US010905378B1

(12) **United States Patent**
Ben-Tsur et al.

(10) **Patent No.: US 10,905,378 B1**
(45) **Date of Patent: Feb. 2, 2021**

(54) **METHOD FOR TREATING GASTROPARESIS USING A VIBRATING INGESTIBLE CAPSULE**

(71) Applicant: **VIBRANT LTD.**, Yokneam (IL)

(72) Inventors: **Lior Ben-Tsur**, Netanya (IL); **Camille Morliere**, Hadera (IL)

(73) Assignee: **VIBRANT LTD**, Yokneam (IL)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 190 days.

(21) Appl. No.: **15/882,329**

(22) Filed: **Jan. 29, 2018**

Related U.S. Application Data

(60) Provisional application No. 62/451,837, filed on Jan. 30, 2017.

(51) **Int. Cl.**
A61B 5/00 (2006.01)
A61B 5/07 (2006.01)

(52) **U.S. Cl.**
CPC ***A61B 5/6861*** (2013.01); ***A61B 5/073*** (2013.01); *A61H 2201/1207* (2013.01)

(58) **Field of Classification Search**
CPC A61B 5/6861; A61B 5/073
See application file for complete search history.

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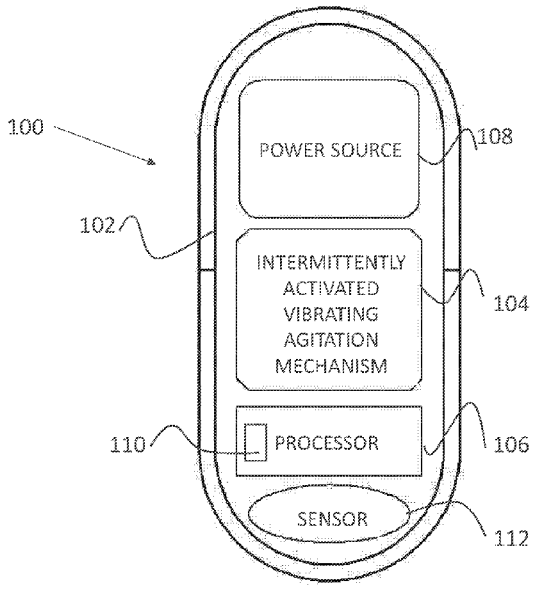
Primary Examiner — Samchuan C Yao
Assistant Examiner — Matthew Standard
(74) *Attorney, Agent, or Firm* — Momentum IP Group; Marc Van Dyke

(57) **ABSTRACT**

A method for treating gastroparesis in a subject using a vibrating ingestible capsule ingested by the subject and activated in a targeted zone of the gastrointestinal tract of the subject.

17 Claims, 2 Drawing Sheets



US008579835B2

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

(10) **Patent No.: US 8,579,835 B2**
(45) **Date of Patent: Nov. 12, 2013**

(54) **APPARATUS AND METHOD FOR SELECTIVE ULTRASONIC DAMAGE OF ADIPOCYTES**

(75) Inventors: **Alexander Britva**, Migdal Ha'emek (IL); **Alexander Dverin**, Netanya (IL); **Ziv Karni**, Kfar Shmaryahu (IL)

(73) Assignee: **Alma Lasers Ltd.**, Caesarea (IL)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 31 days.

(21) Appl. No.: **12/672,855**

(22) PCT Filed: **Feb. 1, 2009**

(86) PCT No.: **PCT/IB2009/050391**

§ 371 (c)(1),
(2), (4) Date: **Apr. 15, 2010**

(87) PCT Pub. No.: **WO2009/095894**

PCT Pub. Date: **Aug. 6, 2009**

(65) **Prior Publication Data**

US 2011/0213279 A1 Sep. 1, 2011

Related U.S. Application Data

(60) Provisional application No. 61/063,355, filed on Feb. 1, 2008, provisional application No. 61/100,737, filed on Sep. 28, 2008.

(51) **Int. Cl.**
A61H 1/00 (2006.01)

(52) **U.S. Cl.**
USPC **601/2**

(58) **Field of Classification Search**
USPC 601/2
See application file for complete search history.

(56) **References Cited**

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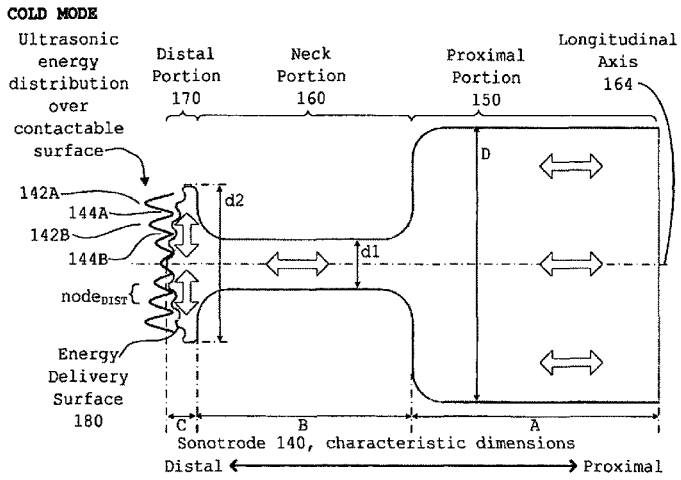
Primary Examiner — Tse Chen
Assistant Examiner — Hien Nguyen
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

An apparatus and a method for treating adipose tissue located beneath a patient's skin is disclosed herein. In some embodiments, the apparatus includes a sonotrode and an ultrasound transducer operative to induce longitudinal and/or transversal ultrasound vibrations in a least a portion of the sonotrode. In some embodiments, the apparatus provides a "cold" or "transverse" mode where ultrasound energy delivered to the patient is primarily energy of transverse ultrasound waves, and a "hot" or "longitudinal" mode where ultrasound energy delivered to the patient is primarily energy of longitudinal ultrasound waves. The longitudinal waves may be useful for 'pre-heating' tissue of the patient before delivering the transverse waves.

26 Claims, 19 Drawing Sheets



US010322253B2

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

(10) **Patent No.: US 10,322,253 B2**
(45) **Date of Patent: Jun. 18, 2019**

(54) **BALLOONED VENTILATION TUBE CLEANING DEVICE**

(75) Inventors: **Elad Einav**, Tel Aviv (IL); **Oron Zachar**, Tel Aviv (IL)

(73) Assignee: **TELEFLEX LIFE SCIENCES UNLIMITED COMPANY**, Hamilton (BM)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 542 days.

(21) Appl. No.: **14/008,558**

(22) PCT Filed: **Mar. 29, 2012**

(86) PCT No.: **PCT/IB2012/051532**
§ 371 (c)(1),
(2), (4) Date: **Nov. 29, 2013**

(87) PCT Pub. No.: **WO2012/131626**
PCT Pub. Date: **Oct. 4, 2012**

(65) **Prior Publication Data**

US 2014/0246015 A1 Sep. 4, 2014

Related U.S. Application Data

(60) Provisional application No. 61/539,998, filed on Sep. 28, 2011, provisional application No. 61/560,385, (Continued)

(30) **Foreign Application Priority Data**

Sep. 26, 2011 (PL) 396436

(51) **Int. Cl.**
A61M 1/00 (2006.01)
A61M 16/00 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61M 16/0463*** (2013.01); ***A61M 16/0057*** (2013.01); ***A61M 16/0438*** (2014.02);
(Continued)

(58) **Field of Classification Search**
CPC A61M 2025/0019; A61M 16/0463; A61M 16/0459; A61M 16/0456; A61M 16/0438;
(Continued)

(56) **References Cited**

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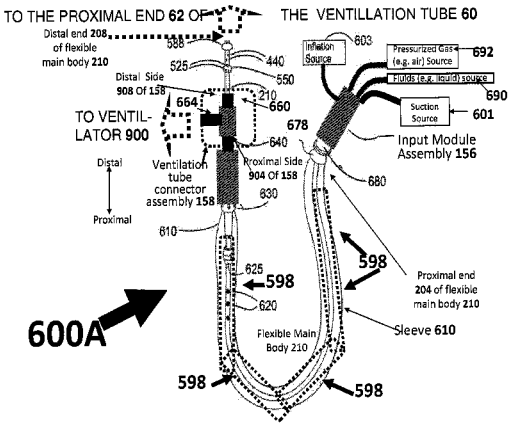
U.S. Appl. No. 61/468,990, filed Mar. 29, 2011.
(Continued)

Primary Examiner — Lauren P Farrar
(74) *Attorney, Agent, or Firm* — Baker & Hostetler LLP

(57) **ABSTRACT**

A cleaning device, system and method for use with an ETT or tracheostomy ventilation tube **60**, a ventilator machine **900**, a source(s) **602** of fluid (for example, pressurized or unpressurized) and a source(s) of suctioning **603** is disclosed. In some embodiments, the cleaning device is useful for cleaning an inner surface of the ventilation tube **60** and/or for preventing or hindering the accumulation of biofilm thereon. In some embodiments, it is possible to clean biofilm or any other material on the inner surface **201** by delivering fluid into an interior of the ventilation tube, wiping the tube interior with a width-expanded wiping element (e.g. an inflated balloon) by longitudinal motion of
(Continued)



US010720755B2

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

(10) **Patent No.: US 10,720,755 B2**
(45) **Date of Patent: Jul. 21, 2020**

(54) **ENSEMBLE-AVERAGED MEASUREMENT OF STOCHASTIC MOTION BY CURRENT-MODULATING OF VCSEL WAVELENGTH**

(71) Applicants: **Ilya Fine**, Rehovot (IL); **Alexander Kaminsky**, Tbilisi (GE)

(72) Inventors: **Ilya Fine**, Rehovot (IL); **Alexander Kaminsky**, Tbilisi (GE)

(73) Assignee: **ELFI-TECH LTD.**, Rehovot (IL)

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

(21) Appl. No.: **15/890,388**

(22) Filed: **Feb. 7, 2018**

(65) **Prior Publication Data**

US 2019/0312411 A1 Oct. 10, 2019

(51) **Int. Cl.**

H01S 5/183 (2006.01)
G01N 15/14 (2006.01)
G01N 33/86 (2006.01)

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

CPC ***H01S 5/183*** (2013.01); ***G01N 15/1434*** (2013.01); ***G01N 33/86*** (2013.01); *G01N 2015/1445* (2013.01)

(58) **Field of Classification Search**

CPC H01S 5/183; G01N 33/86; G01N 15/1434; G01N 2015/1445

See application file for complete search history.

(56) **References Cited**

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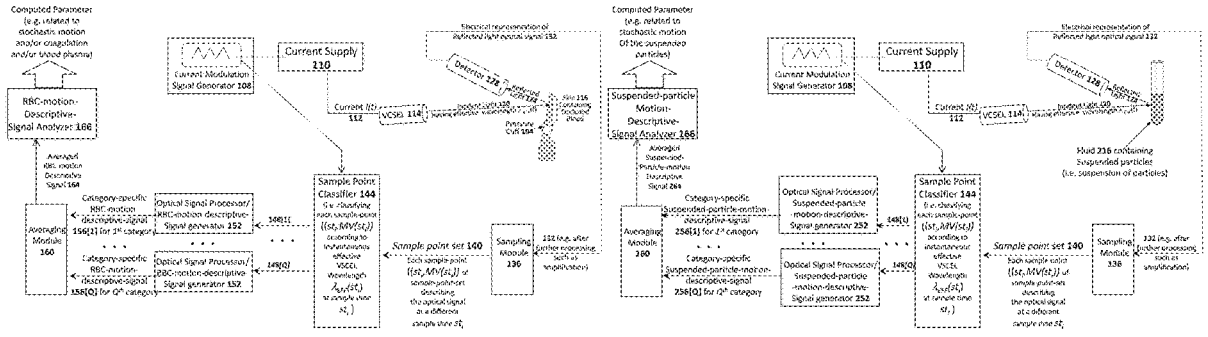
Primary Examiner — Mohamed K Amara
(74) *Attorney, Agent, or Firm* — Marc Van Dyke; Momentum IP Group

(57) **ABSTRACT**

Embodiments of the invention relate to a method and apparatus for measuring at least one parameter that is (i) descriptive of stochastic motion of suspended particles within a fluid; and/or (ii) is a rheological property of the fluid or of the suspension; (iii) describes a concentration of suspended particles within the fluid; and/or (iv) is a diffusion coefficient of the suspended particles and/or (iv) is a viscosity of the fluid or of the suspension; and/or (v) is a food aging or spoilage parameter and/or (vii) is an in-vivo or in-vitro blood coagulation parameter.

