

UNITED STATES DISTRICT COURT
DISTRICT OF MARYLAND

NOBLE INNOVATIONS NC L.L.C.
523 EAST ROSEMARY STREET
CHAPEL HILL, NORTH CAROLINA 27514

Plaintiff,

v.

COLGATE-PALMOLIVE COMPANY
1105 N MARKET STREET
WILMINGTON, DELAWARE 19801

WALMART, INC.
701 SOUTH WALTON BLVD.
BENTONVILLE ARKANSAS 72716

and

TARGET CORPORATION
777 NICOLLET MALL
MINNEAPOLIS MINNESOTA 55402

Defendants

Registered Agent for all Defendants:
The Corporation Trust, Inc.
2405 York Road, Suite 201
Timonium, Maryland 21093-2264

Civil Action No. 22-cv-3373

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Noble Innovations NC L.L.C. (“Noble”), by its undersigned counsel, alleges as follows for its Complaint against defendants Colgate-Palmolive Company, Walmart, Inc. and Target Corporation.

Complaint for Patent Infringement -1-

THE NATURE OF THIS ACTION

1. Noble brings this action against Colgate, Walmart and Target pursuant to 35 U.S.C. §101 et. seq. and §§ 271, 281, 283, 284, & 285 inclusive, for infringement of one or more claims of U.S. Patent No. 8,881,332 (“the '332 Patent”) entitled Toothbrush System Utilizing Oral Care Capsule. Plaintiff is also the owner of U.S. Patent No. 9,808,077 (“the '077 Patent”) entitled Toothbrush System Utilizing Oral Care Capsule. The '332 and '077 Noble patents protect the inventions of Lise and Patrick Noble. The Noble Patents are directed to toothbrushes with a dentifrice capsule receiving zone, to toothbrushes with a dentifrice capsule and to mechanisms for placing a dentifrice capsule into a receiving zone of a toothbrush. Colgate was made aware of the Noble patents but has continued to infringe the '332 Noble Patent, and has refused to cease its infringing actions, thereby necessitating this lawsuit.

THE PARTIES

2. Plaintiff Noble Innovations NC L.L.C. is a limited liability company organized and existing under the laws of the State of North Carolina, located in Chapel Hill, North Carolina. Noble Innovations NC, L.L.C. was formed to develop and market the inventions of its founders, Lise and Patrick Noble.

3. Defendant Colgate is a domestic company which has the accused product manufactured in Switzerland and imported for sale in the United States, with its headquarters in New York, registered to do business in Maryland with numerous employees located in Maryland, including at least one national team leader, a district manager, numerous Practice Development, business development and customer development managers, a dental professional,

Complaint for Patent Infringement -2-

and at least twenty other employees who regularly conduct business in Maryland through established and regular places of business in Maryland, including defendant's conduct of business in the sense of storage, transport, sales, marketing, sales development, stocking, distribution, retail monitoring, supervision, stocking and signage, product development and exchange of goods or services at regular and established places of business. Colgate's products are distributed and sold directly into Maryland by Colgate and are sold at retail throughout Maryland and throughout the United States, with significant sales presence in Maryland, including sales at Co-Defendant's retail stores.

4. Defendant Walmart is a domestic company headquartered in Arkansas, which purchases the accused product from Colgate and re-sells the accused product at its retail stores in Maryland. Walmart is registered to do business in Maryland with a registered agent in Maryland and maintains numerous regular and established places of business throughout Maryland where it sells the accused product at retail stores throughout Maryland and throughout the United States, with significant sales presence in Maryland.

5. Defendant Target is a domestic company headquartered in Minnesota, which purchases the accused product from Colgate and re-sells the accused product at its retail stores in Maryland. Target is registered to do business in Maryland with a registered agent in Maryland and maintains numerous regular and established places of business throughout Maryland where it sells the accused product at retail stores throughout Maryland and throughout the United States, with significant sales presence in Maryland.

JURISDICTION AND VENUE

6. This is an action for patent infringement arising under the laws of the United States, 35 U.S.C. §271 *et seq.*

7. This Court has subject matter jurisdiction over this action pursuant to 35 U.S.C. §§271, 281 and 28 U.S.C. §§1331 and 1338(a), federal question, and 28 U.S.C. §1332 diversity jurisdiction.

8. This Court has personal jurisdiction over Colgate, Walmart and Target because of sales of the infringing products into and within Maryland and because each of the Defendants has employees who are conducting the business of Defendants at a regular and established places of business, with employees and agents regularly conducting that business, through activities that constitute, the defendant's conduct of business in the sense of importation, sales, retail sales distribution sales, storage, transport, retail shelf space, and exchange of goods or services. Defendants have committed tortious acts of infringement within Maryland giving rise to this action and regularly do business, derive substantial revenues, and have established more than minimum contacts with Maryland such that the exercise of jurisdiction would not offend traditional notions of fair play and substantial justice.

9. Venue is proper in the District of Maryland pursuant to 28 U.S.C. §§1391(b), 1391(c) and 1400(b). Upon information and belief, Defendants are doing business in this judicial district, have committed acts of infringement are causing injury to Noble and have regular and established places of business in this District and have employees conducting regular and established business in this judicial district.

BACKGROUND AND GENERAL ALLEGATIONS

10. In August, 2007, Lise and Patrick Noble filed a patent application for their invention for an improved toothbrush. The Nobles were granted a first patent on their invention, US 8,881,332, in 2014 and a second patent, US 9,808,077, in 2017. Copies of the patents are attached to the Complaint as exhibits. The Nobles formed Noble Innovations LLC in 2014 to explore development of the inventions and licensing of the patents. Plaintiff, Noble Innovations NC L.L.C., was formed in 2020 to resume the activities of Noble Innovations LLC. Noble Innovations NC L.L.C. is the owner by assignment of all of the rights and interest in the patents.

11. The patented Noble toothbrush includes a brush head having a capsule receiving zone sized to receive an dentrifice capsule, and a plurality of capsule retaining elements adapted to retain the capsule in such zone. Loading of such toothbrush with a capsule may be performed with a dispenser including a toothbrush manipulation element adapted to move a retention structure associated with the brush head, and dispensation element adapted to deliver the capsule into the receiving zone.

12. US Patent 8,881,332 (The '332 Patent) was legally issued by The United States Patent and Trademark Office on November 11, 2014, the inventors of which were Lise Noble and Patrick Noble.

13. US Patent 9,808,077 (The '077 Patent) was legally issued by The United States Patent and Trademark Office on November 7, 2017, the inventors of which were Lise Noble and Patrick Noble.

14. In late 2007, the Nobles contacted Colgate in confidence to discuss the licensing of their novel toothbrush to Colgate. Colgate rejected the offer to license and brought the Wisp

toothbrush to market in 2009 incorporating the Noble patented invention.

THE PATENTS

15. The '332 patent is directed to a Toothbrush System Utilizing an Oral Care Capsule, and contains eighteen claims protecting the invention, Claim one is as follows:

1. A toothbrush comprising a brush head that includes:

- a front surface;
- a back surface;
- a plurality of vertical bristles extending upward from the front surface;
- a capsule receiving zone sized to receive an oral care capsule, the capsule receiving zone including a recess defined in the front surface and arranged to receive at least a portion of an oral care capsule inserted past the vertical bristles;
- and
- at least one pair of angled capsule retaining elements that are elevated above the recess and configured to retain an oral care capsule in the capsule receiving zone, wherein each pair of the at least one pair angled capsule retaining elements includes a first and a second angled capsule retaining element arranged along diametrically opposing sides of an oral care capsule when present in the capsule receiving zone; and wherein at least a portion of each angled capsule retaining element of the at least one pair of capsule retaining elements is arranged to contact the oral care capsule.

16. The '332 patent is directed to a Toothbrush System Utilizing an Oral Care Capsule, and contains eighteen claims protecting the invention, Claim one is as follows:

1. A dispensing device configured for use with at least one toothbrush including a brush head having a capsule receiving zone configured to receive an oral care capsule, the dispensing device comprising:

- a container including an interior arranged to contain a plurality of oral care capsules including the oral care capsule;
- a bristle spreading element including an aperture arranged to permit passage of the oral care capsule, the bristle spreading element arranged to spread apart at least some bristles of the brush head to prepare the brush head to receive the oral care capsule in the capsule receiving zone; and
- a moveable dispensation element arranged to contact and push the oral care capsule through the aperture to be received by the capsule receiving zone of the

brush head.

COLGATE INFRINGEMENT

17. Colgate manufactures and sells the WISP toothbrush which includes a brush head having a capsule receiving zone sized to receive an dentrifice capsule, and a plurality of capsule retaining elements adapted to retain the capsule in such zone.



18. The Colgate Wisp infringes the '332 Patent.

19. Colgate was placed on notice of the '332 Patent in 2015.

20. Plaintiff has conducted a detailed analysis, establishing and confirming that Colgate's Wisp infringes claims of the '332 Patent.

21. Attached as an Exhibit to the Complaint is claim chart demonstrating the correspondence of components of the Wisp with elements of claims of the '332 patent.

22. Plaintiff attempted to engage in discussions with Colgate but Colgate declined further discussion.

23. Colgate has continued infringement.

WALMART AND TARGET INFRINGEMENT

24. Walmart and Target purchase Wisp toothbrushes from Colgate and resell the Wisp toothbrushes at retail stores and on-line throughout the United States.

COUNT I

COLGATE INFRINGEMENT OF U.S. PATENT NO. 8,881,332

25. The allegations of each of the paragraphs above are hereby re-alleged and incorporated herein by reference.

26. Plaintiff is the owner of the '332 Patent.

27. Colgate has infringed, and continues to infringe, at least claims 1, 5, 8, 9, 10, 11, 13, 14, 15, 16, 17, and 18 of the '332 Patent, under 35 U.S.C. § 271(a),

"(a) Except as otherwise provided in this title, whoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor, infringes the patent.

by importing and selling the Accused WISP Products in the United States. Colgate continues to import and sell its Wisp products which infringe claims of the '322 Patent.

28. Colgate does not have a license or authority to use the '322 Patent.

29. Colgate has been willfully infringing the '322 Patent since at least April, 2015 when it responded to communications from Plaintiff regarding the '332 Patent. Upon information and belief, Colgate has no good faith defense to Plaintiff's infringement allegations and has refused to cease selling products or to engage in further attempts to reach a business resolution. Instead, Colgate has intentionally continued its knowing infringement.

30. As a result of Colgate's infringement of the '332 Patent, Plaintiff has suffered and will continue to suffer damages in an amount not yet determined, of at least a reasonable royalty.

COUNT II

WALMART Infringement of U.S. Patent No. 8,881,332

31. The allegations of each of the paragraphs above are hereby re-alleged and incorporated herein by reference.

32. Plaintiff is the owner of the '332 Patent.

33. Walmart has infringed, and continues to infringe, at least claims 1, 5, 8, 9, 10, 11, 13, 14, 15, 16, 17, and 18 of the '332 Patent, under 35 U.S.C. § 271(a),

"(a) Except as otherwise provided in this title, whoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor, infringes the patent.

by selling the Accused WISP Products in the United States. Walmart continues to sell Wisp products which infringe claims of the '322 Patent.

34. Walmart does not have a license or authority to use the '322 Patent.

35. As a result of Walmart's infringement of the '332 Patent, Plaintiff has suffered and will continue to suffer damages in an amount not yet determined, of at least a reasonable royalty.

COUNT III

TARGET Infringement of U.S. Patent No. 8,881,332

36. The allegations of each of the paragraphs above are hereby re-alleged and incorporated herein by reference.

37. Plaintiff is the owner of the '332 Patent.

38. Target has infringed, and continues to infringe, at least claims 1, 5, 8, 9, 10, 11, 13, 14, 15, 16, 17, and 18 of the '332 Patent, under 35 U.S.C. § 271(a),

Complaint for Patent Infringement -9-

"(a) Except as otherwise provided in this title, whoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor, infringes the patent.

by selling the Accused WISP Products in the United States. Target continues to sell Wisp products which infringe claims of the '322 Patent.

39. Target does not have a license or authority to use the '322 Patent.

40. As a result of Target's infringement of the '332 Patent, Plaintiff has suffered and will continue to suffer damages in an amount not yet determined, of at least a reasonable royalty.

PRAYER FOR RELIEF

- A. For a Judgment declaring that Colgate has infringed the '332 Patent.
- B. For a judgment declaring that Colgate's infringement of the '332 Patent has been willful;
- C. For a Judgment declaring that Defendant Walmart has infringed the '332 Patent.
- D. For a Judgment declaring that Defendant Target has infringed the '332 Patent.
- E. For a grant of a permanent injunction pursuant to 35 U.S.C. §283, enjoining each of the Defendants from further acts of infringement;
- F. For a judgment awarding Plaintiff compensatory damages as a result of each Defendants' infringement sufficient to reasonably and entirely compensate Plaintiff for infringement of the '332 Patent in an amount to be determined at trial;
- G. For a judgment declaring that Colgate's infringement was willful and for enhancement of damages in accordance with 35 U.S.C. 284;
- H. For a judgment declaring that this case is exceptional and awarding Plaintiff its

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expenses, costs and attorneys' fees in accordance with 35 U.S.C. § 285 and Rule 54(d) of the Federal Rules of Civil Procedure;

I. For a judgment awarding Plaintiff prejudgment interest pursuant to 35 U.S.C. § 284, and a further award of post judgment interest, pursuant to 28 U.S.C. § 1961, continuing until such judgment is paid.

J. For a judgment awarding Plaintiff enhanced damages under 35 U.S.C. § 284; and

K. For such other relief to which Plaintiff is entitled under the applicable United States laws and regulations or as this Court deems just and proper.

DEMAND FOR JURY TRIAL

Pursuant to Federal Rule of Civil Procedure Rule 38(b), Plaintiff hereby demands trial by jury as to all claims in this litigation.

DATED: December 31, 2022

Respectfully submitted,

/s/ Joseph J. Zito
Joseph J. Zito
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1250 Connecticut Ave., suite 700
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jzito@dnlzito.com
Attorneys for Plaintiff
Noble Innovations NC L.L.C.

The JS 44 civil cover sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. (SEE INSTRUCTIONS ON NEXT PAGE OF THIS FORM.)

I. (a) PLAINTIFFS

NOBLE INNOVATIONS NC L.L.C.

(b) County of Residence of First Listed Plaintiff _____
(EXCEPT IN U.S. PLAINTIFF CASES)

(c) Attorneys (Firm Name, Address, and Telephone Number)

Joseph J. Zito, DNL ZITO CASTELLANO, 1250
Connecticut Avenue, NW Suite 700, Washington, DC
20036 tel: 202-466-3500

DEFENDANTS

Colgate-Palmolive Company; Walmart Inc; Target Corporation

County of Residence of First Listed Defendant _____
(IN U.S. PLAINTIFF CASES ONLY)

NOTE: IN LAND CONDEMNATION CASES, USE THE LOCATION OF
THE TRACT OF LAND INVOLVED.

Attorneys (If Known)

II. BASIS OF JURISDICTION (Place an "X" in One Box Only)

- ☐ 1 U.S. Government Plaintiff ☒ 3 Federal Question (U.S. Government Not a Party)
- ☐ 2 U.S. Government Defendant ☐ 4 Diversity (Indicate Citizenship of Parties in Item III)

III. CITIZENSHIP OF PRINCIPAL PARTIES (Place an "X" in One Box for Plaintiff and One Box for Defendant)

- | | PTF | DEF | | PTF | DEF |
|---|----------------------------|----------------------------|---|----------------------------|----------------------------|
| Citizen of This State | ☐ 1 | ☐ 1 | Incorporated or Principal Place of Business In This State | ☐ 4 | ☐ 4 |
| Citizen of Another State | ☐ 2 | ☐ 2 | Incorporated and Principal Place of Business In Another State | ☐ 5 | ☐ 5 |
| Citizen or Subject of a Foreign Country | ☐ 3 | ☐ 3 | Foreign Nation | ☐ 6 | ☐ 6 |

IV. NATURE OF SUIT (Place an "X" in One Box Only)Click here for: [Nature of Suit Code Descriptions.](#)

CONTRACT	TORTS	FORFEITURE/PENALTY	BANKRUPTCY	OTHER STATUTES
☐ 110 Insurance ☐ 120 Marine ☐ 130 Miller Act ☐ 140 Negotiable Instrument ☐ 150 Recovery of Overpayment & Enforcement of Judgment ☐ 151 Medicare Act ☐ 152 Recovery of Defaulted Student Loans (Excludes Veterans) ☐ 153 Recovery of Overpayment of Veteran's Benefits ☐ 160 Stockholders' Suits ☐ 190 Other Contract ☐ 195 Contract Product Liability ☐ 196 Franchise	PERSONAL INJURY ☐ 310 Airplane ☐ 315 Airplane Product Liability ☐ 320 Assault, Libel & Slander ☐ 330 Federal Employers' Liability ☐ 340 Marine ☐ 345 Marine Product Liability ☐ 350 Motor Vehicle ☐ 355 Motor Vehicle Product Liability ☐ 360 Other Personal Injury ☐ 362 Personal Injury - Medical Malpractice PERSONAL INJURY ☐ 365 Personal Injury - Product Liability ☐ 367 Health Care/Pharmaceutical Personal Injury Product Liability ☐ 368 Asbestos Personal Injury Product Liability PERSONAL PROPERTY ☐ 370 Other Fraud ☐ 371 Truth in Lending ☐ 380 Other Personal Property Damage ☐ 385 Property Damage Product Liability	☐ 625 Drug Related Seizure of Property 21 USC 881 ☐ 690 Other LABOR ☐ 710 Fair Labor Standards Act ☐ 720 Labor/Management Relations ☐ 740 Railway Labor Act ☐ 751 Family and Medical Leave Act ☐ 790 Other Labor Litigation ☐ 791 Employee Retirement Income Security Act IMMIGRATION ☐ 462 Naturalization Application ☐ 465 Other Immigration Actions	☐ 422 Appeal 28 USC 158 ☐ 423 Withdrawal 28 USC 157 INTELLECTUAL PROPERTY RIGHTS ☐ 820 Copyrights ☒ 830 Patent ☐ 835 Patent - Abbreviated New Drug Application ☐ 840 Trademark ☐ 880 Defend Trade Secrets Act of 2016 SOCIAL SECURITY ☐ 861 HIA (1395ff) ☐ 862 Black Lung (923) ☐ 863 DIWC/DIWW (405(g)) ☐ 864 SSID Title XVI ☐ 865 RSI (405(g)) FEDERAL TAX SUITS ☐ 870 Taxes (U.S. Plaintiff or Defendant) ☐ 871 IRS—Third Party 26 USC 7609	☐ 375 False Claims Act ☐ 376 Qui Tam (31 USC 3729(a)) ☐ 400 State Reapportionment ☐ 410 Antitrust ☐ 430 Banks and Banking ☐ 450 Commerce ☐ 460 Deportation ☐ 470 Racketeer Influenced and Corrupt Organizations ☐ 480 Consumer Credit (15 USC 1681 or 1692) ☐ 485 Telephone Consumer Protection Act ☐ 490 Cable/Sat TV ☐ 850 Securities/Commodities/Exchange ☐ 890 Other Statutory Actions ☐ 891 Agricultural Acts ☐ 893 Environmental Matters ☐ 895 Freedom of Information Act ☐ 896 Arbitration ☐ 899 Administrative Procedure Act/Review or Appeal of Agency Decision ☐ 950 Constitutionality of State Statutes
REAL PROPERTY ☐ 210 Land Condemnation ☐ 220 Foreclosure ☐ 230 Rent Lease & Ejectment ☐ 240 Torts to Land ☐ 245 Tort Product Liability ☐ 290 All Other Real Property	CIVIL RIGHTS ☐ 440 Other Civil Rights ☐ 441 Voting ☐ 442 Employment ☐ 443 Housing/Accommodations ☐ 445 Amer. w/Disabilities - Employment ☐ 446 Amer. w/Disabilities - Other ☐ 448 Education PRISONER PETITIONS Habeas Corpus: ☐ 463 Alien Detainee ☐ 510 Motions to Vacate Sentence ☐ 530 General ☐ 535 Death Penalty Other: ☐ 540 Mandamus & Other ☐ 550 Civil Rights ☐ 555 Prison Condition ☐ 560 Civil Detainee - Conditions of Confinement			

V. ORIGIN (Place an "X" in One Box Only)

- ☒ 1 Original Proceeding ☐ 2 Removed from State Court ☐ 3 Remanded from Appellate Court ☐ 4 Reinstated or Reopened ☐ 5 Transferred from Another District (specify) ☐ 6 Multidistrict Litigation - Transfer ☐ 8 Multidistrict Litigation - Direct File

VI. CAUSE OF ACTION

Cite the U.S. Civil Statute under which you are filing (Do not cite jurisdictional statutes unless diversity):

35 USC sec. 271

Brief description of cause:
Patent Infringement**VII. REQUESTED IN COMPLAINT:**

☐ CHECK IF THIS IS A CLASS ACTION UNDER RULE 23, F.R.Cv.P.

