

Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175

PTO/AIA/80 (07-17)

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138718

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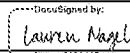
Assignee name and address: Solmetex, LLC  
50 Bearfoot Rd.  
Northborough, MA 01532

**A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.**

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Signature



Date 1/10/2023

Name Lauren Nagel

Telephone

Title Chief Operating Officer

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**EX1002****Petitioner Ascentcare ('329 Patent)**

Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175  
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**DECLARATION FOR PATENT APPLICATION**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an original inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled **Intraoral Dental Suction and Isolation System** the specification of which was filed **December 9, 2013** and assigned U.S. patent application **14/100,323**.

I hereby state that the above-identified application was made or authorized to be made by me.

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 Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of inventor:

**Thien Nguyen**

Citizenship:

U.S. CITIZEN

Inventor's signature:



*(Permanent ink only)*

Dated (optional):

(Date)

Mailing Address:

**92 Corporate Park  
Suite C, #818  
Irvine, California 92606**

Residence:

Santa Ana, California  
*(Japan: prefecture, city, village, city ward, etc.; US: city and state)*

**37 CFR §1.56 Duty to disclose information material to patentability.**

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)(4) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

(1) Prior art cited in search reports of a foreign patent office in a counterpart application, and

(2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a *prima facie* case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

(i) Opposing an argument of unpatentability relied on by the Office, or

(ii) Asserting an argument of patentability. A *prima facie* case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden of proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

(e) In any continuation-in-part application, the duty under this section includes the duty to disclose to the Office all information known to the person to be material to patentability, as defined in paragraph (b) of this section, 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.

**DECLARATION FOR PATENT APPLICATION**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

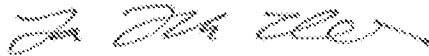
I believe I am an original inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled **Intraoral Dental Suction and Isolation System** the specification of which was filed **December 9, 2013** and assigned U.S. patent application **14/100,323**.

I hereby state that the above-identified application was made or authorized to be made by me.

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 Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of inventor: **Tam Thanh Pham**

Citizenship: USA



Inventor's signature: \_\_\_\_\_  
(Permanent ink only)

Dated (optional): May 19, 2014  
(Date)

Mailing Address: **92 Corporate Park  
Suite C, #818  
Irvine, California 92606**

Residence: San Francisco, California  
(Japan: prefecture, city, village, city ward, etc.; US: city and state)

**37 CFR §1.56 Duty to disclose information material to patentability.**

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

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(2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

(1) It establishes, by itself or in combination with other information, a *prima facie* case of unpatentability of a claim; or

(2) It refutes, or is inconsistent with, a position the applicant takes in:

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(ii) Asserting an argument of patentability. A *prima facie* case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden of proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

(1) Each inventor named in the application;

(2) Each attorney or agent who prepares or prosecutes the application; and

(3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

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(e) In any continuation-in-part application, the duty under this section includes the duty to disclose to the Office all information known to the person to be material to patentability, as defined in paragraph (b) of this section, 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.

