US009510664B2

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

(10) **Patent No.: US 9,510,664 B2**
(45) **Date of Patent: Dec. 6, 2016**

(54) **TOOTHBRUSH HAVING AN INNER CAVITY**

(71) Applicant: **The Procter & Gamble Company**, Cincinnati, OH (US)

(72) Inventors: **Li Wen**, Mason, OH (US); **Matthew Lloyd Newman**, Mason, OH (US); **Andreas Birk**, Kronberg (DE); **Andreas Bresselschmidt**, Kronberg (DE); **Andrew Joseph Horton**, West Chester, OH (US); **Siegfried Kurt Hustedt**, Kronberg (DE); **Scott Andrew Jackson**, Cincinnati, OH (US); **Jochen Erich Kawerau**, Kronberg (DE); **Ulrich Pfeifer**, Kronberg (DE); **Richard Darren Satterfield**, West Chester, OH (US); **Heidrun Annika Schmelcher**, Kronberg (DE); **Franziska Schmid**, Kronberg (DE); **Jens Uwe Stoerkel**, Kronberg (DE); **Benjamin John Wilson**, Kronberg (DE); **Tilmann Winkler**, Kronberg (DE)

(73) Assignee: **THE PROCTER & GAMBLE CO**, Cincinnati, OH (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 722 days.

(21) Appl. No.: **13/683,495**

(22) Filed: **Nov. 21, 2012**

(65) **Prior Publication Data**

US 2014/0137350 A1 May 22, 2014

Related U.S. Application Data

(60) Provisional application No. 61/562,675, filed on Nov. 22, 2011.

(51) **Int. Cl.**
A46B 9/04 (2006.01)
A46B 5/02 (2006.01)

(52) **U.S. Cl.**
CPC . ***A46B 9/04*** (2013.01); ***A46B 5/02*** (2013.01); ***A46B 5/023*** (2013.01); ***A46B 5/025*** (2013.01); *A46B 2200/1066* (2013.01)

(58) **Field of Classification Search**
CPC A46B 9/04; A46B 5/02; A46B 2200/1066; A46B 5/021
USPC 15/167.1, 143.1, 22.1
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

265,181	A	9/1882	Sylvester
3,936,261	A	2/1976	Jones et al.
4,802,255	A	2/1989	Breuer et al.
5,052,071	A	10/1991	Halm

(Continued)

FOREIGN PATENT DOCUMENTS

CN	2756064	2/2006
CN	102166064	8/2011

(Continued)

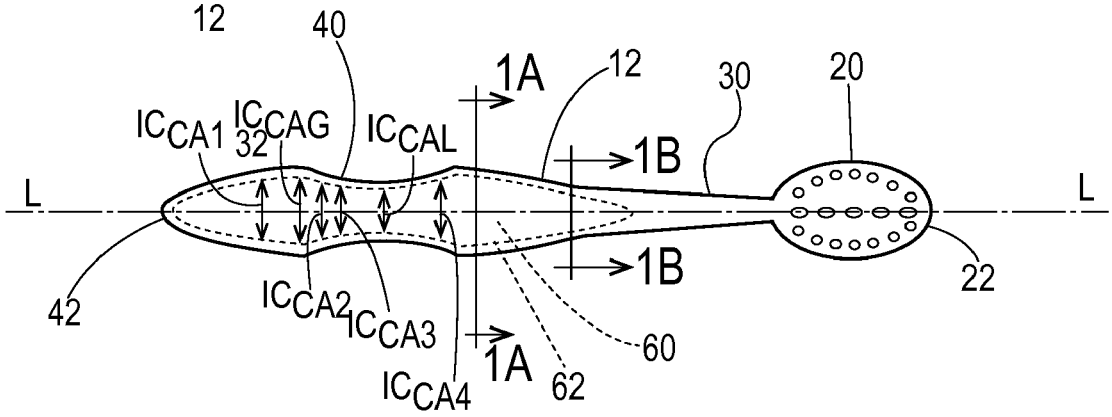
OTHER PUBLICATIONS

International Search Report, mail date Aug. 7, 2013, 15 pages.

(Continued)

Primary Examiner — Monica Carter
Assistant Examiner — Stephanie Berry
(74) *Attorney, Agent, or Firm* — James E. Oehlenschlager

(57) **ABSTRACT**

A personal care article, such as a toothbrush having an inner cavity made in one molding process.

10 Claims, 7 Drawing Sheets