DEMAND \$

CHECK YES only if demanded in complaint:

JURY DEMAND: ☒ Yes ☐ No**VIII. RELATED CASE(S) IF ANY**

(See instructions):

JUDGE

DOCKET NUMBER

DATE

December 30, 2022

SIGNATURE OF ATTORNEY OF RECORD

/s/ Joseph J. Zito

FOR OFFICE USE ONLY

RECEIPT #

AMOUNT

APPLYING IFP

JUDGE

MAG. JUDGE

PETITIONER - COLGATE, Exhibit 1005

Case 8:22-cv-03373-PX Document 1-1 Filed 12/30/22 Page 2 of 2
INSTRUCTIONS FOR ATTORNEYS COMPLETING CIVIL COVER SHEET FORM JS 44

Authority For Civil Cover Sheet

The JS 44 civil cover sheet and the information contained herein neither replaces nor supplements the filings and service of pleading or other papers as required by law, except as provided by local rules of court. This form, approved by the Judicial Conference of the United States in September 1974, is required for the use of the Clerk of Court for the purpose of initiating the civil docket sheet. Consequently, a civil cover sheet is submitted to the Clerk of Court for each civil complaint filed. The attorney filing a case should complete the form as follows:

- I.(a) Plaintiffs-Defendants.** Enter names (last, first, middle initial) of plaintiff and defendant. If the plaintiff or defendant is a government agency, use only the full name or standard abbreviations. If the plaintiff or defendant is an official within a government agency, identify first the agency and then the official, giving both name and title.
 - (b) County of Residence.** For each civil case filed, except U.S. plaintiff cases, enter the name of the county where the first listed plaintiff resides at the time of filing. In U.S. plaintiff cases, enter the name of the county in which the first listed defendant resides at the time of filing. (NOTE: In land condemnation cases, the county of residence of the "defendant" is the location of the tract of land involved.)
 - (c) Attorneys.** Enter the firm name, address, telephone number, and attorney of record. If there are several attorneys, list them on an attachment, noting in this section "(see attachment)".
- II. Jurisdiction.** The basis of jurisdiction is set forth under Rule 8(a), F.R.Cv.P., which requires that jurisdictions be shown in pleadings. Place an "X" in one of the boxes. If there is more than one basis of jurisdiction, precedence is given in the order shown below.
- United States plaintiff. (1) Jurisdiction based on 28 U.S.C. 1345 and 1348. Suits by agencies and officers of the United States are included here. United States defendant. (2) When the plaintiff is suing the United States, its officers or agencies, place an "X" in this box.
- Federal question. (3) This refers to suits under 28 U.S.C. 1331, where jurisdiction arises under the Constitution of the United States, an amendment to the Constitution, an act of Congress or a treaty of the United States. In cases where the U.S. is a party, the U.S. plaintiff or defendant code takes precedence, and box 1 or 2 should be marked.
- Diversity of citizenship. (4) This refers to suits under 28 U.S.C. 1332, where parties are citizens of different states. When Box 4 is checked, the citizenship of the different parties must be checked. (See Section III below; **NOTE: federal question actions take precedence over diversity cases.**)
- III. Residence (citizenship) of Principal Parties.** This section of the JS 44 is to be completed if diversity of citizenship was indicated above. Mark this section for each principal party.
- IV. Nature of Suit.** Place an "X" in the appropriate box. If there are multiple nature of suit codes associated with the case, pick the nature of suit code that is most applicable. Click here for: [Nature of Suit Code Descriptions](#).
- V. Origin.** Place an "X" in one of the seven boxes.
- Original Proceedings. (1) Cases which originate in the United States district courts.
- Removed from State Court. (2) Proceedings initiated in state courts may be removed to the district courts under Title 28 U.S.C., Section 1441.
- Remanded from Appellate Court. (3) Check this box for cases remanded to the district court for further action. Use the date of remand as the filing date.
- Reinstated or Reopened. (4) Check this box for cases reinstated or reopened in the district court. Use the reopening date as the filing date.
- Transferred from Another District. (5) For cases transferred under Title 28 U.S.C. Section 1404(a). Do not use this for within district transfers or multidistrict litigation transfers.
- Multidistrict Litigation – Transfer. (6) Check this box when a multidistrict case is transferred into the district under authority of Title 28 U.S.C. Section 1407.
- Multidistrict Litigation – Direct File. (8) Check this box when a multidistrict case is filed in the same district as the Master MDL docket.
- PLEASE NOTE THAT THERE IS NOT AN ORIGIN CODE 7.** Origin Code 7 was used for historical records and is no longer relevant due to changes in statute.
- VI. Cause of Action.** Report the civil statute directly related to the cause of action and give a brief description of the cause. **Do not cite jurisdictional statutes unless diversity.** Example: U.S. Civil Statute: 47 USC 553 Brief Description: Unauthorized reception of cable service.
- VII. Requested in Complaint.** Class Action. Place an "X" in this box if you are filing a class action under Rule 23, F.R.Cv.P.
- Demand. In this space enter the actual dollar amount being demanded or indicate other demand, such as a preliminary injunction.
- Jury Demand. Check the appropriate box to indicate whether or not a jury is being demanded.
- VIII. Related Cases.** This section of the JS 44 is used to reference related pending cases, if any. If there are related pending cases, insert the docket numbers and the corresponding judge names for such cases.

Date and Attorney Signature. Date and sign the civil cover sheet.

(12) **United States Patent**
Noble et al.

(10) **Patent No.:** **US 8,881,332 B2**
(45) **Date of Patent:** **Nov. 11, 2014**

(54) **TOOTHBRUSH SYSTEM UTILIZING ORAL CARE CAPSULE**

(76) Inventors: **Lise W. Noble**, Chapel Hill, NC (US);
Patrick T. Noble, Chapel Hill, NC (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1344 days.

(21) Appl. No.: **12/101,446**

(22) Filed: **Apr. 11, 2008**

(65) **Prior Publication Data**

US 2009/0044356 A1 Feb. 19, 2009

Related U.S. Application Data

(63) Continuation-in-part of application No. 11/840,627, filed on Aug. 17, 2007, now abandoned.

(51) **Int. Cl.**

A47L 13/22 (2006.01)
A45B 11/00 (2006.01)
A46B 15/00 (2006.01)
A46B 9/02 (2006.01)
A46B 11/00 (2006.01)
A46B 17/06 (2006.01)

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

CPC *A46B 15/0002* (2013.01); *A46B 9/025* (2013.01); *A46B 11/0003* (2013.01); *A46B 11/0006* (2013.01); *A46B 11/0068* (2013.01); *A46B 15/0008* (2013.01); *A46B 15/0036* (2013.01); *A46B 17/06* (2013.01); *A46B 2200/1066* (2013.01)

USPC **15/167.1**; 401/268

(58) **Field of Classification Search**

USPC 15/167.1; 132/321; 401/268

IPC *A46B 11/00*, *11/04*; *A47L 13/22*

See application file for complete search history.

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(Continued)

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WO 0226078 A2 4/2002

Primary Examiner — Monica Carter

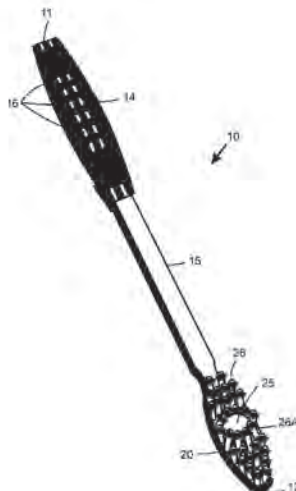
Assistant Examiner — Stephanie Berry

(74) *Attorney, Agent, or Firm* — Withrow & Terranova, P.L.L.C.; Vincent K. Gustafson

(57) **ABSTRACT**

A toothbrush includes a brush head having a capsule receiving zone sized to receive a dentrifice capsule, and a plurality of angled bristles adapted to retain the capsule in such zone. Loading of such toothbrush with a capsule may be performed with a dispenser including a toothbrush manipulation element adapted to move a retention structure associated with the brush head, and dispensation element adapted to deliver the capsule into the receiving zone. Such dispenser may include a desiccant material disposed to receive moisture from a capsule storage container. A dispenser may further include a plurality of toothbrush insertion apertures each adapted to receive a portion of a different toothbrush, so as to enable multiple users each having different toothbrushes to use the same dispenser without requiring contact between multiple brushes and single capsule interface surface of the dispenser.

18 Claims, 11 Drawing Sheets



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Page 2

(56)

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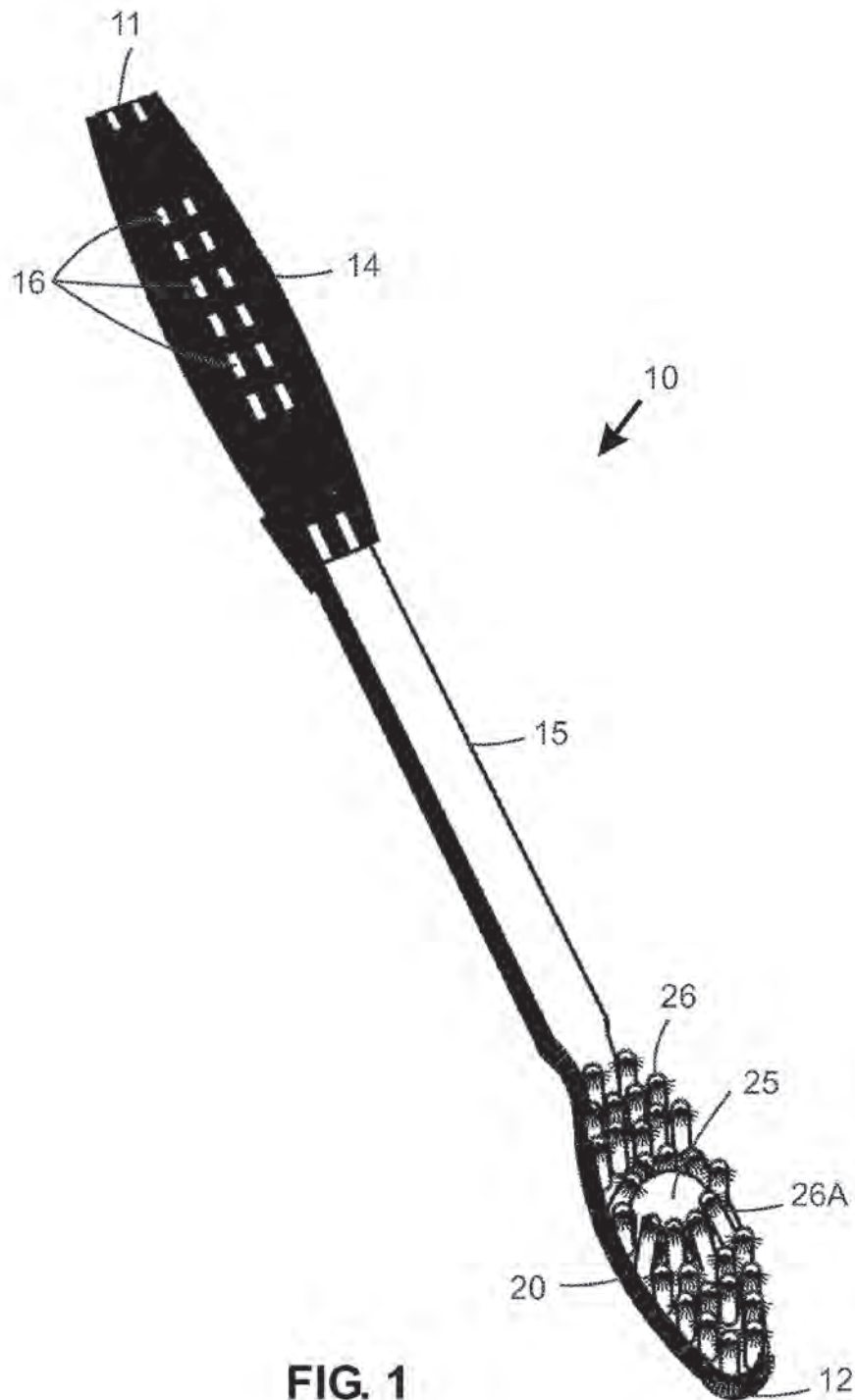
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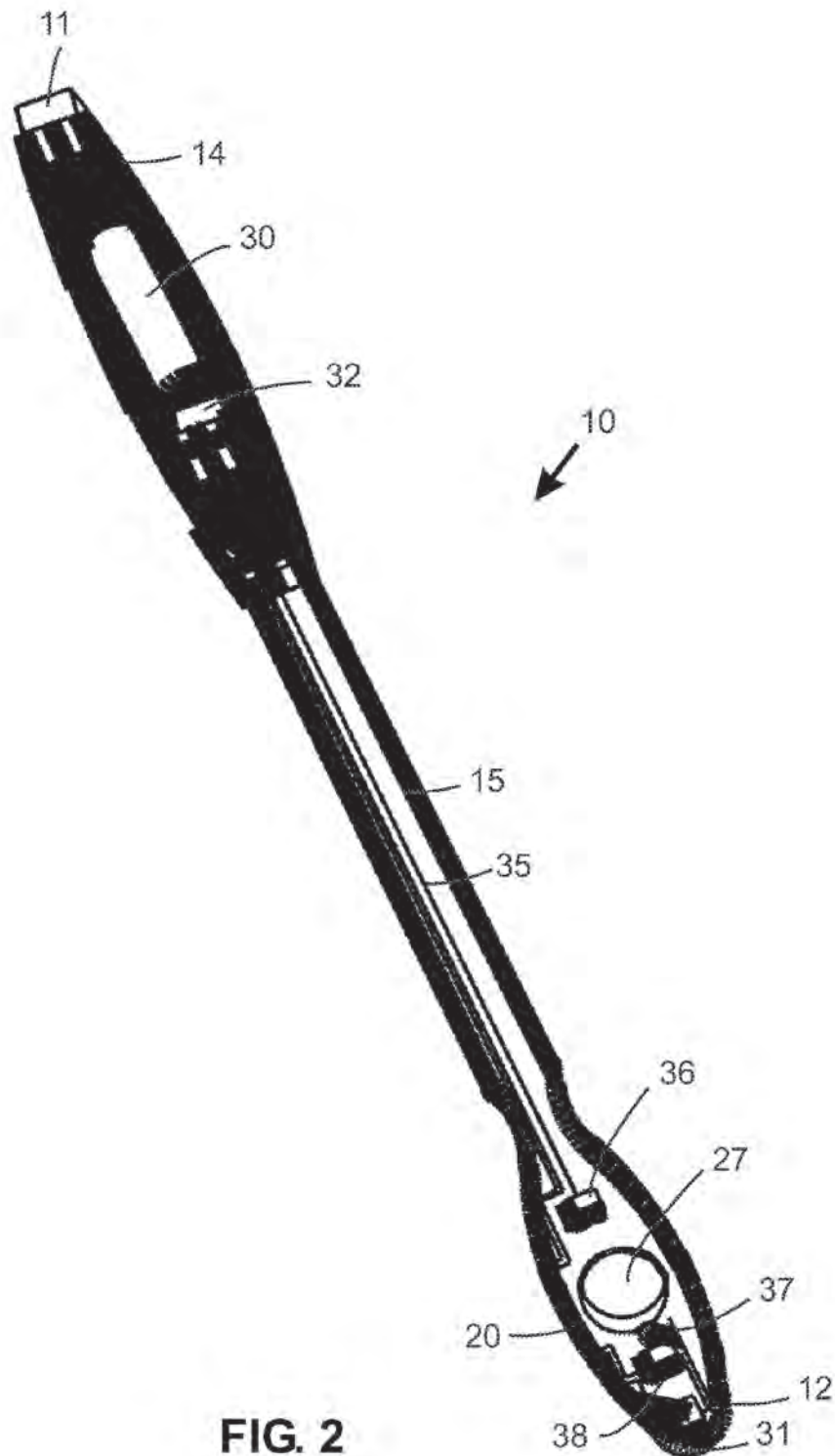


FIG. 2

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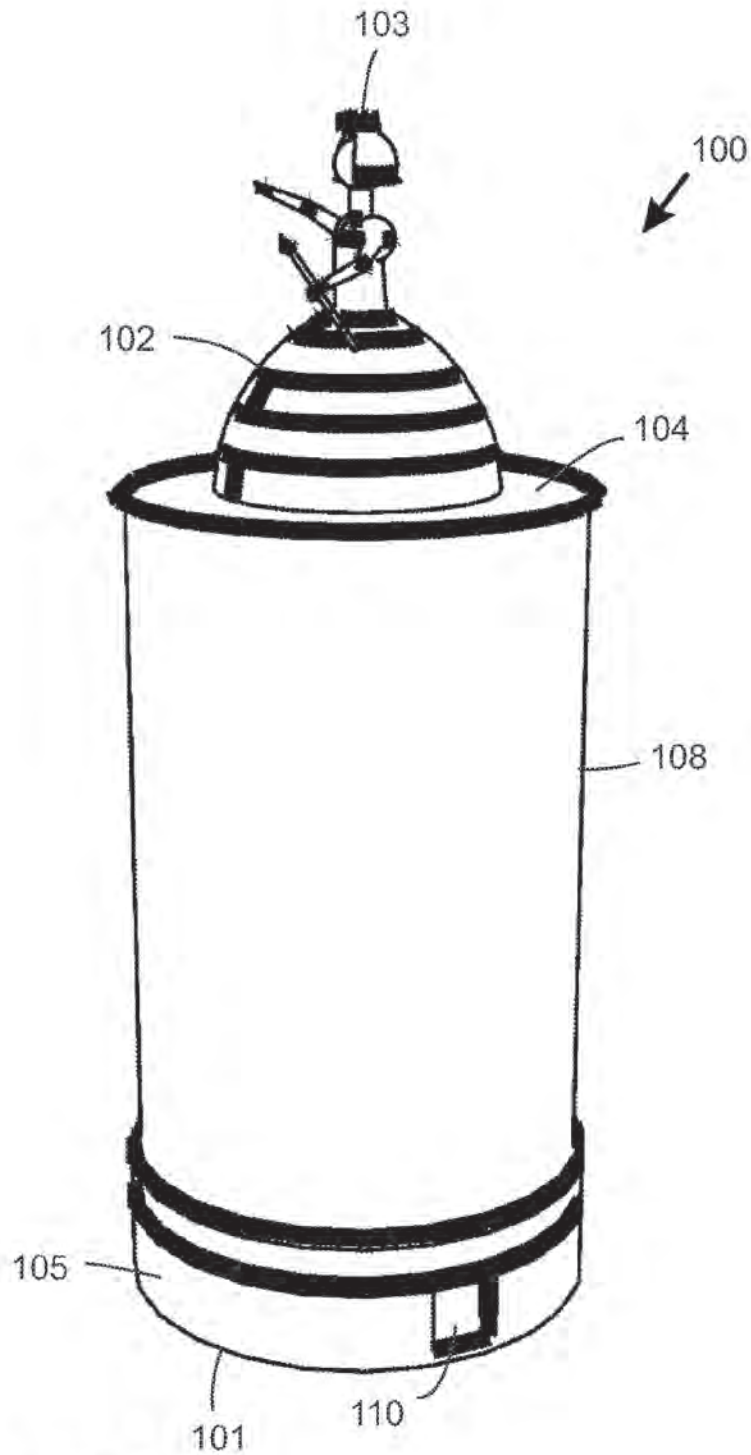


FIG. 3

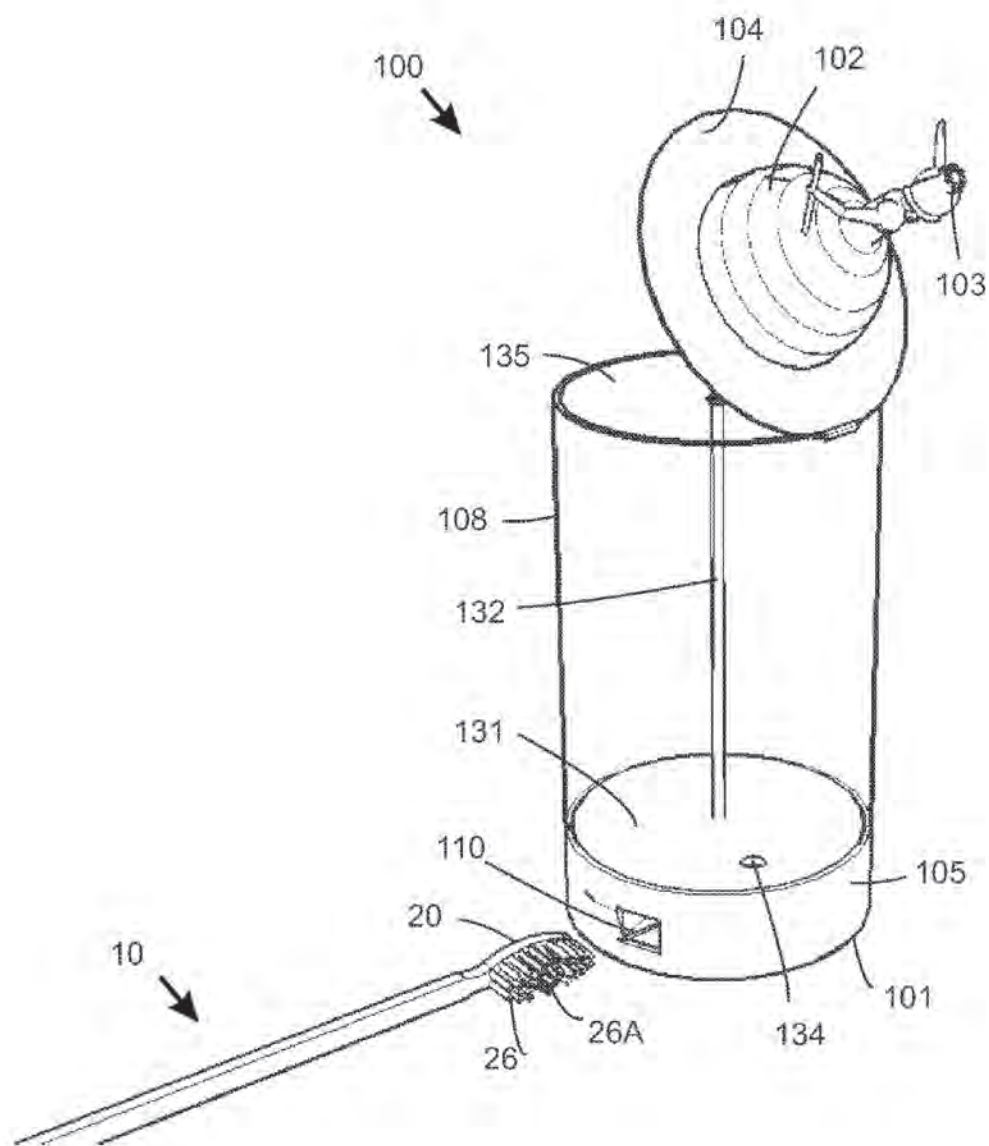


FIG. 4

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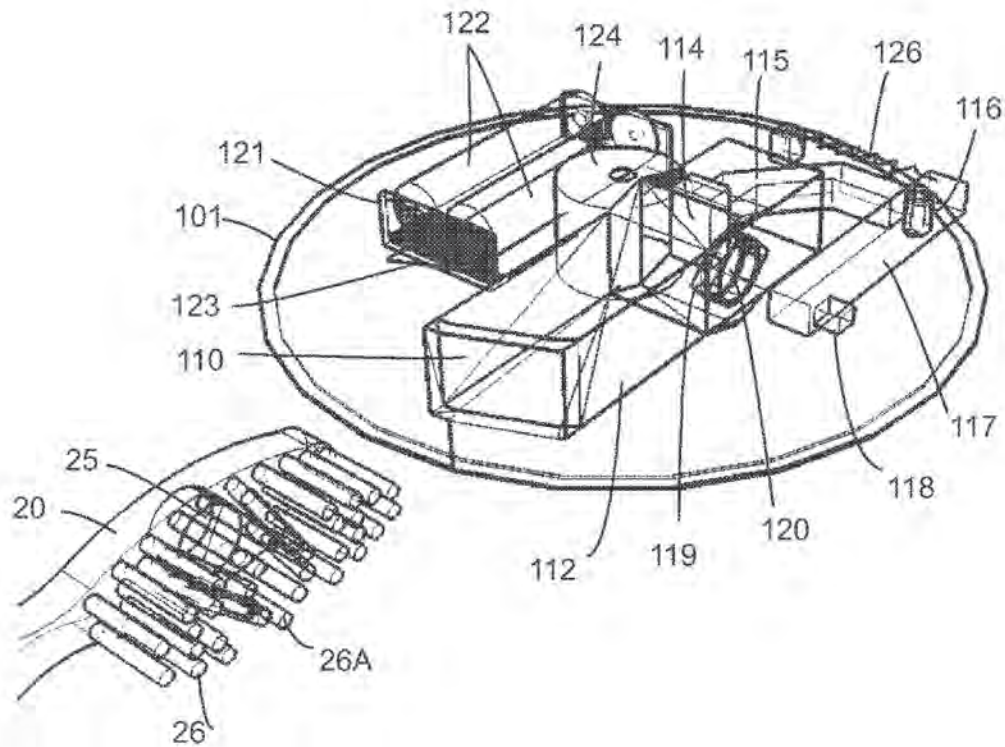