5 Claims, 24 Drawing Sheets



US010433825B2

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

(10) **Patent No.: US 10,433,825 B2**
(45) **Date of Patent: Oct. 8, 2019**

(54) **DEVICE AND METHOD FOR PREPARING AND ADMINISTERING ONE-COMPONENT FIBRIN SEALANT**

(71) Applicants: **Ethicon, Inc.**, Somerville, NJ (US); **Omrix Biopharmaceuticals Ltd.**, Rehovot (IL)

(72) Inventors: **Ashley DeAnglis**, Skillman, NJ (US); **Yair Pilpel**, Rehovot (IL); **Yuri Zherdev**, Rehovot (IL); **Sivan Doron**, Moshav Arugot (IL); **Lior Erez**, Rehovot (IL)

(73) Assignees: **Ethicon, Inc.**, Somerville, NJ (US); **Omrix Biopharmaceuticals Ltd.**, Rehovot (IL)

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

(21) Appl. No.: **14/668,341**

(22) Filed: **Mar. 25, 2015**

(65) **Prior Publication Data**

US 2015/0272562 A1 Oct. 1, 2015

Related U.S. Application Data

(60) Provisional application No. 61/970,929, filed on Mar. 27, 2014.

(30) **Foreign Application Priority Data**

Mar. 27, 2014 (IL) 231792

(51) **Int. Cl.**
A61M 5/178 (2006.01)
A61L 15/32 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61B 17/00491*** (2013.01); ***A61K 38/36*** (2013.01); ***A61K 38/363*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC C12Y 304/21005
See application file for complete search history.

(56) **References Cited**

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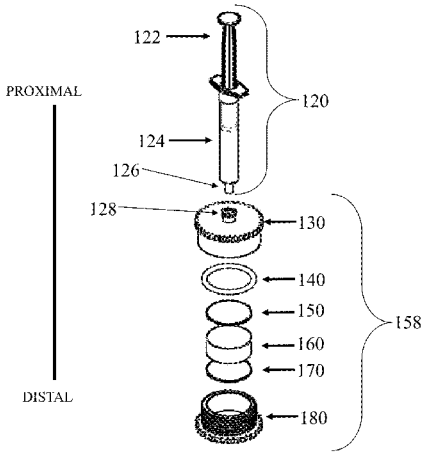
Primary Examiner — Marsha Tsay
(74) *Attorney, Agent, or Firm* — David R. Crichton

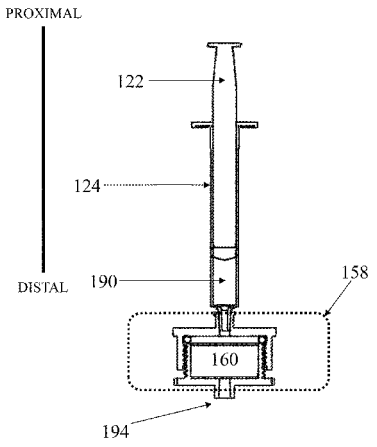
(57) **ABSTRACT**

Provided herein are systems for preparing and delivering fibrin sealant to a surface and methods of use thereof. In one embodiment, the system comprises: a. a quantity of a liquid mixture disposed within a container, the mixture comprising: I. fibrin or II. fibrinogen and Factor II; and b. a resin bed disposed within a vessel, the vessel capable of being in fluid communication with the container, wherein when in fluid communication, passage of the mixture through the vessel results in modification of the concentration of small molecules inhibitor(s) and/or inducer(s) within the mixture, favoring fibrin clot formation.

24 Claims, 8 Drawing Sheets

Specification includes a Sequence Listing.





US008834368B2

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

(10) **Patent No.: US 8,834,368 B2**
(45) **Date of Patent: Sep. 16, 2014**

(54) **GOLDMANN APPLANATION TONOMETER, BIOMICROSCOPY DEVICE AND RELATED METHODS**

(76) Inventors: **Yosef Glovinsky**, Petach Tikva (IL); **Vadim Shmukler**, Rishon Lezion (IL); **Ilia Piven**, Ramat Gan (IL)

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

(21) Appl. No.: **13/595,538**

(22) Filed: **Aug. 27, 2012**

(65) **Prior Publication Data**

US 2013/0085369 A1 Apr. 4, 2013

Related U.S. Application Data

(63) Continuation-in-part of application No. 13/037,355, filed on Feb. 28, 2011, and a continuation-in-part of application No. PCT/US2011/026561, filed on Feb. 28, 2011.

(60) Provisional application No. 61/414,423, filed on Nov. 17, 2010, provisional application No. 61/319,117, filed on Mar. 30, 2010, provisional application No. 61/308,339, filed on Feb. 26, 2010.

(51) **Int. Cl.**

A61B 3/16	(2006.01)
A61B 3/13	(2006.01)
A61B 3/135	(2006.01)

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

USPC **600/405**; 600/399; 351/245

(58) **Field of Classification Search**

USPC 600/399, 405; 351/245

See application file for complete search history.

(56) **References Cited**

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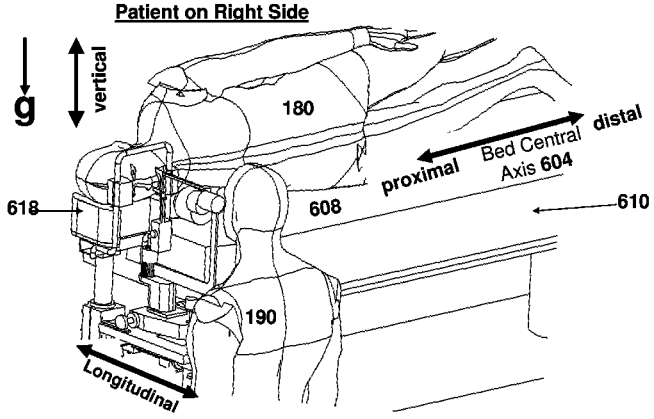
Primary Examiner — Rene Towa
Assistant Examiner — Emily Lloyd
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

Apparatus and methods for subjecting a patient to an slit lamp microscopy and/or Goldmann tonometry eye examination are disclosed herein. In some embodiments, the patient is in a side-lying down position at a time of the examination. In some embodiments, it is possible to examine an upper and/or lower eye—for example, a lower eye slightly above a supporting surface. Related apparatus are disclosed herein. In some embodiments, the apparatus includes a bed and/or a headrest and/or a face immobilization assembly are disclosed herein.

10 Claims, 64 Drawing Sheets



US008868149B2

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

(10) **Patent No.: US 8,868,149 B2**
(45) **Date of Patent: Oct. 21, 2014**

(54) **PHOTOPLETHYSMOGRAPHY DEVICE AND METHOD**

(71) Applicants: **Leon Eisen**, Ashdod (IL); **Alexander Kamisnky**, Rehovot (IL); **Ilya Fine**, Rehovot (IL)

(72) Inventors: **Leon Eisen**, Ashdod (IL); **Alexander Kamisnky**, Rehovot (IL); **Ilya Fine**, Rehovot (IL)

(73) Assignee: **Oxitone Medical Ltd.**, Ashkelon (IL)

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

(21) Appl. No.: **13/653,233**

(22) Filed: **Oct. 16, 2012**

(65) **Prior Publication Data**

US 2013/0131475 A1 May 23, 2013

Related U.S. Application Data

(63) Continuation-in-part of application No. 12/847,048, filed on Jul. 30, 2010, now abandoned, and a continuation-in-part of application No. PCT/IL2010/000616, filed on Aug. 1, 2010.

(60) Provisional application No. 61/229,741, filed on Jul. 30, 2009.

(51) **Int. Cl.**

A61B 5/00	(2006.01)
A61B 5/145	(2006.01)
A61B 5/1455	(2006.01)
A61B 5/024	(2006.01)

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

CPC ***A61B 5/14552*** (2013.01); ***A61B 5/7207*** (2013.01); *A61B 5/681* (2013.01); ***A61B 5/14546*** (2013.01); *A61B 5/7285* (2013.01); ***A61B 5/14551*** (2013.01); *A61B 5/7257* (2013.01); ***A61B 5/7246*** (2013.01); *A61B 5/02416* (2013.01)

USPC **600/324**

(58) **Field of Classification Search**

USPC 600/324

See application file for complete search history.

(56) **References Cited**

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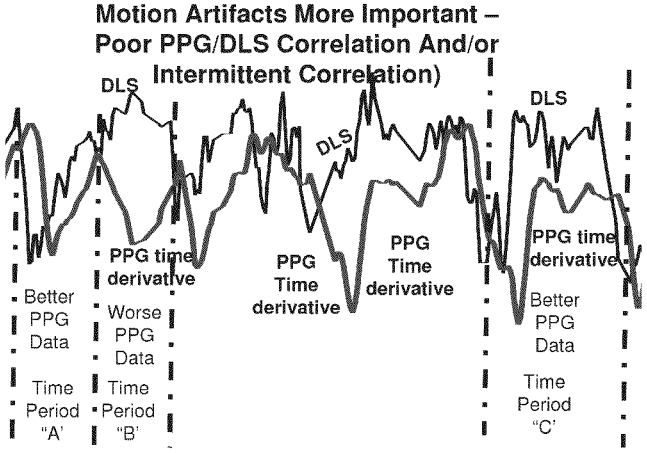
Primary Examiner — Clayton E Laballe
Assistant Examiner — Linda B Smith
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

A system and method for measuring one or more light-absorption related blood analyte concentration parameters of a mammalian subject, is disclosed. In some embodiments, the system comprises: a) a photoplethysmography (PPG) device configured to effect a PPG measurement by illuminating skin of the subject with at least two distinct wavelengths of light and determining relative absorbance at each of the wavelengths; b) a dynamic light scattering measurement (DLS) device configured to effect a DLS measurement of the subject to rheologically measure a pulse parameter of the subject; and c) electronic circuitry configured to: i) temporally correlating the results of the PPG and DLS measurements; and ii) accordance with the temporal correlation between the PPG and DLS measurements, assessing value(s) of the one or more light-absorption related blood analyte concentration parameter(s).

1 Claim, 27 Drawing Sheets



US00D787688S

(12) United States Design Patent

Stephenson

(10) Patent No.: US D787,688 S
(45) Date of Patent: ** May 23, 2017

(54) **WOUND DRESSING**

(71) Applicant: **Crawford Woundcare Limited**, Knutsford (GB)

(72) Inventor: **Christian Stephenson**, Wilmslow (GB)

(73) Assignee: **Crawford Woundcare Limited**, Knutsford (GB)

(**) Term: **14 Years**

(21) Appl. No.: **29/496,147**

(22) Filed: **Jul. 9, 2014**

(51) **LOC (10) Cl.** **24-04**

(52) **U.S. Cl.**
USPC **D24/189**

(58) **Field of Classification Search**
USPC D24/189–192
CPC A61K 9/0014; A61K 47/00; A61L 26/00; A61F 13/0203; A61F 13/0206; A61F 13/0209; A61F 13/023; A61F 13/0233
See application file for complete search history.

(56) **References Cited**

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(Continued)

Primary Examiner — Michael A. Pratt
Assistant Examiner — Michelle E Wilson
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **CLAIM**

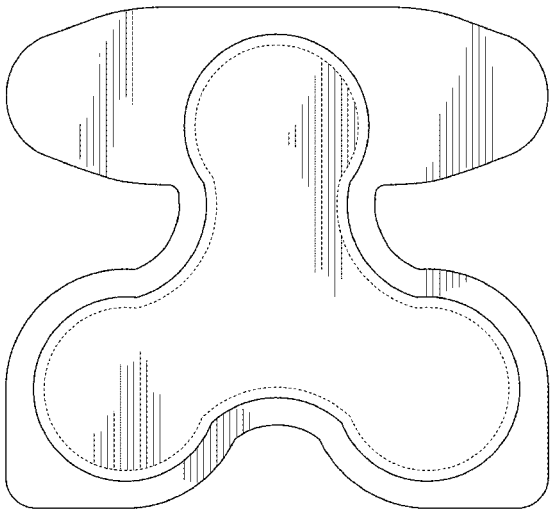
The ornamental design for a wound dressing, as shown and described.

DESCRIPTION

FIG. **1** is a front view of a first embodiment of a wound dressing showing the new design;
FIG. **2** is a back view thereof;
FIG. **3** is a right view thereof;
FIG. **4** is a left view thereof;
FIG. **5** is a top view thereof;
FIG. **6** is a bottom view thereof; and,
FIG. **7** is a perspective view thereof.

The broken lines immediately adjacent to the shaded areas, represent the bounds of the claimed design while all other broken lines are directed to environment and are for illustrative purposes only; the broken lines form no part of the claimed design.