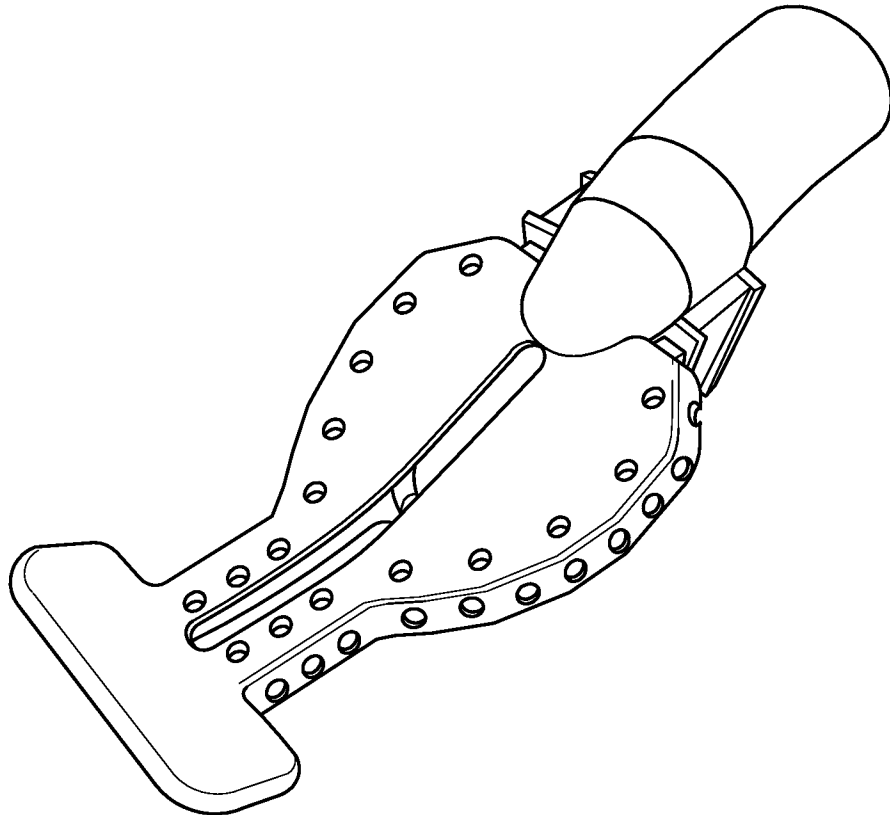


*FIG. 1A*



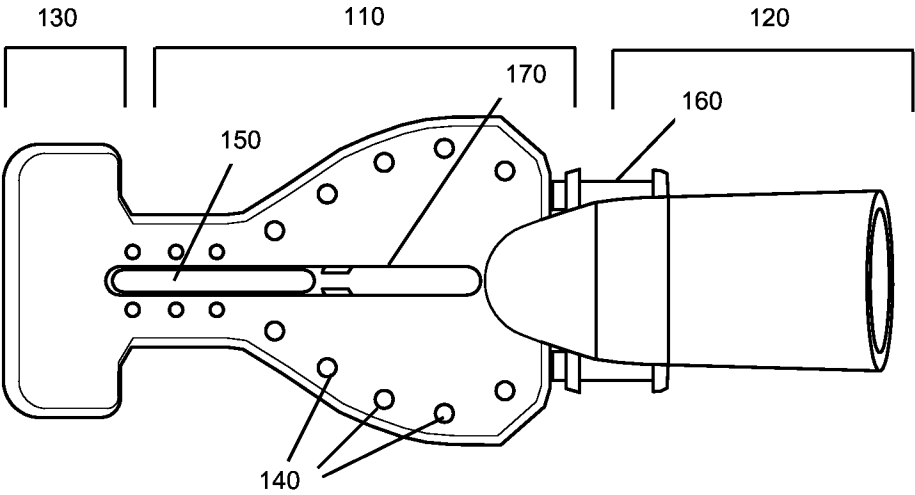


*FIG. 1B*