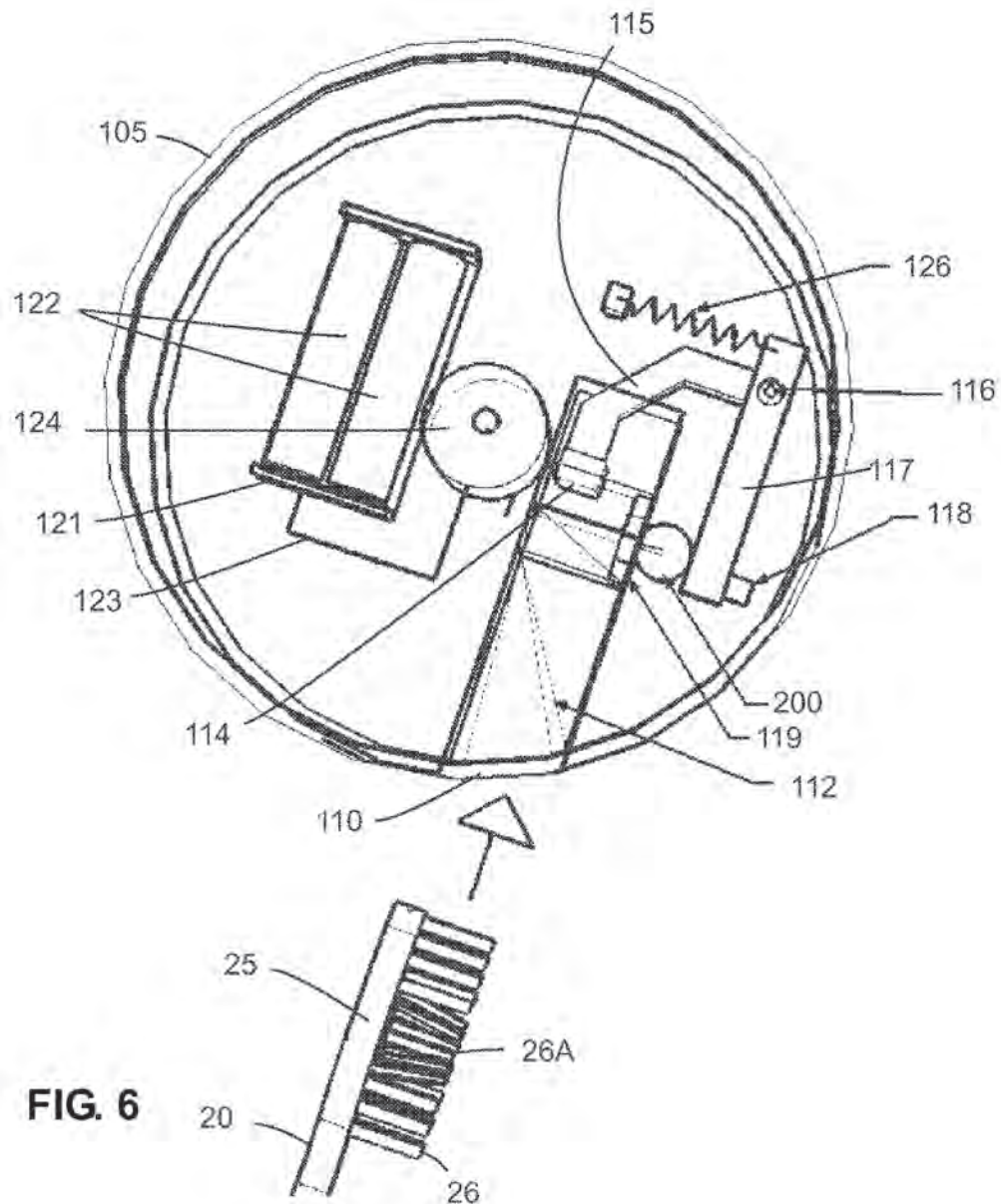
FIG. 5

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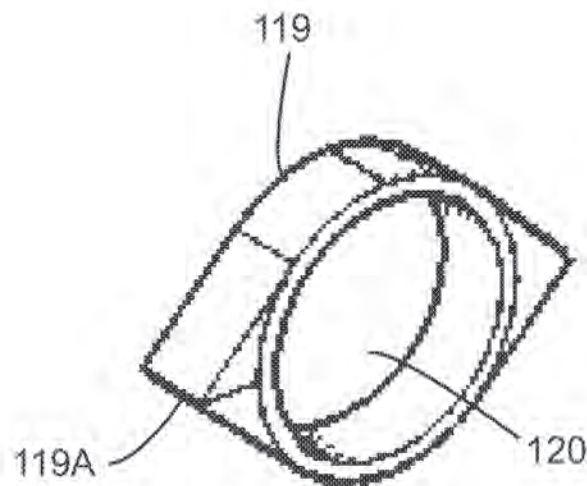


FIG. 7

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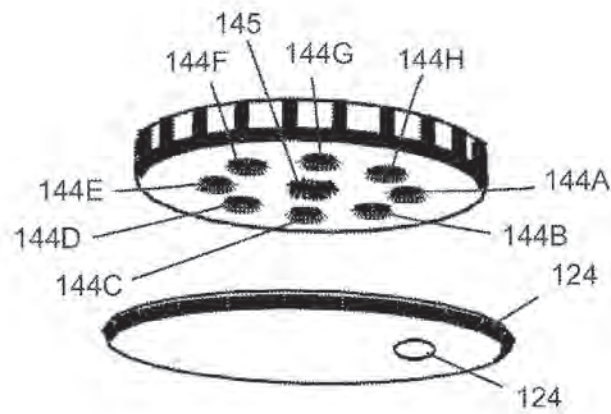


FIG. 8

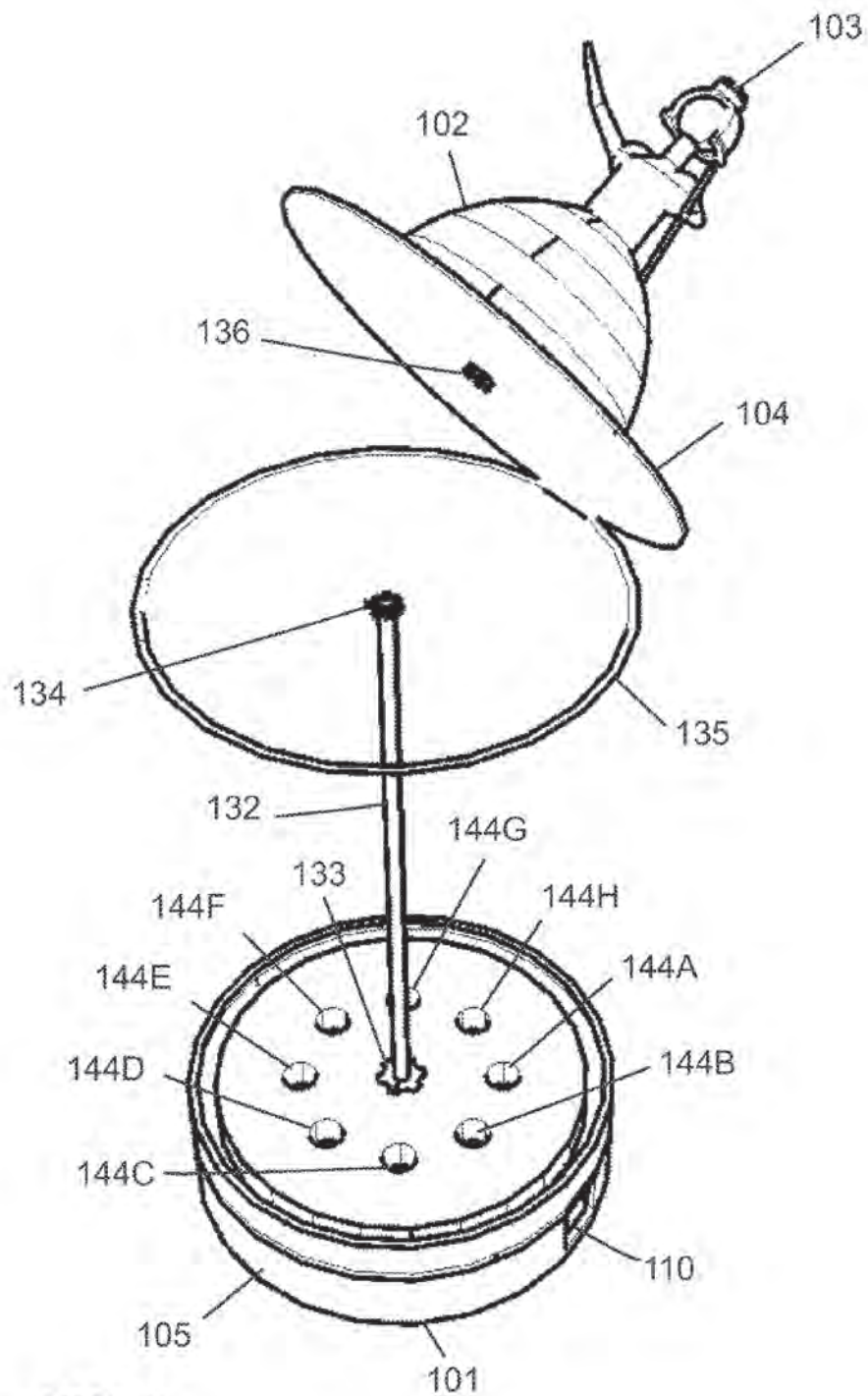


FIG. 9

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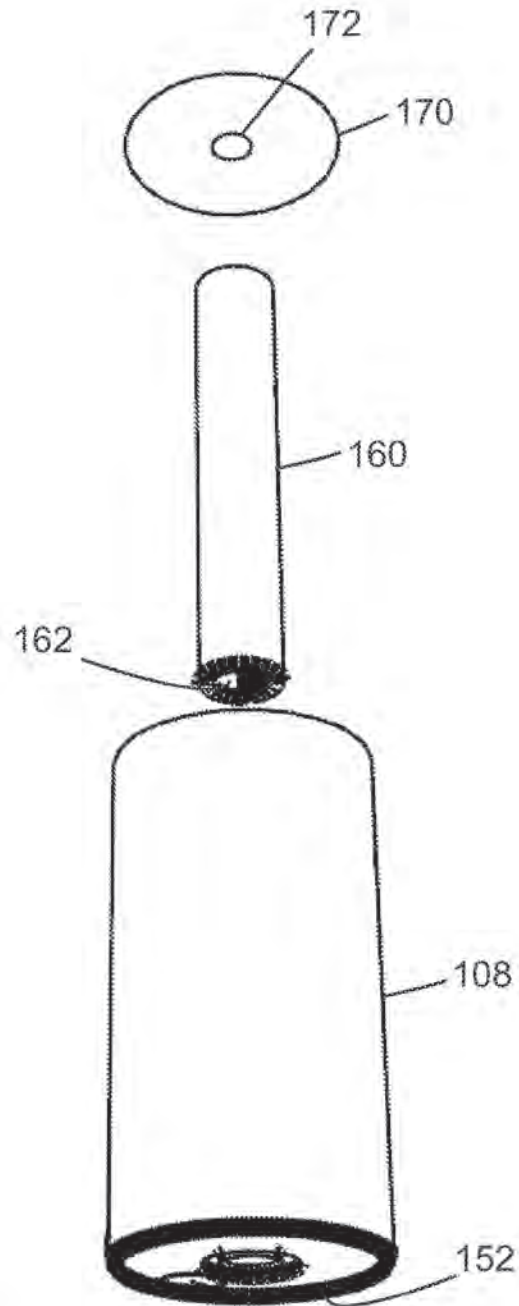


FIG. 10

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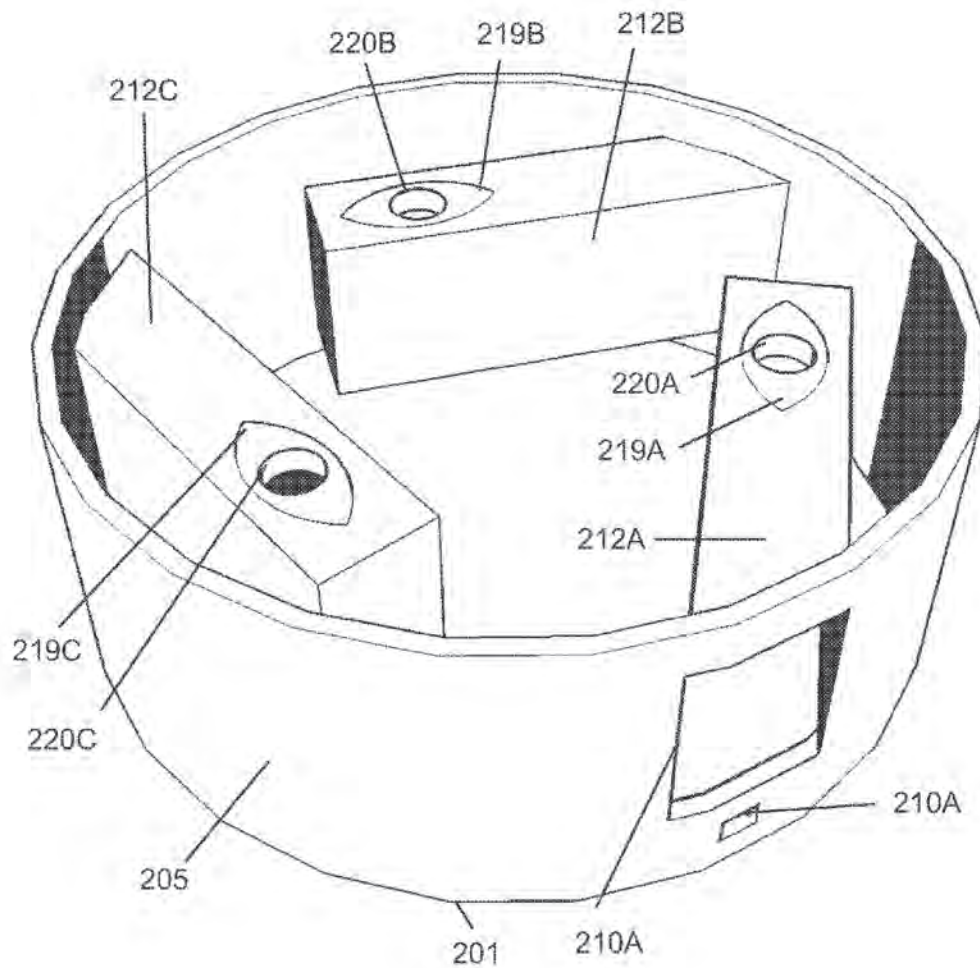


FIG. 11

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TOOTHBRUSH SYSTEM UTILIZING ORAL CARE CAPSULE**STATEMENT OF RELATED APPLICATION(S)**

This application is a continuation-in-part of U.S. patent application Ser. No. 11/840,627 filed on Aug. 17, 2007, now abandoned. Benefit of the filing date of such prior application is claimed under 35 U.S.C. §120, and the disclosure of such prior application is hereby incorporated by reference as if set forth fully herein.

FIELD OF THE INVENTION

The present invention relates to oral care, and more specifically, to toothbrushes and dispensing systems utilizing oral care capsules.

DESCRIPTION OF THE RELATED ART

Good oral hygiene requires regular and proper attention to tooth brushing and flossing. According to the American Academy of Periodontology, chronic gingivitis (causing gum tissue to swell, turn red, and bleed easily) is common in children, but can be prevented and treated with a regular routine of brushing, flossing and professional dental care. Absent treatment, chronic gingivitis can lead to more serious forms of periodontal disease.

Proper oral care habits can be difficult to instill in young children. Common challenges for caregivers of children include motivating children to initiate oral hygiene tasks, and to execute such tasks properly without assistance.

Even if motivation barriers are overcome, children often have difficulty in using conventional oral hygiene products and performing conventional oral hygiene methods. For example, many young children have difficulty in manipulating a toothbrush and toothpaste tube in separate hands and dispensing a proper amount from such a tube to the toothbrush. Avoiding generation of messes due to transfer of toothpaste to skin, clothing, and other surfaces during or after such dispensation may also be difficult for young children at a stage of physiological development where muscle control and general coordination are limited. Thereafter, children desiring to engage in other activities may be inclined to rush the task of brushing teeth without devoting the recommended time of two minutes or more to the task.

Conventional toothpaste dispensing systems further provide opportunities for not only growth of pathogens such as bacteria and virus, but also transfer of such pathogens from one toothbrush (or user) to another.

Oral care capsules, which avoid some of the mess associated with conventional toothpaste, are known. Examples of various oral care capsules are disclosed in U.S. Patent Application Publication No. 2005/0260141 to Alexander (hereinafter "Alexander"), U.S. Pat. No. 7,074,390 to MacKinnon (hereinafter "MacKinnon"), and U.S. Pat. No. 4,427,116 to Brown (hereinafter "Brown"), each of which is hereby incorporated by reference. Alexander discloses formation of variously shaped discrete toothpaste beads each having a dry exterior formed by locally applied processes such as heating, drying, extrusion, dusting, molding, varnishing, and coating. One or more beads are selected for use, removed from the container or dispenser, and broken open either by finger pressure, by pressing the bead against a brush or the user's teeth, or it may be bitten; after the internally stored toothpaste is released into the mouth, a conventional toothbrush is used in the normal manner. (Alexander, ¶0081.) MacKinnon dis-

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closes formation of a dentrifice or toothpaste capsule, (optionally including miswak fibers) having a shell of choline, albumin, or gelatin. In use, a capsule according to MacKinnon is put into the user's mouth, the coating is broken with the teeth, and the toothpaste released thereby is distributed throughout the mouth using the tongue or a toothbrush. (MacKinnon, col. 2.) Brown discloses a capsule including a predetermined amount of toothpaste that is encapsulated with a covering (e.g., gelatin) that is preferably water-soluble and breakable when bitten or chewed. (Brown, col. 2). Thus, each of the preceding references require manual manipulation of an oral care capsule by the user.

Furthermore, each of the preceding references rely upon insertion of a capsule into the user's mouth, and such capsules may not be desirable appropriate for use by small children. A very young user may liken a dentrifice capsule to candy, and inclined to swallow it rather than use it in combination with a brush. If a capsule is very small in size, then multiple capsules may be required to deliver an appropriate amount of toothpaste to the user, and opportunities may abound for inconsistent application or waste. Alternatively, if a large capsule is too large in size, then it may pose a choking hazard for a young user.

Moreover, ensuring that the shell or coating of an oral care capsule is easily dissolved in the mouth of a user may limit the ability to practically store multiple capsules in a typical high-moisture bathroom environment. That is, if capsules are stored in a tightly sealed container to prevent moisture infiltration that may degrade a dissolvable coating, such container may be unsuitable for use by a small child. Alternatively, if capsules are stored in a less well-sealed container suitable for manipulation by a small child, moisture infiltration may degrade water-dissolvable capsule coating materials that may lead to spoilage of stored capsules.

Different users having dedicated toothbrushes may store and use such toothbrushes in a single bathroom. Contact between toothbrushes for different users should be minimized to prevent spread of pathogens from one user to another. If an oral care capsule is subject to use with a toothbrush, it would be desirable to avoid contact between toothbrushes for different users and an interface for an oral care capsule.