1 Claim, 4 Drawing Sheets



US009433774B2

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

(10) **Patent No.: US 9,433,774 B2**
(45) **Date of Patent: Sep. 6, 2016**

(54) **HEADSET FOR TREATMENT AND ASSESSMENT OF MEDICAL CONDITIONS**

(71) Applicant: **NEUROLIEF LTD.**, Yokneam Illit (IL)

(72) Inventors: **Amit Dar**, Kfar Hess (IL); **Jonathan Bar-Or**, Pardes Hana Karkur (IL); **Amir Cohen**, Ra'anana (IL); **Ron Belson**, Tel Aviv (IL)

(73) Assignee: **NEUROLIEF LTD.**, Yokneam Illit (IL)

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

(21) Appl. No.: **14/849,868**

(22) Filed: **Sep. 10, 2015**

(65) **Prior Publication Data**

US 2015/0374971 A1 Dec. 31, 2015

Related U.S. Application Data

(63) Continuation-in-part of application No. PCT/IB2014/059858, filed on Mar. 15, 2014.

(60) Provisional application No. 61/786,701, filed on Mar. 15, 2013.

(51) **Int. Cl.**

A61N 1/00	(2006.01)
A61N 1/04	(2006.01)
A61N 1/36	(2006.01)
A61B 5/0478	(2006.01)
A61B 5/00	(2006.01)

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

CPC ***A61N 1/0484*** (2013.01); ***A61N 1/0476*** (2013.01); ***A61N 1/0488*** (2013.01); ***A61N 1/0492*** (2013.01); ***A61N 1/36014*** (2013.01); *A61B 5/0478* (2013.01); *A61B 5/6803* (2013.01)

(58) **Field of Classification Search**

CPC A61N 1/0484; A61N 1/0472; A61N 1/0476; A61N 1/0492; A61N 1/36014; A61N 1/0456; A61B 5/6803; A61B 5/6802; A61B 5/6814; A61B 5/683; A61B 5/6831; A61B 5/0478; A41F 1/008

See application file for complete search history.

(56) **References Cited**

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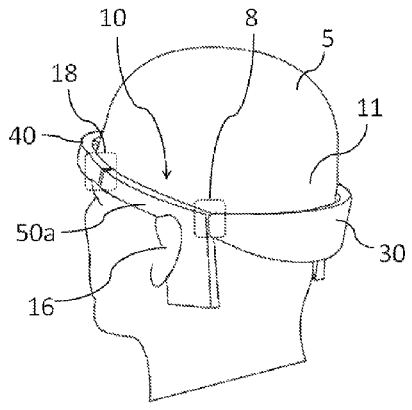
(Continued)

Primary Examiner — Robert N Wieland
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

A circumferential headset for use in delivering electrical stimulation to the skin surface of the head.

46 Claims, 15 Drawing Sheets



US008950406B2

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

(10) **Patent No.: US 8,950,406 B2**
(45) **Date of Patent: Feb. 10, 2015**

(54) **METHOD AND APPARATUS FOR LIGHT-BASED HAIR REMOVAL**

(75) Inventors: **Ziv Karni**, Kfar Shmaryahu (IL); **Joseph Lepselter**, Nordiya (IL)

(73) Assignee: **Alma Lasers Ltd.**, Caesarea (IL)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1686 days.

(21) Appl. No.: **12/203,161**

(22) Filed: **Sep. 3, 2008**

(65) **Prior Publication Data**

US 2009/0254068 A1 Oct. 8, 2009

Related U.S. Application Data

(63) Continuation of application No. PCT/IL2007/000274, filed on Mar. 4, 2007.

(60) Provisional application No. 60/853,428, filed on Oct. 23, 2006, provisional application No. 60/778,403, filed on Mar. 3, 2006.

(51) **Int. Cl.**
A61B 19/00 (2006.01)
A61B 18/20 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61B 18/203*** (2013.01); *A61B 2017/00154* (2013.01); *A61B 2018/00005* (2013.01); *A61B 2018/00452* (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC A61B 18/20; A61B 18/203; A61B 2018/00452; A61B 2018/00476; A61B 2018/1807; A61B 2018/00458; A61B 2018/0047; A61B 2018/00636; A61B 2018/00779; A61B 2018/00791; A61N 5/0616; A61N 2005/0643; A61N 2005/0644
USPC 606/3, 8–12, 16–18; 607/88–91, 96, 607/100, 108; 128/898
See application file for complete search history.

(56) **References Cited**

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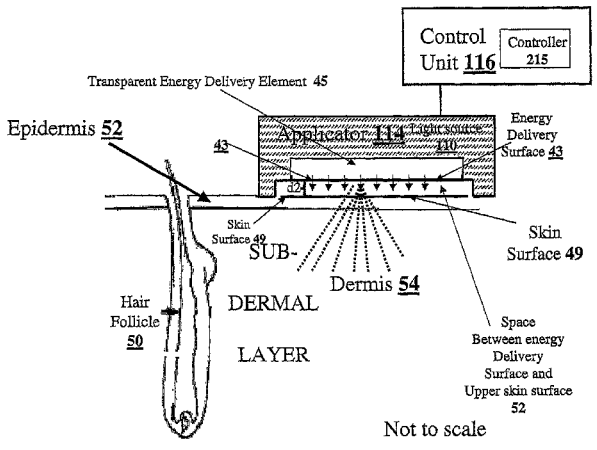
Primary Examiner — Ahmed Farah
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

Methods and apparatus for damaging hair follicles using a series of rapidly-delivered low-fluence pulses of coherent or incoherent light are disclosed herein. In some embodiments, the pulses of coherent or incoherent light have a wavelength or wavelengths primarily in the range between 750 nm and 1500 nm. In some embodiments, applied electromagnetic radiation comprising the rapidly-delivered low-fluence pulses is effective for concomitantly heating both the sub-dermal layer (i.e. the dermis) of the tissue and the hair follicles. In some embodiments, the thermal damaging of the hair follicles is useful for facilitating hair-removal.

4 Claims, 9 Drawing Sheets



US008852254B2

(12) **United States Patent**
Moscovici

(10) **Patent No.: US 8,852,254 B2**
(45) **Date of Patent: Oct. 7, 2014**

(54) **APPARATUS AND METHOD FOR PROVIDING A MULTI-STAGE LIGHT TREATMENT**

(75) Inventor: **Lucian Moscovici**, Ramat Gan (IL)

(73) Assignee: **Lucian Moscovici**, Ramat Gan (IL)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1737 days.

(21) Appl. No.: **11/884,299**

(22) PCT Filed: **Feb. 19, 2006**

(86) PCT No.: **PCT/IL2006/000212**
§ 371 (c)(1),
(2), (4) Date: **Aug. 14, 2007**

(87) PCT Pub. No.: **WO2006/087723**
PCT Pub. Date: **Aug. 24, 2006**

(65) **Prior Publication Data**

US 2008/0103561 A1 May 1, 2008

Related U.S. Application Data

(60) Provisional application No. 60/653,998, filed on Feb. 18, 2005.

(51) **Int. Cl.**
A61N 5/06 (2006.01)

(52) **U.S. Cl.**
USPC **607/88**; 607/89; 607/90; 607/91; 607/92; 607/93; 607/94

(58) **Field of Classification Search**
USPC 128/898; 607/88–94
See application file for complete search history.

(56) **References Cited**

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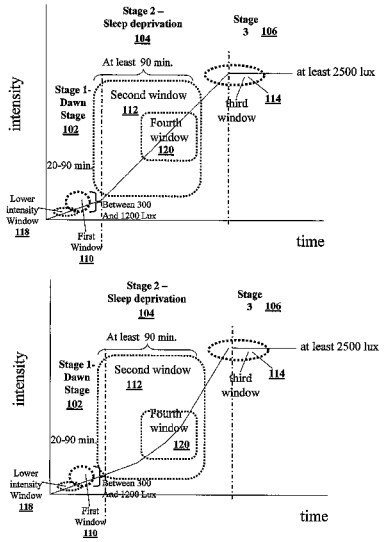
Primary Examiner — Ahmed M Farah
Assistant Examiner — William Cheng
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

Apparatus and methods for treating psychiatric disorders, mood disorders and circadian rhythm disorders with a multi-stage light protocol are disclosed. The presently disclosed multi-stage light protocol provides a synergistic treatment including up to 4 types of therapies: bright light therapy, extended sleep deprivation therapy, dawn simulation therapy and short to medium wavelength light therapy. According to some embodiments, the first stage of the protocol includes a first time window of 20 minutes during which, for a majority of the time, the light intensity is between 50 lux and 2000 lux. According to some embodiments, the second stage of the protocol includes a second time window of at least 90 minutes during which, for every 10 minute period within the second time window, for a majority of the time, the light intensity is exceeds 100 lux. According to some embodiments, the third stage of the protocol includes a third time window of 60 minutes during which, for a majority of the time, the light intensity exceeds 2000 lux In some embodiments, the light is provided by apparatus including a plurality of LEDs. Typically, the light includes white light having a broad spectrum. In some embodiments, the light further includes light having a medium wavelength, for example, wavelengths between 520 nm and 535 nm.

39 Claims, 4 Drawing Sheets



US009314944B2

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

(10) **Patent No.: US 9,314,944 B2**
(45) **Date of Patent: Apr. 19, 2016**

(54) **METHOD OF FORMING A SEAMLESS BLADDER**

(75) Inventors: **Shaul Shohat**, Kfar HaOranim (IL); **Abraham Jackob Domb**, Efrat (IL); **Adrian Paz**, Petach-Tikva (IL)

(73) Assignee: **BIOPROTECT LTD.**, Kfar-Saba (IL)

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

(21) Appl. No.: **13/495,087**

(22) Filed: **Jun. 13, 2012**

(65) **Prior Publication Data**

US 2012/0253097 A1 Oct. 4, 2012

Related U.S. Application Data

(63) Continuation of application No. 11/630,257, filed as application No. PCT/IL2005/000672 on Jun. 23, 2005, now Pat. No. 8,221,442.

(60) Provisional application No. 60/581,769, filed on Jun. 23, 2004.

(51) **Int. Cl.**

B29C 33/52	(2006.01)
B29C 41/14	(2006.01)
A61B 17/02	(2006.01)
A61B 17/00	(2006.01)
A61B 17/32	(2006.01)
A61B 19/00	(2006.01)

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

CPC ***B29C 33/52*** (2013.01); ***A61B 17/0218*** (2013.01); ***B29C 41/14*** (2013.01); *A61B 2017/00004* (2013.01); *A61B 2017/00526* (2013.01); *A61B 2017/00557* (2013.01); *A61B 2017/00831* (2013.01); *A61B 2017/00867* (2013.01); *A61B 2017/00902* (2013.01); *A61B 2017/00929* (2013.01); *A61B 2017/320048* (2013.01); *A61B 2019/481* (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

(56) **References Cited**

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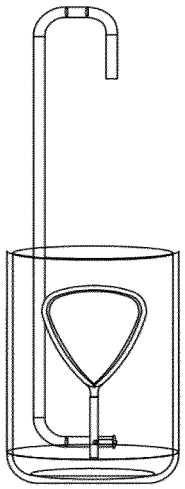
Primary Examiner — Benjamin Schiffman

(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

A tissue displacement/separation device is provided. The device includes a bladder which is expandable between a first tissue and a second tissue of a body. The bladder has an expanded shape which is selected capable of displacing or separating the first tissue from the second tissue in a manner suitable for protecting the first tissue from an effect of a treatment applied to the second tissue.

34 Claims, 9 Drawing Sheets



US009532923B2

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

(10) **Patent No.: US 9,532,923 B2**
(45) **Date of Patent: Jan. 3, 2017**

(54) **METHOD OF OPERATING A GASTROINTESTINAL CAPSULE**

(71) Applicant: **VIBRANT LTD.**, Migdal Haemek (IL)

(72) Inventors: **Shaul Shohat**, Kfar Hoaranim (IL); **Alexander Belenky**, Hod Hasharon (IL); **Roni Shabat**, Kibbutz Izrael (IL)

(73) Assignee: **VIBRANT LTD.**, Yokneam (IL)

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

(21) Appl. No.: **14/732,733**

(22) Filed: **Jun. 7, 2015**

(65) **Prior Publication Data**

US 2015/0313792 A1 Nov. 5, 2015

Related U.S. Application Data

(63) Continuation of application No. 12/310,201, filed as application No. PCT/IL2007/001139 on Sep. 17, 2007, now Pat. No. 9,078,799.

(60) Provisional application No. 60/845,200, filed on Sep. 18, 2006.

(51) **Int. Cl.**
A61H 23/00 (2006.01)
A61H 23/02 (2006.01)

(52) **U.S. Cl.**
CPC ***A61H 23/02*** (2013.01); *A61H 23/0263* (2013.01); *A61H 2205/083* (2013.01)

(58) **Field of Classification Search**
CPC A61H 23/00; A61H 23/02; A61H 23/0254; A61H 23/0263; A61H 2205/083; A61H 1/00
See application file for complete search history.

