressing against the core side surface of the vibration core.

Further, the insertion piece includes a projection plate, the projection plate being arranged to extend in an axial direction of the core channel, the contact engagement surface of the core channel being formed on an inner side of the projection plate, the projection plate being formed with a hollow cavity that includes a bottom opening, the hollow cavity being arranged to extend in the axial direction of the core channel, the hollow cavity and the contact engagement surface being arranged to separate from each other.

Further, the elastic bar includes, in an upper part, a deformable section, an upper end of the deformable section being fixedly connected to a side wall of the insertion piece, a lower end of the deformable section being joined to the curved section; the deformable section includes an inside surface facing the core channel, the inside surface of the deformable section being a regular and smooth longitudinal surface, the deformable section including an outside surface facing the inside surface of the insertion compartment, the outside surface of the deformable section being of a curved recess facing toward the core channel.

Further, the insertion piece is provided, on an outside surface, with a planar section 119 in the form of a regular and smooth longitudinal surface, the planar section and the contact engagement surface being arranged opposite to each other, the planar section being arranged to extend in the axial direction of the core channel, a rib being formed on and raised from a middle portion of the planar section, the rib being arranged to extend in the axial direction of the core channel and spanning over entirety of the planar section.

Further, the insertion piece is provided, in an outside surface of an upper part thereof, with two retaining notches, the two retaining notches being arranged opposite to each other, the retaining notches having two ends horizontally extending through the insertion piece, the insertion compartment being provided with two retaining blocks raised from an inside surface thereof, the two retaining blocks being respectively insertable into the retaining notches.

Further, the insertion piece is provided, in an outside surface of a lower part thereof, with a circumferential groove, the circumferential groove being of a circumferential arrangement circling about the axial direction of the insertion piece, the insertion compartment being provided with multiple engagement projections raised from an inside surface thereof, the multiple engagement projections being sequentially and circumferentially arranged at intervals, the multiple engagement projections being insertable into the circumferential groove.

Compared to the known techniques, the present invention provides an electrical toothbrush head that can be set in secure contact engagement with a vibration core, wherein in combination with the toothbrush handle, the vibration core is inserted into the core channel, and the vibration core is clamped between the contact engagement surface and the curved section. Due to the elastic bar being deformed to swing outward, the elastic filler block is compressed. As

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such, the restoring forces of the elastic filler block and the elastic bar drive the curved section to elastically contact and press the vibration core, where the contacting and pressing is achieved in a secured and firm manner and allowing for elastic connection in cooperation with high frequency vibration of the vibration core.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing an electrical toothbrush that can be set in secure contact engagement with a vibration core according to the present information;

FIG. 2 is a perspective view showing a toothbrush body according to the present invention;

FIG. 3 is a perspective view showing a toothbrush handle according to the present invention;

FIG. 4 is a perspective view showing an insertion piece according to the present invention;

FIG. 5 is a perspective view showing an insertion piece according to the present invention;

FIG. 6 is a cross-sectional view showing an elastic filler block according to the present invention in an uncompressed state;

FIG. 7 is a cross-sectional view showing a vibration core in collaborative engagement with an elastic bar and a contact surface; and

FIG. 8 is a partial cross-sectional view showing collaborative combination between a rib and an insertion slot according to the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

For better understanding of the purpose, technical solution, and advantages of the present invention, a more detailed description will be provided for the present invention, with reference to the attached drawings and embodiments thereof. It is noted that the specific embodiments described herein are provided only for illustration of the present invention and should not be construed to impose undue constraints to the present invention.

The detailed description of the present invention provided below refers only to specific embodiments thereof.

Identical or similar reference signs shown in the attached drawings refer to identical or similar parts of the embodiment. In the description of the present invention, it is noted that terms, such as "up", "down", "left", and "right", which are used to indicate a directional or positional relationship refer to a directional or positional relationship illustrated in the drawings and are used only for easy description of the present invention and simplifying the illustration, and are not indicate or suggest a specific device or component must take a specific direction or constructed and operated according to a specific direction. Thus, the terms that are used to describe the positional relationship in the drawings are only used for illustrative purposes and should not be construed as constraint to the patent. For those having ordinary skill in the art, the meaning of such terms can be understood according to specific context.

Referring to FIGS. 1-8, a preferred embodiment according to the present invention is provided.

The instant embodiment provides an electrical toothbrush head that is collaboratively combinable with a vibration core 401 of a toothbrush handle 400, and the electrical toothbrush head and the toothbrush handle 400 are combined together to form a complete electrical toothbrush.

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The electrical toothbrush head that can be set in secure contact engagement with the vibration core comprises a toothbrush body 500. The toothbrush body 500 may have a shape that is determined according to practical needs and is not limited to any specific shape. The toothbrush body 500 is provided, in a lower part thereof, with an insertion compartment 501 that has a bottom opening. An insertion piece 100 is inserted through the bottom opening and disposed in the insertion compartment 501. The insertion piece 100 is provided, in a lower part thereof, with a core channel 115 into which the vibration core 401 that is made in a flat form is insertable. The insertion piece 100 is formed, in a bottom thereof, with an insertion opening in communication with the core channel 115. The insertion piece 100 is inserted through the bottom opening of the insertion compartment 501 into the insertion compartment 501 to be retained therein, and the vibration core 401 is inserted through the insertion opening into the core channel 115 to be retained therein.

The insertion piece 100 is provided in a sidewall thereof with a sideways slot 102. The sideways slot 102 penetrates to outside of the insertion piece 100 and the core channel 115. An elastic bar 103 that is integrally formed as one piece and elastically swingable is arranged in the sideways slot 102. The elastic bar 103 is arranged to extend in an axial direction of the core channel 115, and an upper end of the elastic bar 103 is fixedly connected to the sidewall of the insertion piece 100, while a lower end of the elastic bar 103 is arranged in a movable manner. In this way, when pressed by the vibration core 401, the elastic bar 103 may undergo elastic swinging by taking the upper end thereof as a swing position, and when the vibration core 401 is withdrawn from the core channel 115, under an action of elastic restoring force of the elastic bar 103, the elastic bar 103 resumes an original state.

The core channel 115 has an inner surface that forms a contact engagement surface 116 arranged to face the elastic bar 103. The contact engagement surface 116 extends regularly and smoothly in an axial direction of the core channel 115. The elastic bar 103 has a middle portion that bulges and curves toward the core channel 115 to form a curved section 118. A contact engagement spacing is present between the curved section 118 and the contact engagement surface 116. The contact engagement spacing is formed in the middle of the core channel 115, and the size of the contact engagement spacing is smaller than a thickness of the vibration core 401.

Due to the contact engagement spacing being smaller than the thickness of the vibration core 401, when the vibration core 401 is inserted through the contact engagement spacing, the elastic bar 103 swings away from the contact engagement surface 116 and induces a restoring force toward the contact engagement surface 116. The restoring force allows the curved section 118 to firmly and securely contact and engage with the vibration core 401.

The vibration core 401 includes two core side surfaces that are opposite to each other. When the vibration core 401 is inserted into the core channel 115 through the insertion opening of the insertion piece 100, the vibration core 401 extends through the contact engagement spacing to set the contact engagement surface 116 in contact and pressing engagement with one of the core side surfaces of the vibration core 401, through surface engagement therebetween, while another one of the core side surfaces of the vibration core 401 is in contact and pressing engagement with the curved section 118 and pushes the elastic bar 103 to elastically deform away from the contact engagement surface 116. The restoring force of the elastic bar 103 also

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drives the curved section 118 toward the contact engagement surface 116 to contact and engage with the vibration core 401. In this way, surface contact engagement between one of the core side surfaces of the vibration core 401 and the contact engagement surface 116 is made more secured and firmer.

An outside surface of the curved section 118 surrounds and defines a curved trough, and the curved trough, in the entirety thereof, is filled with a single piece, block-like, elastic filler block 200. The elastic filler block 200 contacts and presses an inside surface of the insertion compartment 501 and is in a compressed state. After the insertion piece 100 is inserted into the insertion compartment 501, the elastic filler block 200 is set in the compressed state. In this way, the elastic filler block 200 generates a restoring force toward the curved section 118, and the restoring force further drives the curved section 118 to more securely and more firmly contact and engage with the core side surface of the vibration core 401.

When electrical toothbrush head that can be set in secure contact engagement with the vibration core as described above is put into collaborative combination with the toothbrush handle 400, the vibration core 401 penetrates into the core channel 115, and the vibration core 401 is sandwiched between and clamped by the contact engagement surface 116 and the curved section 118. And, since the elastic bar 103 deforms and swings in an outward direction, the elastic filler block 200 gets compressed. As such, the restoring forces of the elastic filler block 200 and the elastic bar 103 drive the curved section 118 to elastically contact and press against the vibration core 401, achieving secured and firm contact engagement, allowing for elastic connection in cooperation with the high frequency vibration of the vibration core 401.