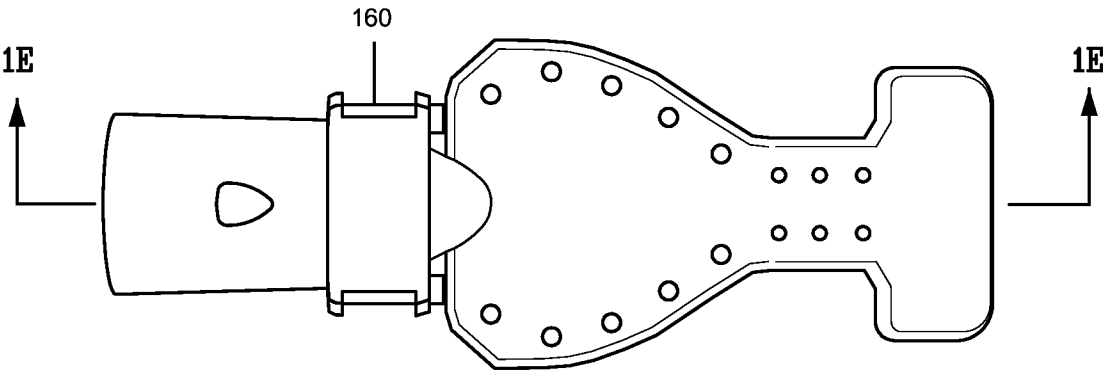
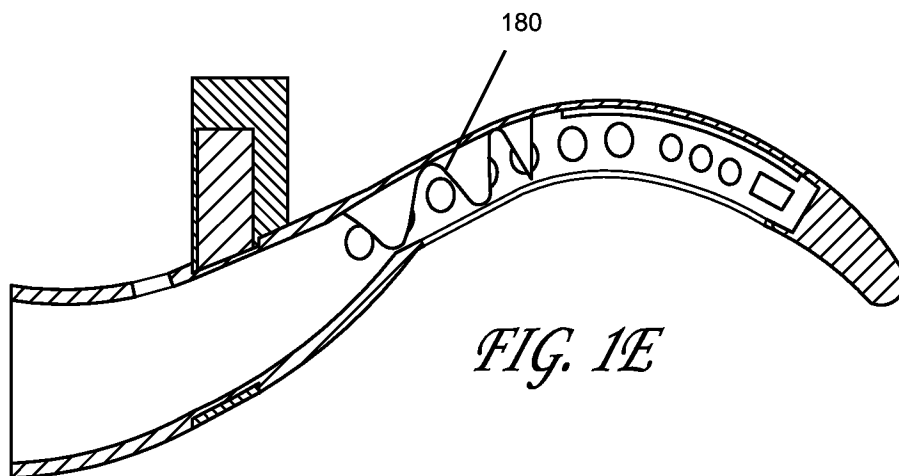
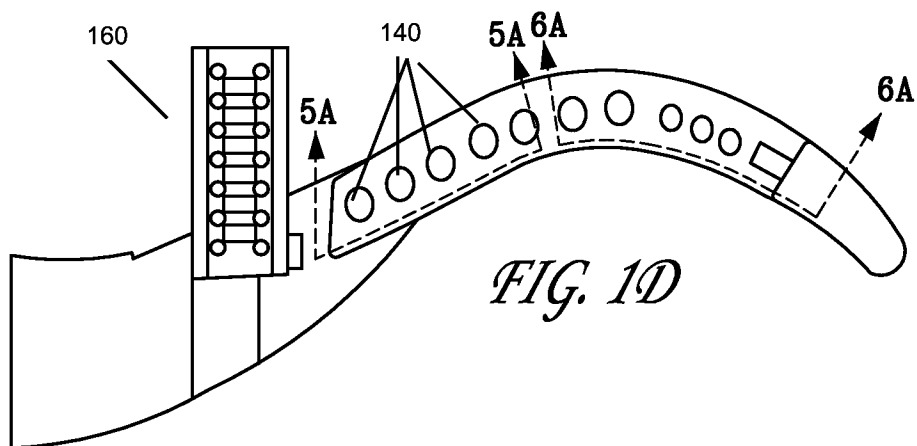