Thus, it would be desirable to provide toothbrushes and dentrifice dispensing systems that motivate children to initiate and perform oral care tasks properly, while minimizing dangers to such users, minimizing mess creation, reducing opportunities for pathogen growth, promoting consistent dentrifice dispensing, and promoting reliable dentrifice storage.

SUMMARY OF THE INVENTION

The present invention relates to toothbrushes and oral care (dentrifice) capsules, and methods of dispensing and using same, that are suitable for use by small children, and that overcome various limitations associated with such capsules.

In one aspect, the invention relates to a toothbrush comprising a brush head having a capsule receiving zone sized to receive an oral care capsule, and having a plurality of angled bristles adapted to retain an oral care capsule in the capsule receiving zone.

In another aspect, the invention relates to a dispensing device adapted for use with a toothbrush including a brush head (i) having a capsule receiving zone sized to receive an oral care capsule, and (ii) having a plurality of angled bristles adapted to retain an oral care capsule in the capsule receiving zone, the dispensing device comprising: a toothbrush

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manipulation element adapted to move a retention structure associated with the brush head to enable receipt of said oral care capsule; and a dispensation element adapted to deliver said oral care capsule into the capsule receiving zone.

In a further aspect, the invention relates to an oral care capsule dispensing device, comprising: a container having an interior adapted to contain a plurality of oral care capsules; a desiccant material disposed to receive moisture from the interior; and a selectively closable dispensing orifice adapted to permit dispensation of at least one oral care capsule from the container.

In a further aspect, any of the foregoing aspects may be combined for additional advantage.

Other aspects, features and embodiments of the invention will be more fully apparent from the ensuing disclosure and appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective upper view of a toothbrush according to one embodiment of the present invention, the toothbrush having angled bristles adapted to receive and retain an oral care capsule for use in cleansing teeth and gums of a user.

FIG. 2 is a perspective upper view of an internal portion of the toothbrush of FIG. 1 according to one embodiment of the present invention.

FIG. 3 is a perspective side view of the exterior of a dispenser for oral care capsules according to one embodiment of the present invention, the dispenser being adapted for use with the toothbrush of FIGS. 1-2.

FIG. 4 is a perspective view of the toothbrush of FIGS. 1-2 positioned for insertion into a side aperture of the dispenser of FIG. 3 to permit the toothbrush to receive an oral care capsule.

FIG. 5 is a side perspective view of a first internal loading portion of the dispenser of FIGS. 3-4 having an integral bristle spreader, and a portion of the toothbrush of FIGS. 1, 2, and 4 positioned for insertion into a side aperture of the dispenser portion.

FIG. 6 is a top perspective view of the dispenser portion and the toothbrush portion of FIG. 5.

FIG. 7 is a perspective view of the bristle spreader of the dispenser portion of FIGS. 5-6.

FIG. 8 is a side perspective assembly view of a second dispensing portion of the dispenser of FIG. 3 and the first loading portion of FIG. 5, with the second dispensing portion including a rotatable distribution plate having multiple apertures adapted to receive oral care capsules, and a dispensation plate adapted to permit passage of a single capsule from the distribution plate to the first loading portion.

FIG. 9 is an upper perspective view of the assembled first and second dispenser portions of FIG. 8, coupled to a vertically protruding shaft affixed to a container cover having a hinged decorative lid.

FIG. 10 is a side perspective assembly view of a third portion of the dispenser of FIG. 3, including a cylindrical container adapted to store multiple oral care capsules, and a desiccant element insertable into the container.

FIG. 11 is a perspective view of a base portion of an oral care capsule dispenser including multiple toothbrush insertion apertures and guide tubes, each adapted to receive a toothbrush of a different user.

DETAILED DESCRIPTION OF THE INVENTION, AND PREFERRED EMBODIMENTS THEREOF

The present invention relates to a toothbrush adapted to receive and retain an oral care capsule, and to a dispensing device adapted supply at least one oral care capsule to such a toothbrush.

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As indicated previously, various types of oral care or dentrifice capsules, and methods of making same, are known. At least an exterior portion of each capsule includes a solid material, such as gelatin, that is dissolvable in water and/or saliva (e.g., in the mouth of a user). Use of such dentrifice capsules provides multiple advantages over conventional flowable toothpastes subject to dispensation by displacement from a flexible tube. A measured and reproducible quantity of dentrifice is included in each capsule. Potential for transfer of paste material to undesired surface following dispensation but prior to use is substantially eliminated. A capsule or portion thereof may include a dissolution time profile that may be used as a guide for desirable brushing duration.

A preferred capsule is spherical or spheroidal (approximately spherical) in shape, to provide volumetric efficiency and substantially uniform dissolution of at least an exterior portion thereof. The composition of a capsule can be varied with respect to radius, to provide any one or more of various functions. For example, an outer or near-outer layer may comprise an effervescent layer with micro-abrasives to assist in cleaning the teeth and gums. Various effervescent materials and related additives suitable for oral use and/or ingestion, and methods for making same, are disclosed in U.S. Pat. No. 5,178,878, No. 4,753,792, and No. 3,962,417, which are hereby incorporated by reference. A plaque colorant layer may be provided to render plaque formed on teeth immediately visible to the naked eye of the user. A pH lowering layer may be provided to lower the pH environment in the user's mouth, as has been recently determined to promote absorption of fluoride into the user's teeth due to the lowered pH environment. (See, e.g., T. Kalili, et al., "Fluoride Absorption by Enamel from Toothpaste in Lowered pH Environment," J. Dent. Res. 83 (Spec Iss A) Abstract #4033 (2004).) Such pH lowering layer may be time-released to maintain pH at a target value for a desired period of time. One or more neutralizing and/or decolorant agents may be provided to neutralize pH and/or attenuate or remote the plaque colorant material, such as to avoid lasting effect of the plaque colorant. An oral care tablet with a plaque color indicators and decolorizing agent is disclosed in U.S. Patent Application Publication No. 2006/0115435, which is hereby incorporated by reference. One or more flavoring layers may be provided. A dentrifice layer (e.g., in solid, gel, or paste form), including abrasive materials such as silica may be further provided within the capsule. Further possible layers include a whitening layer (e.g., containing a peroxide), an anticalculus (anti-tartar) layer, a whitening layer (e.g., including a peroxide material), an antibacterial layer (e.g., including triclosan), and a breath freshening layer. Any two or more of the foregoing layers may overlap or be combined as desirable for simultaneous effect, or may be separated (e.g., by an intermediate gel layer) as desirable or necessary, and any combination of the foregoing layers may be provided in a single capsule. In terms of external appearance, capsules may be provided in various colors or patterns, and may further be printed with words or pictures such as corresponding to media characters.

A toothbrush 10 adapted to receive and retain an oral care capsule is illustrated in FIGS. 1-2. The toothbrush 10 includes a handle 14 disposed along a first end 11 optionally including a dial or switch 33, an intermediate shaft 15, and a brush head 20 disposed along a second end 12 optionally having an activation element 31. The brush head 20 includes a capsule receiving zone 25, such as may include a recess defined in the brush head 20, disposed within a plurality of angled bristles 26A. The angled bristles 26A are preferably canted away from vertical in a direction toward the center of the capsule receiving zone 25, so as to retain an oral care capsule (not

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shown) insertable into the capsule receiving zone 25. The size and shape of the capsule receiving zone 25, and the size, spacing, and angle of the angled bristles 26A, are selected to retain an oral care capsule of a predetermined size and shape. As shown in FIGS. 1, 4, and 5, ten angled bristles 26A are equally spaced around the perimeter of a circular recess (spanning 360 degrees) defining the capsule receiving zone 25. Conventional straight bristles 26 may be further provided apart from the capsule receiving zone 25.

In the present embodiment, an oral care capsule is loaded into the toothbrush 10 by spreading the angled bristles 26A apart, and then inserting the capsule past the spread bristles into the oral care capsule receiving zone. In another embodiment to be described in more detail hereinafter, a toothbrush may include a moveable retaining element bounding a capsule receiving zone (e.g., from behind) and permitting an oral care capsule to be loaded without spreading apart bristles of the toothbrush.

One or more signaling elements 16 adapted to provide a user-perceptible signal may be disposed in or along the toothbrush handle 14. Such signal may be any of visible, auditory, and vibratory in nature. The one or more signaling elements 16 may provide a signal indicative of any of oral care cleansing cycle time and attainment of a threshold oral care cleansing cycle time, to ensure that the user engages in an oral cleansing operation of an optimally effective duration (e.g., two minutes or more). A threshold oral care cleansing time may be set or adjusted by the user with an input element, such as the switch 33 or a separate interface element adapted to communicate with the toothbrush 10 for programming.

The handle 14 preferably includes a battery 30 or other charge storage element. The brush head 20 may include various signalling elements 36, 37, such as LEDs, sound generators, and/or vibration generators. One or more sensors 38 may be further provided to sense one or more conditions indicative of usage of said toothbrush 10 in an oral care cleansing cycle. For example, the one or more sensors 38 may sense any of motion, acceleration, vibration, and pressure. Signals generated by the one or more sensors 38 may be used, for example, in conjunction with a timer to determine time elapsed in an oral care cleaning cycle, or whether a minimum threshold oral care cleansing cycle has been satisfied. Alternatively, the activation element 31 may be depressed or otherwise activated at the beginning of an oral care cleansing cycle, and used to initiate a time for determining time elapsed in an oral care cleansing cycle or whether a minimum threshold time has been satisfied.

Circuitry 32 adapted to perform any of various desirable functions disclosed herein may be disposed in the handle 14. For example, the circuitry 32 may control signalling elements 16, 36, provide timer functionality, store or allow adjustment of a threshold oral care cleansing cycle time, and the like. One or more conductors 35 may be disposed between the handle 14 and the brush head 20 to permit electrical communication between the battery 30 and/or circuitry 32 disposed in the handle 14, and the various electrically operable elements (e.g., signalling elements 36, 37, sensor 38, activation element 31) disposed in the brush head 20. In a preferred embodiment, the brush head 20 comprises a substantially optically transmissive material, such as to enable external transmission of light from one or more light emitting diodes or the like.

The capsule receiving zone 25 may include a recess formable by various means. In one embodiment, such a recess is defined by forming an aperture 27 through an intermediate portion of the brush head 14, and then closing the recess from

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behind with a cover (not shown). Alternatively, such a recess may be formed by conventional molding or other shaping techniques.

While a manually operated toothbrush 10 is shown, an electrically operated toothbrush with the same features as described herein is specifically contemplated as encompassed by the present invention.

As indicated previously, a toothbrush may include a moveable retaining element bounding a capsule receiving zone and permitting an oral care capsule to be loaded without spreading apart bristles of the toothbrush. For example, a rear portion of a brush head may include a hinged or slidable portion (e.g., a cover) that may be moved to an open position to expose an oral care capsule loading aperture. Such cover may be moved through operation of a corresponding toothbrush manipulation element associated with an oral care capsule dispensing device. Upon movement of such moveable retaining element to an open position, the oral care capsule is loaded into the oral care capsule loading aperture that constitutes an oral care capsule receiving zone. Thereafter, the moveable retaining element is returned to a closed position, and the oral care capsule is retained from behind by the retaining element, and preferably also from above by a plurality of angled bristles. In this regard, the moveable cover functions to selective cover or obstruct the oral care capsule loading aperture.

In another embodiment, a brush head of a toothbrush includes a flexural portion adapted to permit at least some bristles of a plurality of angled bristles to be spread apart so as to enable an oral care capsule to be loaded in a capsule receiving zone of such brush head. An associated dispensing device may include a corresponding structure adapted to automatically effectuate such flexure of the brush head to permit loading of at least one capsule into a capsule receiving zone defined therein. Following a loading operation, flexing force is released from the brush head to cause the brush head to return to a relaxed position with an oral care capsule retained in the capsule receiving zone by the angled bristles.

A dispenser 100 for oral care capsules, adapted for use with the toothbrush 10, is illustrated in FIG. 3, with various portions thereof illustrated in the ensuing FIGS. 4-10.

The dispenser 100 includes a bottom surface 101, a base portion 105, a container 108, and an outer lid 104. The container 108 may be formed of a translucent or substantially optionally transmissive material to permit viewing of the contents therein. The container 108 may include a ramp (not shown), such as may be configured in a helical or spiral shape, to guide oral care capsules to a desired location (such as toward a distribution plate 141, as illustrated in FIGS. 8-9). The outer lid 104, which may be pivotally coupled to the container portion 108, optionally includes a figurine 102 and one or more light elements 103, such as may be provided in view of a user for entertainment utility. A toothbrush insertion aperture 110, sized and shaped to receive at least a portion of a toothbrush, is defined in the base portion 105.

Referring to FIG. 4, a toothbrush 10 may be oriented as shown for insertion into the toothbrush receiving aperture 110 of the dispensing device 100. The bottom surface 101 may be equipped with a non-skid material or a suction cup to prevent displacement of the dispensing device 100 upon insertion of a portion of a toothbrush 10 therein.

Disposed above the base portion 105 of the dispensing device 100 is a container 108 adapted to retain a plurality of oral care capsules (not shown) therein. A rotatable vertical shaft 132 may be provided along a vertical axis of the container 108 to mechanically couple the container 108, via inner lid 135 thereof, to a motor 124 (illustrated in FIG. 5). By way of such coupling, the outer lid 104 and figurine 102, along

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with distribution plate 141 (shown in FIGS. 8-9) may be caused to rotate through operation of the motor. If desired, the container 108 or a portion thereof may be coupled to rotate by operation of the motor 124 for user entertainment and/or dispensing utility. An orifice plate 131, defining an orifice 134 adapted to permit the passage of an oral care capsule in the base portion 105, is disposed below the container 108.

FIGS. 5-6 illustrate selected internal components of the base portion 105 as positioned relative to a toothbrush 20 positioned for insertion therein. The toothbrush insertion aperture 110 leads to a guide tube 112 that guides the toothbrush head 20 into position for loading of an oral care capsule therein. Disposed within the guide tube is a toothbrush manipulation element in the form of a bristle spreader 119 defined an aperture 120 and having a wedge-shaped leading edge 119A. Such leading edge 119A may be configured as a wedge or block adapted to provide the desired spreading functionality. A close-up perspective view of the bristle spreader 119 is shown in FIG. 7. As the brush head 20 is inserted past the bristle spreader 119, the wedge-shaped leading edge 119A of the spreader 119 spreads apart the angled bristles 26A to prepare the brush head 20 to receive an oral care capsule. Although the illustrated embodiment is directed to a specific mechanical oral care capsule loading mechanism, and of various other mechanically or electrically actuated means may be used, as will be recognized by those skilled in the art, to provide automatic dispensing operation. In the illustrated embodiment, the toothbrush head 20 is inserted into the guide tube 112 to contact a push bar 114 joined via arm 115 a lever 117 having an associated pivot 116 and return spring 126. Upon depressing the push bar 114, the lever is forced toward the guide tube 112 and the aperture-defining bristle spreading element 119 disposed therein. In this manner, an oral care capsule 200 disposed between the lever 117 (e.g., opposite tab 118) may be pushed through a the aperture 120 of the bristle spreader 119, past the spread-apart angled bristles 26A, and into the oral care capsule receiving zone 25 of the brush head 20 of the toothbrush 10. Upon removal of the brush head from the bristle spreader 119, the angled bristles 26A return to their relaxed position to contract around an oral care capsule disposed within the capsule receiving zone 25.

Although FIG. 6 illustrates loading of an oral care capsule 200 laterally in a toothbrush head 20, a dispensing device may be configured for capsule loading in any desired direction. In one embodiment, a dispensing device is adapted to load an oral care capsule in an upward direction into a capsule receiving zone of a corresponding toothbrush head. In yet another embodiment, a dispensing device is adapted to load an oral care capsule in a downward direction into a capsule receiving zone of a corresponding toothbrush head.

FIGS. 5-6 further illustrate a battery holder 121 including two batteries 122, and a motor 124 coupled to receive power from the batteries 122 via cable 123. Such motor 124 may be used to set in motion any desired portion of the dispensing device 100, such as the container 108, figurine 102, and/or distribution plate 141 (illustrated in FIGS. 8-9). As an alternative to batteries 122, the dispensing device may be operated via alternating current input with an appropriate internal AC/DC converter (not shown).

The dispensing device 100 may further include a sterilization element, such as an ultraviolet light or other element (not shown), disposed in, along, or proximate to the guide tube 112. Such sterilization element may be activated upon insertion of a brush head 20 into the guide tube 112 to effect sterilization of the brush head 20 and therefore avoid pathogen growth (e.g., along any of the brush head 20, the guide

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tube 112, the spreading element 119, the push bar 114) and potential for transfer of pathogens from one surface (or toothbrush) to the next. Such sterilization element may be operated by the batteries 122 or another power source. Moreover, any surfaces subject to contacting a toothbrush insertable into the dispensing device 100, and even the toothbrush 20, may be coated or otherwise formed with an antibacterial substance such as 5-chloro-2phenol (2,4dichlorophenoxy) commonly sold under the trade name Microban®.

Referring to FIGS. 8-9, the dispensing device 100 preferably includes a rotatable distribution plate 141 including a plurality of apertures 144A-144H each sized to receive an oral care capsule, with the distribution plate 141 disposed above the orifice plate 131. The apertures 144A-144H of the distribution plate 141 are positioned to permit oral care capsules disposed therein to drop into the orifice 134, preferably one at a time, upon rotation of the distribution plate 141. The orifice 134 of the orifice plate 131 is disposed immediately above the oral care capsule 200 shown in FIG. 6, such that an oral care capsule 200 that falls through the orifice 134 is ready for loading through the aperture 120 of the bristle spreading element 119 into a brush head 20 inserted into the guide tube 112. The distribution plate 141 further includes a central aperture 145 that is keyed or otherwise shaped to receive a lower torque transfer element 133 associated with the shaft 132, to rotate the distribution plate 131 without slippage. Likewise, the outer lid 104 may include an aperture 136 that is keyed or otherwise shaped to receive an upper torque transfer element 134 associated with the shaft 132, to permit the lid 104 and optional figurine 102 to rotate as well. Electrical contacts may be further provided through the shaft 132, torque transfer elements 133, 134, and aperture 136 to supply electrical power to the signaling element 103 (e.g., LED) associated with the figurine 102.

The distribution plate 141 is preferably closely spaced relative to the orifice plate 131, and one or more seals (not shown) may be provided therebetween. Any of the distribution plate 141 and orifice plate 131 may be formed or coated with a friction-reducing material, such as polytetrafluoroethylene (PTFE) to minimize wear or possible binding therebetween. Between dispensing cycles, the distribution plate 141 preferably rests in a position wherein none of the apertures 144A-144H are aligned with the orifice 131 of the orifice plate 134. This promotes sealing of the container 108, so as to minimize infiltration of moisture into the container 108 that might otherwise degrade water-dissolvable capsule shell or coating materials.

As toothbrushes are conventionally utilized in bathroom environments that may be quite moist, and oral care capsules may have water-dissolvable outer shell or coating materials, it is desirable to minimize presence of moisture in a container 108 having a plurality of oral care capsules disposed therein. Referring to FIG. 10, in one embodiment a desiccant material 160 may be disposed to receive moisture from a container 108. Such desiccant material 160 may be provided as a central portion of the container 108 or in any other desired location. Such desiccant may include a moisture absorbing board, silica gel, clay, or a molecular sieve, whether disposed loosely or packed, in a (e.g., mesh) pouch or other permeable retainer, disposed in moisture receiving relationship relative to the interior of the container 108. A cover 170 defining an aperture 172 may be provided over the desiccant 160 and the container 108. Such cover 170 may be permanently sealed to the container 108, or may be removable to permit replacement of the desiccant material.

The container 108 preferably comprises a cartridge that may be removed from the dispensing apparatus and replaced

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by the user. Such container may alternatively be refilled by the user through a capsule insertion port (not shown).

In another embodiment, a dispensing device includes a plurality of toothbrush insertion apertures each adapted to receive a portion of a different toothbrush, so as to enable multiple users each having different toothbrushes to use the same dispenser without requiring contact between multiple brushes and single capsule interface surface of the dispenser. Such dispenser may resemble the dispenser 100 described hereinabove with reference to FIGS. 3-4, but modified to include multiple toothbrush insertion apertures and guide tubes each intended to receive a different toothbrush. Referring to FIG. 11, a base portion 205 of a dispensing device has a bottom surface 201 and includes three guide tubes 212A-212C. Each guide tube 212A-212C has an associated toothbrush insertion aperture (e.g., toothbrush insertion aperture 210A for guide tube 212A is shown; it is to be understood that corresponding toothbrush insertion apertures are provided for guide tubes 212B, 212C) adapted to receive a portion of a different toothbrush. Each guide tube 212A-212C has an associated bristle spreading element 219A-219C adapted to spread apart bristles of a toothbrush as described hereinabove, to permit an oral care capsule to be supplied to the toothbrush through an aperture 220A-220C associated with the respective guide tube 212A-212C.

Each toothbrush insertion aperture (e.g., 210A) and/or guide tube 212A-212C preferably has an associated marking element (e.g., marking element 211) providing visible differentiation between the different toothbrush insertion apertures of the device. Such marking elements (e.g., marking element 211A) may differ in terms of color, size, shape, texture, or any combination of the foregoing parameters. Each marking element (e.g., 211A) may be provided in any suitable location proximate to an associated toothbrush aperture (e.g., 210A), such as along outer surface of the base 205, within a guide tube 212A-212C, or both.

The base 205 shown in FIG. 11 is preferably stationary in character, with the lower surface 201 disposed on or just above an underlying surface such as a countertop. Various methods may be employed to supply oral care capsules to each aperture 220A-220C. In one embodiment, separate ramps (not shown) may be provided to guide oral care capsules from a container (e.g., container 108 shown in FIG. 4) to each aperture 220A-220C, with an optional interposing distribution plate (e.g., distribution plate 141 shown in FIGS. 8-9, optionally modified to include multiple apertures) for regulating passage of oral care capsules. In another embodiment, a single ramp or guide may be employed and selectively moved (e.g., in conjunction with movement of a container 108) into position to supply an oral care capsule to an aperture 220A, 220B, 220C. Such movement may include manual operation by a user, or automated movement with an electric motor (not shown).

