

ESCOBAR - URIBE ASOCIADOS

A B O G A D O S

Carrera 11A No. 94-76 Of. 305 - P.O. Box 94948, Bogotá, Colombia, S.A.
 Tels. (571) 6162051 - 6162061 6161859 - 6161869
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2469/P

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO DIVISION DE NUEVAS CREACIONES

E. S. D.

Ref.: Expediente No. 02.042.325
 Solicitud de Patente a nombre de
 McNeil-PPC, Inc.

SUPERINTENDENCIA Y COMERCIO
 Radicación : 02042325 00000002 Folios: 90
 Fecha (FND): 2002-06-25 14:21:02
 Trámite : 002 PATENTES D 1 REGISTRO/ 444 RESPUESTA
 Dependencia: 2000 DIVISION DE NUEVAS CREACIONES

Yo, JIMENA ESCOBAR URIBE, identificada como aparece al pie de mi firma, domiciliada en la Carrera 11 A No. 94-76, of. 305-306, obrando como apoderada de la sociedad McNeil-PPC, Inc, domiciliada en Skillman, New Jersey, Estados Unidos de América, solicitante de la patente de la referencia, en respuesta su oficio No. 12425 notificado por fijación en lista el día 20 de junio de 2002, me permito manifestar lo siguiente:

1. Anexo el documento de cesión suscrito por los inventores a favor de mi mandante.

De conformidad con las normas legales vigentes, artículo 1 de la Resolución 210 de 2001, expedida por el Superintendente de Industria y Comercio y artículo 2 de la Convención de la Haya, los documentos en inglés que se pretendan aportar como parte de los trámites de propiedad industrial ante la Superintendencia de Industria y Comercio no requieren traducción. Por otro lado, la legalización consular y/o diplomática de los documentos expedidos en el extranjero no es necesaria. Por lo tanto, el documento de cesión anexo a este memorial es válidamente presentado en idioma inglés y con la correspondiente Apostilla.

2. Anexo los artes finales en tamaño 12 x 12 centímetros (por duplicado) y una copia tamaño 6 x 6 centímetros de la figura característica.
3. Acompaño al presente memorial la copia certificada de la solicitud de Patente Número 09/863,773 presentada en los Estados Unidos de América el día 23 de mayo de 2001, con la debida traducción de lo pertinente, incluyendo el capítulo reivindicatorio.

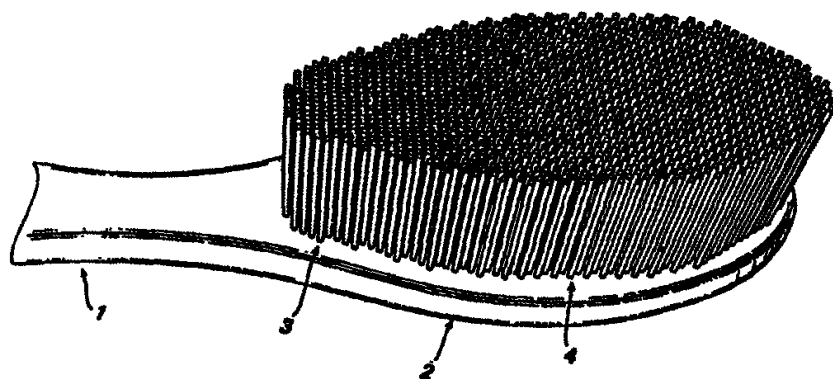
Espero con esto haber dado cabal cumplimiento a lo solicitado por ese despacho y de conformidad con lo indicado en los artículos 3º., inciso 3, 35 inciso 2 y 59 inciso 2 del CCA, al analizar este memorial, atentamente solicito se traten todas las cuestiones planteadas con motivo del mismo.

Señor Superintendente,


JIMENA ESCOBAR URIBE
C.C.39.779.452 de usaquén
T.P. 68228
Cód. 5376

FIG. 1

FIG. 72



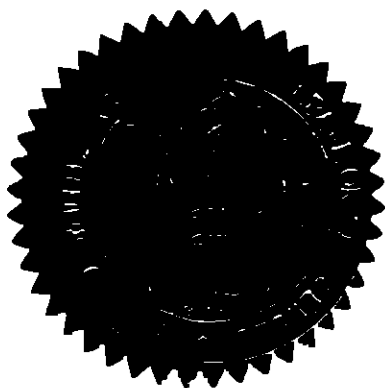
APOSTILLE

(CONVENTION DE LA HAYE DU 5 OCTOBRE 1961)

- 1 COUNTRY UNITED STATES OF AMERICA
- 2 THIS PUBLIC DOCUMENT HAS BEEN SIGNED BY
CHRISTINA A CLICKNER
- 3 ACTING IN THE CAPACITY OF
NOTARY PUBLIC OF NEW JERSEY
4. BEARS THE SEAL/STAMP OF
CHRISTINA A CLICKNER, NOTARY

CERTIFIED

- 5 AT TRENTON, NEW JERSEY
- 6 THE 3RD DAY OF JUNE 2002
- 7 BY: John E McCormac, CPA, NEW JERSEY TREASURER
- 8 NO. A152137
9. SEAL/STAMP:
10. SIGNATURE



John E McCormac

JDC 375 COL(L)

CERTIFICATION

I hereby certify that I have compared the attached document with the original, and that such said document is a true copy of the original Assignment document as filed in the U.S. Patent Office in connection with USSN 09/863,773 filed MAY 23, 2001.

A handwritten signature in cursive script, reading "Christina A. Clickner", written in black ink.

**Christina A. Clickner
(Notary Public of New Jersey)
My Commission Expires:
March 2, 2005**

A S S I G N M E N T

Serial No 09/863,773
Filed May 23, 2001

WHEREAS, Thomas Patrick Luchino, Mark David Saindon, and Alan Gregory Trojanowski, residing at 201 Stirrup Drive, Freehold, New Jersey 07728, 4 Mansfield Road, Princeton, NJ 08540, and 39 Hillside Avenue, Monmouth Junction, New Jersey 08852 respectively (hereinafter called "Assignors"), have made certain new and useful inventions or discoveries relating to

A TOOTHBRUSH WITH INDIVIDUALLY EMBEDDED BRISTLES

for which they have executed an application for Letters Patent of the United States; and

WHEREAS, McNeil-PPC, Inc., a corporation of the State of New Jersey, (hereinafter called "Assignee"), is desirous of acquiring Assignors' entire right, title, and interest therein

NOW, THEREFORE, BE IT KNOWN that for and in consideration of the sum of One Dollar and other valuable considerations to them moving, the receipt of which is hereby acknowledged, Assignors have sold, assigned, and transferred, and do hereby sell, assign and transfer unto said Assignee their entire right, title and interest in and to all said inventions and discoveries disclosed in said application whose identification above by serial number and filing date, when available is hereby authorized, and in and to said application, all substitutions, divisions, and continuations thereof, and in and to all Letters Patent, United States and foreign, that may be granted for said inventions and discoveries, and in and to all extensions, renewals, and reissues thereof, the same to be held and enjoyed by said Assignee, its successors and assigns, as fully and entirely as the same would have been held and enjoyed by Assignors if this Assignment and sale had not been made,

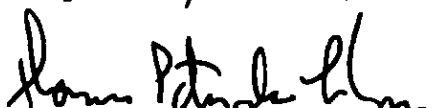
And Assignors hereby authorize and request the Commissioner of Patents of the United States to issue said Letters Patent in accordance with this Assignment,

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And for the consideration aforesaid, Assignors covenant and agree with said Assignee that he has a full and unencumbered title to the inventions and discoveries above described and hereby assigned, which title they warrant unto said Assignee, its successors and assigns,

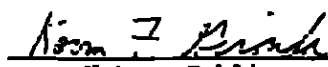
And for the consideration aforesaid, Assignors further covenant and agree that they will, whenever requested, but without cost to them promptly communicate to said Assignee or its representatives any facts known to them relating to said inventions and discoveries, testify in any interference or legal proceedings involving said inventions and discoveries, and execute any additional papers that may be necessary to enable said Assignee or its representatives, successors, nominees, or assigns to secure full and complete protection for the said inventions and discoveries or that may be necessary to vest in said Assignee the complete title to the said inventions and discoveries and patents hereby conveyed and to enable it to record said title

IN TESTIMONY WHEREOF, Assignor has hereunto set his hand and seal this 23rd day of April, 2002


Thomas Patrick Luchino (L.S.)

STATE OF New Jersey)
) ss
COUNTY OF Atlantic)

BE IT REMEMBERED, That on this 23rd day of April, 2002, before me, a Notary Public, personally appeared Thomas Patrick Luchino, who I am satisfied is the person named in and who executed the foregoing instrument in my presence, and I having first made known to him the contents thereof, he did acknowledge that he signed, sealed, and delivered the same as his voluntary act and deed for the uses and purposes therein expressed.


Notary Public
attorney at law
member of the Bar of the
State of New Jersey

IN TESTIMONY WHEREOF, Assignor has hereunto set his hand
and seal this day of , 2002

_____(L.S)
Mark David Saindon

STATE OF)
) ss
COUNTY OF)

BE IT REMEMBERED, That on this day of ,
2002, before me, a Notary Public, personally appeared Mark David
Saindon, who I am satisfied is the person named in and who
executed the foregoing instrument in my presence, and I having
first made known to him the contents thereof, he did acknowledge
that he signed, sealed, and delivered the same as his voluntary
act and deed for the uses and purposes therein expressed.

Notary Public

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IN TESTIMONY WHEREOF, Assignor has hereunto set his hand
and seal this 23rd day of April, 2002.

Alan Gregory Trojanowski (L S)
Alan Gregory Trojanowski

STATE OF New Jersey)
COUNTY OF Somerset) ss.

BE IT REMEMBERED, That on this 23rd day of April, 2002, before me, a Notary Public, personally appeared Alan Gregory Trojanowski, who I am satisfied is the person named in and who executed the foregoing instrument in my presence, and I having first made known to him the contents thereof, he did acknowledge that he signed, sealed, and delivered the same as his voluntary act and deed for the uses and purposes therein expressed

Kevin F. Maranda
Notary Public
Attorney at Law
member of the Bar of the
State of New Jersey

A S S I G N M E N T

Serial No. 09/863,773
Filed May 23, 2001

WHEREAS, Thomas Patrick Luchino, Mark David Saindon, and Alan Gregory Trojanowski, residing at 201 Stirrup Drive, Freehold, New Jersey 07728, 4 Mansfield Road, Princeton, NJ 08540, and 39 Hillside Avenue, Monmouth Junction, New Jersey 08852 respectively (hereinafter called "Assignors"), have made certain new and useful inventions or discoveries relating to

A TOOTHBRUSH WITH INDIVIDUALLY EMBEDDED BRISTLES

for which they have executed an application for Letters Patent of the United States, and

WHEREAS, McNeil-PPC, Inc., a corporation of the State of New Jersey, (hereinafter called "Assignee"), is desirous of acquiring Assignors' entire right, title, and interest therein

NOW, THEREFORE, BE IT KNOWN that for and in consideration of the sum of One Dollar and other valuable considerations to them moving, the receipt of which is hereby acknowledged, Assignors have sold, assigned, and transferred, and do hereby sell, assign and transfer unto said Assignee their entire right, title and interest in and to all said inventions and discoveries disclosed in said application whose identification above by serial number and filing date, when available is hereby authorized, and in and to said application, all substitutions, divisions, and continuations thereof, and in and to all Letters Patent, United States and foreign, that may be granted for said inventions and discoveries, and in and to all extensions, renewals, and reissues thereof, the same to be held and enjoyed by said Assignee, its successors and assigns, as fully and entirely as the same would have been held and enjoyed by Assignors if this Assignment and sale had not been made,

And Assignors hereby authorize and request the Commissioner of Patents of the United States to issue said Letters Patent in accordance with this Assignment,

And for the consideration aforesaid, Assignors covenant and agree with said Assignee that he has a full and unencumbered title to the inventions and discoveries above described and hereby assigned, which title they warrant unto said Assignee, its successors and assigns;

And for the consideration aforesaid, Assignors further covenant and agree that they will, whenever requested, but without cost to them promptly communicate to said Assignee or its representatives any facts known to them relating to said inventions and discoveries, testify in any interference or legal proceedings involving said inventions and discoveries, and execute any additional papers that may be necessary to enable said Assignee or its representatives, successors, nominees, or assigns to secure full and complete protection for the said inventions and discoveries or that may be necessary to vest in said Assignee the complete title to the said inventions and discoveries and patents hereby conveyed and to enable it to record said title

IN TESTIMONY WHEREOF, Assignor has hereunto set his hand and seal this day of , 2002

_____(L S)
Thomas Patrick Luchino

STATE OF New Jersey)
) ss
COUNTY OF)

BE IT REMEMBERED, That on this day of , 2002, before me, a Notary Public, personally appeared Thomas Patrick Luchino, who I am satisfied is the person named in and who executed the foregoing instrument in my presence, and I having first made known to him the contents thereof, he did acknowledge that he signed, sealed, and delivered the same as his voluntary act and deed for the uses and purposes therein expressed

Notary Public

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IN TESTIMONY WHEREOF, Assignor has hereunto set his hand
and seal this 24 day of April, 2002

Mark David Saindon (L S)
Mark David Saindon

STATE OF FRANCE)
COUNTY OF Loui05) ss
(Eu20)

BE IT REMEMBERED, That on this day of 24 April,
2002, before me, a Notary Public, personally appeared Mark David
Saindon, who I am satisfied is the person named in and who
executed the foregoing instrument in my presence, and I having
first made known to him the contents thereof, he did acknowledge
that he signed, sealed, and delivered the same as his voluntary
act and deed for the uses and purposes therein expressed



[Signature]
Notary Public

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IN TESTIMONY WHEREOF, Assignor has hereunto set his hand
and seal this day of , 2002.

_____(L S)
Alan Gregory Trojanowski

STATE OF New Jersey)
) ss.
COUNTY OF)

BE IT REMEMBERED, That on this day of ,
2002, before me, a Notary Public, personally appeared Alan
Gregory Trojanowski, who I am satisfied is the person named in
and who executed the foregoing instrument in my presence, and I
having first made known to him the contents thereof, he did
acknowledge that he signed, sealed, and delivered the same as
his voluntary act and deed for the uses and purposes therein
expressed

Notary Public

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**ESTADOS UNIDOS DE AMERICA
A TODOS AQUELLOS A QUIENES EL PRESENTE LLEGUE:**

**DEPARTAMENTO DE COMERCIO DE LOS ESTADOS
UNIDOS
Oficina de Patentes y Marcas de los Estados Unidos**

Mayo 13, 2002

La presente es para certificar que el anexo es una copia fiel de los registros de la Oficina de Patentes y Marcas de los Estados Unidos, de los documentos de la solicitud de patente identificada más adelante, que cumplieron con los requerimientos para concederse una fecha de presentación de acuerdo con 35 USC 111.