The curved trough is provided therein with a constraint plate 110 that is arranged horizontal. An inner end of the constraint plate 110 is fixedly connected to a middle of the outside surface of the curved section 118, and an outer end of the constraint plate 110 extends toward an inside surface of the insertion compartment 501, and forming a constraint spacing with respect to the inside surface of the insertion compartment 501. The elastic filler block 200 covers and encloses the entirety of the constraint plate 110.

The constraint plate 110 is arranged in the curved trough, and the constraint plate 110 is connected to the middle of the curved trough, so that the constraint plate 110 improves the bending strength of the curved section 118 and prevents the curved section 118 from deforming when the curved section 118 is being contacted and pressed. Further, the arrangement of the constraint plate 110 also helps to securely retain the elastic filler block 200 in the curved trough. Further, the constraint spacing formed between the constraint plate 110 and the inside surface of the insertion compartment 501 sets a constraint to a distance of elastically swinging of the elastic bar 103.

The constraint plate 110 divides the curved trough into two separation troughs that are respectively arranged at upper and lower sides. The elastic filler block 200 fills up both of the two separation troughs. The constraint plate 110 is formed with multiple penetration holes 111 that extend longitudinally through the constraint plate 110. The elastic filler block 200 fills up the multiple penetration holes 111. By means of the arrangement of the penetration holes 111 and the elastic filler block 200 filling up the penetration holes 111, portions of the elastic filler block 200 in the two separation troughs can be joined together as one piece, keeping the integrity of the elastic filler block 200 and

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achieving an effect of reinforcing the constraint plate 110 to further keep the bending strength of the curved section 118.

The separation troughs are each provided therein with multiple horizontal pillars 112 that are set horizontal. The multiple horizontal pillars 112 are sequentially arranged at intervals in an axial direction of the core channel 115. The horizontal pillars 112 have an inner end fixedly connected to the outside surface of the curved section 118, and the horizontal pillars 112 have an outer end extending toward the inside surface of the insertion compartment 501 and being arranged to be spaced from the inside surface of the insertion compartment 501. The elastic filler block 200 covers and encloses the multiple horizontal pillars 112.

The arrangement of the horizontal pillars 112 helps improve the bending strength of the entirety of the curved section 118, so that, together with the arrangement of the constraint plate 110, the bending strength of the entirety of the curved section 118 can be assured, so that the curved section 118, as being contacted and pressed by the vibration core 401 operating at a high frequency, is prevented from deforming to cause subsequent instability for contact engagement thereof.

In the instant embodiment, the curved section 118 has a curved side surface facing toward the contact engagement surface 116. A middle of the curved side surface is recessed in a direction away from the contact engagement surface 116 to form a recessed groove. An interior of the recessed groove is filled up with a silicone rubber body 300. The curved side surface includes two planar pressing surfaces 301. The two planar pressing surfaces 301 are respectively located on upper and lower sides of the recessed groove. The two planar pressing surfaces 301 are each arranged in a manner of being flush with an outside surface of the silicone rubber body 300. As such, when the vibration core 401 is inserted into the core channel 115, the two planar pressing surfaces 301 and the outside surface of the silicone rubber body 300 are each contacting and pressing against the core side surface of the vibration core 401 to increase the contacting and pressing surface area of the vibration core 401. Further, contacting and pressing conducted on the outside surface of the silicone rubber body 300 would improve the security and firmness of contact engagement.

The insertion piece 100 includes a projection plate 114. The projection plate 114 is arranged to extend in an axial direction of the core channel 115. The contact engagement surface 116 of the core channel 115 is formed on an inner side of the projection plate 114. The projection plate 114 is formed with a hollow cavity 117 that includes a bottom opening. The hollow cavity 117 is arranged to extend in the axial direction of the core channel 115. The hollow cavity 117 and the contact engagement surface 116 are arranged to separate from each other.

With the arrangement of the hollow cavity 117, the contact engagement surface 116, as being contacted and pressed by the vibration core 401, may be elastically deformable. Particularly, when the vibration core 401 is vibrating at a high frequency, the contact engagement surface 116 may get deformed in collaboration therewith. As such, all the three of the elastic filler block 200, the elastic bar 103, the contact engagement surface 116 are elastically deformable, this not only allowing the vibration core 401 to be securely disposed in the core channel 115, but also achieving elastic contact and pressing between the curved section 118 and the contact engagement surface 116 and the vibration core 401 when the vibration core 401 is vibrating at a high frequency, thereby preventing damage to the

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vibration core 401, and excessive abrasion of the curved section 118 and the contact engagement surface 116.

The elastic bar 103 includes, in an upper part, a deformable section 109. An upper end of the deformable section 109 is fixedly connected to a side wall of the insertion piece 100, and a lower end of the deformable section 109 is joined to the curved section 118. The deformable section 109 includes an inside surface 107 facing the core channel 115. The inside surface 107 of the deformable section 109 is a regular and smooth longitudinal surface. The deformable section 109 includes an outside surface 108 facing the inside surface of the insertion compartment 501. The outside surface 108 of the deformable section 109 is of a curved recess facing toward the core channel 115.

In this way, the elastic deformability of the deformable section 109 in a direction away from the contact engagement surface 116 is higher than the elastic deformability of the deformable section 109 in a direction toward the contact engagement surface 116, allowing the vibration core 401 to easily insert into the core channel 115 and penetrate through the contact engagement spacing.

The insertion piece 100 is provided, on an outside surface, with a planar section 119 in the form of a regular and smooth longitudinal surface. The planar section 119 and the contact engagement surface 116 are arranged opposite to each other. The planar section 119 is arranged to extend in the axial direction of the core channel 115. A rib 120 is formed on and raised from a middle portion of the planar section 119. The rib 120 is arranged to extend in the axial direction of the core channel 115 and spans over the entirety of the planar section 119.

Arranging the rib 120 on the planar section 119 helps improve the strength of the planar section 119 and also to limit deformation of the projection in the side thereof that is opposite to the contact engagement surface 116, so as to ensure individual elastic deformability of the contact engagement surface 116. Further, the insertion compartment 501 is also provided, in the interior thereof, with an insertion slot 504. In the collaborative combining of the insertion piece 100 and the insertion compartment 501, the rib 120 is fit into the insertion slot 504, so that connection between the middle of the insertion piece 100 and the toothbrush body 500 is made secured and firm.

Referring to FIG. 8, in the instant embodiment, the insertion slot 504 includes an insertion slot bottom wall 5041 facing the planar section 119, the rib 120 includes a rib wall 121 facing the bottom wall of the insertion slot 504. After the rib 120 is inserted into the insertion slot 504, the rib wall 121 and the insertion slot bottom wall 5041 are facing each other, and upper and lower ends of the rib wall 121 are separately in contact engagement with the insertion slot bottom wall 5041. A gap is present between a middle portion of the rib wall 121 and the insertion slot bottom wall 5041. In this way, due to the rib wall 121 and the insertion slot bottom wall 5041 including the gap therebetween, the collaborative combination of the rib 120 and the insertion slot 504 would include an elastic variation space. When the contact engagement surface 116 is contacted and pressed by the vibration core 401, the hollow cavity 117 of the projection plate 114 and the combination gap between the rib 120 and the insertion slot 504 both suit the need for elastic deformation of the contact engagement surface 116, achieving elastic contact engagement between contact engagement surface 116 and the vibration core 401.

The insertion piece 100 is provided, in an outside surface of an upper part thereof, with two retaining notches 101. The two retaining notches 101 are arranged opposite to each

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other. The retaining notches 101 have two ends horizontally extending through the insertion piece 100. The insertion compartment 501 is provided with two retaining blocks 505 raised from an inside surface thereof. The two retaining blocks 505 are respectively inserted into the retaining notches 101. The collaborative engagement between the retaining blocks 505 and the retaining notches 101 allows the upper part of the insertion piece 100 to be securely connected to the toothbrush body 500.

The insertion piece 100 is provided, in an outside surface of a lower part thereof, with a circumferential groove 104. The circumferential groove 104 is of a circumferential arrangement circling about the axial direction of the insertion piece 100. The insertion compartment 501 is provided with multiple engagement projections 503 raised from an inside surface thereof. The multiple engagement projections 503 are sequentially and circumferentially arranged at intervals. The multiple engagement projections 503 are insertable into the circumferential groove 104 to have the lower part of the insertion piece 100 securely connected to the toothbrush body 500.