In operation of a dispenser including the base portion 210, a first user inserts a portion of a toothbrush (e.g., toothbrush 10 as described hereinabove) into a toothbrush insertion aperture (e.g., insertion aperture 210A) to contact a bristle spreader (e.g., bristle spreader 219A) disposed therein. Each toothbrush insertion aperture shown in FIG. 11 is arranged to receive a toothbrush 10 (as described hereinabove) with bristles facing upward. The bristle spreader (e.g., 219A) has a wedge-shaped leading edge adapted to spread apart angled bristles of the toothbrush 10 to prepare the brush head 20 to receive an oral care capsule. An oral care capsule (not shown) is directed through an oral care capsule loading aperture (e.g., aperture 220A) past spread-apart angled bristles 26A, and into an oral care capsule receiving zone 25 of the brush head

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20 of the tooth brush 10. Any various loading mechanism (e.g., mechanically and/or electrically actuated) within the knowledge of one skilled in the art may be used to load a toothbrush with an oral care capsule as described herein. Upon removal of the brush head 20 from the bristle spreader 219A, the angled bristles 26A return to their relaxed position to contract around an oral care capsule disposed within the capsule receiving zone 25. The toothbrush 10 is then removed from the toothbrush insertion aperture 210A, and utilized by the user for oral cleaning.

Second and third users with different toothbrushes may repeat the foregoing procedure, but each utilizing dedicated toothbrush insertion apertures and guide tubes 210A, 210B, 210C, to prevent contact between different brushes and any single interface surface of the dispenser.

While the invention has been described herein in reference to specific aspects, features and illustrative embodiments of the invention, it will be appreciated that the utility of the invention is not thus limited, but rather extends to and encompasses numerous other variations, modifications and alternative embodiments, as will suggest themselves to those of ordinary skill in the field of the present invention, based on the disclosure herein. Correspondingly, the invention as hereinafter claimed is intended to be broadly construed and interpreted, as including all such variations, modifications and alternative embodiments, within its spirit and scope.

What is claimed is:

1. A toothbrush comprising a brush head that includes:

- a front surface;
- a back surface;
- a plurality of vertical bristles extending upward from the front surface;
- a capsule receiving zone sized to receive an oral care capsule, the capsule receiving zone including a recess defined in the front surface and arranged to receive at least a portion of an oral care capsule inserted past the vertical bristles; and
- at least one pair of angled capsule retaining elements that are elevated above the recess and configured to retain an oral care capsule in the capsule receiving zone, wherein each pair of the at least one pair angled capsule retaining elements includes a first and a second angled capsule retaining element arranged along diametrically opposing sides of an oral care capsule when present in the capsule receiving zone; and wherein at least a portion of each angled capsule retaining element of the at least one pair of capsule retaining elements is arranged to contact the oral care capsule.

2. The toothbrush of claim 1, wherein the at least one pair of angled capsule retaining elements comprises multiple pairs of angled bristles canted away from vertical in a direction toward a center of the capsule receiving zone, and the brush head includes a flexural portion adapted to permit at least some bristles of the multiple pairs of angled bristles to be spread apart so as to enable an oral care capsule to be loaded into the capsule receiving zone.

3. The toothbrush of claim 1, further comprising a signaling element adapted to provide a user-perceptible signal indicative of any of oral care cleansing cycle time and attainment of a threshold oral care cleansing cycle time.

4. The toothbrush of claim 3, further comprising a sensor adapted to sense a condition indicative of usage of said toothbrush in an oral care cleansing cycle.

5. The toothbrush of claim 1, wherein each capsule retaining element of the at least one pair of angled capsule retaining

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elements comprises a retaining element canted away from vertical in a direction toward a center of the capsule receiving zone.

6. The toothbrush of claim 5, wherein the at least one pair of angled capsule retaining elements comprises angled bristles canted away from vertical in a direction toward a center of the capsule receiving zone.

7. The toothbrush of claim 5, wherein the at least one pair of angled capsule retaining elements is arranged between the plurality of vertical bristles and a center of the capsule receiving zone.

8. The toothbrush of claim 1, including an oral care capsule retained by the at least one pair of capsule retaining elements in the capsule receiving zone, wherein the oral care capsule comprises one or more of the following: a dentrifice composition, a whitening composition, an anticalculus composition, and antibacterial composition, and a breath freshening composition.

9. A method comprising loading an oral care capsule into a capsule receiving zone of a toothbrush according to claim 1 by inserting at least a portion of the oral care capsule in a direction past the vertical bristles into the recess, and retaining the oral care capsule in the capsule receiving zone using the at least one pair of angled capsule retaining elements.

10. A toothbrush comprising a brush head that includes:

a front surface and a back surface that opposes the front surface;

a plurality of bristles extending upward from the front surface and arranged distal from a center of the front surface;

a capsule receiving zone including a recess defined in the front surface and arranged to receive at least a portion of an oral care capsule insertable past the bristles into the recess; and

at least three angled capsule retaining elements that are elevated above the recess, are configured to retain an oral care capsule in the capsule receiving zone, and are canted away from vertical in a direction toward a center of the capsule receiving zone, wherein each angled capsule retaining element of the at least three angled capsule retaining elements is arranged proximate to a perimeter of the capsule receiving zone at a position at least 108 degrees apart from at least one other angled capsule retaining element of the at least three angled capsule

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retaining elements relative to a center of the capsule receiving zone; and wherein at least a portion of each angled capsule retaining element of the at least three angled capsule retaining elements is arranged to contact the oral care capsule.

11. The toothbrush of claim 10, wherein the at least three angled capsule retaining elements are arranged between the plurality of bristles and a center of the capsule receiving zone.

12. The toothbrush of claim 10, wherein the at least three angled capsule retaining elements comprise at least three angled bristles.

13. The toothbrush of claim 10, including an oral care capsule retained by the at least three capsule retaining elements in the capsule receiving zone, wherein the oral care capsule comprises one or more of the following: a dentrifice composition, a whitening composition, an anticalculus composition, and antibacterial composition, and a breath freshening composition.

14. A method comprising loading an oral care capsule into a capsule receiving zone of a toothbrush according to claim 10 by inserting at least a portion of the oral care capsule in a direction past the bristles into the recess, and retaining the oral care capsule in the capsule receiving zone using the at least three angled capsule retaining elements.

15. The toothbrush of claim 1, wherein the at least one pair of angled capsule retaining elements comprises multiple pairs of angled capsule retaining elements.

16. The toothbrush of claim 1, wherein at least a portion of each angled capsule retaining element of the at least one pair of angled capsule retaining elements is arranged to overlap a portion of the recess of the capsule receiving zone.

17. The toothbrush of claim 10, wherein at least a portion of each angled capsule retaining element of the at least three angled capsule retaining elements is arranged to overlap a portion of the recess of the capsule receiving zone.

18. The toothbrush of claim 10, wherein each angled capsule retaining element of the at least three angled capsule retaining elements is arranged proximate to a perimeter of the capsule receiving zone at a position at least 144 degrees apart from at least one other angled capsule retaining element of the at least three angled capsule retaining elements relative to a center of the capsule receiving zone.

* * * * *

(12) **United States Patent**
Noble et al.

(10) **Patent No.:** **US 9,808,077 B2**
(45) **Date of Patent:** **Nov. 7, 2017**

(54) **TOOTHBRUSH SYSTEM UTILIZING ORAL CARE CAPSULE**

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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 85 days.

(21) Appl. No.: **14/535,442**

(22) Filed: **Nov. 7, 2014**

(65) **Prior Publication Data**

US 2015/0083747 A1 Mar. 26, 2015

Related U.S. Application Data

(63) Continuation of application No. 12/101,446, filed on Apr. 11, 2008, now Pat. No. 8,881,332, which is a
(Continued)

(51) **Int. Cl.**
B65H 3/00 (2006.01)
A46B 11/00 (2006.01)

(Continued)

(52) **U.S. Cl.**
CPC **A46B 11/0003** (2013.01); **A46B 9/025**
(2013.01); **A46B 11/0006** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC . A46B 11/0003; A46B 9/025; A46B 11/0006;
A46B 11/0068; A46B 15/0002;
(Continued)

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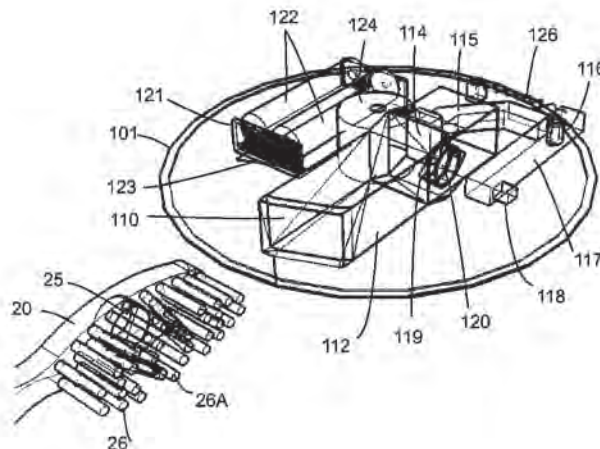
Primary Examiner — Rakesh Kumar

(74) *Attorney, Agent, or Firm* — Withrow & Terranova, P.L.L.C.; Vincent K. Gustafson

(57) **ABSTRACT**

A toothbrush includes a brush head having a capsule receiving zone sized to receive a dentifrice capsule. A plurality angled bristles may retain the capsule in such zone. Loading of such toothbrush with a capsule may be performed with a dispenser including a toothbrush manipulation element adapted to move a retention structure associated with the brush head, and dispensation element adapted to deliver the capsule into the receiving zone. Such dispenser may include a desiccant material disposed to receive moisture from a capsule storage container. A dispenser may further include a plurality of toothbrush insertion apertures each adapted to receive a portion of a different toothbrush, so as to enable multiple users each having different toothbrushes to use the same dispenser without requiring contact between multiple brushes and single capsule interface surface of the dispenser.

20 Claims, 11 Drawing Sheets



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Related U.S. Application Data

continuation-in-part of application No. 11/840,627,
filed on Aug. 17, 2007, now abandoned.

(51) **Int. Cl.**

A46B 9/02 (2006.01)
A46B 15/00 (2006.01)
A46B 17/06 (2006.01)
A61C 19/06 (2006.01)

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

CPC *A46B 11/0068* (2013.01); *A46B 15/0002*
(2013.01); *A46B 15/0008* (2013.01); *A46B*
15/0036 (2013.01); *A46B 17/06* (2013.01);
A61C 19/063 (2013.01); *A46B 2200/1066*
(2013.01)

(58) **Field of Classification Search**

CPC . A46B 15/0008; A46B 15/0036; A46B 17/06;
A46B 2200/1066; A61C 19/063
USPC 221/289, 267, 264
See application file for complete search history.

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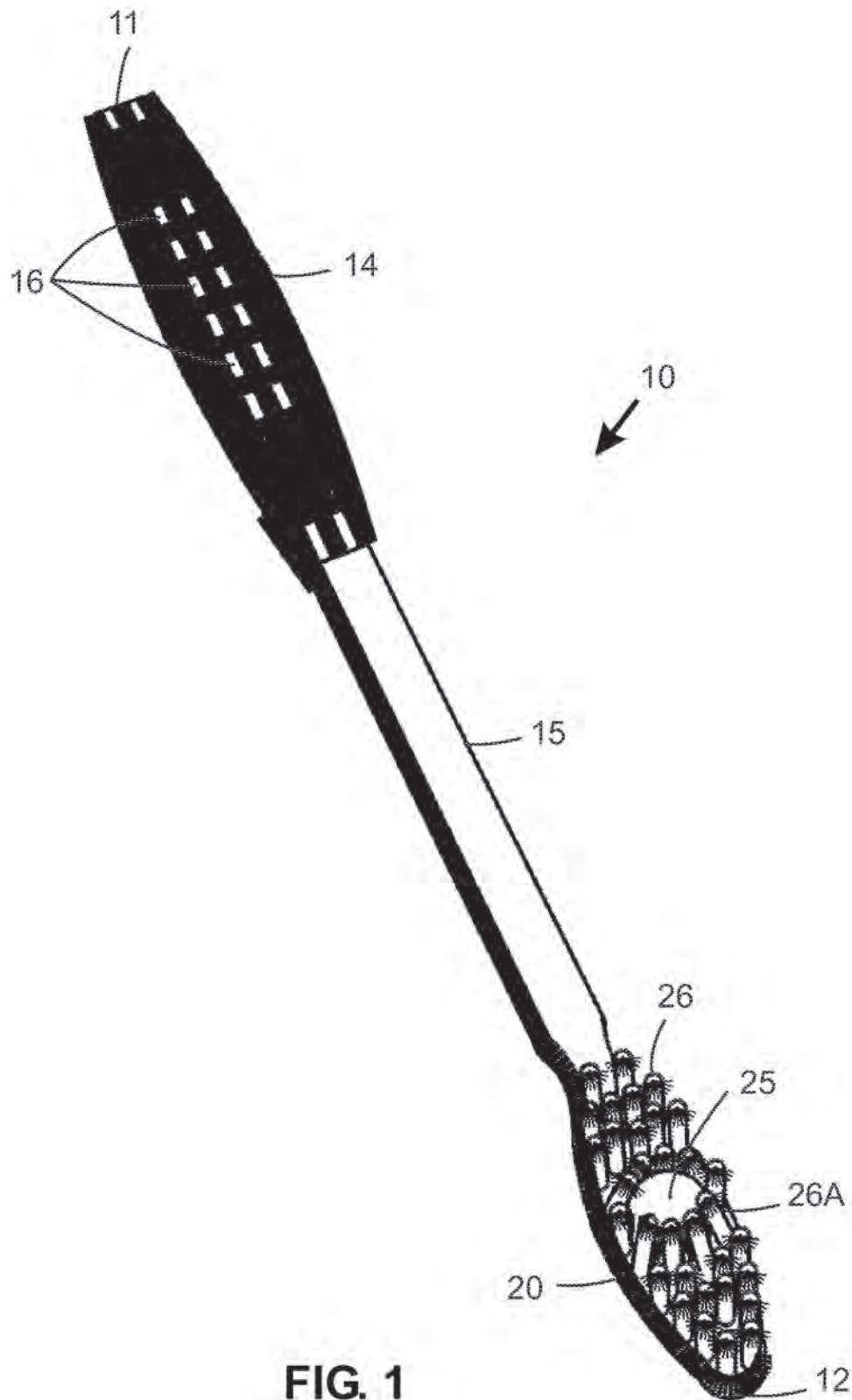


FIG. 1

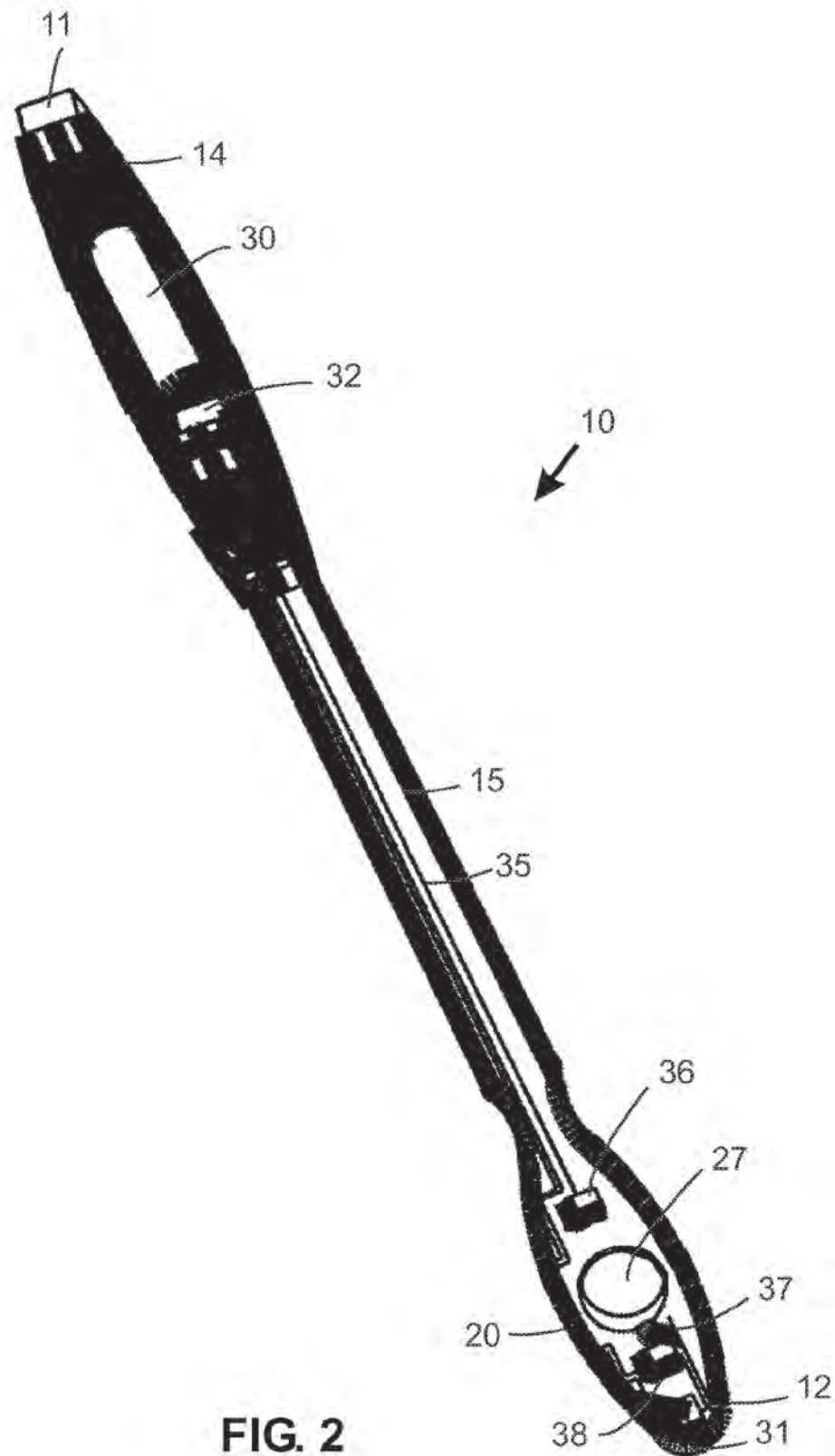


FIG. 2

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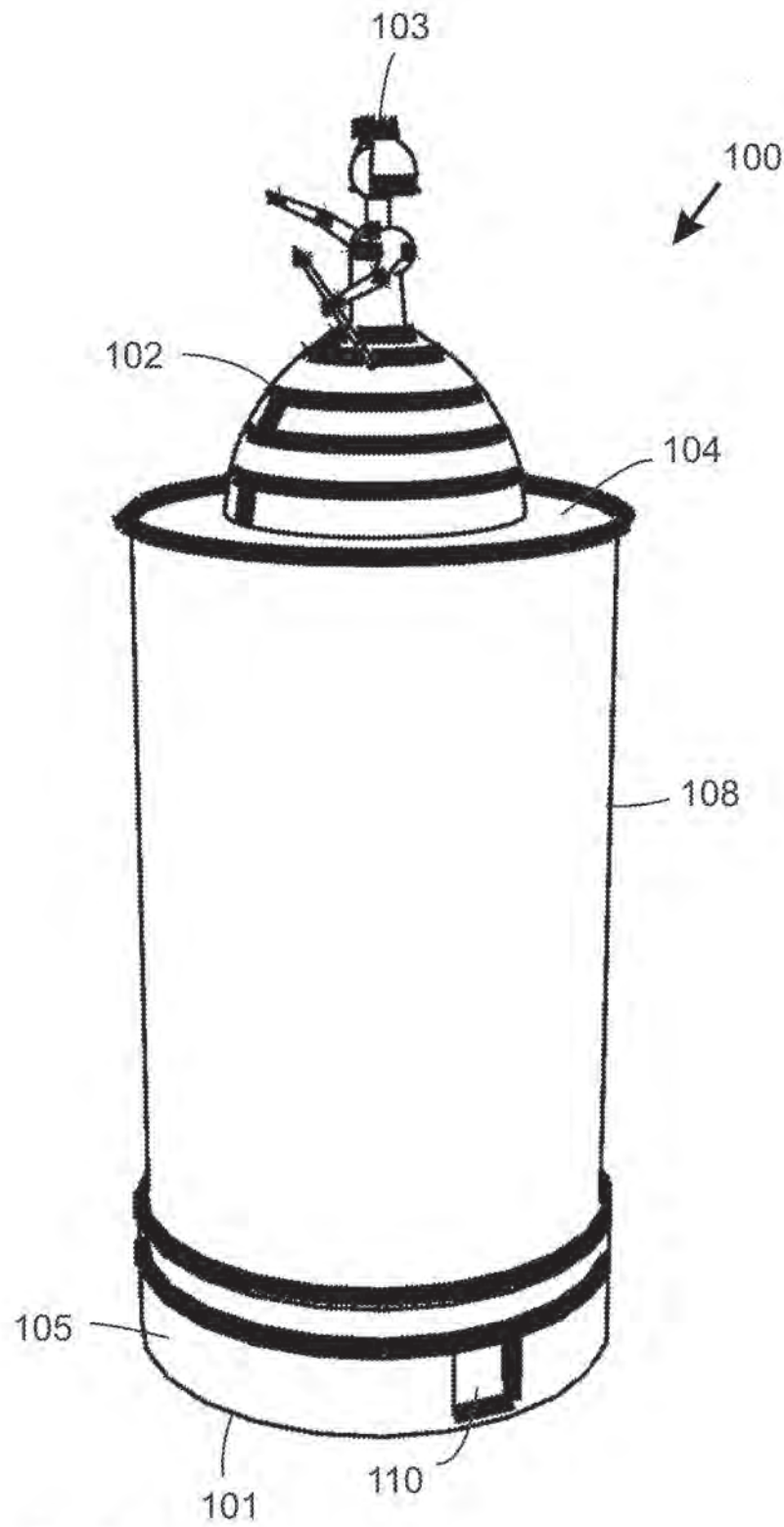