Número de Solicitud: 09/863,773

Fecha de Presentación: Mayo 23, 2001

**Por la autoridad del
Comisionado de Patentes y Marca**

**(fdo) P.R. GRANT
Oficial Certificador
Sello oficial de la Oficina de Patentes y Marcas de los
Estados Unidos de América**

REIVINDICACIONES

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- 1 Un cepillo de dientes que comprende

un mango,

una cabeza de cepillo dental distante del mango, y

una multiplicidad de cerdas de primer tipo, teniendo cada una de dichas cerdas un diámetro que varía desde aproximadamente 0,25 mm hasta alrededor de 0,60 mm y que están individualmente embebidas en dicha cabeza de cepillo de dientes, estando dichas cerdas manualmente distanciadas entre sí en una distancia que varía desde aproximadamente 0,5 veces hasta alrededor de 10 veces el diámetro de las cerdas

- 2 Un cepillo dental de acuerdo con la reivindicación 1 que comprende adicionalmente al menos un mechón denso de cerdas

- 3 Un cepillo dental de acuerdo con la reivindicación 1 en el cual

el primer tipo de cerdas comprende por lo menos una cerda que tiene un diámetro aproximadamente de 0,35 mm hasta alrededor de 0,60 mm y al menos una cerda que tiene un diámetro desde aproximadamente 0,25 mm hasta alrededor de 0,35 mm

- 4 Un cepillo dental de acuerdo con la reivindicación 3 en donde la cabeza de cepillo dental comprende adicionalmente secciones en las cuales

las cerdas están dispuestas de tal manera que por lo menos una sección en la cabeza de cepillo dental contiene cerdas que tienen diámetros desde aproximadamente 0,35 mm hasta alrededor de 0,60 mm, mientras que la menos una sección de la cabeza de cepillo dental contiene primer tipo de cerdas que tienen diámetros que varían desde aproximadamente 0,25 mm hasta alrededor de 0,35 mm

- 5 Un cepillo dental que comprende

un mango,

una cabeza de cepillo dental distante de centro del mango,

por lo menos un segundo tipo de cerdas individualmente embebidas que tienen un diámetro de aproximadamente 0,08 mm hasta aproximadamente 0,35 mm y una longitud libre aproximadamente desde 7 mm hasta más o menos 16 mm, y

por lo menos un tercer tipo de cerdas que tienen un diámetro de aproximadamente 0,15 mm hasta alrededor de 0,40 mm y una longitud libre aproximadamente desde 5 mm hasta alrededor de 14 mm, en donde la diferencia de guarnición entre el segundo tipo de cerda y el

tercer tipo de cerda varía entre aproximadamente 0,5 mm hasta alrededor de 3 mm

- 6 Un cepillo dental de acuerdo con la reivindicación 5 que comprende adicionalmente por lo menos una sección en donde

las longitudes libres de las cerdas dentro de por lo menos una sección de la cabeza del cepillo dental se hacen variar de tal manera como para originar un perfil de corte de diente de sierra

- 7 Un cepillo dental de acuerdo con la reivindicación 5 que comprende adicionalmente por lo menos una sección en donde

las longitudes libres de las cerdas dentro de por lo menos una sección de la cabeza del cepillo dental se hacen variar de tal manera como para crear un perfil de corte de onda

- 8 Un cepillo dental de acuerdo con la reivindicación 5 que comprende adicionalmente por lo menos una sección en la cual

las longitudes libres de las cerdas dentro de por lo menos una sección de la cabeza del cepillo dental se hacen variar de tal manera como para crear un perfil de corte en arco

- 9 Un cepillo dental de acuerdo con la reivindicación 5 que comprende adicionalmente primera y segundas secciones en donde

las primeras secciones comprende cerdas de segundo tipo y las segundas secciones comprenden cerdas de tercer tipo y cada una de la primera y la segunda secciones comprende desde 1 hasta 7 filas de cerdas

- 10 El cepillo dental de acuerdo con la reivindicación 9 en donde

las primeras secciones están alternativamente distanciadas con las segundas secciones

- 11 Un cepillo dental de acuerdo con la reivindicación 5 en donde

el segundo y el tercer tipo de cerdas están dispuestas para crear una configuración de ondas alternantes

- 12 Un cepillo dental de acuerdo con la reivindicación 5 en donde

el segundo y el tercer tipo de cerdas están dispuestos para crear una configuración de un círculo de segundo tipo de cerdas que rodean las cerdas del tercer tipo a lo largo de una fila

- 13 Un cepillo dental de acuerdo con la reivindicación 5 en el cual

el segundo y el tercer tipo de cerdas están dispuestos para crear una configuración de un hexágono de cerdas de segundo tipo que rodean una cerda de tercer tipo

- 14 Un cepillo dental de acuerdo con la reivindicación 5 que comprende adicionalmente

por lo menos un cuarto tipo de cerda que tiene un diámetro de aproximadamente 0,15 mm hasta alrededor de 1,0 mm y una longitud libre de aproximadamente 9 mm hasta alrededor de 15 mm dispuestas alrededor de la periferia de la cabeza de cepillo dental

- 15 Un cepillo dental de acuerdo con la reivindicación 14 en el cual

el cepillo dental contiene un número de cerdas de cuarto tipo dispuestas a lo largo de la periferia de la cabeza del cepillo dental, y

la altura de las cerdas del cuarto tipo alterna a lo largo de la periferia de la cabeza del cepillo dental para crear una forma configurada en arco

- 16 Un cepillo dental de acuerdo con la reivindicación 14 en donde

el cepillo dental contiene una pluralidad de cerdas del cuarto tipo dispuestas a lo largo de la periferia de la cabeza del cepillo, y

la altura de las cerdas del cuarto tipo alterna a lo largo de la periferia de la cabeza del cepillo dental para crear una forma conformada en diente de sierra

17 Un cepillo dental de acuerdo con la reivindicación 14, en donde

el cepillo dental contiene un número de cerdas del cuarto tipo dispuestas a lo largo de la periferia de la cabeza del cepillo dental, y

la altura de las cerdas del cuarto tipo alterna a lo largo de la periferia de la cabeza del cepillo dental para crear una forma conformada en onda

18 Un cepillo dental de acuerdo con la reivindicación 5 en donde

el cepillo dental contiene una multiplicidad de diámetros de cerdas dentro de la cabeza de cepillo dental

19 Un cepillo dental de acuerdo con la reivindicación 5 en donde

el cepillo dental contiene una multiplicidad de cerdas que se distancian dentro de la cabeza del cepillo

20 Un cepillo dental de acuerdo con la reivindicación 5, que comprende adicionalmente

por lo menos un mechón denso de cerdas

21 Un cepillo dental que comprende

un mango,

una cabeza de cepillo dental, distante del centro del mango, comprendiendo la cabeza de cepillo dental una periferia y un extremo distante del centro, y

cerdas que están individualmente embebidas en la cabeza del cepillo dental y mutuamente distanciadas entre sí en una distancia desde aproximadamente 0,5 veces hasta alrededor de 10 veces el diámetro de las cerdas,

en donde las cerdas comprenden un segundo tipo de cerdas que tienen un diámetro desde aproximadamente 0,08 mm hasta alrededor de 0,35 mm y una longitud libre aproximadamente desde 7 mm hasta alrededor de 16 mm, tercer tipo de cerdas que tienen un diámetro aproximadamente de 0,15 mm hasta alrededor de 0,40 mm y una longitud libre desde aproximadamente 5 mm hasta 14 mm, cuarto tipo de cerdas que tienen un diámetro de aproximadamente 0,15 mm hasta alrededor de 1,0 mm y una longitud libre de aproximadamente 9 mm hasta alrededor de 15 mm dispuesta a lo largo de la periferia de la cabeza del cepillo dental, y un mechón denso de cerdas en el extremo distante del centro

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22 Un cepillo dental que comprende

un mango,

una cabeza de cepillo dental distante al mango;

una multiplicidad de cerdas del primer tipo, teniendo cada una de dichas cerdas un diámetro que varía desde aproximadamente 0,25 mm hasta alrededor de 0,60 mm y que están embebidas individualmente en dicha cabeza de cepillo dental, estando dichas cerdas mutuamente distanciadas entre sí en una distancia que varía desde aproximadamente 0,5 veces hasta alrededor de 10 veces el diámetro de las cerdas, y

por lo menos un mechón denso de cerdas

23 Un cepillo dental de acuerdo con la reivindicación 22 en donde

el primer tipo de cerdas comprende por lo menos una cerda que tiene un diámetro desde aproximadamente 0,35 mm hasta alrededor de 0,60 mm y por lo menos una cerda que tiene un diámetro desde aproximadamente 0,25 mm hasta alrededor de 0,35 mm

24 Un cepillo dental de acuerdo con la reivindicación 22 en donde el mechón denso de cerdas tiene una forma seleccionada entre el grupo formado por círculo, cuadrado, oval, triángulo, rectángulo alargado,

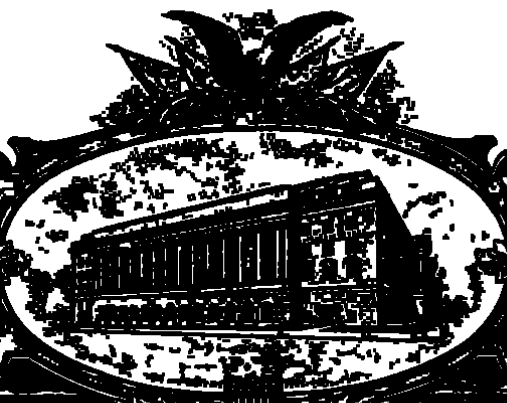
poligonal, de media luna, de herradura, de barra, de estrellas, de arco y sus combinaciones

- 25 El cepillo dental de acuerdo con la reivindicación 24 que comprende adicionalmente un mechón denso de cerdas distante del centro

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20169⁹² 93

PA 613333



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

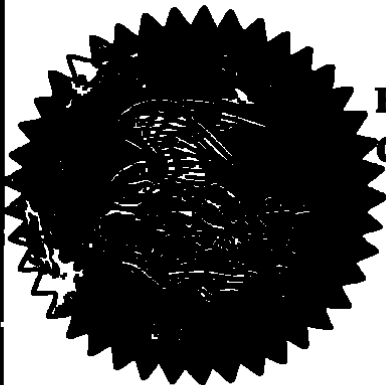
United States Patent and Trademark Office

May 13, 2002

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE UNDER 35 USC 111.

APPLICATION NUMBER: 09/863,773

FILING DATE: May 23, 2001



**By Authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS**

**P. R. GRANT
Certifying Officer**

05/23/01

098673-052301

UTILITY PATENT APPLICATION TRANSMITTAL

Attorney Docket No.

JDC-376

First Inventor

THOMAS PATRICK LUCHINO ET AL

Title

A TOOTHBRUSH WITH INDIVIDUALLY EMBEDDED BRISTLES

Express Mail Label No.

ELA57889716US

PTO
09/863773

(only for new non-provisional applications under 37 CFR 1.53(b))

APPLICATION ELEMENTS

See MPEP Chapter 800 concerning utility patent application contents.

ADDRESS TO

Commissioner for Patents
Box Patent Application
Washington, DC 20231

1 ☒ Fee Transmittal Form (e.g., PTO/SB/17)
(submit an original and a duplicate for fee processing)

2 ☐ Applicant claims small entity status.

3 ☒ Specification [Total Pages 36]

(Preferred arrangement set forth below)

- Descriptive Title of the Invention
- Cross Reference to Related Applications
- Statement Regarding Fed sponsored R&D
- Reference to sequence listing, a table, or a computer program listing appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

4 ☒ Drawing(s) (35 USC 113) [Total Sheets 21]

5 Oath or Declaration [Total Pages 3]

- a. ☐ Newly executed (original or copy)
- b. ☒ Unexecuted original
- c. ☐ Copy from a prior application (37 CFR 1.53(d))
(for continuation/divisional with Box 18 completed)
 - i. ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).

7 ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)

8 Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)

- a. ☐ Computer Readable Form (CRF)
- b. ☐ Specification Sequence Listing on
 - i. ☐ CD-ROM or CD-R (2 copies), or
 - ii. ☐ paper
- c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

- 9. ☐ Assignment Papers (cover sheet & document(s))
- 10. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney
(when there is an assignee)
- 11. ☐ English Translation Document (if applicable)
- 12. ☐ Information Disclosure Statement (IDS) (PTO-1449) ☐ Copies of IDS Citations
- 13. ☐ Preliminary Amendment
- 14. ☒ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
- 15. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
- 16. ☐ Request and Certifications under 35 U.S.C. 122
(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
- 17. ☐ Other

6 ☐ Application Data Sheet. See 37 CFR 1.78

18. ☐ If a CONTINUING APPLICATION, check appropriate box and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.78:

☐ Continuation ☐ Divisional ☒ Continuation-in-Part (CIP) of prior application No.: 08/461,891, filed 12/15/98.

Prior application Information: Examiner NOT ASSIGNED Group Art Unit 1744
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FEE TRANSMITTAL	<i>Complete if Known</i>	
	Application Number	
	Filing Date	
	First Named Inventor	Thomas P. Luchino et al
	Group Art Unit	
	Attorney Docket Number	JDC-376

FEE CALCULATION

CLAIMS AS FILED

(1)	(2)	(3)	(4)	(5)
FOR:	NUMBER FILED	NUMBER EXTRA	RATE	BASIC FEE \$710.00
TOTAL CLAIMS	25 - 20 =	5	x 18.00	\$ 90.00
INDEPENDENT CLAIMS	4 - 3 =	1	x 80.00	\$ 80.00
MULTIPLE DEPENDENT CLAIMS	☐	N/A	\$270.00	
			TOTAL FEES	\$ 880.00

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: THOMAS P. LUCHINO, MARK DAVID SAINDON and ALAN
GREGORY TROJANOWSKI

For : A TOOTHBRUSH WITH INDIVIDUALLY EMBEDDED BRISTLES

Express Mail Certificate

"Express Mail" mailing number: EL457890716US

Date of Deposit: May 23, 2001

I hereby certify that this complete continuation-in-part application, including specification pages, claims, informal drawings, Declaration and Power of Attorney, is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner for Patents, Washington, D.C. 20231.

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A TOOTHBRUSH WITH INDIVIDUALLY EMBEDDED BRISTLES

This is a continuation-in-part of Application Serial No. 09/461,891, filed December 15, 1999.

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This invention relates to a toothbrush. The toothbrush is characterized by standing plastic bristles which are individually embedded in the head of the toothbrush at a small distance from each other. Within the head of a single toothbrush, several different bristle arrangements may exist, each with a unique oral cavity functional purpose.