As such, the collaborative combination between the retaining notches 101 and the retaining blocks 505 and the collaborative combination between the rib 120 and the insertion slot 504, as well as the combination between the circumferential groove 104 and the engagement projections 503 achieve retaining combination in upper, middle, and lower parts between the insertion piece 100 and the insertion compartment 501, ensuring secured disposition of the insertion piece 100 in the interior of the insertion compartment 501.

The insertion piece 100 is provided, on a bottom thereof, with a horizontally arranged annular end face. The annular end face is recessed upward to form a first annular area. The first annular area is circumferentially arranged in a circumferential direction of the annular end face. An upper magnetic attraction ring 106 is fit into the first annular area, and the upper magnetic attraction ring 106 is flush with the annular end face.

The toothbrush handle 400 is provided, on a top thereof, with a connecting end face that circumferentially surrounds a periphery of the vibration core 401 and is arranged horizontal and is recessed downward to form a second annular area. The second annular area is circumferentially arranged in a circumferential direction of the connecting end face. A lower magnetic attraction ring 502 is fit into the second annular area, and the lower magnetic attraction ring 502 is flush with the connecting end face.

When the vibration core 401 is inserted into the core channel 115, the annular end face and the connecting end face abut with each other in a top-down fashion. The upper magnetic attraction ring 106 and the lower magnetic attraction ring 502 magnetically attract and connect to each other in a top-down fashion. In this way, the electrical toothbrush head and the toothbrush handle 400 are collaboratively combinable and the magnetic attraction between the upper magnetic attraction ring 106 and the lower magnetic attraction ring 502 enables butting connection and surface engagement between the connecting end face and the annular end face, and the connection is secured and firm.

The above description provides only a preferred embodiment of the present invention and is not intended to limit the present invention. Any modification, equivalent substitute, and improvement that fall in the spirit and principle of the present invention are considered included in the scope of protection of the present invention defined in the appended claims.

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What is claimed is:

1. An electrical toothbrush head for being in secure contact engagement with a vibration core, comprising a toothbrush body, the toothbrush body being provided, in a lower part thereof, with an insertion compartment that has a bottom opening, an insertion piece being inserted through the bottom opening and disposed in the insertion compartment, the insertion piece being provided, in a lower part thereof, with a core channel into which the vibration core in a flat form is insertable, the insertion piece being formed, in a bottom thereof, with an insertion opening in communication with the core channel;

the insertion piece being provided in a sidewall thereof with a sideways slot, the sideways slot penetrating to outside of the insertion piece and the core channel, an elastic bar that is integrally formed as one piece and elastically swingable being arranged in the sideways slot, the elastic bar being arranged to extend in an axial direction of the core channel, an upper end of the elastic bar being fixedly connected to the sidewall of the insertion piece, a lower end of the elastic bar being arranged in a movable manner;

the core channel having an inner surface that forms a contact engagement surface arranged to face the elastic bar, the contact engagement surface extending smoothly in the axial direction of the core channel, the elastic bar having a middle portion that bulges and curves toward the core channel to form a curved section, a contact engagement spacing being present between the curved section and the contact engagement surface, the contact engagement spacing being formed in a middle of the core channel, the contact engagement spacing being smaller than a thickness of the vibration core when the elastic bar is in an original state;

the vibration core including two core side surfaces that are opposite to each other, such that when the vibration core is inserted into the core channel through the insertion opening of the insertion piece, the vibration core extends through the contact engagement spacing to set the contact engagement surface in contact and pressing engagement with one of the core side surfaces of the vibration core, through surface engagement therebetween, another one of the core side surfaces of the vibration core being in contact and pressing engagement with the curved section and pushing the elastic bar to elastically deform away from the contact engagement surface; and

an outside surface of the curved section surrounding and defining a curved trough, the curved trough being completely filled with a single-piece elastic filler block, the elastic filler block contacting and pressing an inside surface of the insertion compartment and being in a compressed state.

2. The electrical toothbrush head for being in secure contact engagement with the vibration core according to claim 1, wherein the curved trough is provided therein with a constraint plate that is arranged horizontal, an inner end of the constraint plate being fixedly connected to a middle of the outside surface of the curved section, an outer end of the constraint plate extending toward an inside surface of the insertion compartment and forming a constraint spacing with respect to the inside surface of the insertion compartment, the elastic filler block covering and enclosing entirety of the constraint plate.

3. The electrical toothbrush head for being in secure contact engagement with the vibration core according to claim 2, wherein the constraint plate divides the curved

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trough into two separation troughs that are respectively arranged at upper and lower sides, the elastic filler block filling up both of the two separation troughs, the constraint plate being formed with multiple penetration holes that extend longitudinally through the constraint plate, the elastic filler block filling up the multiple penetration holes.

4. The electrical toothbrush head for being in secure contact engagement with the vibration core according to claim 3, wherein the separation troughs are provided therein with multiple horizontal pillars that are set horizontal, the multiple horizontal pillars being sequentially arranged at intervals in the axial direction of the core channel; the horizontal pillars each having an inner ends fixedly connected to the outside surface of the curved section, the horizontal pillars each having an outer end extending toward the inside surface of the insertion compartment and being arranged to be spaced from the inside surface of the insertion compartment, the elastic filler block covering and enclosing the multiple horizontal pillars.

5. The electrical toothbrush head for being in secure contact engagement with the vibration core according to claim 1, wherein the curved section has a curved side surface facing toward the contact engagement surface, a middle of the curved side surface being recessed in a direction away from the contact engagement surface to form a recessed groove, an interior of the recessed groove being filled up with a silicone rubber body; the curved side surface includes two planar pressing surfaces, the two planar pressing surfaces being respectively located on upper and lower sides of the recessed groove, the two planar pressing surfaces being each arranged in a manner of being flush with an outside surface of the silicone rubber body, when the vibration core is inserted into the core channel, the two planar pressing surfaces and the outside surface of the silicone rubber body are each contacting and pressing against the core side surface of the vibration core.

6. The electrical toothbrush head for being in secure contact engagement with the vibration core according to claim 1, wherein the insertion piece includes a projection plate, the projection plate being arranged to extend in the axial direction of the core channel, the contact engagement surface of the core channel being formed on an inner side of the projection plate, the projection plate being formed with a hollow cavity that includes a bottom opening, the hollow cavity being arranged to extend in the axial direction of the core channel, the hollow cavity and the contact engagement surface being arranged to separate from each other.

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7. The electrical toothbrush head for being in secure contact engagement with the vibration core according to claim 1, wherein the elastic bar includes, in an upper part, a deformable section, an upper end of the deformable section being fixedly connected to a side wall of the insertion piece, a lower end of the deformable section being joined to the curved section; the deformable section includes an inside surface facing the core channel, the inside surface of the deformable section being a regular and smooth longitudinal surface, the deformable section including an outside surface facing the inside surface of the insertion compartment, the outside surface of the deformable section being of a curved recess facing toward the core channel.

8. The electrical toothbrush head for being in secure contact engagement with the vibration core according to claim 1, wherein the insertion piece is provided, on an outside surface, with a planar section in the form of a regular and smooth longitudinal surface, the planar section and the contact engagement surface being arranged opposite to each other, the planar section being arranged to extend in the axial direction of the core channel, a rib being formed on and raised from a middle portion of the planar section, the rib being arranged to extend in the axial direction of the core channel and spanning over entirety of the planar section.

9. The electrical toothbrush head for being in secure contact engagement with the vibration core according to claim 1, wherein the insertion piece is provided, in an outside surface of an upper part thereof, with two retaining notches, the two retaining notches being arranged opposite to each other, the retaining notches having two ends horizontally extending through the insertion piece, the insertion compartment being provided with two retaining blocks raised from an inside surface thereof, the two retaining blocks being respectively insertable into the retaining notches.

10. The electrical toothbrush head for being in secure contact engagement with the vibration core according to claim 1, wherein the insertion piece is provided, in an outside surface of a lower part thereof, with a circumferential groove, the circumferential groove being of a circumferential arrangement circling about an axial direction of the insertion piece, the insertion compartment being provided with multiple engagement projections raised from an inside surface thereof, the multiple engagement projections being sequentially and circumferentially arranged at intervals, the multiple engagement projections being insertable into the circumferential groove.

* * * * *

EXHIBIT C



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August 27, 2022

via email to michael@stockmanporopat.com

Michael J. Poropat
Stockman Poropat, LLC
371 Sunrise Highway
Lynbrook, NY 11563

Re: *Demand for Immediate Retraction of Infringement Complaint*

Mr. Poropat:

This law firm represents Oralic Supplies Inc. (“Oralic”), a leading seller of personal care products on platforms such as Amazon.com.