*FIG. 1C*





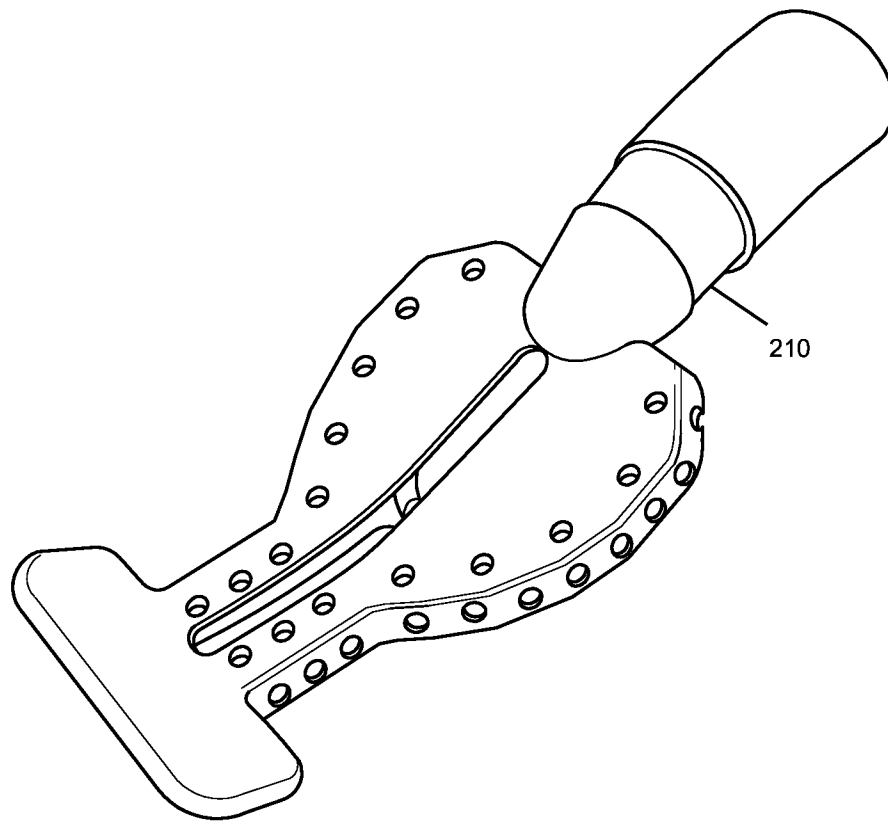


*FIG. 2A*



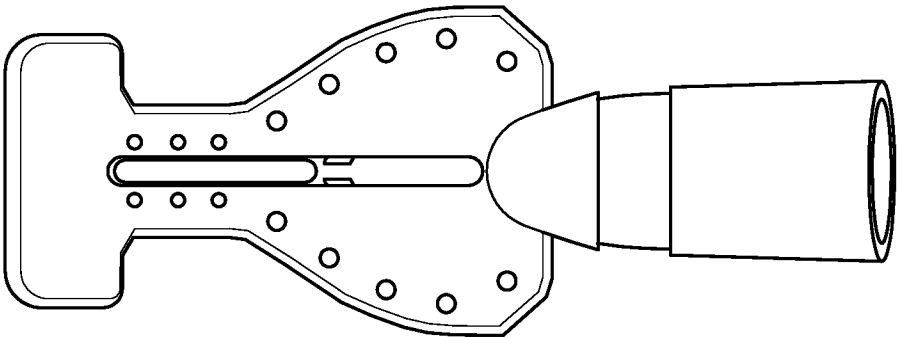


FIG. 2B

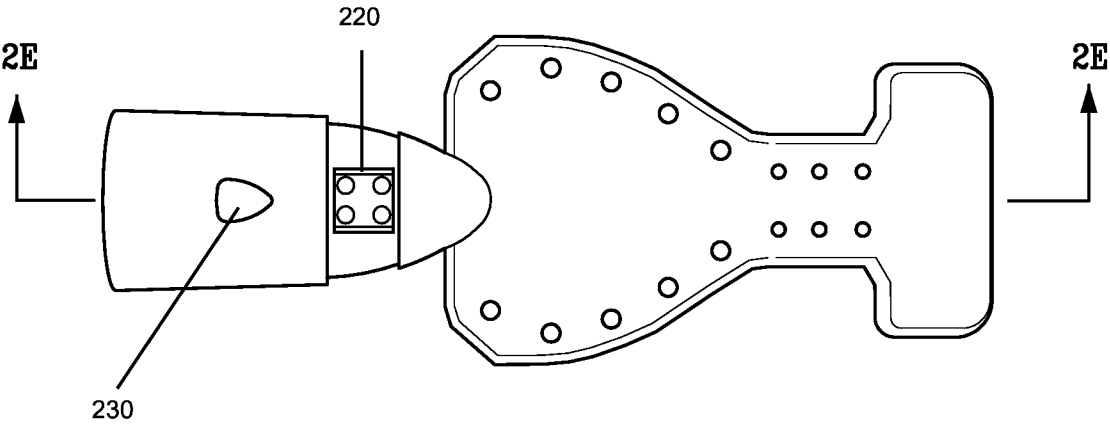


FIG. 2C



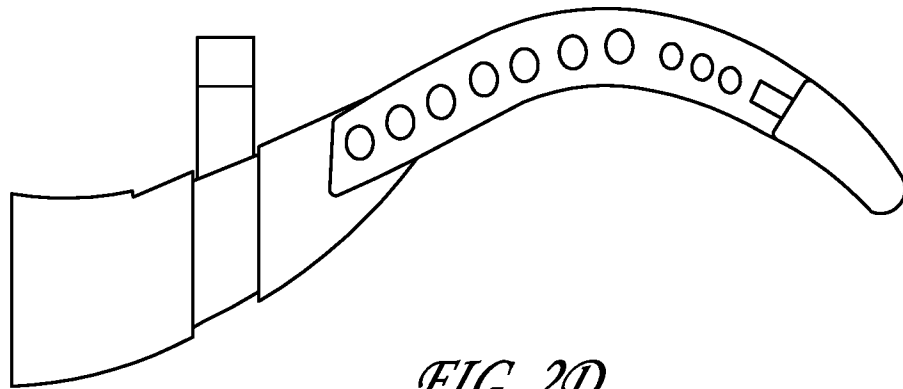


*FIG. 2D*



*FIG. 2E*