Conventional toothbrushes are manufactured by attaching groups of bristles ("tufts") to the plastic head of the toothbrush. The tufts can be adhered in many ways. In one well-known method, each tuft is formed from a plurality of individual bristles folded into a U-shaped configuration. The folded tufts are then inserted into apertures, or cavities, provided in the head of the toothbrush. Each folded tuft is held in place in its respective cavity by inserting a small piece of metal (called an "anchor" or "staple") into the cavity such that the bottom portion of the U-shaped tuft is located and secured between the bottom of the cavity and the staple. That portion of each folded tuft which is secured in its respective cavity is sometimes referred to as the "bristle roots". See, e.g., U.S. 3,590,438,

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the disclosure of which is hereby incorporated by reference. Each tuft is made up of anywhere from 2-60 individual bristles typically having a diameter of about 0.15 to about 0.25 mm and a length of 7 to 13 mm, depending on the manufacturer's design and toothbrush type. For example, a "soft" bristled toothbrush may have different length and diameter bristles than a "medium" bristled toothbrush will have.

In another method of manufacture, each tuft again comprises a plurality of individual bristles. A number of bristle tufts, each of the tufts comprising a plurality of individual bristles, are inserted into respective holes in a first mold member such that a length of the tuft protrudes from a side of the mold member which will subsequently form an inner surface of the mold cavity for the brush body. At least a portion of the protruding length of each tuft is then fused into a mass having a larger cross-section than that of the holes at the inner side of the first mold member. The first mold member is then mated with a second mold member to define the mold cavity for the brush body and molding material is injected into the cavity to form the final brush product. See, e.g., U.S. 4,635,313, the disclosure of which is hereby incorporated by reference.

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This method allows for the creation of complex and asymmetric tuft patterns that may be denser than the standard stapled tuft.

Another method of fastening bristle tufts to a bristle carrier is disclosed in WO 93/12690, the disclosure of which is hereby incorporated by reference.

One problem associated with toothbrushes manufactured with tufted bristles is that bristles incorporated into the tuft structure are not free to bend and flex independently. Thus tufted bristles cannot clean as efficiently as bristles which are free to independently follow the irregular contours along the tooth's structure. Further, the structure of the tuft limits the freedom of motion of the individual bristles, especially over the cusps, grooves and other varied terrain of the tooth structure. In addition, the interproximal access of the bristle is limited by the bulky diameter of the densely packed bristle tufts

Another problem associated with toothbrushes manufactured with bristles in tufts is that after being used, the toothbrushes frequently do not dry out sufficiently prior to their next use. This is because the bristles are combined into bundles, which creates narrow capillaries between the bristles. The moisture from using the toothbrush may be preserved for an

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extended period of time in the narrow capillaries between the bristles. The moisture may provide conditions under which bacteria and microbes may grow. If the toothbrush is used at least twice per day, as recommended by dental professionals, the period between uses may not be long enough to allow for sufficient drying. The problem is particularly noted in the region situated near the head of the toothbrush where the bristles are attached. This effect is additionally promoted by dirt particles or residues of application media, namely toothpaste, that remain in the narrow capillaries and cannot be adequately removed. The relatively close spacing of the bristles within the root region may lead to incomplete removal of toothpaste residue when the toothbrush is rinsed after use.

Therefore, there is a need for a toothbrush which provides efficient tooth cleaning, is itself easily cleaned, and dries in a relatively short period of time.

World Patent Application No. WO 96/27308 describes an article which contains a bristle carrier as well as a bristle covering. The bristle covering contains individual plastic bristles that do not contact one another. The reference teaches that the flexural stiffness of the bristles is critical to the effectiveness of the toothbrush. The stiffness of the

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entire bristle covering can be varied not only by choosing varying bristle dimensions (diameter, length) and bristle materials, but also by choosing slightly varying spacing between the bristles. The bristles may be spaced apart by about 0.5 times to 4 times, in particular 1.5 to 2 times, the bristle diameter, based on the space between the exterior adjacent surfaces of the bristles. The bristles may also have a varying stiffness, for example varying diameters and/or spacing, wherein groups of bristles have the same stiffness within a group but a different stiffness from another bristle group. The bristles may be of varying lengths from the bristle carrier to the free end of the bristle. The bristles may be structured, flocked or coated on their surfaces. Also, the free ends of the bristles may be shaped.

As used herein, the term "free end" means the end of the bristle distal to the point where the bristle is attached to the toothbrush head.

In conventional toothbrushes, stiffness is substantially determined by the length of the tufts and the bristle packing density in the tuft, as well as by the diameter of the individual bristles. This latter factor has the least impact because the bristles are mutually supportive in the tuft as a result of which the flexural stiffness of the tuft is several times greater

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than that of the individual bristle. Due to the separation distance between bristles in the article taught in WO 96/27308, the bristle diameter plays a much larger role in determining stiffness than when the bristles are in tufts WO 96/27308 does not teach appropriate bristle lengths or diameters, the two most important factors in determining the bristle stiffness.

World Patent Application No. WO 99/07252 describes a toothbrush having a plastic bristle head and standing plastic bristles which are individually embedded in the bristle head. The bristles are mutually spaced apart by a small distance. The distance is specified only in that the bristle packing density is 400 to 800 bristles per square centimeter on the brush head. The reference discloses that a bristle density of 600 bristles per square centimeter is preferred. The reference further discloses bristles between about 0.095 mm and about 0.225 mm in diameter. The reference teaches: that the shorter the free length of the bristle, the smaller the diameter selected to maintain stiffness; an overall height of the toothbrush in the region of the bristle head of between 6.5 mm and 11 mm; a thickness of the bristle head of between 1.5 mm and 3 mm; and bristles of 5 mm to 9.5 mm in free length. Since the flexural stiffness of an individual bristle is significantly less than that of a tuft comprising a plurality of bristles

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of the same height and diameter, this patent application discloses the use of a shorter bristle with equivalent diameter to conventional tufted brush bristles. The toothbrush with the individual bristles further makes it possible to vary the flexural stiffness in precise graduations by altering the spacing of the bristles.

WO 99/97252 also states that the individual bristle toothbrushes provide a gap-free surface, which is desirable in terms of cleaning. This is an advantage to the individual bristle technology. Since each bristle is capable of independent movement, more of the small irregularities in the tooth structure can be cleaned at one time. The entire surface of the toothbrush bristles is used to clean more efficiently to provide a better overall clean versus conventional tufted brushes. Although the total number of bristles on the conventional toothbrush is roughly equivalent to the overall number of bristles on the new individual bristle toothbrush, the new toothbrush is perceived to have over 1000 cleaning surfaces (individual bristles) versus 40 to 50 cleaning surfaces (tufts) on the conventional toothbrush.

Typical bristles in a soft tufted toothbrush have a diameter of about 0.15 mm to about 0.25 mm and free lengths from about 8 mm to about 12 mm. The dimensions disclosed in the references above are very similar to

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those used in conventional tufted brushes, but because the bristles in the references are individually embedded, the flexural stiffness is substantially less than the flexural stiffness of a conventional toothbrush whose individual bristle tufts comprise a plurality of bristles. Therefore, the toothbrush with individual bristles embedded in the head as taught in the foregoing references presents several problems for the consumer. One problem is that, although some flex is desired in the bristle to adapt to the contours of the irregular tooth structure, too much flex is not beneficial in that if the bristle is too soft, it will not be able to adequately clean the teeth. There will not be enough strength in the bristle to sweep away the plaque, food debris, etc. Although one certainly does not want to make a bristle that is so stiff that it may injure the soft or hard oral tissues, a certain amount of stiffness is nevertheless required to perform the toothbrush's cleaning function.

A second problem associated with the toothbrushes disclosed in the references above is that they are perceived by the consumer as being too soft and unable to clean as well as somewhat stiffer toothbrushes. Although it is not desirable to make a toothbrush that is so stiff that it could cause damage to the oral tissues, some minimal degree of stiffness is required to provide both actual cleaning and a perception in the

consumer's mind that cleaning is being accomplished. A consumer may believe that a toothbrush that is too soft is not capable of removing plaque, food debris, etc. from the teeth. The flexural stiffness of a single bristle used in a tufted toothbrush is too low when used individually to provide the consumer with a perception that cleaning is actually being effected.

A third problem associated with the toothbrushes disclosed in the references above is that, because the flexural stiffness of the individual bristle is much less than that of a tuft comprised of a plurality of identical bristles, and since there are no supporting bristles about the periphery to return the bristle to the upright position after deflection, the individual bristles are likely to no longer appear to be in an upright, generally perpendicular position after use. Instead, the bristles will bend in all directions from the toothbrush head ("splay") after significantly fewer uses than in a tufted toothbrush. A splayed toothbrush is seen by the consumer as worn and used. Clinical studies in the literature have also shown that these splayed toothbrushes do not clean as well as an identical toothbrush that contains new, upright bristles.

A fourth problem associated with the toothbrushes disclosed in the references above is that, upon

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inspection by the consumer, it is believed that the toothbrush will not last as long as a tufted toothbrush. The toothbrush containing spaced apart, individual bristles is perceived as not having the same resiliency as a tufted toothbrush and thus will need to be replaced sooner. This is mostly due to the perception that there are no other bristles helping to maintain each bristle upright. Since the splaying effect is also the main cue to the consumer that the toothbrush needs to be replaced, the product is undesirable for purchase due to the perceived shorter product life.

Therefore, despite the disclosure of the above-mentioned references, there is a continuing need for a toothbrush which provides efficient tooth cleaning, is easily cleaned, and dries in a relatively short period of time. We have surprisingly found that toothbrushes which employ larger diameter bristles having a length similar to the length of the tufts in tufted toothbrushes will solve or greatly reduce the problems described above. A thicker bristle of similar length to that used in conventional tufted toothbrushes will not only supply more rigidity to the toothbrush, thus providing a more perceivable scrubbing feeling to the user, but will also maintain the bristle length that is required to reach the interdental and subgingival areas. The thicker bristle will inherently have more structural support to resist splaying and retain its upright shape for a

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longer period of time relative to a smaller diameter, equal length bristle.

In one embodiment, the present invention provides a toothbrush having a handle; a toothbrush head distal to the handle; and a multiplicity of first type bristles, each bristle having a diameter of from about 0.25 mm to about 0.60 mm; wherein the first type bristles are individually secured, e.g., by embedding in the toothbrush head, and the bristles are mutually spaced apart from one another by a distance from 0.5 times to 10 times the diameter of the bristles.

The toothbrush handle (1) and toothbrush head (2) may be made in one piece by injection molding. The toothbrush head (2) is distal to the toothbrush handle (1). The toothbrush handle (1) and toothbrush head (2) may be made of polymers such as, but not limited to, polyethylene, polypropylene, and polycarbonate.

The first type bristles (3) and any other bristles utilized in this invention may be made from a material selected from an elastomeric material such as, but not limited to, rubber and a polymer selected from the group consisting of nylon, polyamides, polyesters, polybutylene terephthalate, polypropylene, acetal resins, fluoropolymers, polyacrylates, and polysulfones. The first type bristles and any other bristles utilized

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within this invention may be structured, flocked or coated on their surface area. The first type bristles and any other bristles utilized in this invention may contain additives such as, but not limited to abrasives and polishing agents; anti-cavity agents such as sodium fluoride; antimicrobial agents, and combinations thereof.

In the first embodiment of the invention, it is preferred that the first type bristles (3) all have the same free length. As used herein, the term "free length" means the length of the bristle from inner surface (9) of the toothbrush head to the free end of the bristle. The space between the exterior surfaces of adjacent first type bristles (4) and the diameter of the first type bristles may be varied such that a first type bristle packing density of from 50 per cm² to 1000 per cm² is obtained. Each first type bristle (3) is individually embedded in the head of the toothbrush (2).

The first type bristles (3) as well as any other bristles utilized herein may be secured to the toothbrush head (2) by any process known in the art, including those mentioned hereinabove, or by a bonding method wherein an adhesive is utilized to attach the bristles to the toothbrush head.

A combination of first type bristle diameters ranging from about 0.25 mm to about 0.60 mm, and spacing between

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immediately adjacent bristles ranging from about 0.5 times to about 10 times, preferably about 0.5 times to about 4 times, the diameter of the first type bristles (3) or any other bristles utilized in this invention may be utilized to provide different sensations for different parts of the mouth. For example, the first type bristles (3) may be arranged such that at least one section of the toothbrush head (2) contains first type bristles (3) having diameters ranging from about 0.35 mm to about 0.60 mm, while at least one other section of the toothbrush head (2) contains first type bristles (3) having diameters ranging from about 0.25 mm to about 0.35 mm.

The toothbrush may further include at least one dense tuft (8) of bristles. The skilled art worker will recognize that dense tuft (8) of bristles may be secured to the toothbrush head (2) by means known in the art, such as, but not limited to, fusion or stapling techniques. The bristles in this tuft may have diameters ranging from about 0.08 mm to about 0.40 mm and a free length ranging from about 7 mm to about 15 mm. The dense tuft (8) of bristles may be arranged anywhere on the toothbrush head (2). Preferably, the dense tuft (8) of bristles is distal to the toothbrush handle (1). Preferably, when the dense tuft (8) is distal to the toothbrush handle, the dense tuft has a

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longer length than that of the bristles comprising the toothbrush.

5 In a second embodiment of the present invention, the toothbrush comprises: a handle; a toothbrush head distal to the handle; at least one second type bristle having a diameter of from about 0.08 mm to about 0.35 mm and a free length of from about 7 mm to about 16 mm; and at least one third type bristle having a diameter of from about 0.15 mm to about 0.40 mm and a free length of from about 5 mm to about 14 mm; wherein the trim difference between the second type bristle and the third type bristle ranges from about 0.5 mm to about 3 mm. This toothbrush is believed to provide enhanced cleaning performance.

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20 The second type of bristle (5) must have a diameter which is sufficiently large to provide the bristle with enough inherent stiffness to be able to remove plaque, food debris, etc. from the teeth while remaining flexible enough to follow the contour of the oral surfaces during use. For this purpose, the second type of bristle (5) may have a diameter of from about 0.08 mm to about 0.35 mm, preferably from about 0.13 mm to about 0.35 mm, and a free length of from about 7 mm to about 16 mm, preferably from about 9 mm to about 14 mm. The second type bristles (5) may serve the purpose of interdenal and subgingival cleaning.

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The third type of bristle (6) may serve the purpose of cleaning the surfaces of the teeth. The third type of bristle (6) may have a diameter of from about 0.15 mm to about 0.40 mm, preferably from about 0.20 mm to about 0.40 mm and a free length of from about 5 mm to about 14 mm, preferably from about 7 mm to about 12 mm. A trim difference of from about 0.5 mm to about 3 mm is recommended between the free lengths of the second type (5) and third type (6) of bristles to ensure optimal cleaning interdentally and subgingivally. As used herein, the term "trim difference" means the difference in free lengths between different types of bristles.