Late yesterday our client received a notice from Amazon indicating that you filed an infringement report against Oralic’s ASIN B00NN07IMW (the “IMW ASIN”). The ‘IMW ASIN is a BRUSHMO-branded replacement toothbrush head. In the report, you asserted that the ‘IMW ASIN infringes your client’s U.S. Patent 11,253,052 (the “’052 patent”).

We demand that you immediately contact Amazon and withdraw this complaint.

The claims of your client’s patent are very specific and require many features that are not present in the ‘IMW ASIN. To provide just one of many distinctions as an example, all claims of the ‘052 patent require “an elastic bar that is elastically swingable.” This feature is not part of the ‘IMW ASIN.

A Pennsylvania Limited Liability Partnership



Michael J. Poropat
Stockman Poropat LLC
August 27, 2022
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Also, as the Amazon product listing page clearly shows (see below), Oralic introduced the 'IMW ASIN in September 2014:

Product details

Is Discontinued By Manufacturer : No
Product Dimensions : 8.5 x 3.5 x 1 inches; 2.6 Ounces
Item model number : 858431005084
Date First Available : September 17, 2014
Manufacturer : Brushmo
ASIN : B00NN07IMW

The internal structure of the 'IMW ASIN has not changed since at least 2017. Your client filed its patent application in September 2021. The 'IMW ASIN predates your client's patent application by many years. If you do in fact believe that the claims of the '052 patent read onto the 'IMW ASIN, then the '052 patent is invalid in view of Oralic's prior art.

It is obvious that you did little, if any, pre-filing investigation of the 'IMW ASIN. If you had done so, you would have quickly identified the issues described above.

We require your reply, no later than **Monday, August 29**, in which you:

- confirm that you have withdrawn the complaint;
- send us a copy of your communication with Amazon withdrawing the complaint; and
- confirm that you and your client will refrain from such frivolous actions against Oralic and its products, and intentional interference with Oralic's business, in the future.

We anticipate your prompt reply.

Sincerely,

A handwritten signature in black ink that reads 'James M. Singer'.

James M. Singer

EXHIBIT D

(12) **United States Patent**
Liu

(10) **Patent No.:** **US 9,724,180 B1**
 (45) **Date of Patent:** **Aug. 8, 2017**

- (54) **BRUSH HEAD FOR ELECTRIC TOOTHBRUSH**
- (71) Applicant: **Harria Investment Group Inc., Causeway Bay (HK)**
- (72) Inventor: **Xinlan Liu, Rowland Heights, CA (US)**
- (73) Assignee: **Harria Investment Group Inc., Hong Kong (CN)**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **15/400,369**

(22) Filed: **Jan. 6, 2017**

(51) **Int. Cl.**
A61C 17/22 (2006.01)
A61C 17/34 (2006.01)

(52) **U.S. Cl.**
 CPC **A61C 17/222** (2013.01); **A61C 17/3481** (2013.01)

(58) **Field of Classification Search**
 CPC **A61C 17/22; A61C 17/222; A61C 17/32; A61C 17/34; A61C 17/3481**
 USPC **15/22.1, 22.2**
 See application file for complete search history.

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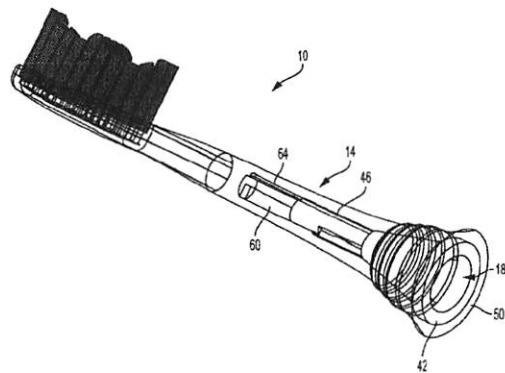
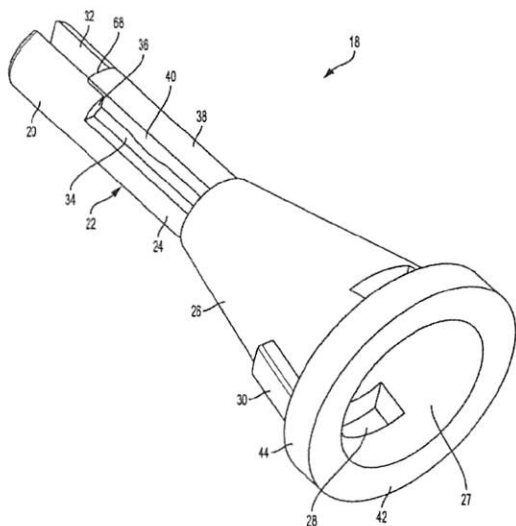
Primary Examiner — Mark Spisich

(74) *Attorney, Agent, or Firm* — Fox Rothschild LLP

(57) **ABSTRACT**

A toothbrush head may include a brush section with bristles thereon, a stem extending from the brush section and a coupling member mountable to inside the stem. The coupling member may have a body that has an opening for receiving a drive shaft of an electric toothbrush handle into the coupling member, and a handle coupling section extending from the body and having a wall and an aperture within the wall for receiving the drive shaft. The wall has at least two longitudinal slits and a resilient wall between the two slits, where the resilient wall may engage with the drive shaft when the drive shaft is inserted into the coupling member. At least a portion of the body of the coupling member and at least a portion of the stem may each have a cone shape that corresponds to each other to achieve a coupling.

20 Claims, 7 Drawing Sheets



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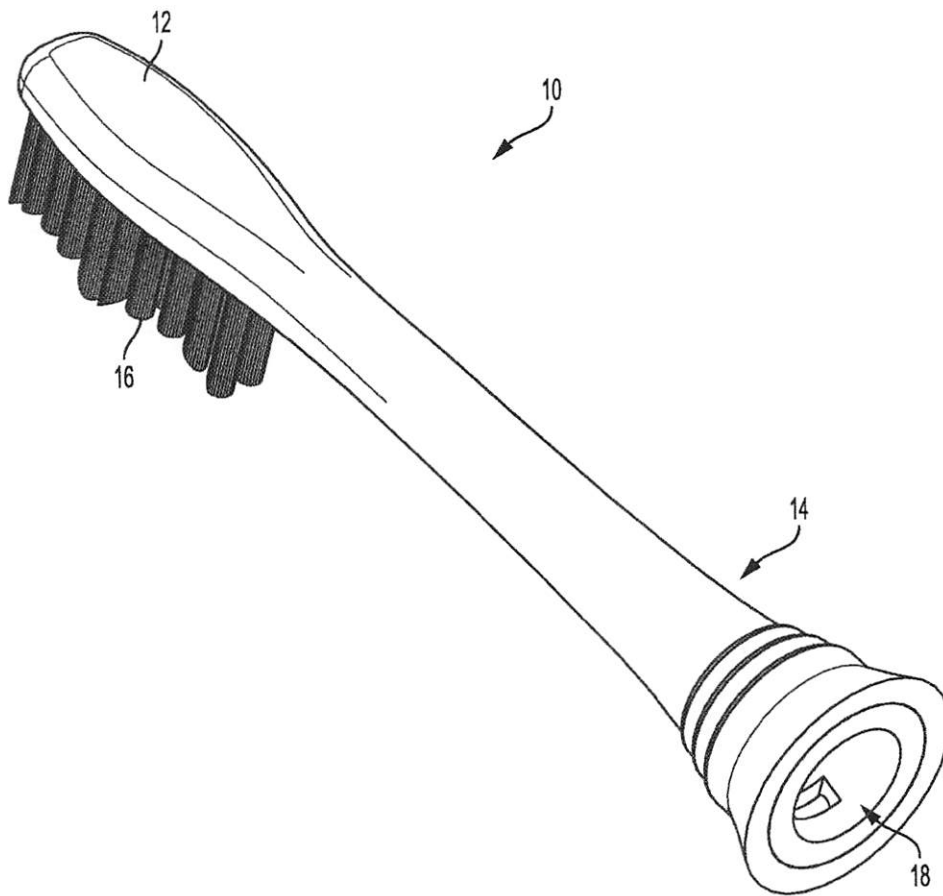