FIG. 3

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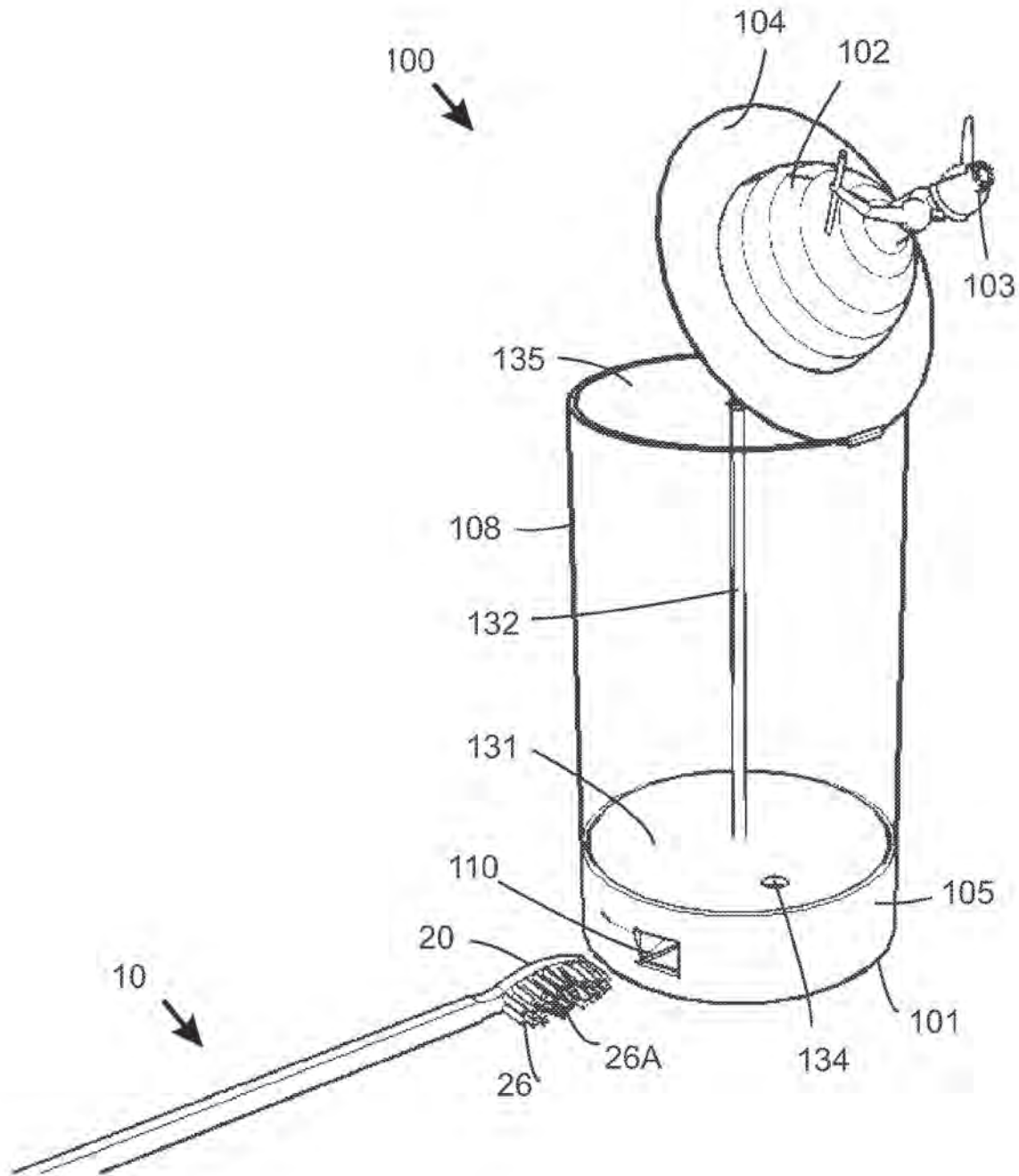


FIG. 4

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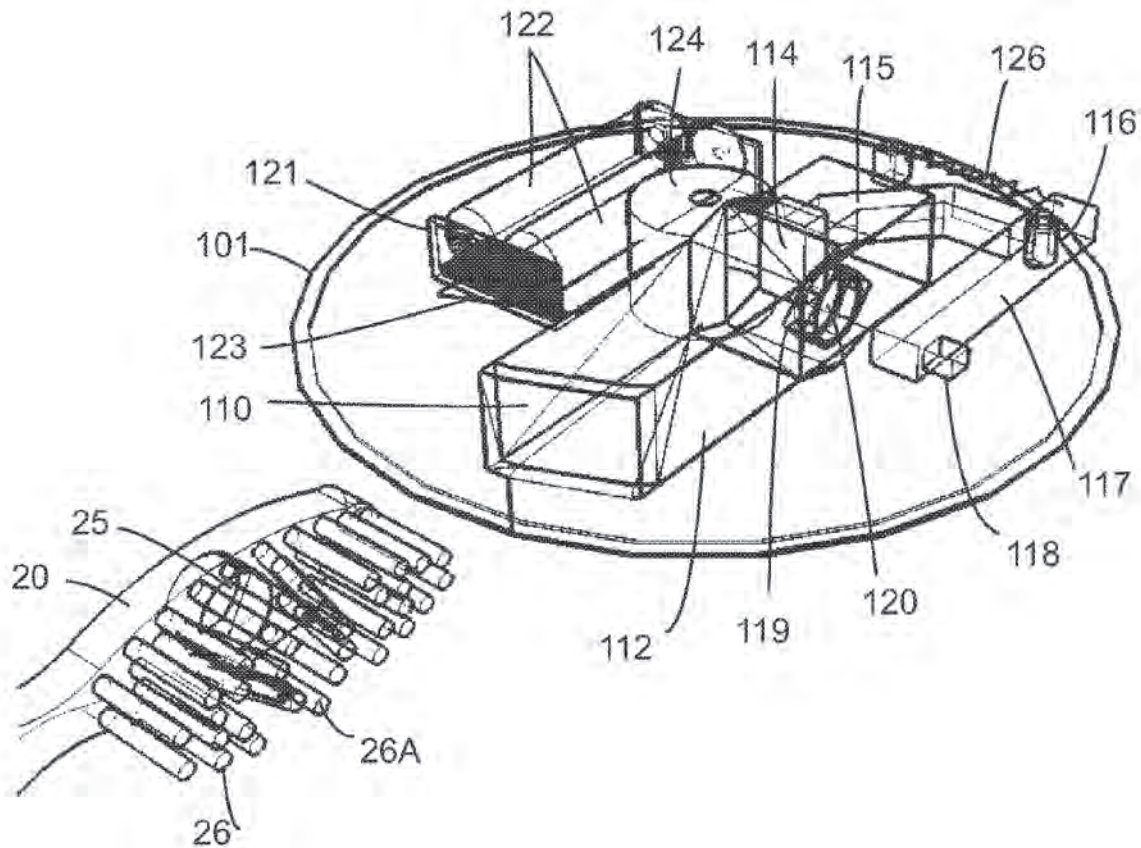


FIG. 5

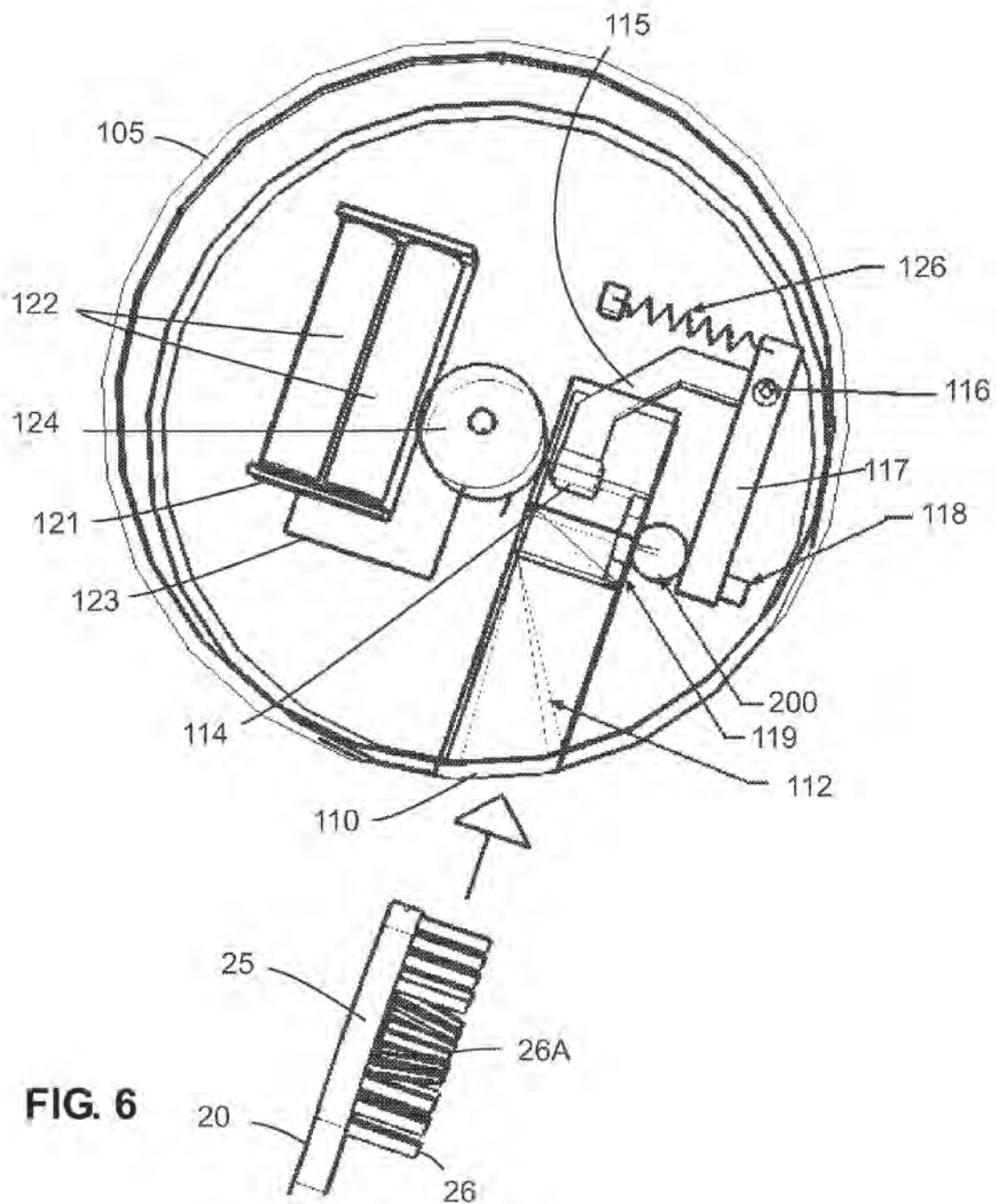


FIG. 6

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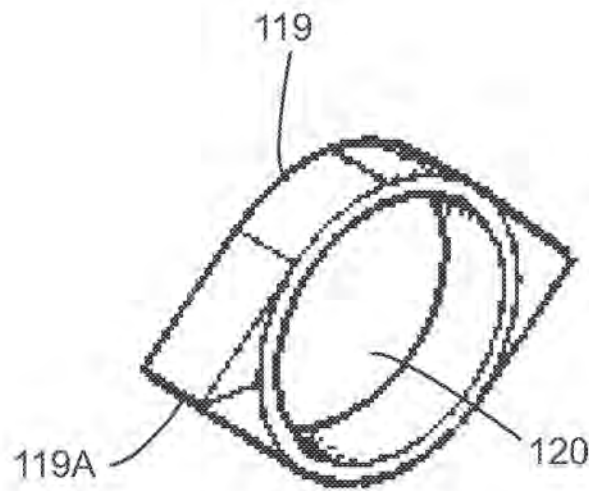


FIG. 7

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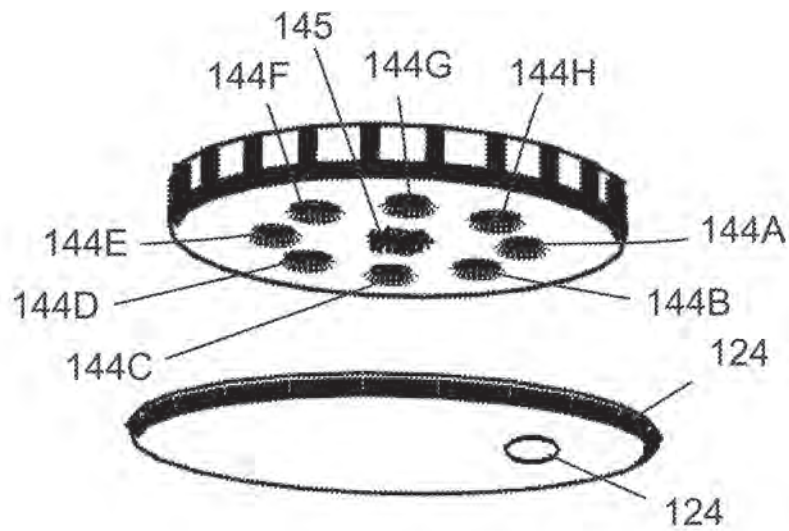


FIG. 8

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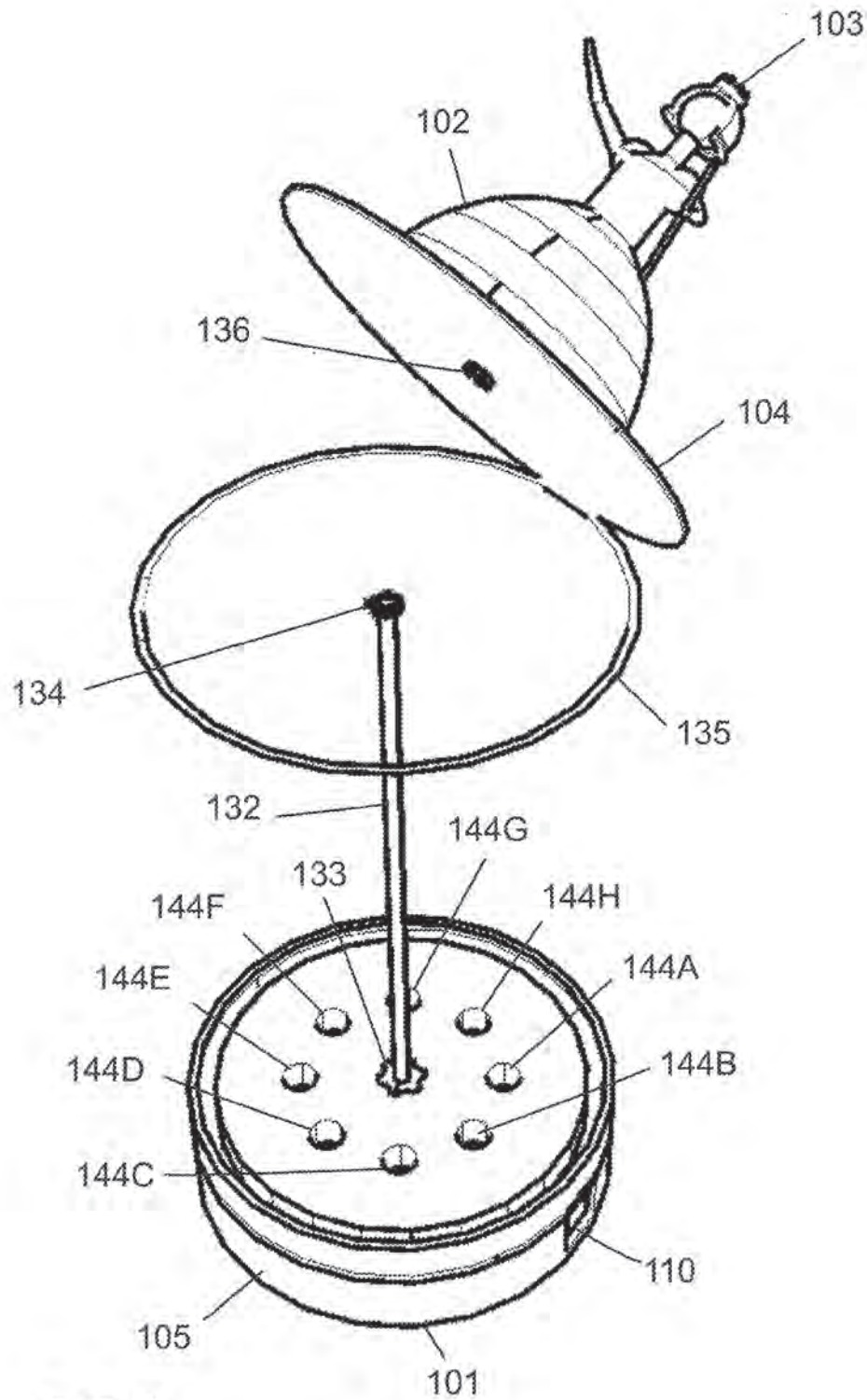


FIG. 9

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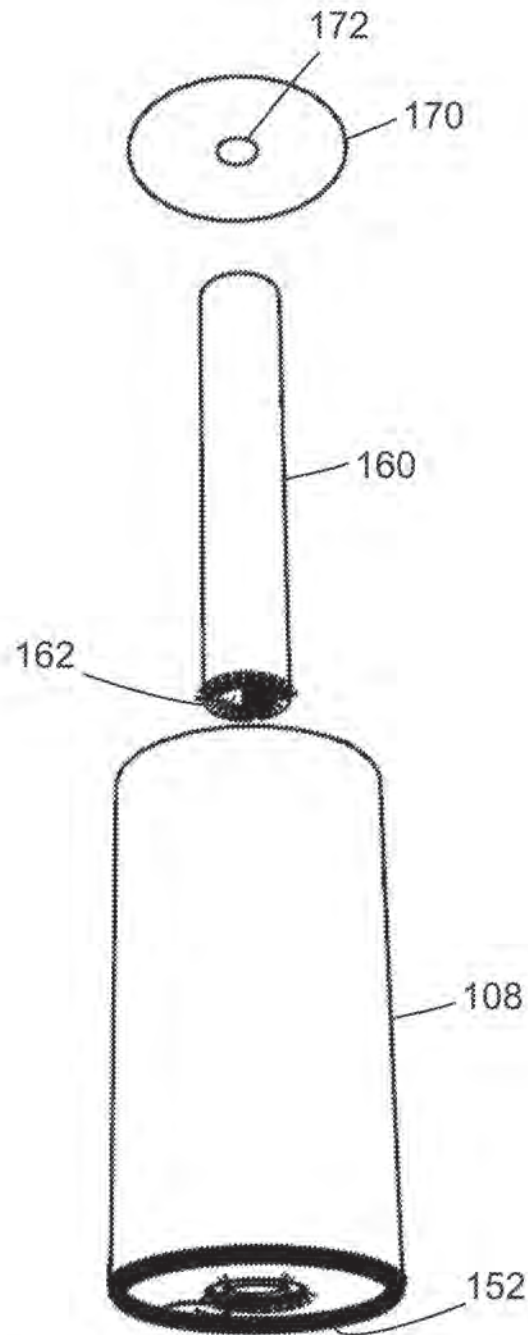


FIG. 10

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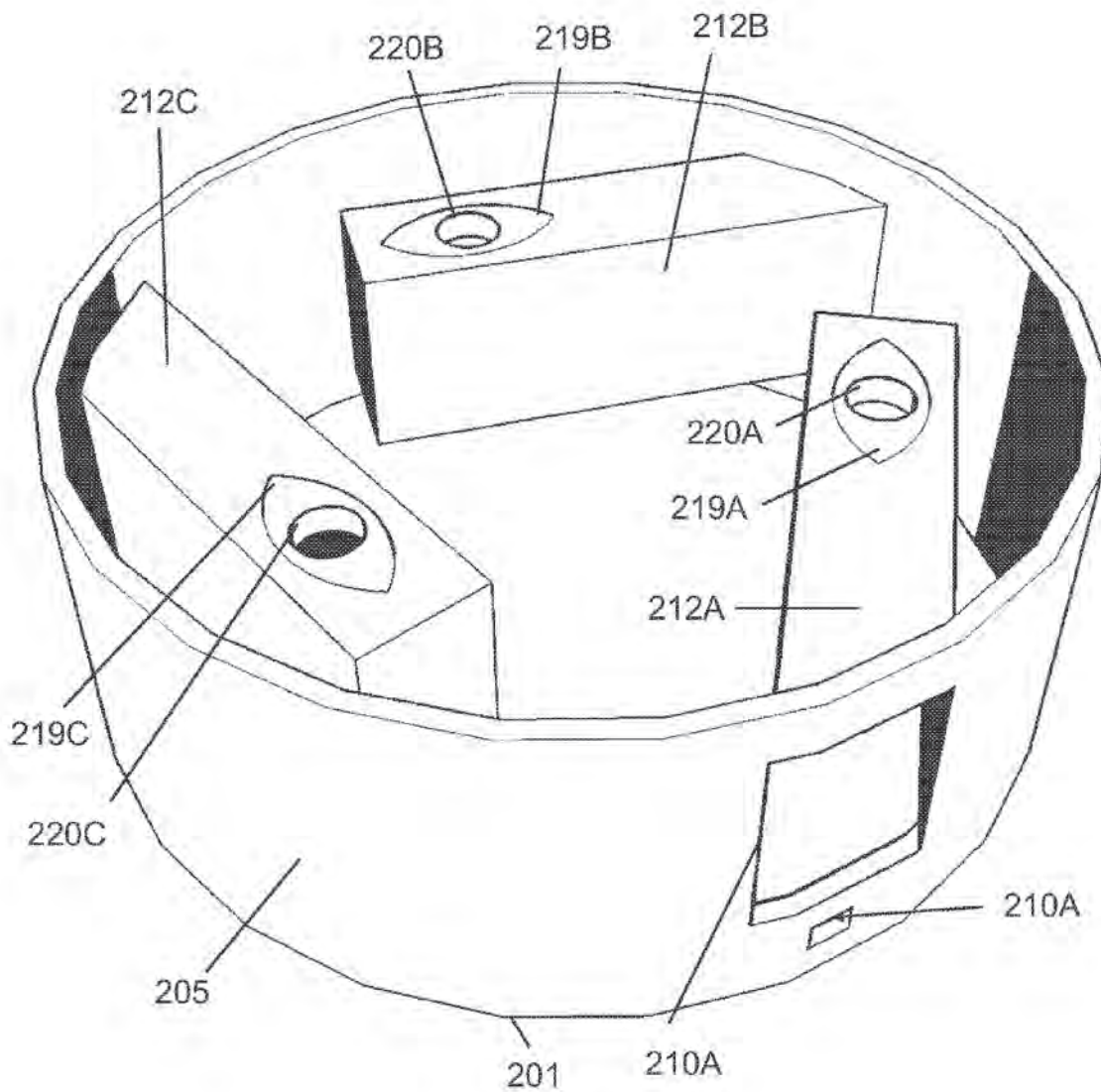


FIG. 11

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TOOTHBRUSH SYSTEM UTILIZING ORAL CARE CAPSULE

STATEMENT OF RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 12/101,446 filed on Apr. 11, 2008 and issuing as U.S. Pat. No. 8,881,332 on Nov. 11, 2014, which is a continuation-in-part of U.S. patent application Ser. No. 11/840,627 filed on Aug. 17, 2007, now abandoned. Benefit of the filing dates of such prior applications is claimed under 35 U.S.C. §120, and the disclosures of such prior applications are hereby incorporated by reference herein.