The free lengths of the bristles within a given section of the toothbrush may be varied to also provide an improved perception of cleaning via visual and tactile stimuli. For example, a sawtooth cut or a zigzag cut reinforces the consumer's perception of interdental cleaning. Other patterns, such as but not limited to, waves, arcs, etc., can be used in place of the sawtooth cut or zigzag cut

In one embodiment of the present invention, alternating sections of second type (5) and third type (6) bristles are contained in the toothbrush to enhance interproximal cleaning efficacy. In this embodiment, second type bristles (5), which may have a diameter of from about 0.08 mm to about 0.35 mm, preferably from

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about 0.13 mm to about 0.35 mm, and a free length of from about 7 mm to about 16 mm, preferably from about 9 mm to about 14 mm, may be alternated with third type bristles (6), which may have a diameter of from about 0.15 mm to about 0.40 mm, preferably from about 0.20 mm to about 0.40 mm, and a free length of from about 5 mm to about 14 mm, preferably from about 7 mm to about 12 mm. The first sections contain second type bristles, and the second sections contain third type bristles. The sections may be from 1 to 7 rows deep. If each section is spaced at 2.15 times the diameter of each adjacent bristle and the transition is spaced at 2.15 times the average diameter of the adjoining bristles, the density of the third type bristle section may be 380-600 bristles per square centimeter while the density of the second type bristle section may be 100-350 bristles per square centimeter. The lower density of bristles is preferred since it allows for the use of thicker diameter bristles, which provide more cleaning sensation to the consumer.

Other patterns besides alternating rows may also be used for the varying length and diameter bristles and these include, but are not limited to alternating waves, a circle of longer bristles surrounding the shorter bristles along a row, a hexagon of longer bristles surrounding a shorter bristle, etc.

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In another embodiment of the present invention, at least one of a fourth type of bristle (7) is contained in at least one section about the periphery of the toothbrush head (2). As used herein, by "periphery" is meant the outer edge of the upper surface of the toothbrush head. Elastomeric material such as, but not limited to rubber may be particularly suited as the material of construction for the fourth type of bristle. The fourth type bristles (7) may be of a diameter of from about 0.15 mm to about 1.0 mm, preferably about 0.30 mm to about 0.50 mm, and a free length of from about 9 mm to about 15 mm, preferably from about 10 mm to about 13 mm. In a preferred embodiment, a plurality of fourth type bristles (7) are arranged about the periphery of the toothbrush head. The free length of the fourth type bristles (7) may also alternate along the periphery of the toothbrush head, resulting in forms. Possible forms include, but are not limited to an arc shape, a sawtooth shape, or a wave shape. Combinations of these height patterns are possible as well, as are repeating patterns, such as a series of smaller arcs along the periphery or a sawtooth with an arcing midline.

The present invention may also provide a toothbrush having a multiplicity of bristle diameters and bristle spacing (4) within the toothbrush head (2) to provide different sensations for different parts of the mouth. Depending on the ratio of the different bristles used of

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each diameter, and the spacing (4) used between bristles, the bristle density on the toothbrush head (2) can be varied from 50 to 1000 per square centimeter. The bristle density could also vary along various regions of the toothbrush head (2) such that one area may have a different bristle density than that of another area to provide the customer with desired tactile perception and visual cues.

The toothbrush may further include at least one dense tuft (8) of bristles. The bristles in the tuft may have diameters ranging from about 0.08 mm to about 0.40 mm and a free length ranging from about 7 mm to about 15 mm. The dense tuft (8) of bristles may be arranged anywhere on the toothbrush head (2). In one embodiment, the toothbrush includes at least one dense tuft with first type bristles; second type bristles; third type bristles; fourth type bristles; or combinations thereof. The dense tuft or tufts may be of any shape. In top plan, the dense tuft or tufts may be, for example, in the form of a circle, square, oval, triangle, elongated rectangle, polygonal, half-moon, horseshoe, bar, stars, arc and combinations thereof. Preferably, a dense tuft (8) of bristles is located at the tip of the free end of the brush head of the toothbrush to aid in cleaning the posterior teeth.

In a preferred embodiment, the present invention provides a toothbrush wherein the toothbrush head (2) contains second type bristles (5) which may have a diameter of from about 0.08 mm to about 0.35 mm, preferably from about 0.13 mm to about 0.35 mm, and a free length of from about 7 mm to about 16 mm, preferably from about 9 mm to about 14 mm throughout the toothbrush head (2, third type bristles (6) which may have a diameter of from about 0.15 mm to about 0.40 mm, preferably from about 0.20 mm to about 0.40 mm, and a free length of from about 5 mm to about 14 mm, preferably from about 7 mm to about 12 mm; and fourth type bristles (7) having a diameter of from about 0.15 mm to about 1.0 mm, preferably about 0.30 mm to about 0.50 mm, and a free length of from about 9 mm to about 15 mm, preferably about 10 mm to about 13 mm along the periphery of the toothbrush head (2). The toothbrush head contains a periphery and a distal end. At the distal end of the toothbrush head (2) is a dense tuft (8) of bristles for cleaning of the back teeth and gums. The bristles in the dense tuft (8) may have diameters ranging from about 0.08 mm to about 0.40 mm and a free length ranging from about 7 mm to about 15 mm. With the varying bristle patterns within this toothbrush, consumers receive not only a superior cleaning of their entire oral cavity (teeth surfaces, gums, interproximal regions, etc.) but also are able to perceive the better

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clean through sensual cues (visual and tactile) delivered via the bristle configuration.

Brief Description of the Drawings

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Descriptions of the Drawing Figures follow. The descriptions are intended to illustrate various aspects of the invention, but should not be construed as limiting the scope of the invention.

Figure 1 displays a toothbrush having a handle (1) and a toothbrush head (2) distal to the toothbrush handle. A multiplicity of first type bristles (3) of uniform length and diameter are embedded in the toothbrush head (2). The first type bristles (3) are mutually spaced apart from one another by a distance (4) from 0.5 times to 10 times the diameter of the bristles.

Figure 1A is a top plan view of the toothbrush shown in Figure 1.

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Figure 2 displays a toothbrush having second type bristles (5) and third type bristles (6) embedded in the toothbrush head (2). The bristles are mutually spaced apart from one another by a distance (4) from 0.5 times to 10 times the diameter of the bristles. The second type bristles (5) are arranged in hexagonal shapes around the third type bristles (6).

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Figure 3 displays a toothbrush having alternating rows of second type bristles (5) and third type bristles (6) embedded in the toothbrush head (2). The bristles are mutually spaced apart from one another by a distance (4) from 0.5 times to 10 times the diameter of the bristles.

Figure 3A is a top plan view of the toothbrush shown in Figure 3.

Figure 4 displays a toothbrush having alternating rows of second type bristles (5) and third type bristles (6) embedded in the toothbrush head (2). The bristles are mutually spaced (4) apart from one another by a distance from 0.5 times to 10 times the diameter of the bristles. Along the periphery of the toothbrush head (2) are fourth type bristles (7) embedded in the toothbrush head (2).

Figure 4A is a top plan view of the toothbrush shown in Figure 4.

Figure 5 displays a toothbrush having second type bristles (5) and third type bristles (6) embedded in the toothbrush head (2). The bristles are mutually spaced apart from one another by a distance (4) from 0.5 times to 10 times the diameter of the bristles. The second type bristles (5) are arranged in hexagonal shapes around the third type bristles (6). At the end of the

toothbrush head (2) distal to the handle (1), is a dense tuft of bristles (8).

Figure 5A is a top view of the toothbrush shown in Figure 5.

Figure 6 displays a toothbrush having second type bristles (5) and third type bristles (6) embedded in the toothbrush head (2). The bristles are mutually spaced apart from one another by a distance (4) from 0.5 times to 10 times the diameter of the bristles. The second type bristles (5) are arranged in hexagonal shapes around the third type bristles (6). At the end of the toothbrush head (2) distal to the handle (1), is a dense tuft of bristles (8). Along the periphery of the toothbrush head (2) are fourth type bristles (7) embedded in the toothbrush head (2).

Figure 6A is a top view of the toothbrush shown in Figure 6.

Figure 7 displays a toothbrush having alternating rows of second type bristles (5) and third type bristles (6) embedded in the toothbrush head (2). The bristles are mutually spaced apart from one another by a distance (4) from 0.5 times to 10 times the diameter of the bristles. At the end of the toothbrush head (2) distal to the handle (1), is a dense tuft of bristles (8). Along the

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periphery of the toothbrush head (2) are fourth type bristles (7) embedded in the toothbrush head (2).

Figure 7A is a top view of the toothbrush shown in Figure 7.

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Figure 8 displays a toothbrush having randomly distributed second type bristles (5) and third type bristles (6) embedded in the toothbrush head (2). The bristles are mutually spaced apart from one another by a distance (4) from 0.5 times to 10 times the diameter of the bristles. At the end of the toothbrush head (2) distal to the handle (1), is a dense tuft of bristles (8). Along the periphery of the toothbrush head (2) are fourth type bristles (7) embedded in the toothbrush head (2).

Figure 8A is a top view of the toothbrush shown in Figure 8.

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Figure 9 displays a perspective view of a toothbrush having a multiplicity of individually embedded first type bristles (3) and a multiplicity of dense tufts (8) of bristles embedded in the toothbrush head (2).

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Figure 9A is a top plan view of the toothbrush shown in Figure 9.

Figures 10 and 11 are perspective views of different embodiments of a toothbrush having a multiplicity of individually embedded first type bristles (3) and a multiplicity of dense tufts (8) of bristles embedded in the toothbrush head (2).

Figures 10A and 11A are top plan views of the toothbrushes shown in Figures 10 and 11, respectively.

Several examples of the invention are set forth below to further illustrate the nature of the invention and the manner of carrying it out. However, the invention should not be considered as being limited to the details thereof.

Example 1

A toothbrush was made according to the design shown in Figure 8. The bristles of the toothbrush according to Figure 8 had the following diameters. second type bristles (5): 0.18 mm; third type bristles (6): 0.23 mm; fourth type bristles (7): 0.2 mm; and dense tuft of bristles (8): 0.25 mm. The heights of the bristles were as follows: second type bristles: 9-10 mm; third type bristles: 10.5 mm; fourth type bristles 10-11.25 mm; and dense tuft of bristles: 12.5 mm. The space between the exterior adjacent surfaces of the second type bristles (5) was about 0.021 mm; the corresponding

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space between the exterior surfaces of the third type
bristles (6) was about 0.0197 mm; the space between the
exterior adjacent surfaces of the fourth type bristles
(7) was about 0.018 mm; and the space between the
exterior surfaces of the individual bristles comprising
the dense tuft (8) of bristles was about 0.020 mm.

Two toothbrushes were made according to the design shown
in Figure 11. First toothbrush (Sample 11A) had
bristles of the following diameters: first type bristles
(3): 0.20 mm; dense tufts (8) of bristles throughout
the toothbrush head: 0.20 mm; and distal dense tuft (8):
of bristles 0.20 mm. The heights of the bristles were as
follows: first type bristles (3): 11 mm; dense tufts of
bristles throughout the toothbrush head: 9 mm; and
distal dense tuft (8) of bristles 12.5 mm. Second
toothbrush (Sample 11B) had the following bristle
diameters: first type bristles (3): 0.20 mm; dense
tufts (8) of bristles throughout the toothbrush head:
0.18 mm; and distal dense tuft (8): of bristles 0.20
mm. The heights of the bristles were as follows: first
type bristles (3): 11 mm; dense tufts (8) of bristles
throughout the toothbrush head: 9 mm; and distal dense
tuft (8) of bristles: 12.5 mm. In each sample 11A, 11B,
the first type bristles (3) were individually embedded
in toothbrush head 2.

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The above-described three toothbrushes were tested for efficacy at cleaning between the teeth according to the procedure described in "Access to interproximal tooth surfaces by different bristle designs and stiffnesses of toothbrushes", Nygaard-Ostby et al., Scand. J. Dent Res. 1979, 87, 424-430, the disclosure of which is incorporated herein by reference. The results of the tests are reported in Table 1.

Table 1

<u>Sample</u>	<u>Between Teeth Access (mm)</u>
<u>Figure 8</u>	<u>12</u>
<u>11A</u>	<u>11.8</u>
<u>11B</u>	<u>12.6</u>
<u>Oral B Cross Action</u>	<u>10.8</u>
<u>Oral B Indicator</u>	<u>7.7</u>

The data above demonstrates that the toothbrushes according to the present invention clean between the teeth better than commercially available toothbrushes.

Example 2

The efficacy of the toothbrush of Figure 8 and the Oral B* Indicator toothbrush was tested by a clinical trial. An examiner-blind, randomized, crossover clinical study was conducted with seventy healthy adults. Plaque was evaluated before and after brushing for one minute using

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the Rustogi Modification of the Navy Plaque Index ("RMNPI"). Subjects were randomly assigned to use one of the two test toothbrushes, namely the Oral B* Indicator toothbrush or the toothbrush made according to the design shown in Figure 8. After brushing at the initial visit, the subjects returned two weeks later to repeat the procedure with the other of the two test toothbrushes. Evaluation of plaque using RMNPI was done at both visits. RMNPI scores were given for the whole mouth, interproximal sites, marginal sites, behind the last molar, anterior sites, and posterior sites. The change in plaque from pre-brushing to post brushing was compared for both toothbrushes. The results are shown in Table 2.

Table 2

	Plaque Scores					
	Invention*			Oral B Indicator		
Tooth Site	Pre	Post	delta	Pre	Post	delta
Whole Mouth	0.64	0.30	52.8	0.64	0.36	44.1
Marginal	1	0.63	37.1	1	0.71	28.9
Interproximal	1	0.38	61.9	1	0.47	52.9
Last Molar	0.58	0.23	60	0.57	0.31	45.8
Anterior	0.65	0.30	54	0.65	0.34	48
Posterior	0.64	0.31	51.8	0.64	0.38	40.7

*Toothbrush of Figure 8.

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The scores reported are the mean scores for the groups of participants. The term "delta" is the percent reduction in plaque for each group from before brushing to after brushing. Using statistical techniques, it was concluded that the toothbrush of the invention removed significantly more plaque than a commercially available toothbrush from the whole mouth, gingival margin, interproximal surface, and behind the last molar, respectively 20%, 28%, 17%, and 31% more.

Toothbrushes in accordance with the present invention provide efficient tooth cleaning, are easily cleaned, and dry in a relatively short period of time.

What is claimed:

1. A toothbrush comprising:

5 a handle,

a toothbrush head distal to the handle; and

10 a multiplicity of first type bristles, each of said bristles having a diameter ranging from about 0.25 mm to about 0.60 mm and being individually embedded in said toothbrush head; said bristles being mutually spaced apart from one another by a distance ranging from about 0.5 times to about 10 times the diameter of the bristles.