FIG. 1

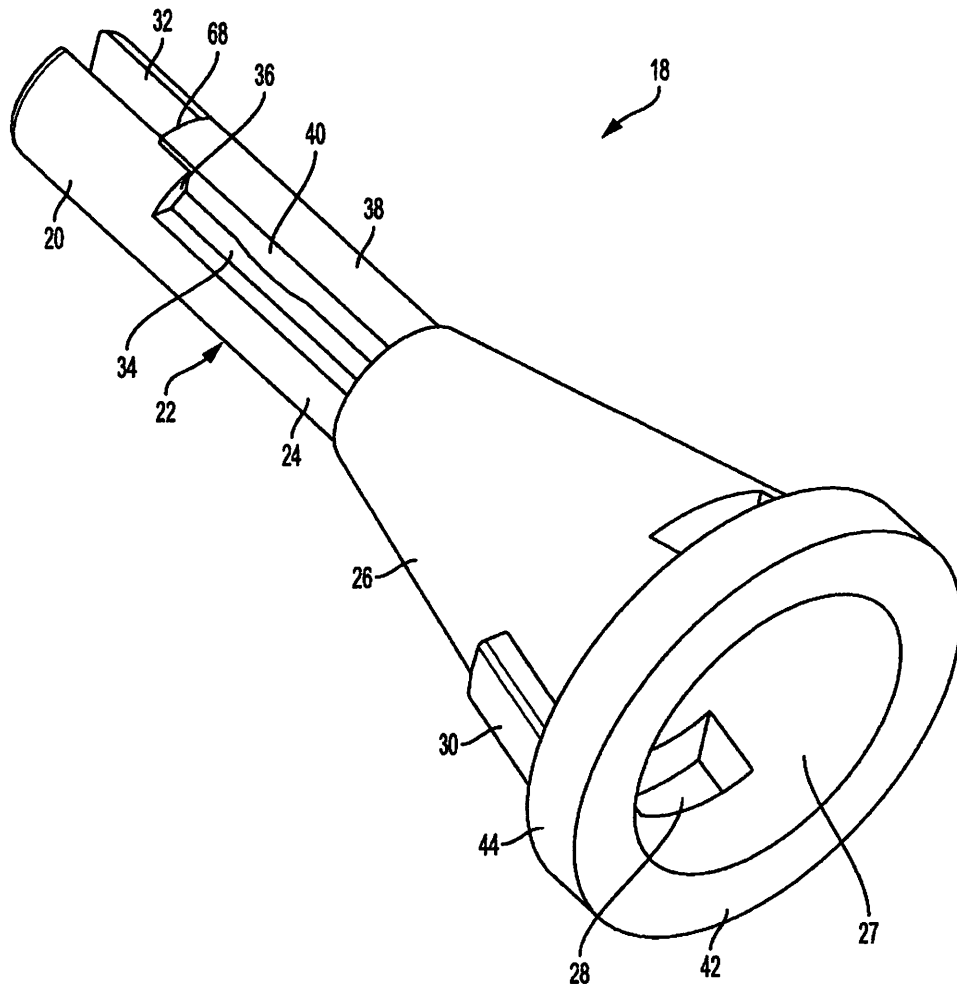


FIG. 2

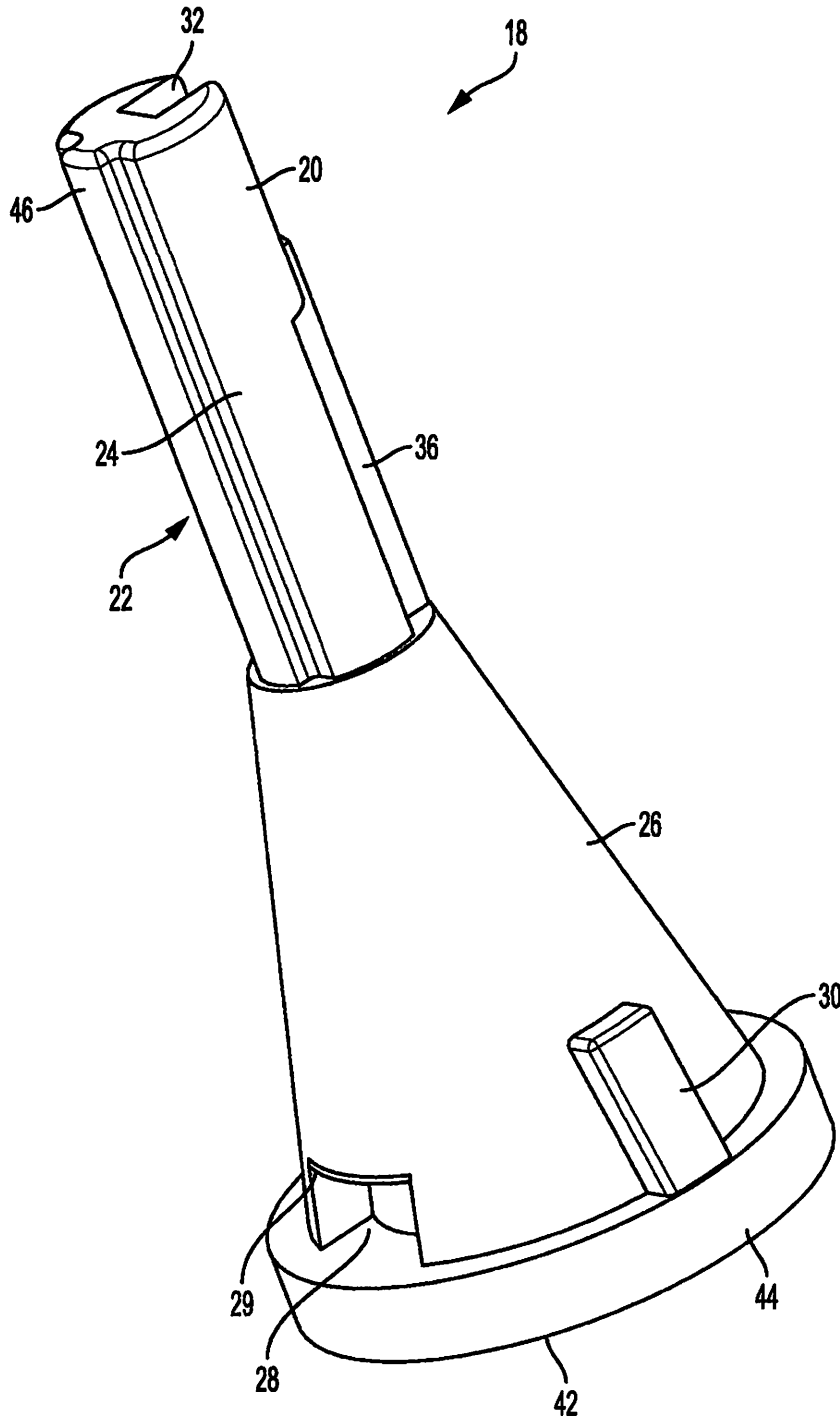


FIG. 3

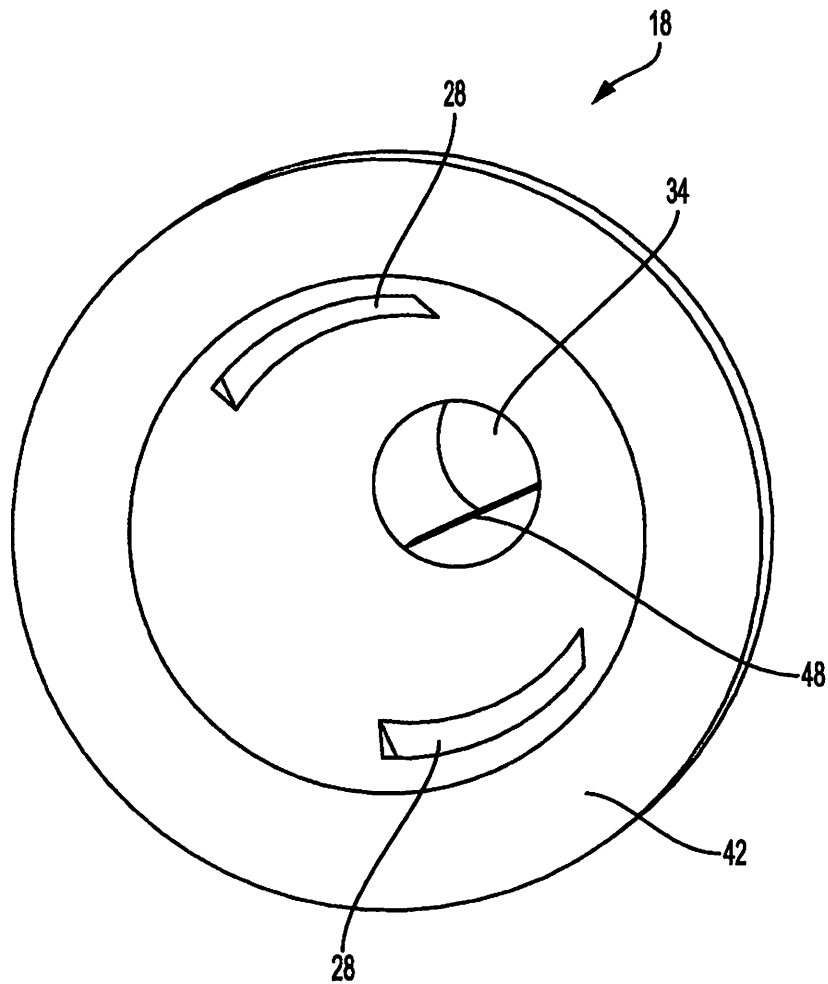


FIG. 4

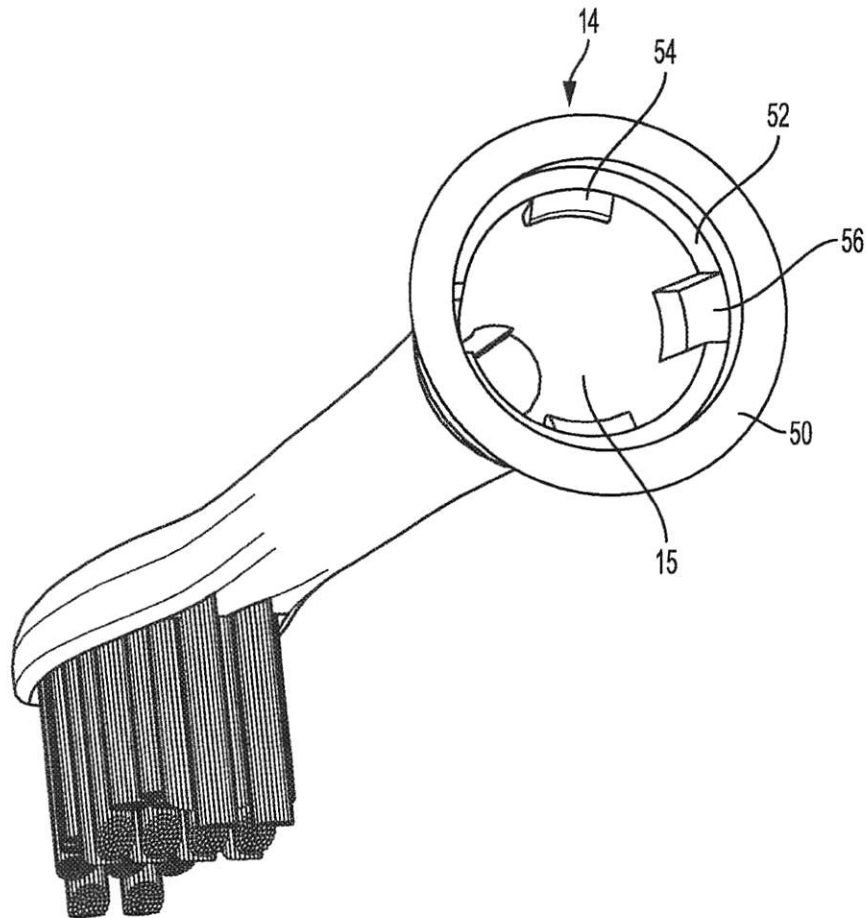


FIG. 5

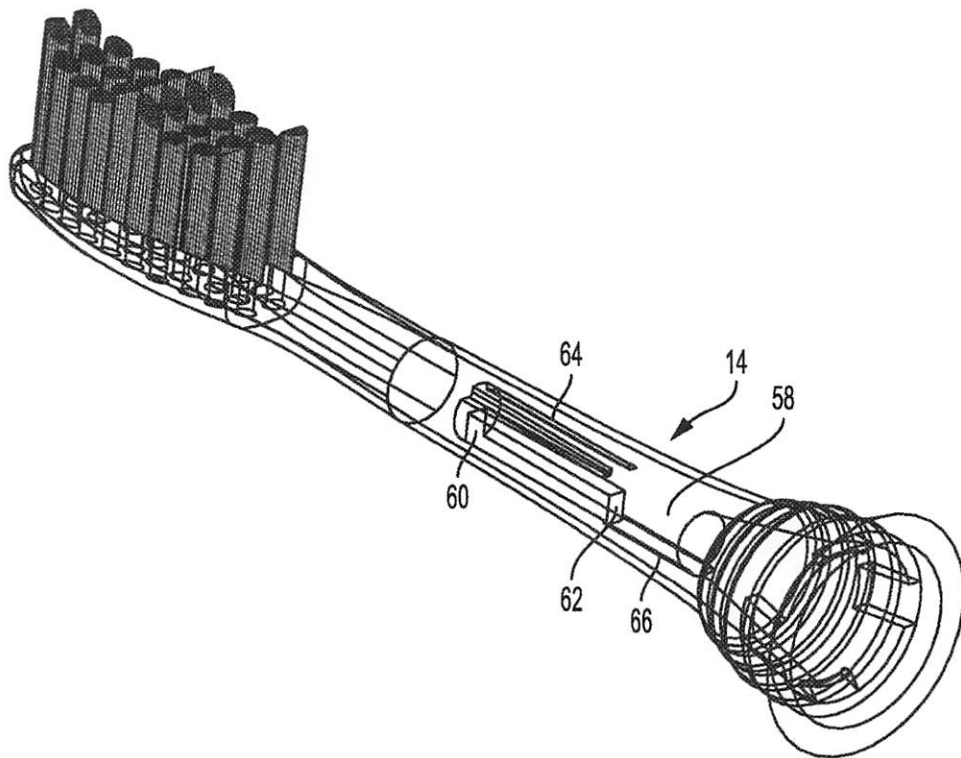


FIG. 6

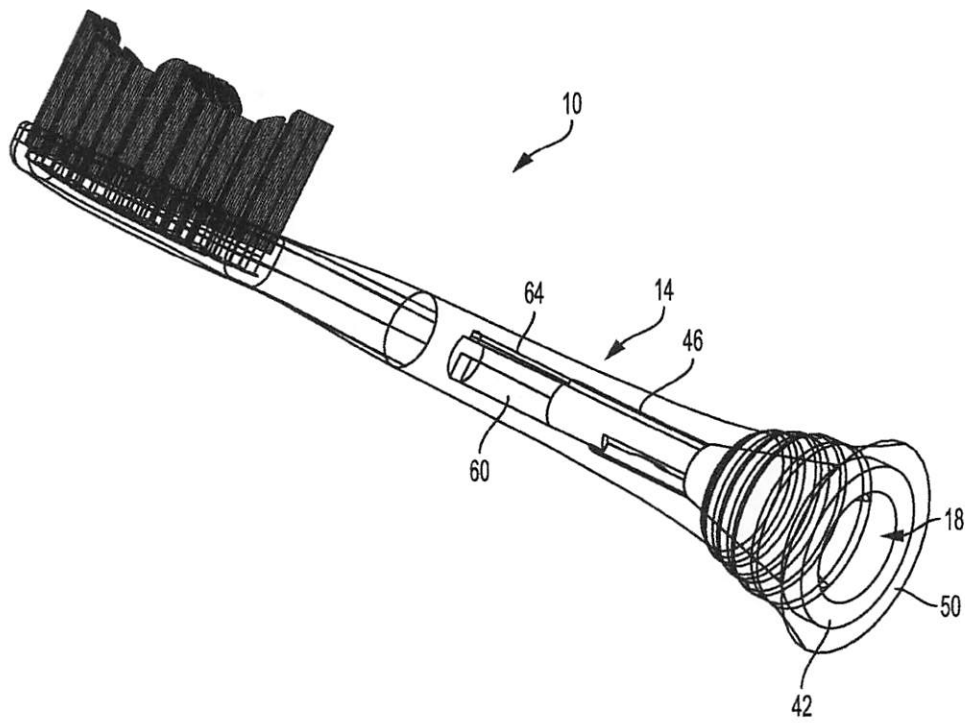


FIG. 7

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**BRUSH HEAD FOR ELECTRIC
TOOTHBRUSH**

BACKGROUND

This disclosure relates to the field of electric toothbrushes and particularly brush heads couplable to an electric toothbrush handle.

Many types of electric toothbrushes use high speed vibrations of the motor inside the toothbrush handle to drive the brush head. In order to operate the electric toothbrush, the construction of the brush head requires that it be tightly coupled to the drive shaft of the toothbrush handle so it can withstand the high speed vibrations from operating the toothbrush. Many existing products, therefore, use metal or springs inside the brush head to facilitate a tight coupling to the drive shaft of the toothbrush handle. This can increase the cost of making the brush head. It is desirable to make a toothbrush head with no or minimal use of metal that can still withstand high speed vibrations from operating the toothbrush.