(56) **References Cited**

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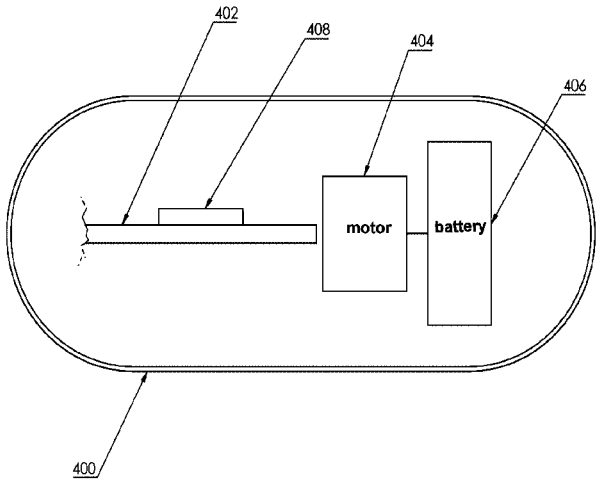
(Continued)

Primary Examiner — Quang D Thanh
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

An ingestible gastrointestinal capsule (GIC) for mechanically stimulating a segment of the gastrointestinal (GI) wall by alternately and repeatedly pressurizing, and/or vibrating it is provided. The GIC is programmed to being activated following a predefined time delay. The activated GIC agitates, shakes, rattles, jolts, vibrates and/or moves in a reciprocal expanding and contracting motion thereby mechanically stimulating the adjacent segment of the GI wall at a targeted location. Activation of the GIC may include a number of automatically accomplished partial activations, such as when the time elapsed from the moment of setting the GIC on equals a predefined time delay; when the mechanical load applied onto the GIC exceeds, and/or gets lower than a respective predefined level of mechanical load; when the ambient pH reaches a predefined level, or changes, and/or a temperature associated with the user reaches a predefined threshold. Agitation is accomplished by means of agitation means embedded in the GIC. Such agitation means includes an unbalanced weight attached to the shaft of an electric motor, an actuator implemented by, such as an electric solenoid, an electro-active polymer (EAP), a dielectric elastomer actuator (DEA), embedded in a GIC of the invention.

18 Claims, 2 Drawing Sheets



US009533169B2

(12) **United States Patent**
Zachar

(10) **Patent No.: US 9,533,169 B2**
(45) **Date of Patent: Jan. 3, 2017**

(54) **APPARATUS AND METHOD FOR IRRADIATING BIOLOGICAL TISSUE**

(71) Applicant: **Oron Zachar**, Tel Aviv (IL)

(72) Inventor: **Oron Zachar**, Tel Aviv (IL)

(73) Assignee: **PRODOLUX SP Z O O**, Warsaw (PL)

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

(21) Appl. No.: **14/447,630**

(22) Filed: **Jul. 31, 2014**

(65) **Prior Publication Data**

US 2015/0057736 A1 Feb. 26, 2015

Related U.S. Application Data

(63) Continuation-in-part of application No. PCT/IB2012/050453, filed on Jan. 31, 2012.

(51) **Int. Cl.**

A61B 18/18	(2006.01)
A61N 5/04	(2006.01)
A61N 2/00	(2006.01)
A61N 2/02	(2006.01)
A61B 18/00	(2006.01)

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

CPC ***A61N 5/04*** (2013.01); ***A61N 2/006*** (2013.01); *A61B 18/1815* (2013.01); *A61B 2018/00321* (2013.01); *A61N 2/02* (2013.01)

(58) **Field of Classification Search**

CPC A61N 5/04; A61N 2/02; A61N 2/006; A61B 18/1815; A61B 2018/00321

USPC 607/88; 600/9, 13

See application file for complete search history.

(56) **References Cited**

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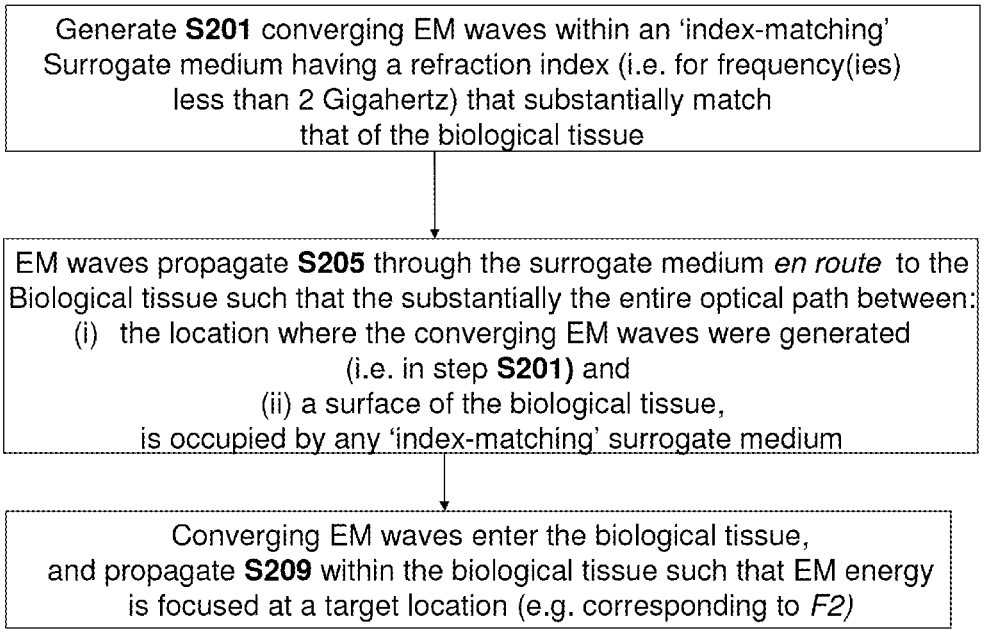
* cited by examiner

Primary Examiner — Carl H Layno
Assistant Examiner — Jon Eric C Morales
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

Methods and apparatus for irradiating biological tissue by EM radiation having radiation frequency(ies) of at most 10 Gigahertz are disclosed herein. In some embodiments, the tissue is irradiated by passing converging EM waves (e.g. generated using an ellipsoidal mirror **110**) through a surrogate medium having a specially shaped ENTRY_SURFACE via which the converging EM waves enter the surrogate medium. In some embodiments, a refractive index at a sub-10 Gigahertz of the surrogate medium is at least 2 or at least 3 or at least 5 and/or substantially matches a refractive index of an irradiated biological tissue. In some embodiments, converging EM waves are formed within the surrogate medium. Some embodiments relate to methods and apparatus for irradiating neuron(s), for example, to non-invasively stimulating or otherwise modify a behavior of neuron(s) using focused or non-focused EM radiation.

1 Claim, 38 Drawing Sheets



US009566431B2

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

(10) **Patent No.: US 9,566,431 B2**
(45) **Date of Patent: Feb. 14, 2017**

(54) **METHOD OF FORMING A LARGE NUMBER OF METAL-ION-DEPOSITION ISLANDS ON THE SCALP BY A RAPID SERIES OF BRIEF ELECTRODE-CONTACT EVENTS**

(71) Applicant: **PILOGICS L.P.**, Haifa (IL)

(72) Inventors: **Dov Ingman**, Haifa (IL); **Erez Manor**, Herzlia (IL)

(73) Assignee: **PILOGICS L.P.**, Haifa (IL)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 161 days.

(21) Appl. No.: **14/246,944**

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

(65) **Prior Publication Data**

US 2015/0283377 A1 Oct. 8, 2015

(51) **Int. Cl.**

A61N 1/32	(2006.01)
A61N 1/04	(2006.01)
A61N 1/20	(2006.01)
A61N 1/05	(2006.01)

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

CPC ***A61N 1/322*** (2013.01); ***A61N 1/0464*** (2013.01); ***A61N 1/0476*** (2013.01); ***A61N 1/205*** (2013.01); ***A61N 1/325*** (2013.01); ***A61N 1/326*** (2013.01); *A61N 1/0502* (2013.01)

(58) **Field of Classification Search**

CPC A61N 1/205; A61N 1/325; A61N 1/30; A61N 1/0408

See application file for complete search history.

(56) **References Cited**

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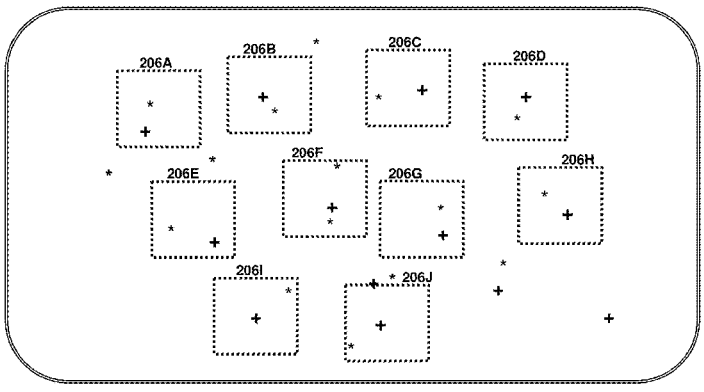
Primary Examiner — Christopher D Koharski
Assistant Examiner — Natasha Patel
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

A method of treating or preventing a hair-condition of a user comprising: subjecting the user's scalp to at least 200 distinct electrode-scalp contact events during a time-interval of at most one minute and dividable into 5 non-overlapping equal-duration sub-intervals covering the time-interval, method performed such that i. for at least a majority of the electrode-scalp contact events, no electrode of the event enters into the dermis; ii. a duration of each electrode contact event is at most 100 milliseconds; and iii. for each electrode contact event, an electrical current flows between the electrode and the scalp so as to deposit electrode-released ions of a first metal or of a second metal on the scalp, thereby forming a respective metal-ion-deposition island on the user's scalp.

25 Claims, 17 Drawing Sheets



+ Zinc-containing deposition island
* Copper-containing deposition island

US009707150B2

(12) **United States Patent**
Shabbat

(10) **Patent No.: US 9,707,150 B2**
(45) **Date of Patent: Jul. 18, 2017**

(54) **GASTROINTESTINAL CAPSULE AND TREATMENT METHOD**

(71) Applicant: **Ronny Shabbat**, Kibbutz Yizra'el (IL)

(72) Inventor: **Ronny Shabbat**, Kibbutz Yizra'el (IL)

(73) Assignee: **VIBRANT LTD.**, Yokneam (IL)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 257 days.

(21) Appl. No.: **14/461,414**

(22) Filed: **Aug. 17, 2014**

(65) **Prior Publication Data**

US 2015/0073315 A1 Mar. 12, 2015

Related U.S. Application Data

(63) Continuation-in-part of application No. PCT/IB2013/000203, filed on Feb. 17, 2012.
(Continued)

(30) **Foreign Application Priority Data**

Feb. 16, 2012 (GB) 1202706.6

(51) **Int. Cl.**
A61H 23/02 (2006.01)
A61B 1/00 (2006.01)
A61H 21/00 (2006.01)

(52) **U.S. Cl.**
CPC ***A61H 23/02*** (2013.01); ***A61B 1/00156*** (2013.01); ***A61H 21/00*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC A61H 2205/083; A61H 2201/149; A61H 2201/1207; A61H 2201/0157;
(Continued)

(56) **References Cited**

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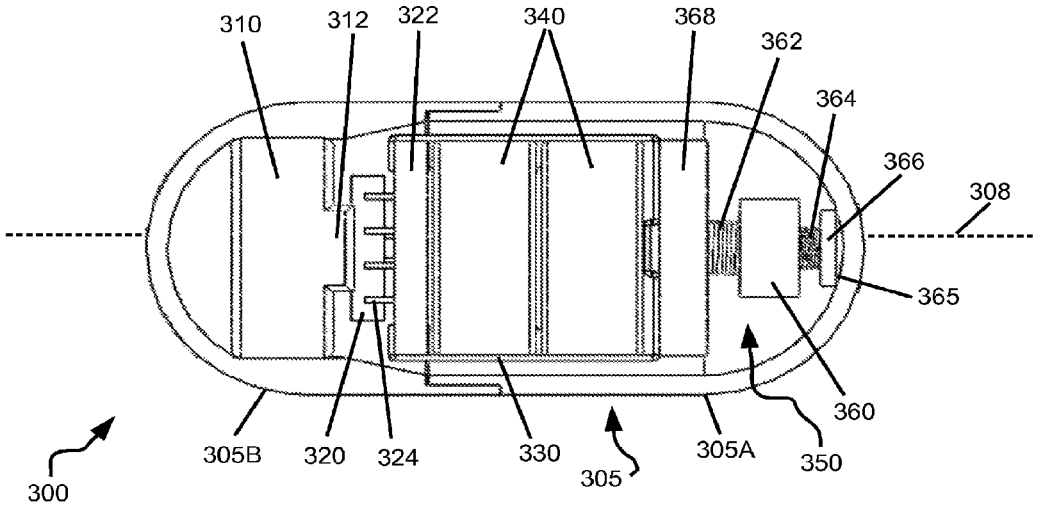
(Continued)

Primary Examiner — Justine Yu
Assistant Examiner — Daniel Garbus
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

A gastrointestinal capsule (GIC) including a capsule housing having a longitudinal axis; a thrusting mechanism, disposed within the housing; and a battery adapted to power the and a battery adapted to power the thrusting mechanism; the thrusting mechanism having an active mode, and a passive mode with respect to the active mode, the thrusting mechanism adapted to exert a radial force on the housing, in a radial direction with respect to the axis, such that when the capsule is disposed within a gastrointestinal tract of a user, and the mechanism is in the active mode, the gastrointestinal capsule stimulates a wall of the tract; the active mode including a series of at least two pulses of the radial force, the series having a first duration, the passive mode having a second duration, wherein an activation cycle is defined by the series of pulses followed by the second duration.