15 2. A toothbrush according to Claim 1 further comprising at least one dense tuft of bristles.

20 3. A toothbrush according to Claim 1 wherein: the first type bristles comprise at least one bristle having a diameter from about 0.35 mm to about 0.60 mm and at least one bristle having a diameter of from about 0.25 mm to about 0.35 mm.

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4. A toothbrush according to Claim 3 wherein the toothbrush head further comprises sections wherein:

the bristles are arranged such that at least one section of the toothbrush head contains bristles having diameters from about 0.35 mm to about 0.60 mm, while at least one section of the toothbrush head contains first type bristles having diameters ranging from about 0.25 mm to about 0.35 mm.

5. A toothbrush comprising:

a handle;

a toothbrush head distal to the handle;

at least one individually embedded second type bristle having a diameter of from about 0.08 mm to about 0.35 mm and a free length of from about 7 mm to about 16 mm; and

at least one third type bristle having a diameter of from about 0.15 mm to about 0.40 mm and a free length of from about 5 mm to about 14 mm; wherein the trim difference between the second type bristle and the third type bristle ranges from about 0.5 mm to about 3 mm.

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6. A toothbrush according to Claim 5 further comprising at least one section wherein:

the free lengths of the bristles within at least one section of the toothbrush head are varied such as to create a sawtooth cut profile.

7. A toothbrush according to Claim 5 further comprising at least one section wherein:

the free lengths of the bristles within at least one section of the toothbrush head are varied such as to create a wave cut profile.

8. A toothbrush according to Claim 5 further comprising at least one section wherein:

the free lengths of the bristles within at least one section of the toothbrush head are varied such as to create an arc cut profile.

9. A toothbrush according to Claim 5 further comprising first sections and second sections wherein:

the first sections comprise second type bristles and the second sections comprise third type bristles and each of the first and second sections comprises from 1 to 7 rows of bristles.

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10. The toothbrush according to Claim 9 wherein: -

the first sections are alternately spaced with the
second sections.

11. A toothbrush according to Claim 5 wherein:

the second and third type bristles are arranged to
create an alternating wave pattern.

12. A toothbrush according to Claim 5 wherein:

the second and third type bristles are arranged to
create a pattern of a circle of second type bristles
surrounding the third type bristles along a row.

13. A toothbrush according to Claim 5 wherein:

the second and third type bristles are arranged to
create a pattern of a hexagon of second type bristles
surrounding a third type bristle.

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14. A toothbrush according to Claim 5 further comprising:

at least one fourth type bristle having a diameter of from about 0.15 mm to about 1.0 mm and a free length of from about 9 mm to about 15 mm arranged about the periphery of the toothbrush head.

15. A toothbrush according to Claim 14 wherein:

the toothbrush contains a plurality of fourth type bristles arranged along the periphery of the toothbrush head; and

the height of the fourth type bristles alternates along the periphery of the toothbrush head to create an arc shaped form.

16. A toothbrush according to Claim 14 wherein:

the toothbrush contains a plurality of fourth type bristles arranged along the periphery of the toothbrush head; and

the height of the fourth type bristles alternates along the periphery of the toothbrush head to create a sawtooth shaped form.

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17. A toothbrush according to Claim 14 wherein:

the toothbrush contains a plurality of fourth type
bristles arranged along the periphery of the toothbrush
head; and

the height of the fourth type bristles alternates along
the periphery of the toothbrush head to create a wave
shaped form.

18. A toothbrush according to Claim 5 wherein:

the toothbrush contains a multiplicity of bristle
diameters within the toothbrush head.

19 A toothbrush according to Claim 5 wherein:

the toothbrush contains a multiplicity of bristle
spacing within the toothbrush head.

20. A toothbrush according to Claim 5 further
comprising:

at least one dense tuft of bristles.

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21. A toothbrush comprising:

a handle;

a toothbrush head distal to the handle, the toothbrush head comprising a periphery and a distal end; and

bristles which are individually embedded in the toothbrush head and mutually spaced apart from one another by a distance from about 0.5 times to about 10 times the diameter of the bristles;

wherein the bristles comprise second type bristles having a diameter of from about 0.08 mm to about 0.35 mm and a free length of from about 7 mm to about 16 mm; third type bristles having a diameter of from about 0.15 mm to about 0.40 mm and a free length of from about 5 mm to 14 mm; fourth type bristles having a diameter of from about 0.15 mm to about 1.0 mm and a free length of from about 9 mm to about 15 mm arranged along the periphery of the toothbrush head; and a dense tuft of bristles at the distal end.

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22. A toothbrush comprising:

a handle;

5 a toothbrush head distal to the handle;

a multiplicity of first type bristles, each of said bristles having a diameter ranging from about 0.25 mm to about 0.60 mm and being individually embedded in said toothbrush head; said bristles being mutually spaced apart from one another by a distance ranging from about 0.5 times to about 10 times the diameter of the bristles; and

at least one dense tuft of bristles.

23. A toothbrush according to Claim 22 wherein:

20 the first type bristles comprise at least one bristle having a diameter from about 0.35 mm to about 0.60 mm and at least one bristle having a diameter of from about 0.25 mm to about 0.35 mm.

25 24. A toothbrush according to Claim 22 wherein the dense tuft of bristles has a shape selected from the group consisting of circle, square, oval, triangle, elongated rectangle, polygonal, half-moon, horseshoe, bar, stars, arc and combinations thereof.

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25. The toothbrush according to Claim 24 - further comprising a distal dense tuft of bristles

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ABSTRACT

A TOOTHBRUSH WITH INDIVIDUALLY EMBEDDED BRISTLES

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An improved toothbrush is disclosed. The toothbrush contains bristles which are individually embedded in a toothbrush head and mutually spaced apart from one another by a distance from 0.5 times to 10 times the diameter of the bristles. The bristles may include first type bristles having a diameter of from about 0.25 mm to about 0.60 mm, second type bristles having a diameter of from about 0.08 mm to about 0.35 mm and a free length of from about 7 mm to about 16 mm; third type bristles having a diameter of from about 0.15 mm to about 0.40 mm and a free length of from about 5 mm to about 14 mm; fourth type bristles having a diameter of from about 0.15 mm to about 1.0 mm and a free length of from about 9 mm to about 15 mm; and a dense tuft of bristles at the end of the toothbrush head distal from the handle.

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PTO/SB/01 (10-09)
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Under the Paperwork Reduction Act of 1995, no person is required to respond to a collection of information unless it carries a valid OMB control number.

DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.83) ☒ Declaration Submitted with Initial Filing ☐ Declaration Submitted after Initial Filing (Surcharge (37 CFR 1.16(e)) required) OR ☐ Declaration Submitted after Initial Filing (Surcharge (37 CFR 1.16(e)) required)	Attorney Docket Number	JDC-375
	First Named Inventor	THOMAS PATRICK LUCHINO
	COMPLETE IF KNOWN	
	Application Number	
	Filing Date	
	Group Art Unit	
Examiner Name		

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.
I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

A TOOTHBRUSH WITH INDIVIDUALLY EMBEDDED BRISTLES
(Title of the invention)

the specification of which

☒ is attached hereto

OR

☐ was filed on (MM/DD/YYYY) [] as United States Application Number or PCT International Application Number [] and was amended on (MM/DD/YYYY)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 366(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/028 attached hereto.

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DECLARATION - Utility or Design Patent Application		
I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.		
Application Number(s)	Filing Date (MM/DD/YYYY)	☐ Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/028 official form.
I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:		
Application Serial No.	Filing Date	Status
09/481,891	12/16/99	Pending Patented Patented
I hereby appoint:		
☒ Practitioner at Customer Number 000027777		Place Customer Number Bar Code Label Here
AND		
☐ Practitioner(s) named below: Name _____ Registration Number _____		
as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith		
Address all telephone calls to Lawrence D. Schuler at telephone number (732) 624-9511		
Direct all correspondence to: ☒ Customer Number or Bar Code Label 000027777 OR ☐ Correspondence address below		
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Address:		
Address:		
City:	State:	ZIP:
Country:	Telephone:	Fax:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR:

☐ A petition has been filed for this unsigned inventor

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Signature

Date

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SECOND INVENTOR:

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Family Name
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Inventor's
Signature

Date

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City

Princeton

State NJ

ZIP 08540

Country USA

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF THIRD INVENTOR:

☐ A petition has been filed for this unsigned inventor

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Family Name
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Inventor's
Signature

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Country USA

Citizenship USA

Mailing Address 39 Hilde Avenue

City

Monmouth Junction

State NJ

ZIP 08852

Country USA

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FIG. 1

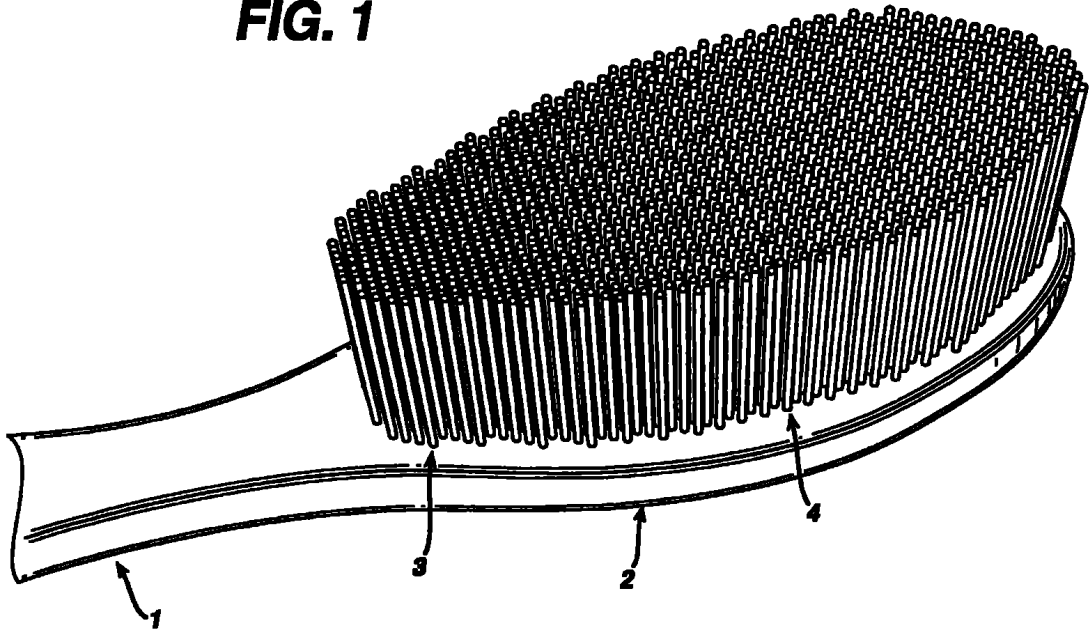
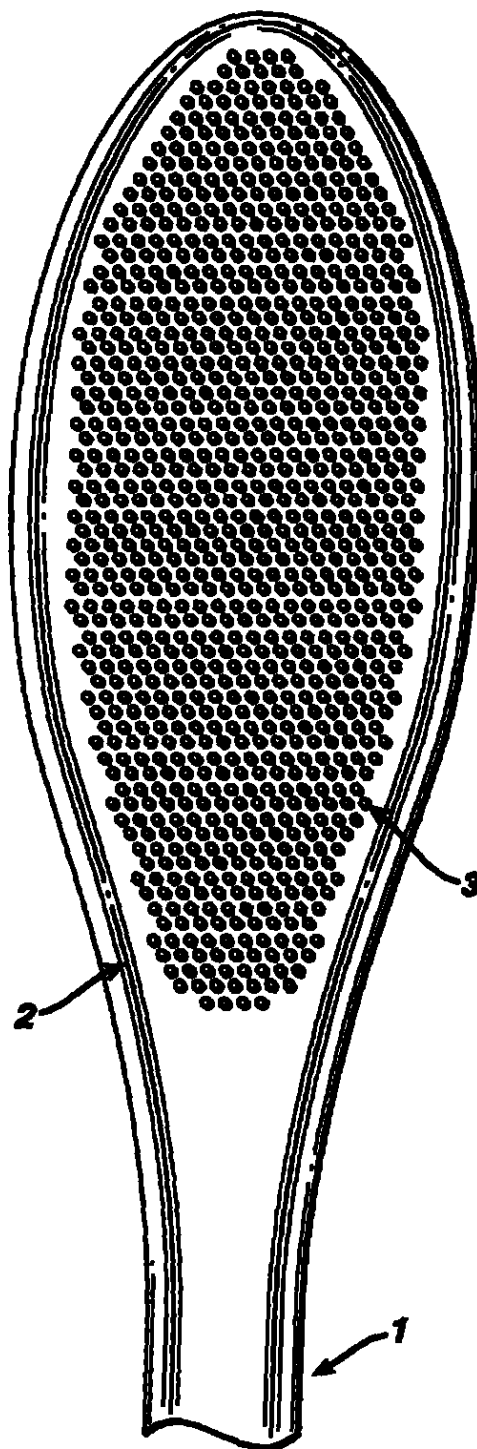