This patent document describes an apparatus that may address at least some of the issues described above and/or other issues.

SUMMARY

In one embodiment, a toothbrush head includes a brush section having bristles attached thereon, a stem extending from the brush section and a coupling member mountable to inside the stem. The stem has an opening for receiving the coupling member and one or more mounting ridges on inside wall of the opening. The coupling member may have a body having an opening configured to receive a drive shaft of an electric toothbrush handle into the coupling member. The coupling member may also have one or more mounting holes that are positioned to engage with the one or more mounting ridges of the stem to secure the coupling member to the stem in position. The coupling member may also have a handle coupling section extending from the body and having a wall and an aperture within the wall for receiving the drive shaft. The wall has at least two longitudinal slits and a resilient wall between the two slits. The resilient wall is positioned to engage with the drive shaft when the drive shaft is inserted into the coupling member. The handle coupling section may further have a flat engaging surface inside the aperture that is positioned to mate with a flat surface of the drive shaft to ensure a tight coupling. The resilient wall may also have a raised portion extending inward and positioned to touch the drive shaft so that the drive shaft is tightly coupled to the handle coupling section while received in the aperture of the handle coupling section.

In various embodiments, the toothbrush head may have additional features that allow a tight coupling between the stem and the coupling member to be able to withstand high frequency vibration from operating the toothbrush. In one embodiment, the stem may further include a ridge block. The stem may also include a longitudinal channel on the inside wall of the opening. The coupling member may further include a longitudinal ridge that is positioned to engage with the longitudinal channel of the stem. The coupling member may also have a mounting channel that is positioned to engage with the ridge block of the stem.

In one embodiment, the opening of the stem has a base platform, and the opening of the body of the coupling member also has a base platform that is positioned to be flush with the base platform of the stem. Further, the stem

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may have a sitting platform along the inside perimeter of the opening of the stem, and the body of the coupling member may have a base ring around the outside perimeter of the opening of the body and positioned to mate with the sitting platform of the stem.

In one embodiment, at least a portion of the body of the coupling member may be in a cone shape. A portion of the stem proximate to the opening may also have a cone shape that corresponds to the cone shape of the body of the coupling member.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a toothbrush head with a coupling member therein according to one embodiment.

FIG. 2 is a perspective view of a coupling member of a toothbrush head according to the embodiment in FIG. 1.

FIG. 3 is a side perspective view of the coupling member of the toothbrush head according to the embodiment in FIG. 1.

FIG. 4 is a bottom perspective view of the coupling member of the toothbrush head according to the embodiment in FIG. 1.

FIG. 5 is a bottom perspective view of the stem of the toothbrush head according to the embodiment in FIG. 1.

FIG. 6 is a wireframe of the stem of the toothbrush head according to the embodiment in FIG. 1.

FIG. 7 is a transparent view of the toothbrush head with the stem therein according to the embodiment in FIG. 1.

DETAILED DESCRIPTION

This disclosure is not limited to the particular systems, methodologies or protocols described, as these may vary. The terminology used in this description is for the purpose of describing the particular versions or embodiments only, and is not intended to limit the scope.

In one embodiment, a brush head 10 is couplable to a drive shaft of an electric toothbrush handle, as shown in FIG. 1. The brush head 10 includes a brush section 12 that has multiple bristles 16 attached thereon. The brush head 10 also has a stem 14, which extends from the brush section 12. The stem 14 has an opening therein (15 in FIG. 5) for receiving and mounting a coupling member 18. The attachment of the coupling member 18 to the stem 14 is further described in detail with reference to FIG. 2.

As shown in FIG. 2, in the illustrated embodiment, the coupling member 18 has a body 26, which has an opening 27 for receiving a drive shaft of the electric toothbrush handle. The body 26 has one or more mounting holes 28 that are positioned to engage with one or more mounting ridges (54 in FIG. 5) of the stem so that the coupling member can be mounted to the stem. The coupling member 18 also has a handle coupling section 22, which has a wall 24 with an aperture 34 inside the wall. The wall 24 has at least two longitudinal slits 36 that form a resilient wall 38 in between. The resilient wall 38 is positioned to touch the drive shaft when the drive shaft is inserted into the aperture inside the wall 24 and exert a return force inward towards the drive shaft to achieve a tight coupling with the drive shaft.

In the illustrated embodiment, the cross-section of the coupling section 22 may correspond to the size of the stem 14 of the brush head 10, for example, at about 1/8 inch in diameter measured from outside, with a length about 1/2 inch. The body 26 may extend from the coupling section and flares outward to the opening 27 to form a cone shape. The

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opening 27 may be of various sizes, for example, at ½ inch in diameter as measured from outside at its widest point.

In various embodiments, multiple engagements between various parts may additionally facilitate the tight coupling between the brush head and the coupling member. For example, in FIG. 2, the coupling member 18 may have one or more mounting blocks 30 extending from outside the body 26 and that are positioned to engage with one or more mounting receptacles 56 (in FIG. 5) inside the opening 15 (FIG. 5) of the stem 14 (FIG. 5). This engagement between each mounting block 30 and its corresponding mounting receptacles 56 (in FIG. 5) will further lock the coupling member into position to prevent the coupling member from being pushed in or rotating about the axis of the stem.

Alternatively, and/or additionally, as shown in FIG. 3, the coupling member 18 may include a head section 20, which extends from the handle coupling section 22 and has a longitudinal ridge 46 on outside surface of the head section and the longitudinal ridge 46 is positioned to engage with a longitudinal channel inside the stem (shown in 64 in FIG. 6). This engagement between the longitudinal ridge 46 and the longitudinal channel 64 inside the stem prevents the coupling member from rotational movement about the axis of the stem. It further provides a guide to facilitate the insertion of the coupling member into the stem. Optionally, as shown in FIG. 3, the longitudinal ridge 46 may also extend longitudinally from the head section 20 along outside surface of the wall 24 of the handle coupling section 22 of the coupling member to further enhance the engagement between the coupling member 18 and the stem and prevent rotational movement or twisting of the coupling member relative to the stem.

Alternatively, and/or additionally, as shown in FIG. 3, the head section 20 may also have a grooved mounting channel 32, which is positioned to engage with a ridge block 60 (in FIG. 6) in the stem to further facilitate the coupling of the coupling member and the stem. Optionally, as shown in FIG. 6, the ridge block 60 inside the stem 14 may have a stopping edge 62, which is positioned to touch the end 68 of mounting channel 32 (in FIG. 2) of the coupling member to prevent the coupling member from further being inserted into inside the stem.

Alternatively, and/or additionally, as shown in FIGS. 2 and 5, the opening 15 of the stem 14 may have a base platform, and the opening 27 of the body 26 of the coupling member 18 may also have a base platform that is positioned to be flush with the base platform of the stem when the coupling member and the stem are fully engaged (as shown in FIG. 1).

Alternatively, and/or additionally, the coupling member 18 may have an engagement means for further coupling the brush head to the drive shaft of the toothbrush handle. This engagement means may include a raised portion 40 that extends inward from the resilient wall 38 and is positioned to touch the drive shaft when the drive shaft is inserted into the aperture 34 of the handle coupling section 22. The raised portion 40, when touching the drive shaft, will also raise the resilient wall 38 outward, thus to increase the inward returning force of the resilient wall 38, whereby a tighter coupling between the coupling member and the drive shaft of the electric toothbrush handle can be achieved.

Alternatively, and/or additionally, as shown in FIG. 4, the handle coupling section may have a flat engaging surface 48 inside the aperture 34 and is positioned to mate with a flat surface of the drive shaft so that the handle coupling section and the drive shaft can be fully coupled.

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Alternatively, and/or additionally, as shown in FIGS. 2 and 5, the stem 14 may have a sitting platform 52 along a portion or all of the inside perimeter of the opening 15, whereas the opening 27 of the body 26 of the coupling member 18 has a base ring 44 around a portion or all of the outside perimeter of the opening 27 which is positioned to mate with the sitting platform 52 of the stem. This mating arrangement will prevent the coupling member from further moving into the stem when it is fully coupled to the stem. This mating arrangement will also make it easier for base platform 42 of the coupling member 18 and the base platform 50 of the stem 14 to flush when they are being assembled together.

Alternatively, and/or additionally, as shown in FIG. 2, the resilient wall 38 the handle coupling section 22 may raise outward above outside surface of the rest of the wall, while the raised resilient wall 38 forms a longitudinal guide that is positioned to engage with a coupling channel 66 inside the stem 14 (in FIG. 6), to further facilitate the coupling of the coupling member and the stem. In one embodiment, as shown in FIG. 2, the raised resilient wall 38 extends from the end 68 of the mounting channel 32. Correspondingly, as shown in FIG. 6, the coupling channel 66 in the stem may extend from the stopping edge 62 of the ridge block 60 longitudinally outward towards the opening (15 in FIG. 5) to engage with the raised resilient wall 38 of the coupling member.