19 Claims, 6 Drawing Sheets



US008708907B2

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

(10) **Patent No.: US 8,708,907 B2**
(45) **Date of Patent: Apr. 29, 2014**

(54) **METHOD AND APPARATUS FOR DETERMINING ONE OR MORE BLOOD PARAMETERS FROM ANALOG ELECTRICAL SIGNALS**

(75) Inventors: **Ilya Fine**, Rehovot (IL); **Alexander Kaminsky**, Rehovot (IL)

(73) Assignee: **Elfi-Tech**, Rehovot (IL)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 416 days.

(21) Appl. No.: **12/774,056**

(22) Filed: **May 5, 2010**

(65) **Prior Publication Data**

US 2010/0286497 A1 Nov. 11, 2010

Related U.S. Application Data

(60) Provisional application No. 61/175,981, filed on May 6, 2009.

(51) **Int. Cl.**

A61B 5/02	(2006.01)
A61B 5/14551	(2006.01)
A61B 5/145	(2006.01)
A61B 8/06	(2006.01)
A61B 8/12	(2006.01)
A61B 5/026	(2006.01)

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

USPC **600/369**; 600/301; 600/323; 600/324; 600/336; 600/364; 600/368; 600/465; 600/467; 600/468; 600/504

(58) **Field of Classification Search**

CPC A61B 5/026; A61B 5/0261; A61B 5/1455
USPC 600/368, 369, 301, 323, 324, 336, 364, 600/465, 467, 468, 504
See application file for complete search history.

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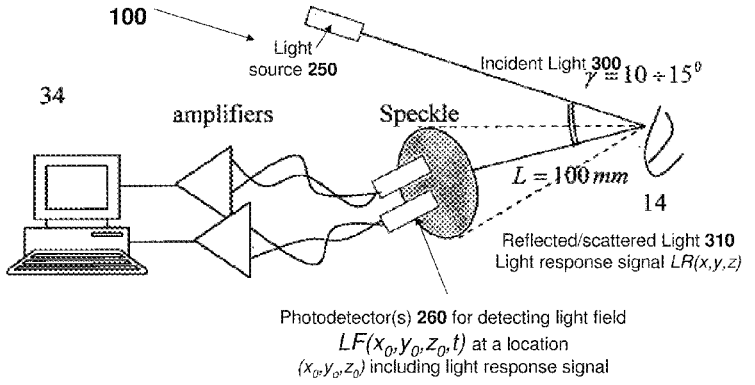
Primary Examiner — Jacqueline Cheng
Assistant Examiner — Puya Agahi
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

Embodiments of the present invention relate to a system and method for in vivo measurement of blood parameters by processing analog electrical signals from a plurality of photodetectors. In some embodiments, it is possible to determine one or more blood parameters according to (i) a first electrical signal from a first detector and (ii) a second electrical signal from a second photodetector. A difference analog electrical signal is generated, indicative of a difference between the light response signal at the first location and light response signal at the second location, is generated. One or more blood parameters may be detected according to the difference analog electrical signal.

12 Claims, 14 Drawing Sheets



$$LF(x0,y0,z0,t) = LF^{SLOWLY\_FLUCTUATING}(x0,y0,z0,t) + LF^{RAPIDLY\_FLUCTUATING}(x0,y0,z0,t) = LF^{SLOWLY\_FLUCTUATING}(x0,y0,z0,t) + [LF^{REGULAR}((x0,y0,z0,t) + LF^{STOCHASTIC}(x0,y0,z0,t)]$$

US009833138B2

(12) **United States Patent**
Nachum

(10) **Patent No.: US 9,833,138 B2**
(45) **Date of Patent: Dec. 5, 2017**

(54) **DEVICE FOR IN-VIVO DETERMINATION OF EYE MOISTURE**

(71) Applicant: **Zvi Nachum**, Tiberias (IL)

(72) Inventor: **Zvi Nachum**, Tiberias (IL)

(73) Assignee: **Z.A Argo**, Tiberias (IL)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 622 days.

(21) Appl. No.: **14/458,344**

(22) Filed: **Aug. 13, 2014**

(65) **Prior Publication Data**

US 2014/0350376 A1 Nov. 27, 2014

Related U.S. Application Data

(63) Continuation-in-part of application No. PCT/IB2013/000173, filed on Feb. 12, 2013.

(30) **Foreign Application Priority Data**

Feb. 13, 2012 (GB) 1202387.5

(51) **Int. Cl.**
A61B 5/053 (2006.01)
A61B 3/10 (2006.01)

(52) **U.S. Cl.**
CPC ***A61B 3/101*** (2013.01); ***A61B 5/053*** (2013.01)

(58) **Field of Classification Search**
CPC A61B 5/053; A61B 5/0537; A61B 5/6821; A61B 3/101
USPC 600/372, 383
See application file for complete search history.

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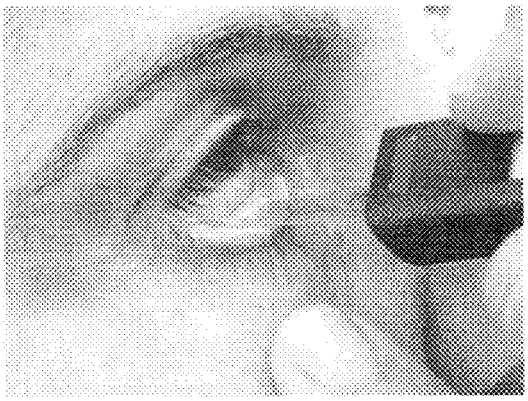
Primary Examiner — Lee S Cohen
Assistant Examiner — Eunhwa Kim
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

A medical diagnostic device and method, the device including: (a) an alternating current source, adapted to produce an alternating current; (b) an electrode arrangement having at least first and second electrodes, separated by an electrically insulating region, the arrangement having an at least semi-rigid region that fixes the electrodes in a spaced-apart manner, the arrangement adapted to contact the soft tissue on the inner surface of the eyelid; and (c) a processor, associated with the electrode arrangement, said electrodes electrically connected to the alternating current source; wherein, when the electrode arrangement is provided with the alternating current, and is disposed against the soft tissue, the soft tissue electrically bridges between the electrodes to form an electrical circuit, wherein an electrical signal is produced by the alternating current electrically passing between the electrodes via the soft tissue; wherein the processor is adapted to receive in-vivo based electrical information originating from the electrical signal, via the circuit, and to produce an output relating to, or derived from, the moisture parameter, based on the in-vivo electrical information; and wherein the pro-

(Continued)



US009925218B2

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

(10) **Patent No.: US 9,925,218 B2**
(45) **Date of Patent: Mar. 27, 2018**

(54) **COMPOSITION, METHOD AND KIT FOR FORMATION OF GALVANIC CELLS ON THE SKIN**

(71) Applicant: **PILOGICS L.P.**, Haifa (IL)

(72) Inventors: **Dov Ingman**, Herzliya (IL); **Erez Manor**, Herzlia (IL)

(73) Assignee: **PILOGICS L.P.**, Haifa (IL)

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

(21) Appl. No.: **14/905,807**

(22) PCT Filed: **Jul. 17, 2014**

(86) PCT No.: **PCT/IB2014/063198**
§ 371 (c)(1),
(2) Date: **Jan. 17, 2016**

(87) PCT Pub. No.: **WO2015/008255**
PCT Pub. Date: **Jan. 22, 2015**

(65) **Prior Publication Data**

US 2016/0151417 A1 Jun. 2, 2016

(30) **Foreign Application Priority Data**

Jul. 17, 2013 (IL) 227522

(51) **Int. Cl.**

A61K 33/34	(2006.01)
A61K 9/48	(2006.01)
A61K 33/30	(2006.01)
A61K 9/00	(2006.01)
A61K 8/19	(2006.01)
A61K 8/25	(2006.01)
A61K 8/27	(2006.01)
A61K 8/02	(2006.01)
A61K 8/11	(2006.01)
A61K 9/107	(2006.01)
A61K 9/50	(2006.01)
A61N 1/20	(2006.01)
A61Q 7/02	(2006.01)
A61Q 7/00	(2006.01)

(52) **U.S. Cl.**
CPC ***A61K 33/34*** (2013.01); ***A61K 8/0241*** (2013.01); ***A61K 8/11*** (2013.01); ***A61K 8/19*** (2013.01); ***A61K 8/25*** (2013.01); ***A61K 8/27*** (2013.01); ***A61K 9/0009*** (2013.01); ***A61K 9/0014*** (2013.01); ***A61K 9/4816*** (2013.01); ***A61K 33/30*** (2013.01); ***A61N 1/205*** (2013.01); ***A61Q 7/00*** (2013.01); ***A61Q 7/02*** (2013.01); *A61K 9/107* (2013.01); *A61K 9/501* (2013.01); *A61K 2800/412* (2013.01); *A61K 2800/413* (2013.01); *A61K 2800/83* (2013.01); *A61K 2800/88* (2013.01)

(58) **Field of Classification Search**
CPC A61K 2800/412; A61K 2800/413; A61K 2800/83; A61K 2800/88; A61K 33/30; A61K 33/34; A61K 8/0241; A61K 8/11; A61K 8/19; A61K 8/25; A61K 8/27; A61K 9/0009; A61K 9/0014; A61K 9/107; A61K 9/48; A61Q 7/00; A61Q 7/02; A61N 1/205
See application file for complete search history.

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Primary Examiner — Aradhana Sasan
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

Embodiments of the invention relate to a composition, method and kit for producing galvanic cells upon application of the composition to the skin. In some embodiments, the composition comprises encapsulated half-galvanic cell units (e.g. individual and/or autonomous half-galvanic cell units) having the same ox/red potential (E°), wherein each half-galvanic cell unit comprises metal particles in the range of nano- to micro size or a mixture thereof, suspended within an aqueous solution of soluble electrolytic salt of same metal and wherein each half-galvanic cell unit is encapsulated by internal layer(s) made of hydrophilic metal (including silicon) oxide nanoparticles and external layer(s) made of hydrophobic metal (including silicon) oxide nanoparticles. The composition is useful for preventing and/or treating alopecia or for enhancing hair growth.

11 Claims, No Drawings

US00D787055S

(12) United States Design Patent

Ingman et al.

(10) Patent No.: US D787,055 S
(45) Date of Patent: ** May 16, 2017

(54) **SCALP-TREATMENT APPARATUS**

(71) Applicant: **PILOGICS L.P.**, Haifa (IL)

(72) Inventors: **Dov Ingman**, Haifa (IL); **Erez Manor**, Herzlia (IL)

(73) Assignee: **PILOGICS L.P.**, Haifa (IL)

(**) Term: **14 Years**

(21) Appl. No.: **29/493,657**

(22) Filed: **Jun. 12, 2014**

(51) **LOC (10) Cl.** **24-02**

(52) **U.S. Cl.**
USPC **D24/133**

(58) **Field of Classification Search**
USPC D24/133, 134, 138, 144, 188; 604/21; 424/401; 607/139
See application file for complete search history.

(56) **References Cited**

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Primary Examiner — Ian Simmons
Assistant Examiner — Samantha Q Lawrence
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **CLAIM**

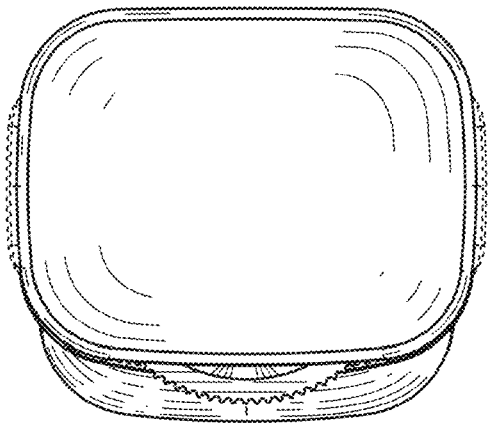
The ornamental design for a scalp-treatment apparatus, as shown and described.