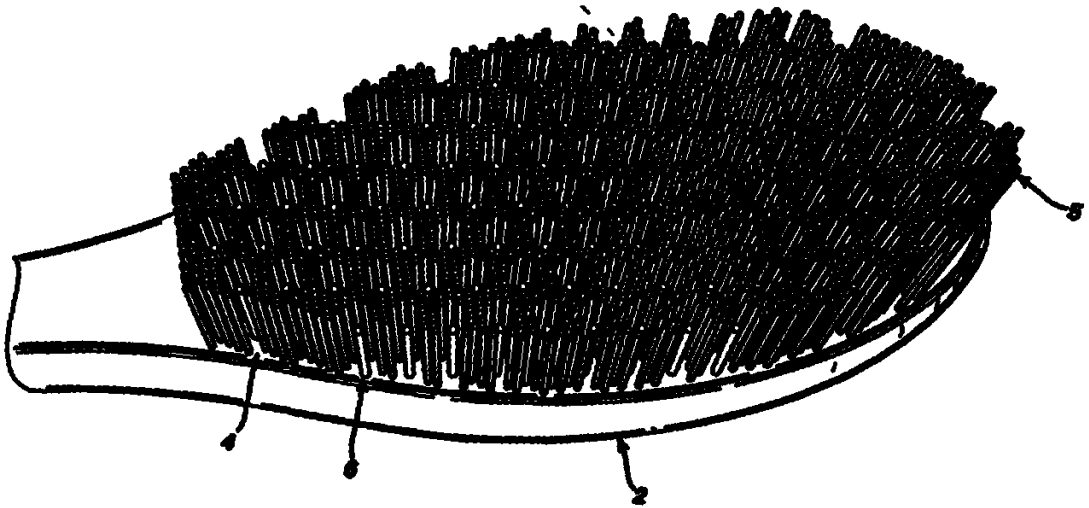
FIG. 1A



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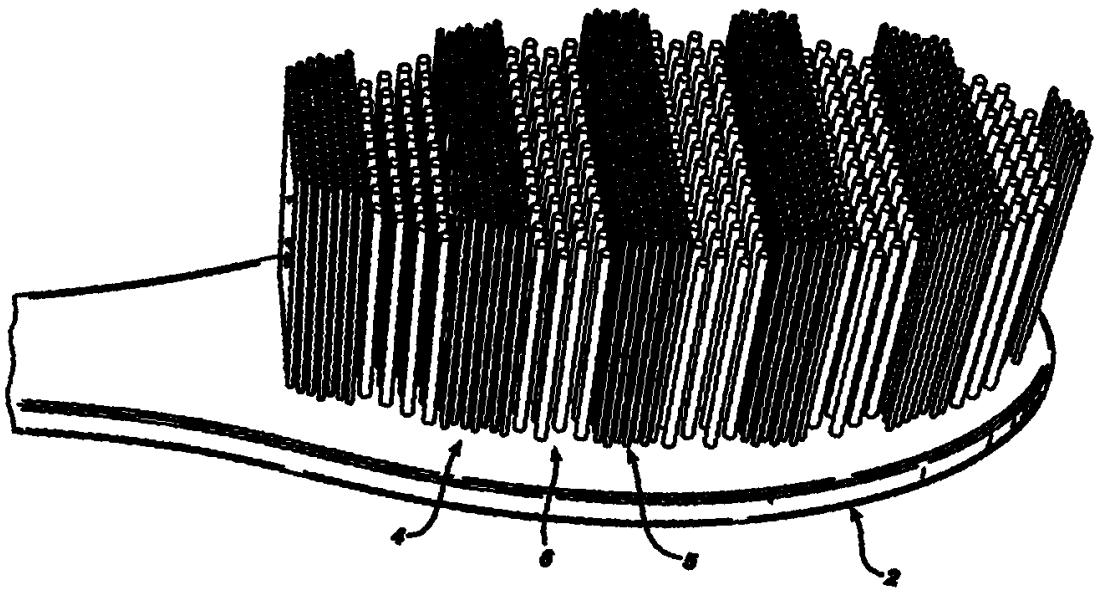
FIG. 2



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FIG. 3

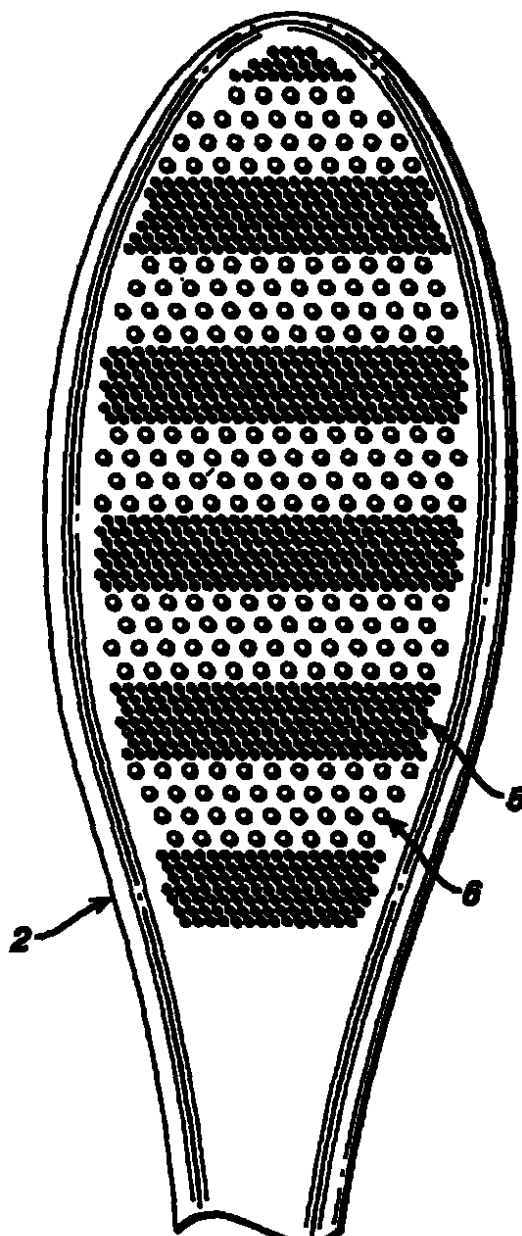
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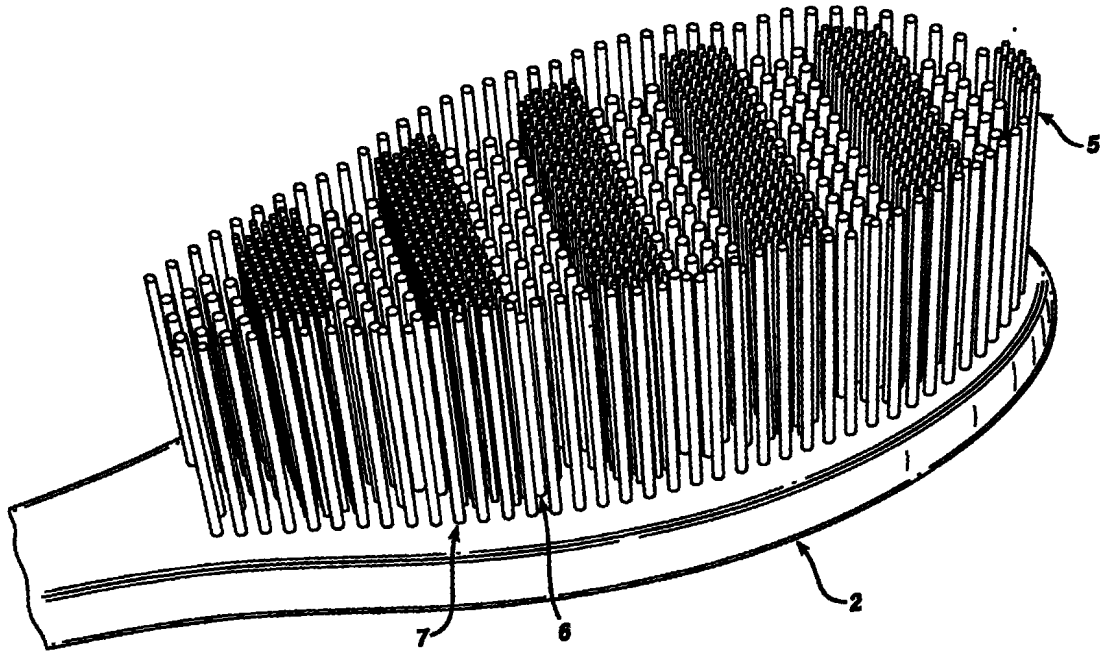
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FIG. 3A



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FIG. 4

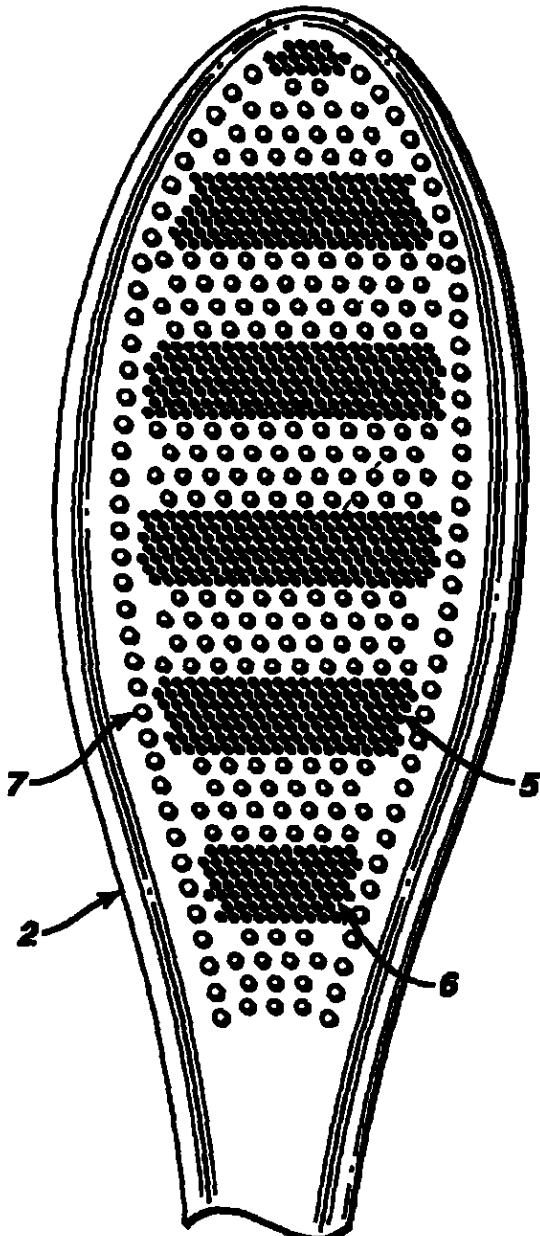


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FIG. 4A



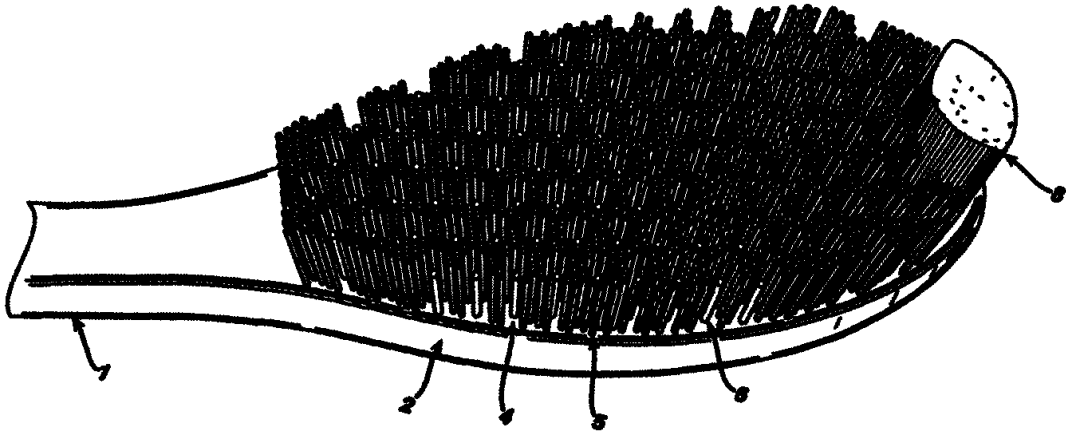
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FIG. 5

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FIG. 5A

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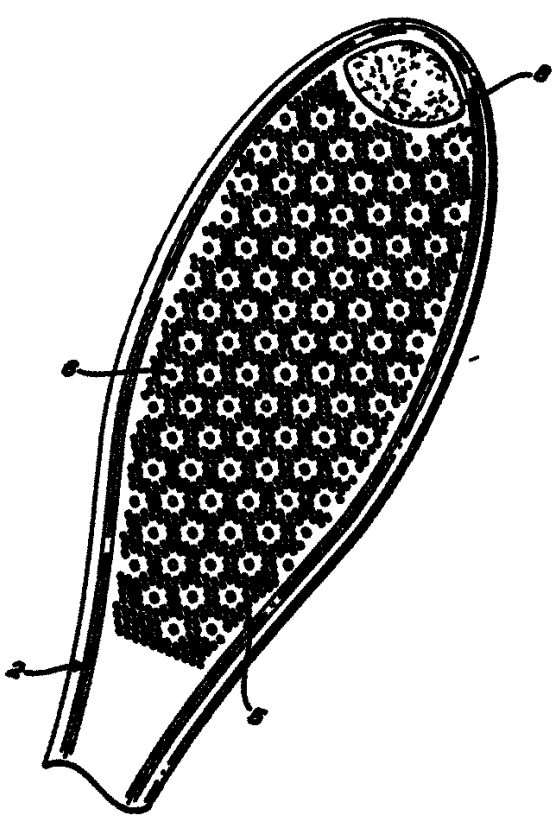
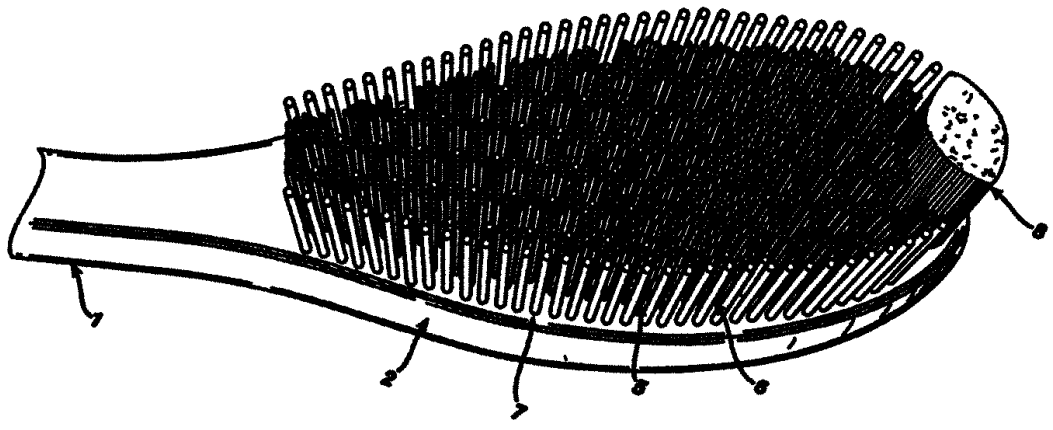