To enable locking of the coupling member to the stem, as shown in FIG. 3, the coupling member 18 may have a locking ridge 29 raising from outside surface of the body 26 proximate to an edge of the one or more mounting holes 28 and positioned to lock the one or more mounting ridges of the stem thereunto (54 in FIG. 5).

Alternatively, and/or additionally, as shown in FIGS. 2 and 5, at least a portion of the head section 20 and/or the handle coupling section 22 of the coupling member 18 are in a cylindrical shape. The body 26 of the coupling member 18 may be in a cone shape near the opening 27 and a portion of the stem proximate to the opening 15 may also have a cone shape that corresponds to the cone shape of the body 26 of the coupling member 18 so that the stem may receive the coupling member into its opening 15.

The various embodiments disclosed in this patent document provide advantages over the prior art, whether stand-alone or combined. For example, the resilient wall of the handle coupling section of the coupling member that is positioned to engage with the drive shaft of the electric toothbrush handle may be made from the same wall of the handle coupling section of the coupling member, which requires no metal spring or other separate resilient member. This both achieves a tight coupling (because there is no separate part) and reduces the cost of making. Further, multiple engagements of various parts of the stem and the coupling member all facilitate a tight coupling between the coupling member and the stem, and thus improve the stability of the brush head as it is operating under the high speed vibrations of the motor inside the handle.

Further, the toothbrush head may be easy to manufacture as all the parts can be made of plastic or polyester materials. The cone shaped opening of the stem may facilitate easy receiving and coupling of the coupling member into the stem, and multiple engagement means, such as, the longitudinal ridge of the coupling member and the corresponding longitudinal channel in the stem, the mounting channel of the coupling member and the corresponding ridge block in the stem, the raised resilient wall of the coupling member and the corresponding coupling channel in the stem, the

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mounting block of the coupling member and the corresponding mounting channel in the stem, the base ring of the coupling member and the mating sitting platform in the stem, the mounting holes of the coupling member and the mounting ridges in the stem, each may facilitate easy sliding and positioning of the coupling member into the stem and secure mounting of the coupling member to the stem.

Other advantages of the present invention can be apparent to those skilled in the art from the foregoing specification. Accordingly, it will be recognized by those skilled in the art that changes or modifications may be made to the above-described embodiments without departing from the broad inventive concepts of the invention. It should therefore be understood that this invention is not limited to the particular embodiments described herein, but is intended to include all changes and modifications that are within the scope and spirit of the invention as defined in the claims.

The invention claimed is:

1. A toothbrush head comprising:

a brush section having a plurality of bristles attached thereon;

a stem extending from the brush section, wherein the stem defines an opening therein and comprises one or more mounting ridges on inside wall of the opening; and

a coupling member mountable to inside the opening of the stem, wherein the coupling member comprises:

a body having an opening configured to receive a drive shaft of an electric toothbrush handle into the coupling member, and one or more mounting holes that are positioned to engage with the one or more mounting ridges of the stem to secure the coupling member to the stem in position, and

a handle coupling section extending from the body and having a wall and defining an aperture within the wall for receiving the drive shaft, wherein the wall has at least two longitudinal slits and a resilient wall between the two slits, further wherein the resilient wall is positioned to engage with the drive shaft when the drive shaft is inserted into the coupling member.

2. The toothbrush head of claim 1, wherein:

the stem further comprises a ridge block and a longitudinal channel on the inside wall of the opening; and the coupling member further comprises a head section extending from the handle coupling section, wherein the head section has a longitudinal ridge that is positioned to engage with the longitudinal channel of the stem, wherein the head section also defines a mounting channel that is positioned to engage with the ridge block of the stem.

3. The toothbrush head of claim 2, wherein an end of the mounting channel is positioned to touch a stopping edge of the ridge block so that the coupling member is prevented from further moving into the stem.

4. The toothbrush head of claim 2, wherein the longitudinal ridge also extends longitudinally along an outside wall of the handle coupling section of the coupling member.

5. The toothbrush head of claim 3, wherein:

the stem further comprises a coupling channel on an inside surface; and

the resilient wall of the handle coupling section raises outward from the handle coupling section and forms a guide that is positioned to engage with the coupling channel of the stem.

6. The toothbrush head of claim 5, wherein the coupling channel of the stem extends from the stopping edge of the ridge block of the stem to the opening of the stem.

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7. The toothbrush head of claim 2, wherein at least a portion of the head section and a portion of the handle coupling section of the coupling member are in a cylindrical shape.

8. The toothbrush head of claim 7, wherein at least a portion of the body of the coupling member is in a cone shape and a portion of the stem proximate to the opening also has a cone shape that corresponds to the cone shape of the body of the coupling member.

9. The toothbrush head of claim 1, wherein:

the opening of the stem has a base platform; and the opening of the body of the coupling member has a base platform that is positioned to be flush with the base platform of the stem.

10. The toothbrush head of claim 1, wherein the resilient wall of the handle coupling section has a raised portion extending inward and positioned to touch the drive shaft so that the drive shaft is tightly coupled to the handle coupling section while received in the aperture of the handle coupling section.

11. The toothbrush head of claim 1, wherein the handle coupling section defines a flat engaging surface inside the aperture that is positioned to mate with a flat surface of the drive shaft.

12. The toothbrush head of claim 1, wherein:

the stem defines a mounting receptacle inside the opening of the stem; and

the body of the coupling member has a mounting block extending from an outside surface of the body and positioned to engage with the mounting receptacle of the stem.

13. The toothbrush head of claim 1, wherein:

the stem defines a sitting platform along at least a portion of an inside perimeter of the opening of the stem; and the body of the coupling member has a base ring around at least a portion of an outside perimeter of the opening of the body and positioned to mate with the sitting platform of the stem.

14. The toothbrush head of claim 1, wherein the body of the coupling member has a locking ridge raising from an outside surface of the body proximate to an edge of the one or more mounting holes and positioned to lock the one or more mounting ridges of the stem thereunto.

15. A toothbrush head comprising:

a brush section having a plurality of bristles attached thereon;

a stem extending from the brush section, wherein the stem defines an opening therein and comprises one or more mounting ridges on inside wall of the opening, further wherein the opening has a base platform; and

a coupling member mountable to inside the opening of the stem, wherein the coupling member comprises:

a body having an opening configured to receive a drive shaft of an electric toothbrush handle into the coupling member, one or more mounting holes that are positioned to engage with the one or more mounting ridges of the stem to secure the coupling member to the stem in position, and one or more locking ridges each raising from an outside surface of the body proximate to an edge of the one or more mounting holes and positioned to lock the one or more mounting ridges of the stem thereunto, wherein the opening of the body has a base platform that is positioned to be flush with the base platform of the stem, and

a handle coupling section extending from the body and having a wall and defining an aperture within the wall for receiving the drive shaft, wherein the wall

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has at least two longitudinal slits and a resilient wall between the two slits, further wherein the resilient wall is positioned to engage with the drive shaft when the drive shaft is inserted into the coupling member.

16. The toothbrush head of claim 15, wherein:

the stem further comprises a ridge block and a longitudinal channel on the inside wall of the opening; and the coupling member further comprises a head section extending from the handle coupling section, wherein the head section has a longitudinal ridge that is positioned to engage with the longitudinal channel of the stem, wherein the head section also defines a mounting channel that is positioned to engage with the ridge block of the stem.

17. The toothbrush head of claim 15, wherein the resilient wall of the handle coupling section has a raised portion extending inward and positioned to touch the drive shaft so that the drive shaft is tightly coupled to the handle coupling section while received in the aperture of the handle coupling section.

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18. The toothbrush head of claim 15, wherein: the stem defines a mounting receptacle inside the opening of the stem; and

the body of the coupling member has a mounting block extending from the outside surface of the body and positioned to engage with the mounting receptacle of the stem.

19. The toothbrush head of claim 15, wherein: the stem defines a sitting platform along at least a portion of an inside perimeter of the opening of the stem; and the body of the coupling member has a base ring around at least a portion of an outside perimeter of the opening of the body and positioned to mate with the sitting platform of the stem.

20. The toothbrush head of claim 15, wherein: the stem further comprises a coupling channel on an inside surface; and the resilient wall of the handle coupling section raises outward from the handle coupling section and forms a guide that is positioned to engage with the coupling channel of the stem.

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