DESCRIPTION

FIG. **1** is a front view of a first embodiment of a scalp-treatment apparatus;
FIG. **2** is a back view thereof;
FIG. **3** is a right view thereof;
FIG. **4** is a left thereof;
FIG. **5** is a top view thereof;
FIG. **6** is a bottom view thereof;
FIG. **7** is a perspective view thereof;
FIG. **8** is an enlarged view taken along the lines shown in FIG. **3**; and,
FIG. **9** is an enlarged view taken along the lines shown in FIG. **6**.

The broken lines shown in FIGS. **2-9** immediately adjacent to the shaded areas, represent the bounds of the claimed design, the bold dash-dot lines in a rectangular configuration represent the boundaries of the close-up sectional views in FIGS. **8-9** and all other broken lines shown in FIGS. **1-9** illustrate scalp-treatment apparatus that form no part of the claimed design.

1 Claim, 9 Drawing Sheets



US00D787689S

(12) United States Design Patent

Roberts

(10) Patent No.: US D787,689 S
(45) Date of Patent: ** May 23, 2017

(54) **WOUND DRESSING**

(71) Applicant: **Crawford Woundcare Limited**, Knutsford (GB)

(72) Inventor: **Sarah Roberts**, Stafford (GB)

(73) Assignee: **Crawford Woundcare Limited**, Knutsford (GB)

(**) Term: **14 Years**

(21) Appl. No.: **29/496,150**

(22) Filed: **Jul. 9, 2014**

(51) **LOC (10) Cl.** **24-04**

(52) **U.S. Cl.**
USPC **D24/189**

(58) **Field of Classification Search**
USPC D24/189–192
CPC A61K 9/0014; A61K 47/00; A61L 26/00; A61F 13/0203; A61F 13/0206; A61F 13/0209; A61F 13/023; A61F 13/0233
See application file for complete search history.

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D712,545	S	*	9/2014	Igwebuike	D24/189
D712,546	S	*	9/2014	Igwebuike	D24/189
D712,547	S	*	9/2014	Igwebuike	D24/189
D712,548	S	*	9/2014	Igwebuike	D24/189
D712,549	S	*	9/2014	Igwebuike	D24/189
D712,550	S	*	9/2014	Igwebuike	D24/189
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Primary Examiner — Michael A. Pratt
Assistant Examiner — Michelle E Wilson
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **CLAIM**

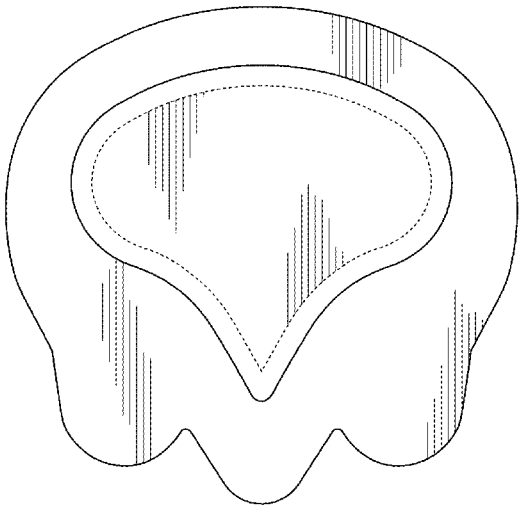
The ornamental design for a wound dressing, as shown and described.

DESCRIPTION

FIG. **1** is a front view of a first embodiment of a wound dressing showing the new design;
FIG. **2** is a back view thereof;
FIG. **3** is a right view thereof;
FIG. **4** is a left view thereof;
FIG. **5** is a top view thereof;
FIG. **6** is a bottom view thereof; and,
FIG. **7** is a perspective view thereof.

The broken lines immediately adjacent to the shaded areas, represent the bounds of the claimed design while all other broken lines are directed to environment and are for illustrative purposes only; the broken lines form no part of the claimed design.

1 Claim, 3 Drawing Sheets



US00D852509S

(12) **United States Design Patent** (10) **Patent No.: US D852,509 S**
Zachar et al. (45) **Date of Patent: ** Jul. 2, 2019**

(54) **TOOTHBRUSH ASSEMBLY**

(71) Applicant: **Airway Medix S.A.**, Warsaw (PL)

(72) Inventors: **Oron Zachar**, Tel Aviv (IL); **Yair Ramot**, Kfar Maas (IL); **Eizik Amar**, Ashdod (IL)

(73) Assignee: **Airway Medix S.A**, Warsaw (PL)

(**) Term: **15 Years**

(21) Appl. No.: **29/591,615**

(22) Filed: **Jan. 21, 2017**

(51) **LOC (11) Cl.** **04-02**

(52) **U.S. Cl.**
USPC **D4/111**; D4/113

(58) **Field of Classification Search**
USPC D4/101, 104, 105, 108, 110, 111; D24/111, 152, 176
CPC A46B 5/00; A46B 5/021; A46B 5/023; A46B 5/026; A46B 5/028; A46B 5/0016; A46B 5/0095; A46B 13/00; A46B 13/02; A46B 2200/10; A46B 2200/30; A46B 2200/108; A46B 2200/302; A46B 2200/304; A46B 2200/1066; A46B 2200/1073; A46B 2200/1086; A46B 2200/3026; A46B 2200/3033; A46B 2200/3046; A61C 15/00; A61C 15/047; A61C 15/048; A61C 17/16; A61C 17/22; A61C 17/26
See application file for complete search history.

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Primary Examiner — Wan Laymon
Assistant Examiner — Clint A Samuel
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

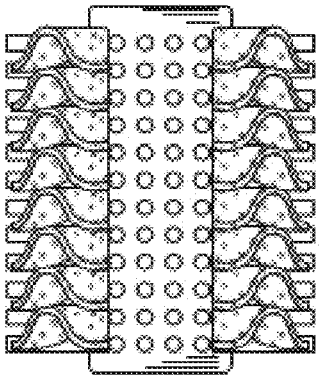
(57) **CLAIM**

The ornamental design for a toothbrush assembly, as shown and described.

DESCRIPTION

The patent or application file contains at least one drawing executed in color. Copies of this patent or patent application publication with color drawing(s) will be provided by the Office upon request and payment of the necessary fee.
FIG. **1** is a front view of a first embodiment of a toothbrush assembly showing the new design;
FIG. **2** is a back view thereof;
FIG. **3** is a left view thereof;
FIG. **4** is a right view thereof;
FIG. **5** is a top view thereof;
FIG. **6** is a bottom view thereof;
FIG. **7** is a perspective view thereof;
FIG. **8** is a front view of a second embodiment of the new design;
FIG. **9** is a back view thereof;
FIG. **10** is a left view thereof;
FIG. **11** is a right view thereof;
FIG. **12** is a top view thereof;
FIG. **13** is a bottom view thereof; and,
FIG. **14** is a perspective view thereof.

1 Claim, 4 Drawing Sheets
(2 of 4 Drawing Sheet(s) Filed in Color)



US00D904033S

(12) **United States Design Patent** (10) **Patent No.: US D904,033 S**
Zachar et al. (45) **Date of Patent: ** Dec. 8, 2020**

(54) **TOOTHBRUSH ASSEMBLY**

(71) Applicant: **Airway Medix S.A.**, Warsaw (PL)

(72) Inventors: **Oron Zachar**, Tel Aviv (IL); **Yair Ramot**, Kfar Maas (IL); **Eizik Amar**, Ashdod (IL)

(73) Assignee: **Airway Medix S.A**, Warsaw (PL)

(**) Term: **15 Years**

(21) Appl. No.: **29/659,605**

(22) Filed: **Aug. 10, 2018**

Related U.S. Application Data

(63) Continuation of application No. 29/579,688, filed on Oct. 1, 2016, now abandoned.

(51) **LOC (12) Cl.** **04-02**

(52) **U.S. Cl.**
USPC **D4/104**

(58) **Field of Classification Search**
USPC D4/100, 101, 102, 104, 105, 106, 108, D4/109, 111, 112, 128, 138; D24/119, D24/152, 176
CPC .. A46B 5/00; A46B 5/021; A46B 9/04; A46B 9/10; A46B 2200/106
See application file for complete search history.

(56) **References Cited**

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Primary Examiner — Jasmine Mlinarcik
(74) *Attorney, Agent, or Firm* — Marc Van Dyke; Momentum IP

(57) **CLAIM**

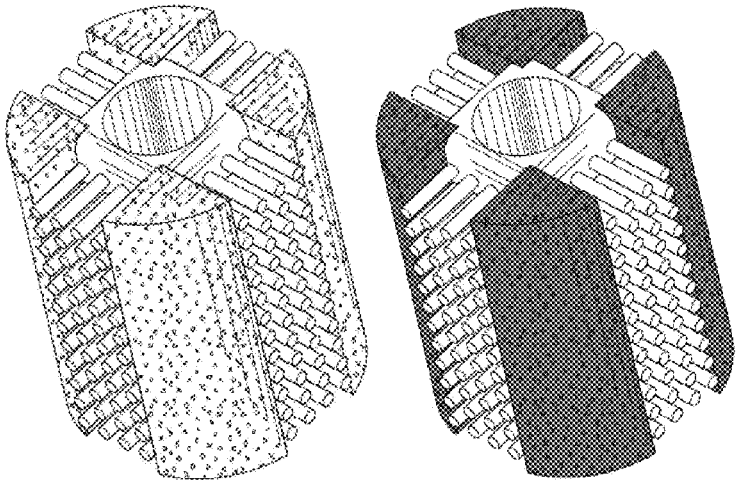
The ornamental design for a toothbrush assembly, as shown and described.

DESCRIPTION

The file of this patent contains at least one drawing executed in color. Copies of this patent with color drawing(s) will be provided by the Office upon request and payment of the necessary fee.

FIG. **1** is a front view of a first embodiment of a toothbrush assembly;
FIG. **2** is a back view thereof;
FIG. **3** is a left side view thereof;
FIG. **4** is a right side view thereof;
FIG. **5** is a top view thereof;
FIG. **6** is a bottom view thereof;
FIG. **7** is a perspective view thereof;
FIG. **8** is a front view of the second embodiment of the toothbrush assembly;
FIG. **9** is a back view thereof;
FIG. **10** is a left side view thereof;
FIG. **11** is a right side view thereof;
FIG. **12** is a top view thereof;
FIG. **13** is a bottom view thereof; and,
FIG. **14** is a perspective view thereof.

1 Claim, 4 Drawing Sheets
(2 of 4 Drawing Sheet(s) Filed in Color)



US010076385B2

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

(10) **Patent No.: US 10,076,385 B2**
(45) **Date of Patent: Sep. 18, 2018**

(54) **METHOD AND APPARATUS FOR ALERTING A USER TO SENSED LATERAL FORCES UPON A GUIDE-SLEEVE IN A ROBOT SURGICAL SYSTEM**

(71) Applicant: **MAZOR ROBOTICS LTD.**, Caesarea (IL)

(72) Inventors: **Moshe Shoham**, Hoshaya (IL); **Eli Zehavi**, Haifa (IL)

(73) Assignee: **MAZOR ROBOTICS LTD.**, Caesarea

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 707 days.

(21) Appl. No.: **14/563,983**

(22) Filed: **Dec. 8, 2014**

(65) **Prior Publication Data**

US 2015/0209056 A1 Jul. 30, 2015

Related U.S. Application Data

(60) Provisional application No. 61/913,328, filed on Dec. 8, 2013.

(51) **Int. Cl.**

A61B 17/17	(2006.01)
A61B 19/00	(2006.01)
A61B 34/30	(2016.01)
A61B 90/11	(2016.01)
A61B 17/00	(2006.01)
A61B 90/00	(2016.01)

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

CPC ***A61B 19/2203*** (2013.01); ***A61B 34/30*** (2016.02); ***A61B 90/11*** (2016.02); *A61B 17/1703* (2013.01); *A61B 17/1707* (2013.01); *A61B 17/1757* (2013.01); *A61B 2017/00119* (2013.01); *A61B 2090/064* (2016.02)

(58) **Field of Classification Search**

CPC . A61B 17/17; A61B 17/1732; A61B 17/1703; A61B 17/1707; A61B 19/201; A61B 19/2203

See application file for complete search history.

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2004/0106916	A1 *	6/2004	Quaid	A61B 34/71 606/1
2012/0158011	A1	6/2012	Sandhu et al.	

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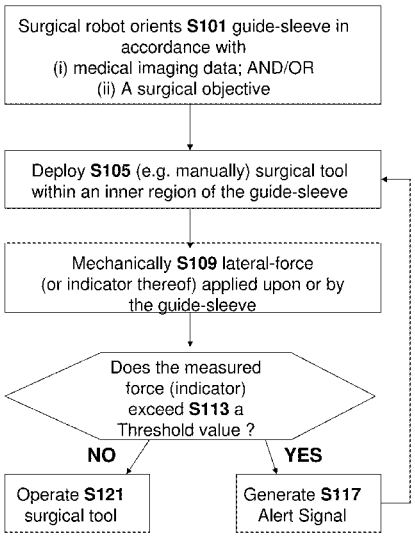
Primary Examiner — Christopher Beccia
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

Methods and apparatus for detecting or predicting surgical tool-bone skiving are disclosed. In some embodiments, the surgical tool is movably and/or snugly disposed within a guide-sleeve. In some embodiments, a magnitude of a lateral force between the surgical tool and the guide-sleeve is measured (e.g. by a force sensor or strain sensor). The present or future skiving may be detected or predicted according to the magnitude of the lateral force. In some embodiments, an alert signal is generated in response to the detecting or predicting of the skiving.