FIG. 6

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FIG. 6A

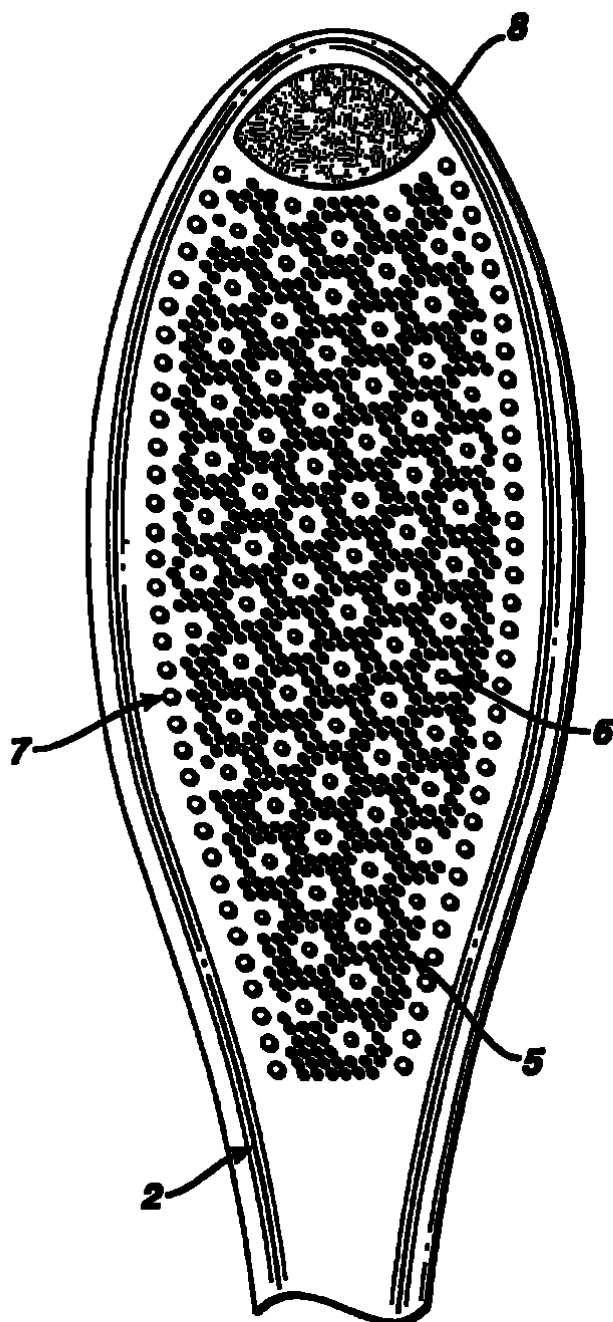
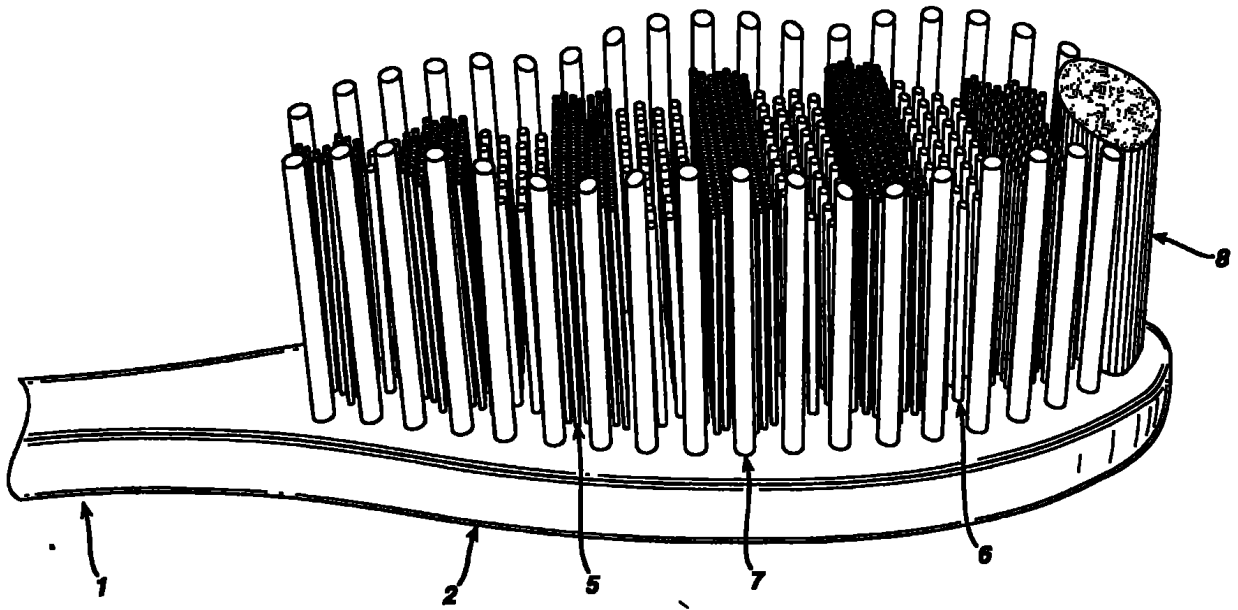
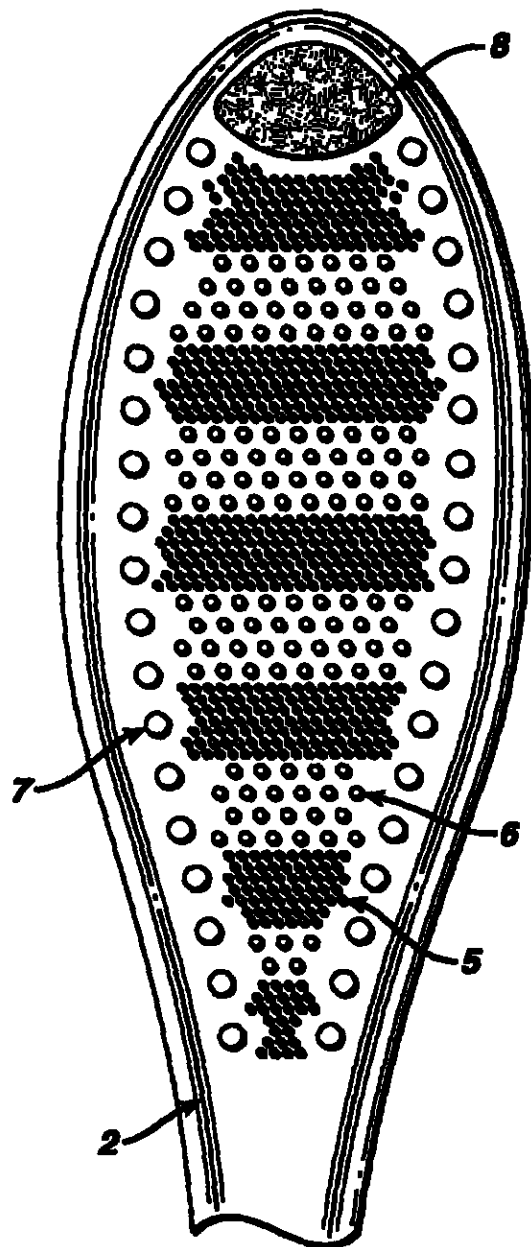


FIG. 7



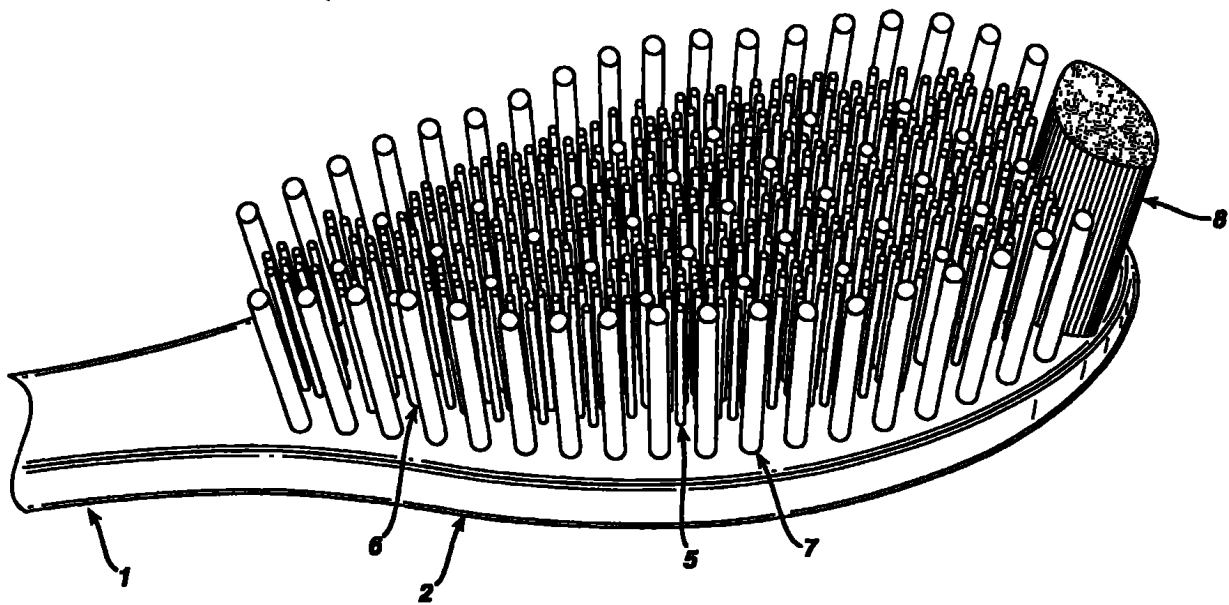
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FIG. 7A



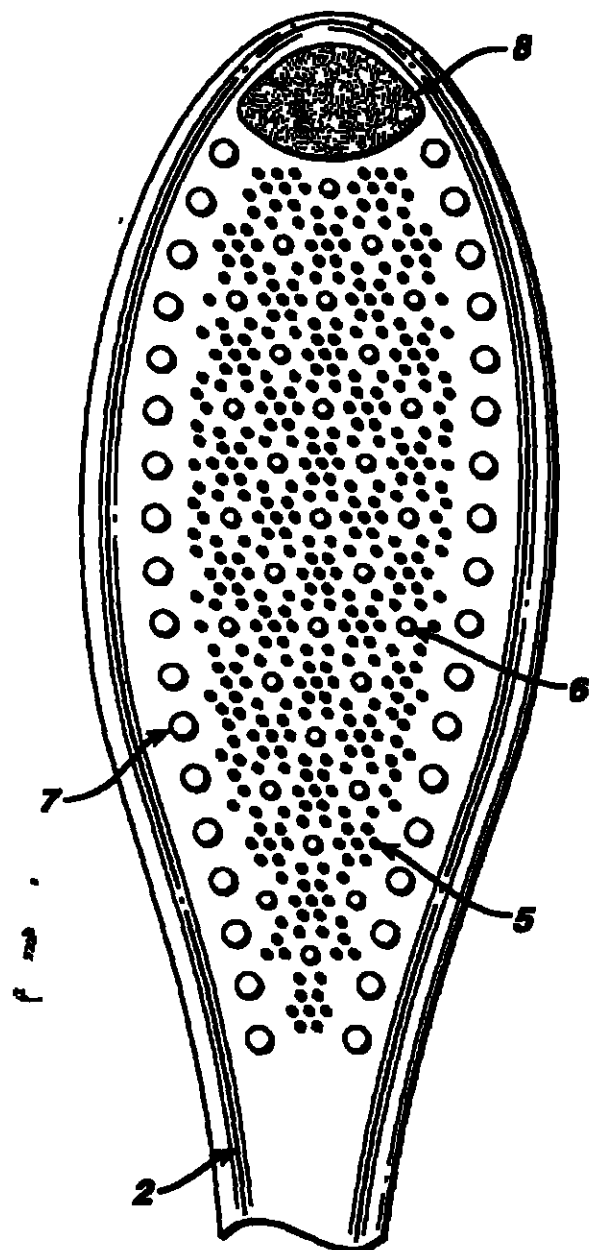
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FIG. 8



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FIG. 8A



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FIG. 9

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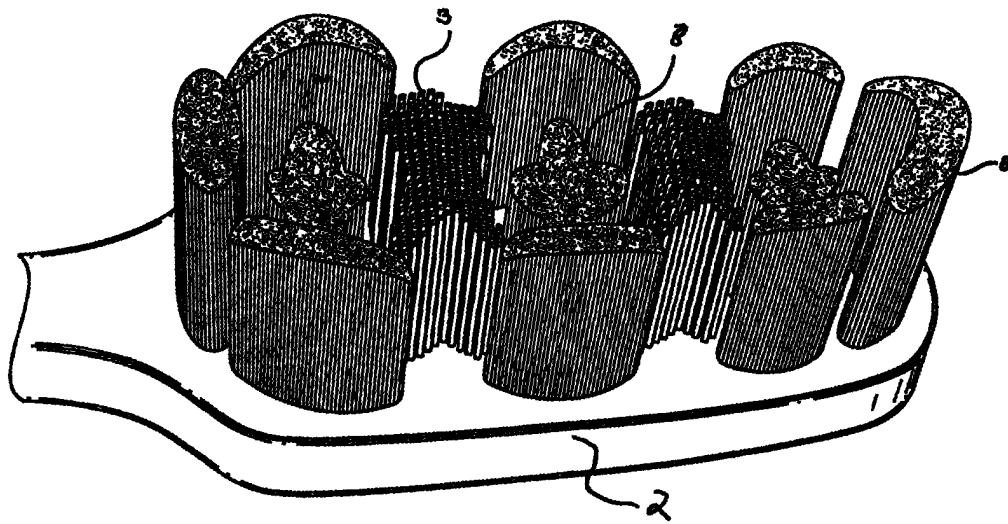
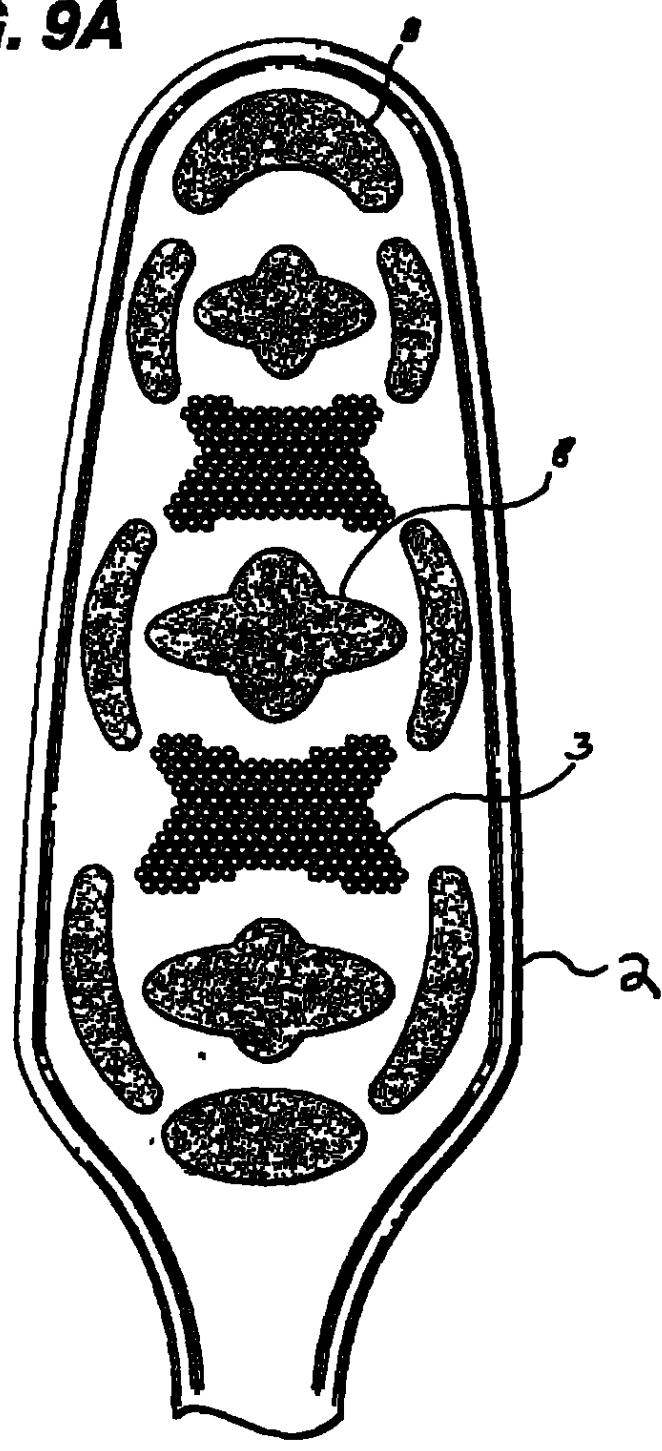
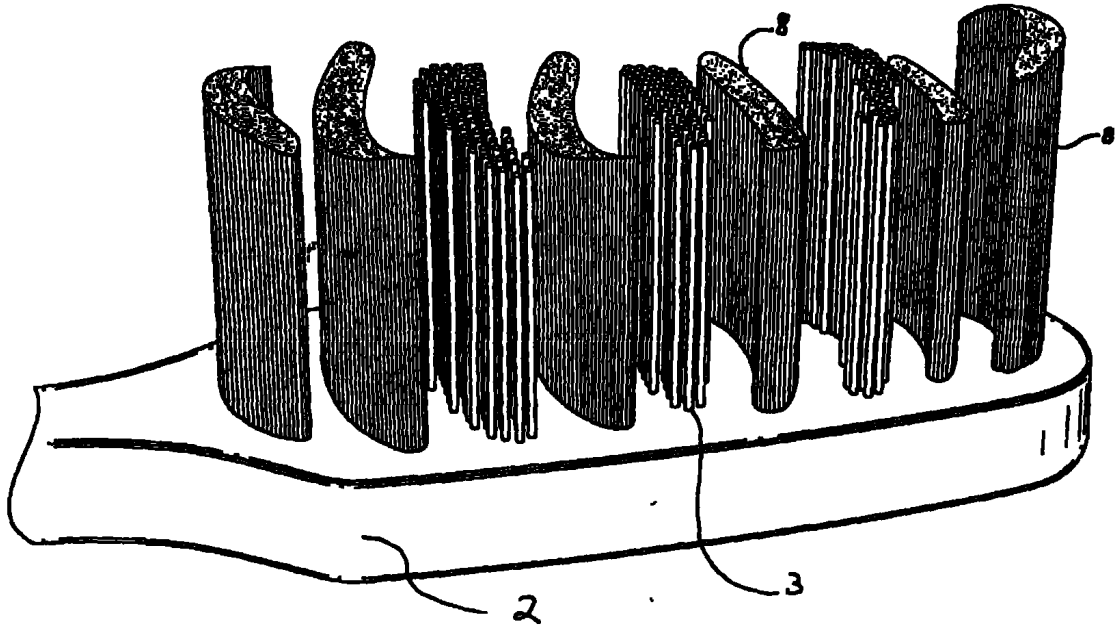