FIELD OF THE INVENTION

The present invention relates to oral care, and more specifically, to toothbrushes and dispensing systems utilizing oral care capsules.

DESCRIPTION OF THE RELATED ART

Good oral hygiene requires regular and proper attention to tooth brushing and flossing. According to the American Academy of Periodontology, chronic gingivitis (causing gum tissue to swell, turn red, and bleed easily) is common in children, but can be prevented and treated with a regular routine of brushing, flossing, and professional dental care. Absent treatment, chronic gingivitis can lead to more serious forms of periodontal disease.

Proper oral care habits can be difficult to instill in young children. Common challenges for caregivers of children include motivating children to initiate oral hygiene tasks, and to execute such tasks properly without assistance.

Even if motivation barriers are overcome, children often have difficulty in using conventional oral hygiene products and performing conventional oral hygiene methods. For example, many young children have difficulty in manipulating a toothbrush and toothpaste tube in separate hands and dispensing a proper amount from such a tube to the toothbrush. Avoiding generation of messes due to transfer of toothpaste to skin, clothing, and other surfaces during or after such dispensation may also be difficult for young children at a stage of physiological development where muscle control and general coordination are limited. Thereafter, children desiring to engage in other activities may be inclined to rush the task of brushing teeth without devoting the recommended time of two minutes or more to the task.

Conventional toothpaste dispensing systems further provide opportunities for not only growth of pathogens such as bacteria and virus, but also transfer of such pathogens from one toothbrush (or user) to another.

Oral care capsules, which avoid some of the mess associated with conventional toothpaste, are known. Examples of various oral care capsules are disclosed in U.S. Patent Application Publication No. 2005/0260141 to Alexander (hereinafter "Alexander"), U.S. Pat. No. 7,074,390 to MacKinnon (hereinafter "MacKinnon"), and U.S. Pat. No. 4,427,116 to Brown (hereinafter "Brown"), each of which is hereby incorporated by reference. Alexander discloses formation of variously shaped discrete toothpaste beads each having a dry exterior formed by locally applied processes such as heating, drying, extrusion, dusting, molding, varnishing, and coating. One or more beads are selected for use, removed from the container or dispenser, and broken open either by finger pressure, by pressing the bead against a brush or the user's teeth, or it may be bitten; after the

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internally stored as toothpaste is released into the mouth, a conventional toothbrush is used in the normal manner. (Alexander, ¶0081.) MacKinnon discloses formation of a dentrifice or toothpaste capsule, (optionally including miswak fibers) having a shell of choline, albumin, or gelatin. In use, a capsule according to MacKinnon is put into the user's mouth, the coating is broken with the teeth, and the toothpaste released thereby is distributed throughout the mouth using the tongue or a toothbrush. (MacKinnon, col. 2.) Brown discloses a capsule including a predetermined amount of toothpaste that is encapsulated with a covering (e.g., gelatin) that is preferably water-soluble and breakable when bitten or chewed. (Brown, col. 2). Thus, each of the preceding references require manual manipulation of an oral care capsule by the user.

Furthermore, each of the preceding references rely upon insertion of a capsule into the user's mouth, and such capsules may not be desirable or appropriate for use by small children. A very young user may liken a dentrifice capsule to candy, and be inclined to swallow it rather than use it in combination with a brush. If a capsule is very small in size, then multiple capsules may be required to deliver an appropriate amount of toothpaste to the user, and opportunities may abound for inconsistent application or waste. Alternatively, if a large capsule is too large in size, then it may pose a choking hazard for a young user.

Moreover, ensuring that the shell or coating of an oral care capsule is easily dissolved in the mouth of a user may limit the ability to practically store multiple capsules in a typical high-moisture bathroom environment. That is, if capsules are stored in a tightly sealed container to prevent moisture infiltration that may degrade a dissolvable coating, such container may be unsuitable for use by a small child. Alternatively, if capsules are stored in a less well-sealed container suitable for manipulation by a small child, moisture infiltration may degrade water-dissolvable capsule coating materials that may lead to spoilage of stored capsules.

Different users having dedicated toothbrushes may store and use such toothbrushes in a single bathroom. Contact between toothbrushes for different users should be minimized to prevent spread of pathogens from one user to another. If an oral care capsule is subject to use with a toothbrush, it would be desirable to avoid contact between toothbrushes for different users and an interface for an oral care capsule.

Thus, it would be desirable to provide toothbrushes and dentrifice dispensing systems that motivate children to initiate and perform oral care tasks properly, while minimizing dangers to such users, minimizing mess creation, reducing opportunities for pathogen growth, promoting consistent dentrifice dispensing, and promoting reliable dentrifice storage.

SUMMARY OF THE INVENTION

The present invention relates to toothbrushes and oral care (dentrifice) capsules, and methods of dispensing and using same, that are suitable for use by small children, and that overcome various limitations associated with such capsules.

In one aspect, the invention relates to a toothbrush comprising a brush head having a capsule receiving zone sized to receive an oral care capsule, and having a plurality of angled bristles adapted to retain an oral care capsule in the capsule receiving zone.

In another aspect, the invention relates to a dispensing device adapted for use with a toothbrush including a brush head (i) having a capsule receiving zone sized to receive an

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oral care capsule, and (ii) having a plurality of angled bristles adapted to retain an oral care capsule in the capsule receiving zone, the dispensing device comprising: a toothbrush manipulation element adapted to move a retention structure associated with the brush head to enable receipt of said oral care capsule; and a dispensation element adapted to deliver said oral care capsule into the capsule receiving zone.

In a further aspect, the invention relates to an oral care capsule dispensing device, comprising: a container having an interior adapted to contain a plurality of oral care capsules; a desiccant material disposed to receive moisture from the interior; and a selectively closable dispensing orifice adapted to permit dispensation of at least one oral care capsule from the container.

In a further aspect, any of the foregoing aspects may be combined for additional advantage.

Other aspects, features, and embodiments of the invention will be more fully apparent from the ensuing disclosure and appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective upper view of a toothbrush according to one embodiment of the present invention, the toothbrush having angled bristles adapted to receive and retain an oral care capsule for use in cleansing teeth and gums of a user.

FIG. 2 is a perspective upper view of an internal portion of the toothbrush of FIG. 1 according to one embodiment of the present invention.

FIG. 3 is a perspective side view of the exterior of a dispenser for oral care capsules according to one embodiment of the present invention, the dispenser being adapted for use with the toothbrush of FIGS. 1-2.

FIG. 4 is a perspective view of the toothbrush of FIGS. 1-2 positioned for insertion into a side aperture of the dispenser of FIG. 3 to permit the toothbrush to receive an oral care capsule.

FIG. 5 is a side perspective view of a first internal loading portion of the dispenser of FIGS. 3-4 having an integral bristle spreader, and a portion of the toothbrush of FIGS. 1, 2, and 4 positioned for insertion into a side aperture of the dispenser portion.

FIG. 6 is a top perspective view of the dispenser portion and the toothbrush portion of FIG. 5.

FIG. 7 is a perspective view of the bristle spreader of the dispenser portion of FIGS. 5-6.

FIG. 8 is a side perspective assembly view of a second dispensing portion of the dispenser of FIG. 3 and the first loading portion of FIG. 5, with the second dispensing portion including a rotatable distribution plate having multiple apertures adapted to receive oral care capsules, and a dispensation plate adapted to permit passage of a single capsule from the distribution plate to the first loading portion.

FIG. 9 is an upper perspective view of the assembled first and second dispenser portions of FIG. 8, coupled to a vertically protruding shaft affixed to a container cover having a hinged decorative lid.

FIG. 10 is a side perspective assembly view of a third portion of the dispenser of FIG. 3, including a cylindrical container adapted to store multiple oral care capsules, and a desiccant element insertable into the container.

FIG. 11 is a perspective view of a base portion of an oral care capsule dispenser including multiple toothbrush inser-

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tion apertures and guide tubes, each adapted to receive a toothbrush of a different user.

DETAILED DESCRIPTION OF THE INVENTION, AND PREFERRED EMBODIMENTS THEREOF

The present invention relates to a toothbrush adapted to receive and retain an oral care capsule, and to a dispensing device adapted to supply at least one oral care capsule to such a toothbrush.

As indicated previously, various types of oral care or dentrifice capsules, and methods of making same, are known. At least an exterior portion of each capsule includes a solid material, such as gelatin, that is dissolvable in water and/or saliva (e.g., in the mouth of a user). Use of such dentrifice capsules provides multiple advantages over conventional flowable toothpastes subject to dispensation by displacement from a flexible tube. A measured and reproducible quantity of dentrifice is included in each capsule. Potential for transfer of paste material to undesired surface following dispensation but prior to use is substantially eliminated. A capsule or portion thereof may include a dissolution time profile that may be used as a guide for desirable brushing duration.

A preferred capsule is spherical or spheroidal (approximately spherical) in shape, to provide volumetric efficiency and substantially uniform dissolution of at least an exterior portion thereof. The composition of a capsule can be varied with respect to radius, to provide any one or more of various functions. For example, an outer or near-outer layer may comprise an effervescent layer with micro-abrasives to assist in cleaning the teeth and gums. Various effervescent materials and related additives suitable for oral use and/or ingestion, and methods for making same, are disclosed in U.S. Pat. No. 5,178,878, U.S. Pat. No. 4,753,792, and U.S. Pat. No. 3,962,417, which are hereby incorporated by reference. A plaque colorant layer may be provided to render plaque formed on teeth immediately visible to the naked eye of the user. A pH lowering layer may be provided to lower the pH environment in the user's mouth, as has been recently determined to promote absorption of fluoride into the user's teeth due to the lowered pH environment. (See, e.g., T. Kalili, et al., "Fluoride Absorption by Enamel from Toothpaste in Lowered pH Environment," J. Dent. Res. 83 (Spec Iss A) Abstract #4033 (2004).) Such pH lowering layer may be time-released to maintain pH at a target value for a desired period of time. One or more neutralizing and/or decolorant agents may be provided to neutralize pH and/or attenuate or remote the plaque colorant material, such as to avoid lasting effect of the plaque colorant. An oral care tablet with a plaque color indicator and decolorizing agent is disclosed in U.S. Patent Application Publication No. 2006/0115435, which is hereby incorporated by reference. One or more flavoring layers may be provided. A dentrifice layer (e.g., in solid, gel, or paste form), including abrasive materials such as silica may be further provided within the capsule. Further possible layers include a whitening layer (e.g., containing a peroxide), an anticalculus (anti-tartar) layer, a whitening layer (e.g. including a peroxide material), an antibacterial layer (e.g., including triclosan), and a breath freshening layer. Any two or more of the foregoing layers may overlap or be combined as desirable for simultaneous effect, or may be separated (e.g., by an intermediate gel layer) as desirable or necessary, and any combination of the foregoing layers may be provided in a single capsule. In terms of external appearance, capsules may be provided in

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various colors or patterns, and may further be printed with words or pictures such as corresponding to media characters.

A toothbrush 10 adapted to receive and retain an oral care capsule is illustrated in FIGS. 1-2. The toothbrush 10 includes a handle 14 disposed along a first end 11 optionally including a dial or switch 33, an intermediate shaft 15, and a brush head 20 disposed along a second end 12 optionally having an activation element 31. The brush head 20 includes a capsule receiving zone 25, such as may include a recess defined in the brush head 20, disposed within a plurality of angled bristles 26A. The angled bristles 26A are preferably canted away from vertical in a direction toward the center of the capsule receiving zone 25, so as to retain an oral care capsule (not shown) insertable into the capsule receiving zone 25. The size and shape of the capsule receiving zone 25, and the size, spacing, and angle of the angled bristles 26A, are selected to retain an oral care capsule of a predetermined size and shape. As shown in FIGS. 1, 4, and 5, ten angled bristles 26A are equally spaced around the perimeter of a circular recess (spanning 360 degrees) defining the capsule receiving zone 25. Conventional straight bristles 26 may be further provided apart from the capsule receiving zone 25.

In the present embodiment, an oral care capsule is loaded into the toothbrush 10 by spreading the angled bristles 26A apart, and then inserting the capsule past the spread bristles into the oral care capsule receiving zone 25. In another embodiment to be described in more detail hereinafter, a toothbrush may include a moveable retaining element bounding a capsule receiving zone (e.g., from behind) and permitting an oral care capsule to be loaded without spreading apart bristles of the toothbrush.

One or more signalling elements 16 adapted to provide a user-perceptible signal may be disposed in or along the toothbrush handle 14. Such signal may be any of visible, auditory, and vibratory in nature. The one or more signaling elements 16 may provide a signal indicative of any of oral care cleansing cycle time and attainment of a threshold oral care cleansing cycle time, to ensure that the user engages in an oral cleansing operation of an optimally effective duration (e.g., two minutes or more). A threshold oral care cleansing time may be set or adjusted by the user with an input element, such as the dial or switch 33 or a separate interface element adapted to communicate with the toothbrush 10 for programming.

The handle 14 preferably includes a battery 30 or other charge storage element. The brush head 20 may include various signalling elements 36, 37, such as LEDs, sound generators, and/or vibration generators. One or more sensors 38 may be further provided to sense one or more conditions indicative of usage of said toothbrush 10 in an oral care cleansing cycle. For example, the one or more sensors 38 may sense any of motion, acceleration, vibration, and pressure. Signals generated by the one or more sensors 38 may be used, for example, in conjunction with a timer to determine time elapsed in an oral care cleaning cycle, or whether a minimum threshold oral care cleansing cycle has been satisfied. Alternatively, the activation element 31 may be depressed or otherwise activated at the beginning of an oral care cleansing cycle, and used to initiate a time for determining time elapsed in an oral care cleansing cycle or whether a minimum threshold time has been satisfied.

Circuitry 32 adapted to perform any of various desirable functions disclosed herein may be disposed in the handle 14. For example, the circuitry 32 may control signalling elements 16, 36, 37 provide timer functionality, store or allow adjustment of a threshold oral care cleansing cycle time, and

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the like. One or more conductors 35 may be disposed between the handle 14 and the brush head 20 to permit electrical communication between the battery 30 and/or circuitry 32 disposed in the handle 14, and the various electrically operable elements (e.g., signalling elements 36, 37, sensor 38, activation element 31) disposed in the brush head 20. In a preferred embodiment, the brush head 20 comprises a substantially optically transmissive material, such as to enable external transmission of light from one or more light emitting diodes or the like.

The capsule receiving zone 25 may include a recess formable by various means. In one embodiment, such a recess is defined by forming an aperture 27 through an intermediate portion of the brush head 14, and then closing the recess from behind with a cover (not shown). Alternatively, such a recess may be formed by conventional molding or other shaping techniques.

While a manually operated toothbrush 10 is shown, an electrically operated toothbrush with the same features as described herein is specifically contemplated as encompassed by the present invention.

As indicated previously, a toothbrush may include a moveable retaining element bounding a capsule receiving zone and permitting an oral care capsule to be loaded without spreading apart bristles of the toothbrush. For example, a rear portion of a brush head may include a hinged or slidable portion (e.g., a cover) that may be moved to an open position to expose an oral care capsule loading aperture. Such cover may be moved through operation of a corresponding toothbrush manipulation element associated with an oral care capsule dispensing device. Upon movement of such moveable retaining element to an open position, the oral care capsule is loaded into the oral care capsule loading aperture that constitutes an oral care capsule receiving zone. Thereafter, the moveable retaining element is returned to a closed position, and the oral care capsule is retained from behind by the retaining element, and preferably also from above by a plurality of angled bristles. In this regard, the moveable cover functions to selectively cover or obstruct the oral care capsule loading aperture.

In another embodiment, a brush head of a toothbrush includes a flexural portion adapted to permit at least some bristles of a plurality of angled bristles to be spread apart so as to enable an oral care capsule to be loaded in a capsule receiving zone of such brush head. An associated dispensing device may include a corresponding structure adapted to automatically effectuate such flexure of the brush head to permit loading of at least one capsule into a capsule receiving zone defined therein. Following a loading operation, flexing force is released from the brush head to cause the brush head to return to a relaxed position with an oral care capsule retained in the capsule receiving zone by the angled bristles.

A dispenser 100 for oral care capsules, adapted for use with the toothbrush 10, is illustrated in FIG. 3, with various portions thereof illustrated in the ensuing FIGS. 4-10.

The dispensing device 100 includes a bottom surface 101, a base portion 105, a container 108, and an outer lid 104. The container 108 may be formed of a translucent or substantially optically transmissive material to permit viewing of the contents therein. The container 108 may include a ramp (not shown), such as may be configured in a helical or spiral shape, to guide oral care capsules to a desired location (such as toward a distribution plate 141, as illustrated in FIGS. 8-9). The outer lid 104, which may be pivotally coupled to the container portion 108, optionally includes a figurine 102 and one or more light elements 103, such as may be provided

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in view of a user for entertainment utility. A toothbrush insertion aperture **110**, sized and shaped to receive at least a portion of a toothbrush, is defined in the base portion **105**.

Referring to FIG. 4, a toothbrush **10** may be oriented as shown for insertion into the toothbrush receiving aperture **110** of the dispensing device **100**. The bottom surface **101** may be equipped with a non-skid material or a suction cup to prevent displacement of the dispensing device **100** upon insertion of a portion of a toothbrush **10** therein.

Disposed above the base portion **105** of the dispensing device **100** is a container **108** adapted to retain a plurality of oral care capsules (not shown) therein. A rotatable vertical shaft **132** may be provided along a vertical axis of the container **108** to mechanically couple the container **108**, via inner lid **135** thereof, to a motor **124** (illustrated in FIG. 5). By way of such coupling, the outer lid **104** and figurine **102**, along with distribution plate **141** (shown in FIGS. 8-9) may be caused to rotate through operation of the motor. If desired, the container **108** or a portion thereof may be coupled to rotate by operation of the motor **124** for user entertainment and/or dispensing utility. An orifice plate **131**, defining an orifice **134** adapted to permit the passage of an oral care capsule in the base portion **105**, is disposed below the container **108**.

FIGS. 5-6 illustrate selected internal components of the base portion **105** as positioned relative to a brush head **20** positioned for insertion therein. The toothbrush insertion aperture **110** leads to a guide tube **112** that guides the brush head **20** into position for loading of an oral care capsule therein. Disposed within the guide tube **112** is a toothbrush manipulation element in the form of a bristle spreader **119** defining an aperture **120** and having a wedge-shaped leading edge **119A**. Such leading edge **119A** may be configured as a wedge or block adapted to provide the desired spreading functionality. A close-up perspective view of the bristle spreader **119** is shown in FIG. 7. As the brush head **20** is inserted past the bristle spreader **119**, the wedge-shaped leading edge **119A** of the bristle spreader **119** spreads apart the angled bristles **26A** to prepare the brush head **20** to receive an oral care capsule. Although the illustrated embodiment is directed to a specific mechanical oral care capsule loading mechanism, various other mechanically or electrically actuated means may be used, as will be recognized by those skilled in the art, to provide automatic dispensing operation. In the illustrated embodiment, the brush head **20** is inserted into the guide tube **112** to contact a push bar **114** joined via arm **115**, a lever **117** having an associated pivot **116**, and return spring **126**. Upon depressing the push bar **114**, the lever **117** is forced toward the guide tube **112** and the aperture-defining bristle spreader **119** disposed therein. In this manner, an oral care capsule **200** disposed between the lever **117** (e.g., opposite tab **118**) may be pushed through the aperture **120** of the bristle spreader **119**, past the spread-apart angled bristles **26A**, and into the oral care capsule receiving zone **25** of the brush head **20** of the toothbrush **10**. Upon removal of the brush head **20** from the bristle spreader **119**, the angled bristles **26A** return to their relaxed position to contract around an oral care capsule disposed within the capsule receiving zone **25**.