15 Claims, 16 Drawing Sheets



US010201325B2

(12) **United States Patent**
Shohat

(10) **Patent No.: US 10,201,325 B2**
(45) **Date of Patent: Feb. 12, 2019**

(54) **CONTROLLED TISSUE DISSECTION SYSTEMS AND METHODS**

(75) Inventor: **Shaul Shohat**, Kfar HaOranim (IL)

(73) Assignee: **BIOPROTECT LTD.**, Kokhav Ya'ir (IL)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 728 days.

(21) Appl. No.: **13/521,080**

(22) PCT Filed: **Jan. 6, 2011**

(86) PCT No.: **PCT/IL2011/000018**

§ 371 (c)(1),
(2), (4) Date: **Jul. 9, 2012**

(87) PCT Pub. No.: **WO2011/083474**

PCT Pub. Date: **Jul. 14, 2011**

(65) **Prior Publication Data**

US 2012/0330340 A1 Dec. 27, 2012

Related U.S. Application Data

(60) Provisional application No. 61/292,899, filed on Jan. 7, 2010, provisional application No. 61/412,490, filed on Nov. 11, 2010.

(51) **Int. Cl.**
A61M 29/02 (2006.01)
A61B 8/12 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61B 8/12*** (2013.01); ***A61B 8/445*** (2013.01); ***A61B 17/320016*** (2013.01); *A61B 2017/320048* (2013.01); *A61B 2034/107* (2016.02)

(58) **Field of Classification Search**
CPC A61L 8/12; A61L 8/445; A61L 17/320016; A61L 2019/507; A61L 2017/320048
See application file for complete search history.

(56) **References Cited**

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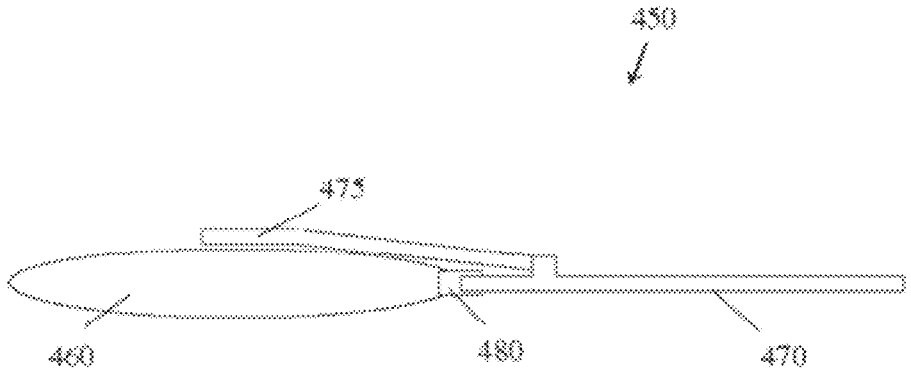
Primary Examiner — Anh Dang
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

Tissue dissecting device, including an inflatable bladder configured to be inserted into a body via an introducer tube in a compact deflated state, and to be inflated to a substantially planar form in a manner which dissects tissue. Method for dissecting tissue, including inserting an inflatable bladder, in a deflated state, via an introducer tube, into a space in a body, and inflating the bladder to substantially planer form, thereby dissecting tissue. Method for dissecting tissue, including inserting an introducer tube via an incision into a body, inserting an inflatable bladder, in a defined state, via the introducer tube, into a space in the body, pulling the introducer tube back at least a length of the deflated bladder, inflating the bladder, via a filling tube, to substantially planar form, thereby dissecting tissue, disconnecting the filling tube from the bladder, retracting the filling tube and the introducer tube from the body.

10 Claims, 19 Drawing Sheets



US010206766B2

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

(10) **Patent No.: US 10,206,766 B2**
(45) **Date of Patent: Feb. 19, 2019**

(54) **TOOTHBRUSH SYSTEM FOR TREATING INTUBATED PATIENTS**

(71) Applicant: **Airway Medix S.A.**, Warsaw (PL)

(72) Inventors: **Oron Zachar**, Tel Aviv (IL); **Yair Ramot**, Kfar Maas (IL); **Eizik Amar**, Ashdod (IL)

(73) Assignee: **Airway Medix S.A.**, Warsaw (PL)

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

(21) Appl. No.: **15/668,726**

(22) Filed: **Aug. 4, 2017**

(65) **Prior Publication Data**

US 2018/0078350 A1 Mar. 22, 2018

Related U.S. Application Data

(60) Provisional application No. 62/371,126, filed on Aug. 4, 2016.

(51) **Int. Cl.**
A61C 17/22 (2006.01)
A61C 17/02 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61C 17/221*** (2013.01); ***A46B 5/0095*** (2013.01); ***A46B 9/04*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC . A46B 13/02; A46B 15/0004; A46B 15/0053; A46B 5/0095; A46B 9/04;
(Continued)

(56) **References Cited**

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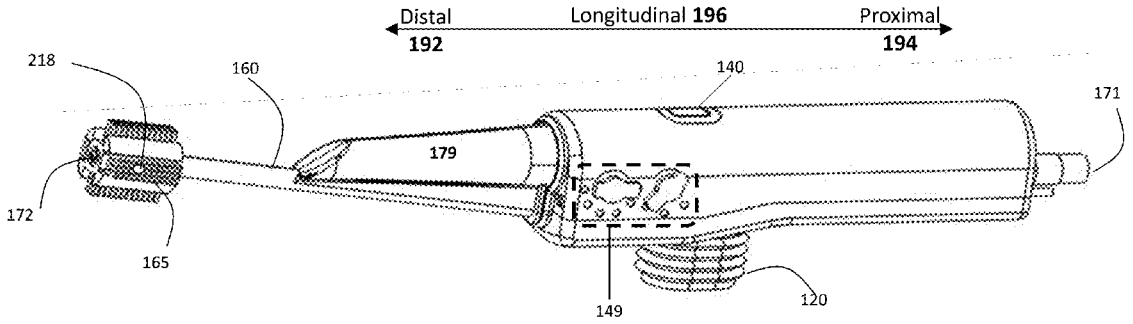
(Continued)

Primary Examiner — Marc Carlson
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

An oral care system for a defined oral care cleaning cycle comprising a base module **100**, a head module **150** comprising a toothbrush-bristle brush **165** disposed on a bristle-retaining surface of the head module, and a tail module **151**. A multi-input/multi-display counter **149** is disposed on a base-module main body **110** of the main body **100**. The multi-input/multi-display counter **149** independently displays first and second count-states, and includes first and second independently-operable user inputs that are respectively associated with the first and second count-states such that: (a) in response to user engagement of the first user input, the first count state is incremented or decremented; and (b) in response to user engagement of the second user input, the second count state is incremented or decremented.

4 Claims, 16 Drawing Sheets



US010299978B2

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

(10) **Patent No.: US 10,299,978 B2**
(45) **Date of Patent: May 28, 2019**

(54) **SYSTEM, METHOD AND KIT FOR ORAL CARE**

(71) Applicant: **Airway Medix S.A.**, Warsaw (PL)

(72) Inventors: **Oron Zachar**, Tel Aviv (IL); **Yair Ramot**, Kfar Maas (IL); **Eizik Amar**, Ashdod (IL)

(73) Assignee: **Airway Medix S.A**, Warsaw (PL)

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

(21) Appl. No.: **15/974,840**

(22) Filed: **May 9, 2018**

(65) **Prior Publication Data**

US 2018/0256430 A1 Sep. 13, 2018

Related U.S. Application Data

(63) Continuation-in-part of application No. PCT/IB2017/001354, filed on Oct. 2, 2017.
(Continued)

(51) **Int. Cl.**
A61G 15/16 (2006.01)
A61C 17/02 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61G 15/16*** (2013.01); ***A46B 11/0041*** (2013.01); ***A46B 11/06*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC A46B 11/0041; A46B 11/0051; A46B 11/0055; A46B 11/0062; A46B 11/06;
(Continued)

(56) **References Cited**

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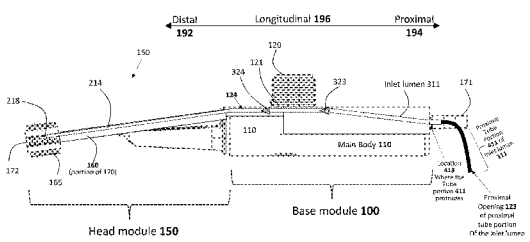
(Continued)

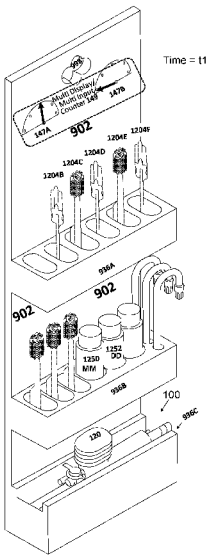
Primary Examiner — Wade Miles
Assistant Examiner — Shannel N Wright
(74) *Attorney, Agent, or Firm* — Marc Van Dyke

(57) **ABSTRACT**

A kit comprising a base module, a plurality of rodded oral care devices, a hanger, a support element that hangs from the hanger, and a non-electronic multi-input multi-display counter is disclosed herein. The support element for supporting each rodded oral care device of the plurality of devices. Embodiments relate to fluid loading/unloading mechanism involving elements of the base module. The non-electronic multi-input multi-display counter may be used to track different types of oral care operations, e.g. at least some of which are performed using the base module and/or a rodded oral care device. Related methods are disclosed.

11 Claims, 25 Drawing Sheets





US010537720B2

(12) **United States Patent**
Ben-Tsur

(10) **Patent No.: US 10,537,720 B2**
(45) **Date of Patent: Jan. 21, 2020**

(54) **METHOD OF ENHANCING ABSORPTION OF INGESTED MEDICAMENTS FOR TREATMENT OF PARKINSONISM**

(71) Applicant: **VIBRANT LTD.**, Yokneam (IL)

(72) Inventor: **Lior Ben-Tsur**, Netanya (IL)

(73) Assignee: **Vibrant Ltd.**, Yokneam (IL)

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

(21) Appl. No.: **16/178,425**

(22) Filed: **Nov. 1, 2018**

(65) **Prior Publication Data**

US 2019/0307999 A1 Oct. 10, 2019

Related U.S. Application Data

(60) Provisional application No. 62/655,031, filed on Apr. 9, 2018.

(51) **Int. Cl.**
A61M 31/00 (2006.01)
A61K 9/00 (2006.01)
A61K 41/00 (2006.01)

(52) **U.S. Cl.**
CPC ***A61M 31/00*** (2013.01); ***A61K 9/0053*** (2013.01); ***A61K 41/0023*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC . A61K 41/0023; A61K 9/0053; A61M 31/00; A61M 37/00
See application file for complete search history.

(56) **References Cited**

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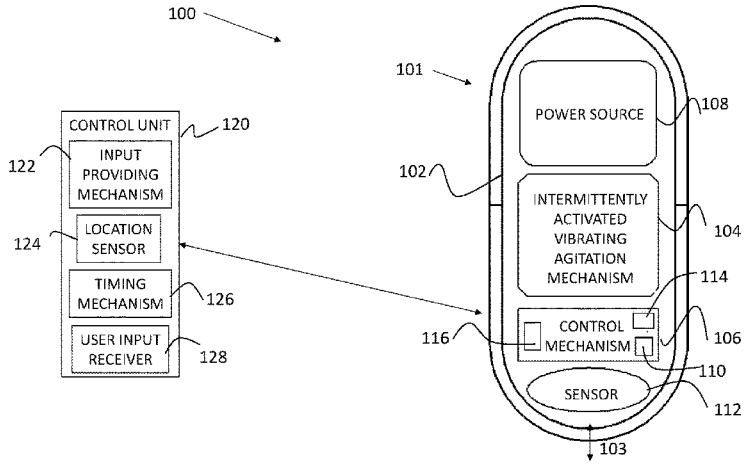
(Continued)

Primary Examiner — William R Carpenter
(74) *Attorney, Agent, or Firm* — Marc Van Dyke; Momentum IP Group

(57) **ABSTRACT**

A method of using a vibrating gastrointestinal capsule in coordination with an ingestible medicament for treatment of Parkinsonism. The vibrating gastrointestinal capsule, is provided to the subject, and includes: a housing; a vibrating agitation mechanism causing said housing to exert vibrations on an environment surrounding the vibrating gastrointestinal capsule; a power supply for powering said vibrating agitation mechanism; and a control mechanism for activating said vibrating agitation mechanism to operate in said vibration mode of operation. The subject ingests the ingestible medicament and the vibrating gastrointestinal capsule. At least one of a time of ingesting of the vibrating gastrointestinal capsule and a timing or activation delay of the vibration mode of operation is controlled, such that the vibration mode of operation at least partially transpires or completely transpires within an actual or estimated absorption time period of the ingestible medicament within the gastrointestinal tract of the subject.