FIG. 9A



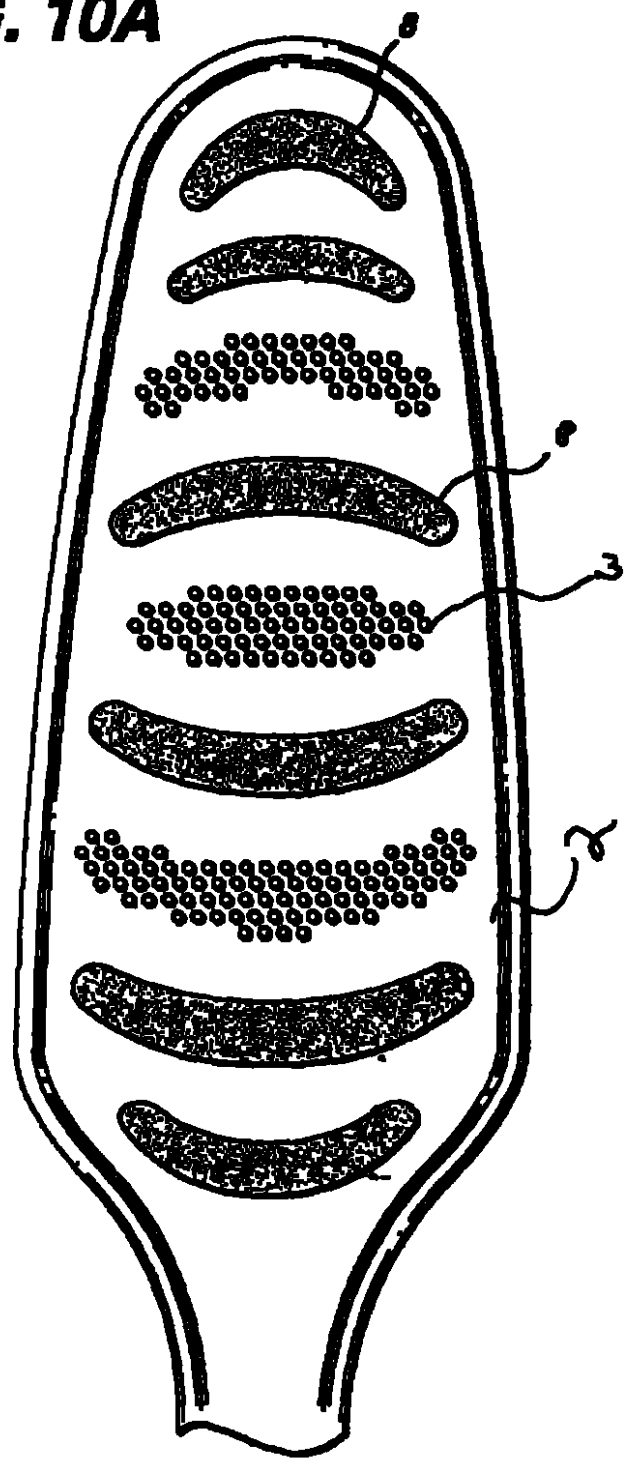
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FIG. 10



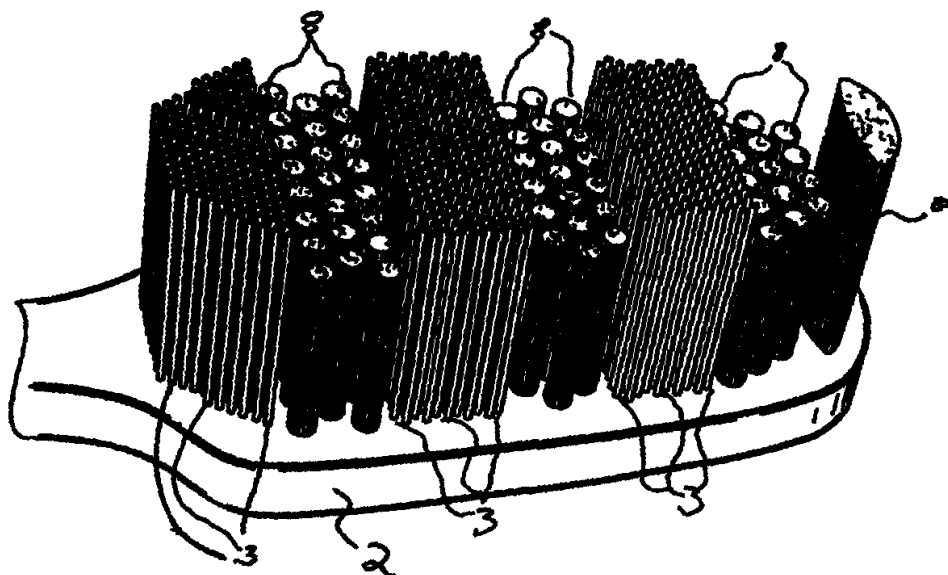
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FIG. 10A



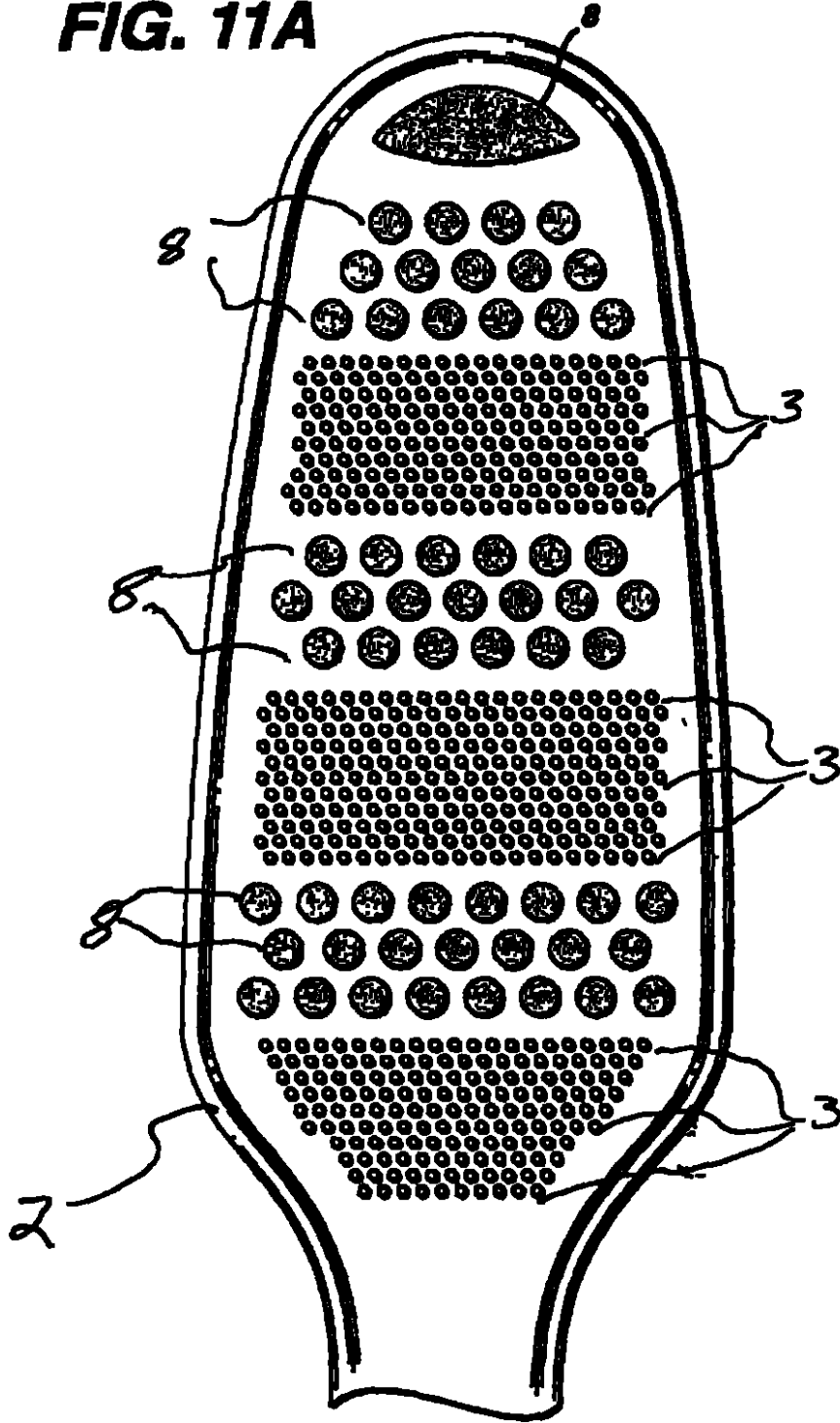
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FIG. 11



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FIG. 11A



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2do. EXAMEN DE FORMA PATENTE DE INVENCION

Folio 160

Radicación no 02-42325

Concepto Técnico no 916

Clasificación Internacional de Patentes: A46B 3/00

Practicado el examen de acuerdo a lo establecido en el Art. 38 de la Decisión 486 se determinó que esta solicitud de Patente de Invención:

- SI ☒ NO ☐ Contiene un resumen de la invención (Art.26-e).
- SI ☒ NO ☐ Contiene el título o nombre de la invención (Art.27-d).
- SI ☒ NO ☐ Contiene la descripción de la invención (Art.26-b).
- SI ☒ NO ☐ NO ES APLICABLE ☐ Contiene los dibujos necesarios para comprender la invención (Art.26-d)
- SI ☒ NO ☐ Contiene una o más reivindicaciones. (Art.26-c).
- SI ☐ NO ☐ NO ES APLICABLE ☒ Han sido desarrollados los productos y/o procedimientos a partir de recursos genéticos o de sus productos derivados de los que cualquiera de los Países Miembros es país de origen. (Art. 26- h).
- SI ☐ NO ☐ NO ES APLICABLE ☒ Los productos y/o procedimientos han sido obtenidos o desarrollados a partir de los conocimientos tradicionales de las comunidades indígenas, afro americanas, o locales de los países miembros, de acuerdo a lo establecido en la Decisión 391 y sus modificaciones y reglamentaciones vigentes.(Art.26-I).
- SI ☐ NO ☒ La invención se refiere a un producto relativo a un material biológico. (Art.26-J).
- SI ☒ NO ☐ NO ES APLICABLE ☐ La prioridad coincide con la materia reivindicada
- SI ☒ NO ☐ CUMPLE LOS REQUISITOS TÉCNICOS

OBSERVACIONES Y OTROS SI ☐ NO ☐ ver hoja(s) anexa(s)

EXAMINADOR TÉCNICO
202051

Bogotá D. C , diciembre 11 de 2003.



Folio 161

2020
Bogotá DC

Doctor(a)
JIMENA ESCOBAR URIBE
Apoderado(a)

REFERENCIA:	Radicación No.	02-42325
	Trámite	002
	Evento	001
	Actuación	416
	Oficio No.	1445
	Folios	001

Teniendo en cuenta que la solicitud de privilegio de patente que se tramita bajo el expediente indicado en la referencia, reúne los requisitos de forma establecidos en los artículos 26 y 27 de la Decisión 486 de la Comisión de la Comunidad Andina, y en las demás disposiciones vigentes sobre la materia, se envía el extracto de la solicitud a la Oficina de Comunicaciones para efecto de su publicación en la Gaceta de Propiedad Industrial, conforme lo establece el artículo 40 de la misma Decisión.

Cúmplase
Dado en Bogotá DC,

76 DIC 2009


ALIX CARMENZA CÉSPEDES DE VERGEL
Jefe de la División de Nuevas Creaciones

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