Although FIG. 6 illustrates loading of an oral care capsule **200** laterally in a toothbrush head **20**, a dispensing device may be configured for capsule loading in any desired direction. In one embodiment, a dispensing device is adapted to load an oral care capsule in an upward direction into a capsule receiving zone of a corresponding toothbrush head. In yet another embodiment, a dispensing device is

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adapted to load an oral care capsule in a downward direction into a capsule receiving zone of a corresponding toothbrush head.

FIGS. 5-6 further illustrate a battery holder **121** including two batteries **122** and a motor **124** coupled to receive power from the batteries **122** via cable **123**. Such motor **124** may be used to set in motion any desired portion of the dispensing device **100**, such as the container **108**, figurine **102**, and/or distribution plate **141** (illustrated in FIGS. 8-9). As an alternative to batteries **122**, the dispensing device may be operated via alternating current input with an appropriate internal AC/DC converter (not shown).

The dispensing device **100** may further include a sterilization element, such as an ultraviolet light or other element (not shown), disposed in, along, or proximate to the guide tube **112**. Such sterilization element may be activated upon insertion of a brush head **20** into the guide tube **112** to effect sterilization of the brush head **20** and therefore avoid pathogen growth (e.g., along any of the brush head **20**, the guide tube **112**, the spreading element **119**, and the push bar **114**) and potential for transfer of pathogens from one surface (or toothbrush) to the next. Such sterilization element may be operated by the batteries **122** or another power source. Moreover, any surfaces subject to contacting a toothbrush insertable into the dispensing device **100**, and even the toothbrush **10**, may be coated or otherwise formed with an antibacterial substance such as 5-chloro-2-phenol (2,4-dichlorophenoxy) commonly sold under the trade name Microban®.

Referring to FIGS. 8-9, the dispensing device **100** preferably includes a rotatable distribution plate **141** including a plurality of apertures **144A-144H** each sized to receive an oral care capsule, with the distribution plate **141** disposed above the orifice plate **131**. The apertures **144A-144H** of the distribution plate **141** are positioned to permit oral care capsules disposed therein to drop into the orifice **134**, preferably one at a time, upon rotation of the distribution plate **141**. The orifice **134** of the orifice plate **131** is disposed immediately above the oral care capsule **200** shown in FIG. 6, such that an oral care capsule **200** that falls through the orifice **134** is ready for loading through the aperture **120** of the bristle spreading element **119** into a brush head **20** inserted into the guide tube **112**. The distribution plate **141** further includes a central aperture **145** that is keyed or otherwise shaped to receive a lower torque transfer element **133** associated with the shaft **132**, to rotate the distribution plate **141** without slippage. Likewise, the outer lid **104** may include an aperture **136** that is keyed or otherwise shaped to receive an upper torque transfer element **134** associated with the shaft **132**, to permit the outer lid **104** and optional figurine **102** to rotate as well. Electrical contacts may be further provided through the shaft **132**, torque transfer elements **133**, **134**, and aperture **136** to supply electrical power to the signalling element **116** (e.g., LED) associated with the figurine **102**.

The distribution plate **141** is preferably closely spaced relative to the orifice plate **131**, and one or more seals (not shown) may be provided therebetween. Any of the distribution plate **141** and orifice plate **131** may be formed or coated with a friction-reducing material, such as polytetrafluoroethylene (PTFE) to minimize wear or possible binding therebetween. Between dispensing cycles, the distribution plate **141** preferably rests in a position wherein none of the apertures **144A-144H** are aligned with the orifice **131** of the orifice plate **134**. This promotes sealing of the container **108**,

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so as to minimize infiltration of moisture into the container **108** that might otherwise degrade water-dissolvable capsule shell or coating materials.

As toothbrushes are conventionally utilized in bathroom environments that may be quite moist, and oral care capsules may have water-dissolvable outer shell or coating materials, it is desirable to minimize presence of moisture in a container **108** having a plurality of oral care capsules disposed therein. Referring to FIG. **10**, in one embodiment a desiccant material **160** may be disposed to receive moisture from the container **108**. Such desiccant material **160** may be provided at a central portion of the container **108** or in any other desired location. Such desiccant material **160** may include a moisture absorbing board, silica gel, clay, or a molecular sieve, whether disposed loosely or packed, in a (e.g., mesh) pouch or other permeable retainer, disposed in moisture receiving relationship relative to the interior of the container **108**. A cover **170** defining an aperture **172** may be provided over the desiccant **160** and the container **108**. Such cover **170** may be permanently sealed to the container **108**, or may be removable to permit replacement of the desiccant material **160**.

The container **108** preferably comprises a cartridge that may be removed from the dispensing apparatus and replaced by the user. Such container may alternatively be refilled by the user through a capsule insertion port (not shown).

In another embodiment, a dispensing device includes a plurality of toothbrush insertion apertures each adapted to receive a portion of a different toothbrush, so as to enable multiple users each having different toothbrushes to use the same dispenser without requiring contact between multiple brushes and single capsule interface surface of the dispenser. Such dispenser may resemble the dispensing device **100** described hereinabove with reference to FIGS. **3-4**, but modified to include multiple toothbrush insertion apertures and guide tubes each intended to receive a different toothbrush. Referring to FIG. **11**, a base portion **205** of a dispensing device has a bottom surface **201** and includes three guide tubes **212A-212C**. Each guide tube **212A-212C** has an associated toothbrush insertion aperture (e.g., toothbrush insertion aperture **210A** for guide tube **212A** is shown; it is to be understood that corresponding toothbrush insertion apertures are provided for guide tubes **212B**, **212C**) adapted to receive a portion of a different toothbrush. Each guide tube **212A-212C** has an associated bristle spreading element **219A-219C** adapted to spread apart bristles of a toothbrush as described hereinabove, to permit an oral care capsule to be supplied to the toothbrush through an aperture **220A-220C** associated with the respective guide tube **212A-212C**.

Each toothbrush insertion aperture (e.g., **210A**) and/or guide tube **212A-212C** preferably has an associated marking element (e.g., marking element **211A**) providing visible differentiation between the different toothbrush insertion apertures of the device. Such marking elements (e.g., marking element **211A**) may differ in terms of color, size, shape, texture, or any combination of the foregoing parameters. Each marking element (e.g., **211A**) may be provided in any suitable location proximate to an associated toothbrush aperture (e.g., **210A**), such as along outer surface of the base **205**, within a guide tube **212A-212C**, or both.

The base **205** shown in FIG. **11** is preferably stationary in character, with the bottom surface **201** disposed on or just above an underlying surface such as a countertop. Various methods may be employed to supply oral care capsules to each aperture **220A-220C**. In one embodiment, separate ramps (not shown) may be provided to guide oral care capsules from a container (e.g., container **108** shown in FIG.

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4) to each aperture **220A-220C**, with an optional interposing distribution plate (e.g., distribution plate **141** shown in FIGS. **8-9**, optionally modified to include multiple apertures) for regulating passage of oral care capsules. In another embodiment, a single ramp or guide may be employed and selectively moved (e.g., in conjunction with movement of a container **108**) into position to supply an oral care capsule to an aperture **220A**, **220B**, **220C**. Such movement may include manual operation by a user, or automated movement with an electric motor (not shown).

In operation of a dispenser including the base portion **205**, a first user inserts a portion of a toothbrush (e.g., toothbrush **10** as described hereinabove) into a toothbrush insertion aperture (e.g., insertion aperture **210A**) to contact a bristle spreader (e.g., bristle spreader **219A**) disposed therein. Each toothbrush insertion aperture shown in FIG. **11** is arranged to receive a toothbrush **10** (as described hereinabove) with bristles facing upward. The bristle spreader (e.g., **219A**) has a wedge-shaped leading edge adapted to spread apart angled bristles of the toothbrush **10** to prepare the brush head **20** to receive an oral care capsule. An oral care capsule (not shown) is directed through an oral care capsule loading aperture (e.g., aperture **220A**) past spread-apart angled bristles **26A**, and into an oral care capsule receiving zone **25** of the brush head **20** of the tooth brush **10**. Any various loading mechanism (e.g., mechanically and/or electrically actuated) within the knowledge of one skilled in the art may be used to load a toothbrush with an oral care capsule as described herein. Upon removal of the brush head **20** from the bristle spreader **219A**, the angled bristles **26A** return to their relaxed position to contract around an oral care capsule disposed within the capsule receiving zone **25**. The toothbrush **10** is then removed from the toothbrush insertion aperture **210A**, and utilized by the user for oral cleaning.

Second and third users with a different toothbrushes may repeat the foregoing procedure, but each utilizing dedicated toothbrush insertion apertures and guide tubes **210A**, **210B**, **210C**, to prevent contact between different brushes and any single interface surface of the dispenser.

While the invention has been described herein in reference to specific aspects, features, and illustrative embodiments of the invention, it will be appreciated that the utility of the invention is not thus limited, but rather extends to and encompasses numerous other variations, modifications, and alternative embodiments, as will suggest themselves to those of ordinary skill in the field of the present invention, based on the disclosure herein. Correspondingly, the invention as hereinafter claimed is intended to be broadly construed and interpreted, as including all such variations, modifications and alternative embodiments, within its spirit and scope.

What is claimed is:

1. A dispensing device configured for use with at least one toothbrush including a brush head having a capsule receiving zone configured to receive an oral care capsule, the dispensing device comprising:

a container including an interior arranged to contain a plurality of oral care capsules including the oral care capsule;

a bristle spreading element including an aperture arranged to permit passage of the oral care capsule, the bristle spreading element arranged to spread apart at least some bristles of the brush head to prepare the brush head to receive the oral care capsule in the capsule receiving zone; and

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a moveable dispensation element arranged to contact and push the oral care capsule through the aperture to be received by the capsule receiving zone of the brush head.

2. The dispensing device of claim 1, wherein the container comprises a ramp arranged to guide oral care capsules of the plurality of oral care capsules toward the moveable dispensation element.

3. The dispensing device of claim 1, further comprising at least one moveable sealing element arranged to reduce infiltration of moisture into the container between cycles of dispensing oral care capsules of the plurality of oral care capsules from the dispensing device.

4. The dispensing device of claim 1, further comprising a selectively closable dispensing orifice configured to permit dispensation of at least one oral care capsule of the plurality of oral care capsules from the container.

5. The dispensing device of claim 1, further comprising a desiccant material arranged in moisture receiving relationship with the interior of the container.

6. The dispensing device of claim 1, further comprising a guide tube arranged to receive the brush head, wherein the bristle spreading element bounds a portion of the guide tube.

7. The dispensing device of claim 1, wherein the moveable dispensation element comprises at least one of a push bar, an arm, a lever, or a spring.

8. A dispensing device configured for use with at least one toothbrush including a brush head having a capsule receiving zone sized to receive an oral care capsule, the dispensing device comprising:

a bristle spreading element configured to contact the brush head and spread apart at least some bristles of the brush head to promote passage of the oral care capsule into a retention structure associated with the brush head to enable receipt of said oral care capsule into the capsule receiving zone; and

at least one dispensation element configured to deliver said oral care capsule through the bristle spreading element into the capsule receiving zone.

9. The dispensing device of claim 8, wherein the bristle spreading element comprises a reduced thickness portion configured to spread apart the at least some bristles of the brush head.

10. The dispensing device of claim 8, further comprising a container containing a plurality of oral care capsules.

11. The dispensing device of claim 8, further comprising a guide tube configured to receive and guide the brush head into position for loading the oral care capsule therein.

12. The dispensing device of claim 8, further comprising: a container having an interior configured to contain a plurality of oral care capsules, and

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at least one selectively closable dispensing orifice configured to permit dispensation of at least one oral care capsule of the plurality of oral care capsules from the container.

13. The dispensing device of claim 12, further comprising a desiccant material disposed to receive moisture from the interior.

14. The dispensing device of claim 12, wherein said container comprises at least one ramp configured to guide said plurality of oral care capsules toward said at least one selectively closable dispensing orifice for dispensation of the at least one oral care capsule of the plurality of oral care capsules through the at least one selectively closable dispensing orifice.

15. The dispensing device of claim 12, configured to effectuate automatic dispensation of at least one oral care capsule of the plurality of oral care capsules from the container through the at least one selectively closable dispensing orifice.

16. An oral care capsule dispensing device, comprising: a container having an interior configured to contain a plurality of oral care capsules;

a bristle spreading element configured to contact a brush head and spread apart at least some bristles of the brush head to promote passage of at least one oral care capsule of the plurality of oral care capsules through the bristle spreading element into a retention structure of the brush head; and

at least one selectively closable dispensing orifice configured to permit dispensation of the at least one oral care capsule from the container.

17. The oral care capsule dispensing device of claim 16, being configured for use with at least one toothbrush including a brush head having a capsule receiving zone sized to receive an oral care capsule of the plurality of oral care capsules; the dispensing device further comprising at least one dispensation element configured to deliver said oral care capsule into the capsule receiving zone.

18. The oral care capsule dispensing device of claim 16, further comprising a desiccant material disposed to receive moisture from the interior.

19. The oral care capsule dispensing device of claim 16, wherein said container comprises at least one ramp configured to guide said plurality of oral care capsules toward said at least one selectively closable dispensing orifice for dispensation of the at least one oral care capsule through the at least one selectively closable dispensing orifice.

20. The oral care capsule dispensing device of claim 16, configured to effectuate automatic dispensation of the at least one oral care capsule from the container through the at least one selectively closable dispensing orifice.

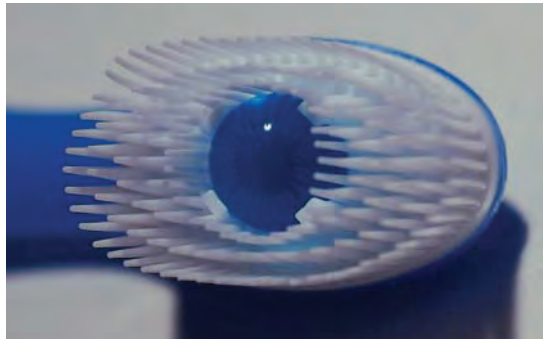
* * * * *

US PATENT 8,881,332	COLGATE WISP
1. A toothbrush comprising a brush head that includes: 	
a front surface;	
a back surface;	
a plurality of vertical bristles extending upward from the front surface;	

a capsule receiving zone sized to receive an oral care capsule, the capsule receiving zone including a recess defined in the front surface and arranged to receive at least a portion of an oral care capsule inserted past the vertical bristles; and



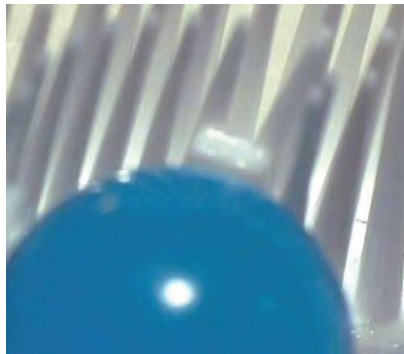
at least one pair of angled capsule retaining elements that are elevated above the recess and configured to retain an oral care capsule in the capsule receiving zone,



wherein each pair of the at least one pair angled capsule retaining elements includes a first and a second angled capsule retaining element arranged along diametrically opposing sides of an oral care capsule when present in the capsule receiving zone; and



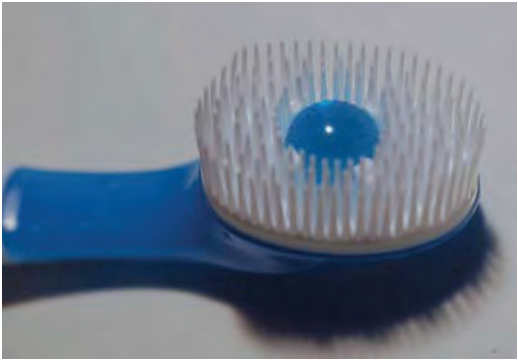
wherein at least a portion of each angled capsule retaining element of the at least one pair of capsule retaining elements is arranged to contact the oral care capsule.



US PATENT 8,881,332	COLGATE WISP
5. The toothbrush of claim 1, wherein each capsule retaining element of the at least one pair of angled capsule retaining elements comprises a retaining element canted away from vertical in a direction toward a center of the capsule receiving zone.	  

US PATENT 8,881,332	COLGATE WISP
8. The toothbrush of claim 1, including an oral care capsule retained by the at least one pair of capsule retaining elements in the capsule receiving zone, wherein the oral care capsule comprises one or more of the following: a dentrifice composition, a whitening composition, an anticalculus composition, and antibacterial composition, and a breath freshening composition.	"Mini-brushes with Freshening Beads" 

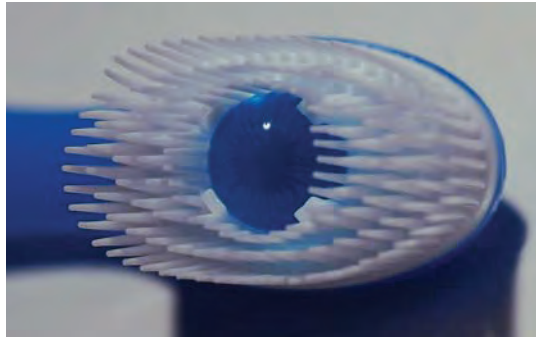
US PATENT 8,881,332	COLGATE WISP
9. A method comprising loading an oral care capsule into a capsule receiving zone of a toothbrush according to claim 1 by inserting at least a portion of the oral care capsule in a direction past the vertical bristles into the recess, and retaining the oral care capsule in the capsule receiving zone using the at least one pair of angled capsule retaining elements.	 

US PATENT 8,881,332	COLGATE WISP
10. A toothbrush comprising a brush head that includes:	
a front surface and a back surface that opposes the front surface;	
a plurality of bristles extending upward from the front surface and arranged distal from a center of the front surface;	

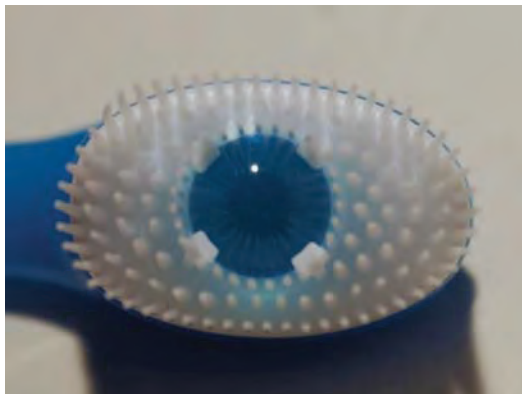
a capsule receiving zone including a recess defined in the front surface and arranged to receive at least a portion of an oral care capsule insertable past the bristles into the recess; and



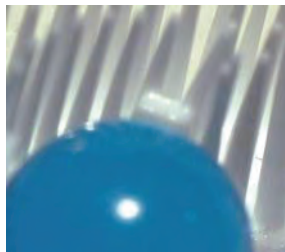
at least three angled capsule retaining elements that are elevated above the recess, are configured to retain an oral care capsule in the capsule receiving zone, and are canted away from vertical in a direction toward a center of the capsule receiving zone,

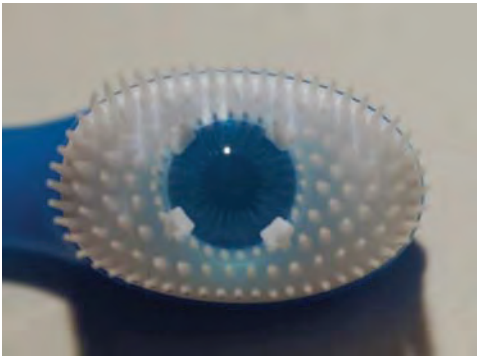


wherein each angled capsule retaining element of the at least three angled capsule retaining elements is arranged proximate to a perimeter of the capsule receiving zone at a position at least 108 degrees apart from at least one other angled capsule retaining element of the at least three angled capsule retaining elements relative to a center of the capsule receiving zone; and



wherein at least a portion of each angled capsule retaining element of the at least three angled capsule retaining elements is arranged to contact the oral care capsule.



US PATENT 8,881,332	COLGATE WISP
11. The toothbrush of claim 10, wherein the at least three angled capsule retaining elements are arranged between the plurality of bristles and a center of the capsule receiving zone.	

US PATENT 8,881,332	COLGATE WISP
13. The toothbrush of claim 10, including an oral care capsule retained by the at least three capsule retaining elements in the capsule receiving zone,	
wherein the oral care capsule comprises one or more of the following: a dentrifice composition, a whitening composition, an anticalculus composition, and antibacterial composition, and a breath freshening composition.	"Mini-brushes with Freshening Beads" 

US PATENT 8,881,332	COLGATE WISP
14. A method comprising loading an oral care capsule into a capsule receiving zone of a toothbrush according to claim 10 by inserting at least a portion of the oral care capsule in a direction past the bristles into the recess, and retaining the oral care capsule in the capsule receiving zone using the at least three angled capsule retaining elements.	

US PATENT 8,881,332	COLGATE WISP
15. The toothbrush of claim 1, wherein the at least one pair of angled capsule retaining elements comprises multiple pairs of angled capsule retaining elements.	

US PATENT 8,881,332	COLGATE WISP
16. The toothbrush of claim 1, wherein at least a portion of each angled capsule retaining element of the at least one pair of angled capsule retaining elements is arranged to overlap a portion of the recess of the capsule receiving zone.	

US PATENT 8,881,332	COLGATE WISP
17. The toothbrush of claim 10, wherein at least a portion of each angled capsule retaining element of the at least three angled capsule retaining elements is arranged to overlap a portion of the recess of the capsule receiving zone.	

US PATENT 8,881,332	COLGATE WISP
18. The toothbrush of claim 10, wherein each angled capsule retaining element of the at least three angled capsule retaining elements is arranged proximate to a perimeter of the capsule receiving zone at a position at least 144 degrees apart from at least one other angled capsule retaining element of the at least three angled capsule retaining elements relative to a center of the capsule receiving zone.	