17 Claims, 2 Drawing Sheets



US010543348B2

(12) **United States Patent**
Ben-Tsur

(10) **Patent No.: US 10,543,348 B2**
(45) **Date of Patent: Jan. 28, 2020**

(54) **METHOD OF ENHANCING ABSORPTION OF INGESTED MEDICAMENTS FOR TREATMENT OF AN AN AILMENT OF THE GI TRACT**

(71) Applicant: **VIBRANT LTD.**, Yokneam (IL)

(72) Inventor: **Lior Ben-Tsur**, Netanya (IL)

(73) Assignee: **Vibrant Ltd.**, Yokneam (IL)

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

(21) Appl. No.: **16/185,044**

(22) Filed: **Nov. 9, 2018**

(65) **Prior Publication Data**

US 2019/0308002 A1 Oct. 10, 2019

Related U.S. Application Data

(60) Provisional application No. 62/655,031, filed on Apr. 9, 2018.

(51) **Int. Cl.**
A61M 37/00 (2006.01)
A61K 9/00 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61M 37/00*** (2013.01); ***A61K 9/0053*** (2013.01); ***A61K 41/0023*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC A61M 31/00; A61M 37/00; A61M 31/002; A61K 41/0023; A61K 9/0053; A61B 5/073
See application file for complete search history.

(56) **References Cited**

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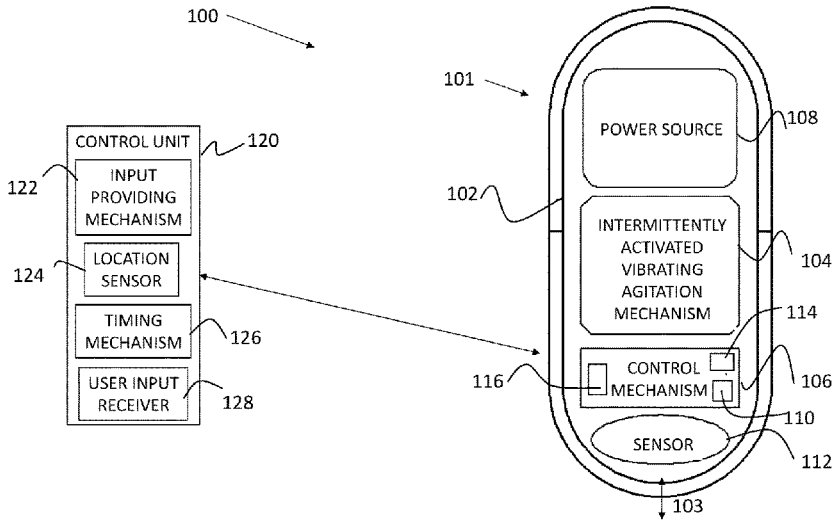
(Continued)

Primary Examiner — William R Carpenter
(74) *Attorney, Agent, or Firm* — Marc Van Dyke; Momentum IP Group

(57) **ABSTRACT**

A method of using a vibrating gastrointestinal capsule in coordination with an ingestible medicament for treatment of an ailment of the GI tract. The vibrating gastrointestinal capsule, is provided to the subject, and includes: a housing; a vibrating agitation mechanism causing the housing to exert vibrations on an environment thereof; a power supply for powering said vibrating agitation mechanism; and a control mechanism for activating said vibrating agitation mechanism to operate in said vibration mode of operation. The subject ingests the ingestible medicament and the vibrating gastrointestinal capsule. At least one of a time of ingesting of the vibrating gastrointestinal capsule and a timing or activation delay of the vibration mode of operation is controlled, such that the vibration mode of operation at least partially transpires or completely transpires within an actual or estimated absorption time period of the ingestible medicament within the gastrointestinal tract of the subject.

16 Claims, 2 Drawing Sheets



US010806884B2

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

(10) **Patent No.: US 10,806,884 B2**
(45) **Date of Patent: Oct. 20, 2020**

(54) **BALLOONED VENTILATION TUBE CLEANING DEVICE**

(71) Applicant: **Teleflex Life Sciences PTE. Ltd.**, Singapore (SG)

(72) Inventors: **Elad Einav**, Tel Aviv (IL); **Oron Zachar**, Tel Aviv (IL)

(73) Assignee: **TELEFLEX LIFE SCIENCES PTE. LTD.**, Singapore (SG)

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

(21) Appl. No.: **16/443,755**

(22) Filed: **Jun. 17, 2019**

(65) **Prior Publication Data**

US 2019/0298950 A1 Oct. 3, 2019

Related U.S. Application Data

(63) Continuation of application No. 14/008,558, filed as application No. PCT/IB2012/051532 on Mar. 29, 2012, now Pat. No. 10,322,253.
(Continued)

(30) **Foreign Application Priority Data**

Sep. 26, 2011	(PL)	396436
Sep. 28, 2011	(GB)	1116735.0
Nov. 16, 2011	(GB)	1119794.4

(51) **Int. Cl.**
A61M 16/04 (2006.01)
A61M 16/00 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61M 16/0463*** (2013.01); ***A61M 16/0057*** (2013.01); ***A61M 16/0438*** (2014.02);
(Continued)

(58) **Field of Classification Search**
CPC A61M 16/0463; A61M 16/0459; A61M 16/0456; A61M 16/0438; A61M 16/0057;
(Continued)

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U.S. Appl. No. 61/468,990, filed Mar. 29, 2011.
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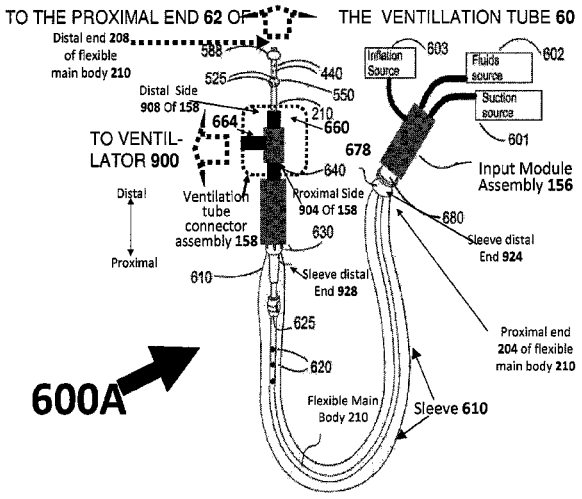
(57) **ABSTRACT**

A cleaning device, system and method for use with an ETT or tracheostomy ventilation tube **60**, a ventilator machine **900**, a source(s) **602** of fluid (for example, pressurized or unpressurized) and a source(s) of suctioning **603** is disclosed. In some embodiments, the cleaning device is useful for cleaning an inner surface of the ventilation tube **60** and/or for preventing or hindering the accumulation of biofilm thereon. In some embodiments, it is possible to clean biofilm or any other material on the inner surface **201** by delivering fluid into an interior of the ventilation tube, wiping the tube interior with a width-expanded wiping element (e.g. an inflated balloon) by longitudinal motion of the wiping element, and suctioning material out of the ventilation tube ventilation tube.

7 Claims, 60 Drawing Sheets



US010814113B2

(12) **United States Patent**
Ben-Tsur et al.

(10) **Patent No.: US 10,814,113 B2**
(45) **Date of Patent: Oct. 27, 2020**

(54) **DEVICE AND METHOD FOR DELIVERING AN INGESTIBLE MEDICAMENT INTO THE GASTROINTESTINAL TRACT OF A USER**

(71) Applicant: **VIBRANT LTD.**, Yokneam (IL)

(72) Inventors: **Lior Ben-Tsur**, Netanya (IL); **Shai Molnar**, Shorashim (IL); **Ronny Shabbat**, Kibbutz Yizra'el (IL)

(73) Assignee: **Vibrant Ltd.**, Yokneam (IL)

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

(21) Appl. No.: **16/732,883**

(22) Filed: **Jan. 2, 2020**

(65) **Prior Publication Data**

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(30) **Foreign Application Priority Data**

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A61M 31/00 (2006.01)
A61B 5/07 (2006.01)
(Continued)

(52) **U.S. Cl.**
CPC ***A61M 31/002*** (2013.01); ***A61B 5/0051*** (2013.01); ***A61B 5/073*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC .. A61M 37/00; A61M 5/168; A61M 5/16804; A61M 5/16836; A61M 5/172;
(Continued)

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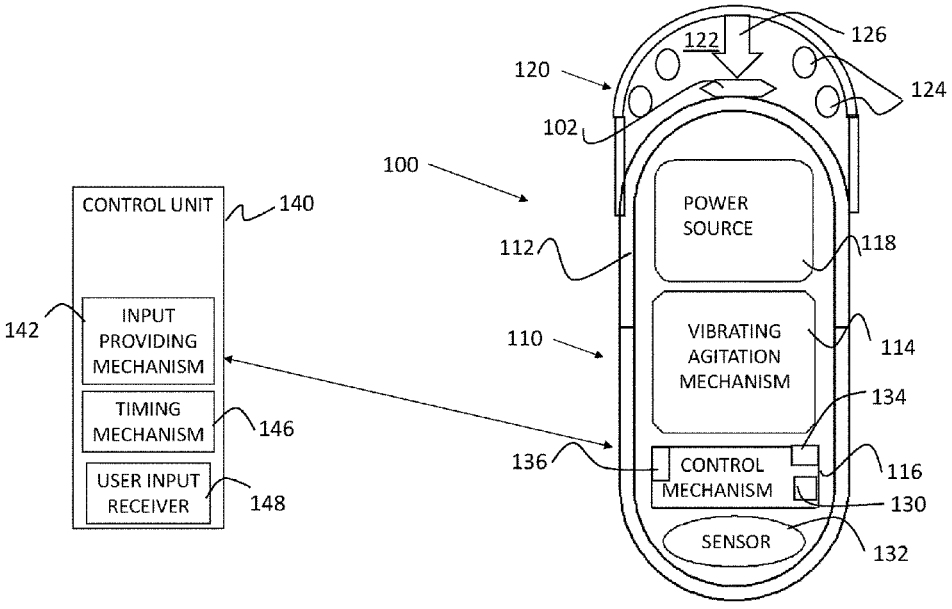
(74) *Attorney, Agent, or Firm* — Marc Van Dyke; Momentum IP Group

(57) **ABSTRACT**

Devices and methods for delivering an ingestible medicament of a medicament tablet into the gastrointestinal tract of a user. A device according to the invention includes a vibrating ingestible capsule and a hollow medicament compartment housing. The vibrating capsule includes a housing, a vibrating agitator disposed within the housing, a power supply, and a control element. The hollow medicament compartment housing is associated with the housing of the capsule and includes at least one aperture. The hollow of the medicament compartment housing is configured to have the medicament tablet disposed therein. The aperture(s) are dimensioned to enable fluid communication the surrounding environment and the hollow.

21 Claims, 10 Drawing Sheets



US010888277B1

(12) **United States Patent**
Ben-Tsur et al.

(10) **Patent No.: US 10,888,277 B1**
(45) **Date of Patent: Jan. 12, 2021**

(54) **METHOD FOR TREATING DIARRHEA AND REDUCING BRISTOL STOOL SCORES USING A VIBRATING INGESTIBLE CAPSULE**

(71) Applicant: **VIBRANT LTD.**, Yokneam (IL)

(72) Inventors: **Lior Ben-Tsur**, Netanya (IL); **Camille Morliere**, Hadera (IL)

(73) Assignee: **VIBRANT LTD**, Yokneam (IL)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 186 days.

(21) Appl. No.: **15/882,289**

(22) Filed: **Jan. 29, 2018**

Related U.S. Application Data

(60) Provisional application No. 62/451,834, filed on Jan. 30, 2017.

(51) **Int. Cl.**
A61B 5/00 (2006.01)
A61B 5/07 (2006.01)

(52) **U.S. Cl.**
CPC ***A61B 5/6861*** (2013.01); ***A61B 5/073*** (2013.01); *A61H 2201/1207* (2013.01)

(58) **Field of Classification Search**
CPC A61B 5/6861; A61B 5/073
See application file for complete search history.

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(57) **ABSTRACT**

A method for treating diarrhea in a subject and/or for reducing Bristol stool scores of fecal matter of a subject using a vibrating ingestible capsule ingested by the subject and activated in a targeted zone of the gastrointestinal tract of the subject.

20 Claims, 2 Drawing Sheets