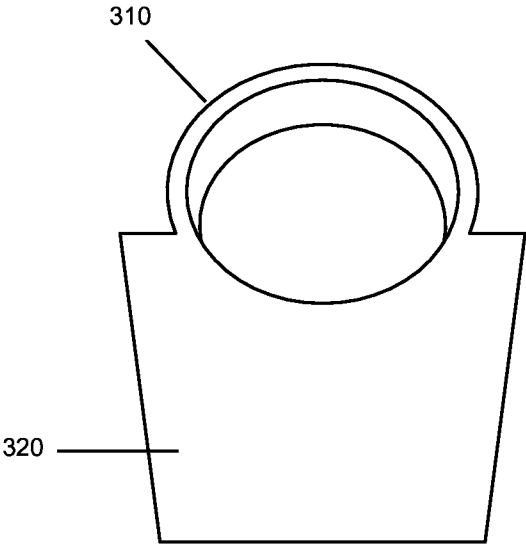


FIG. 3A

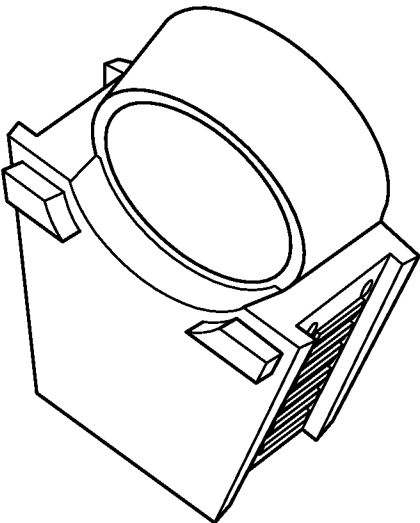


FIG. 3D

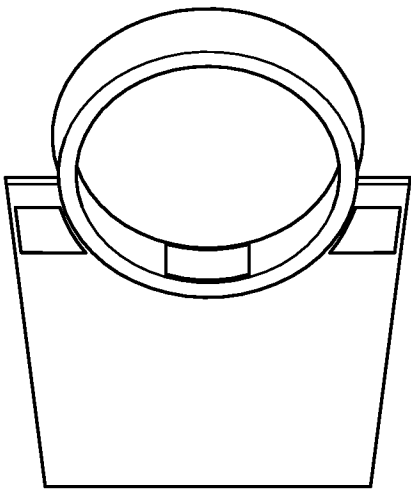


FIG. 3B

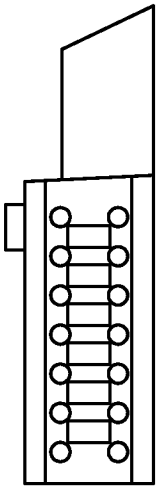


FIG. 3E



FIG. 3C

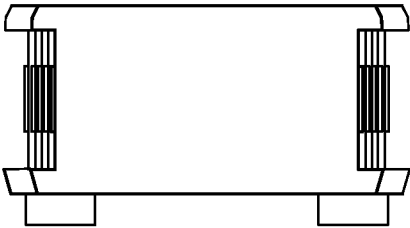
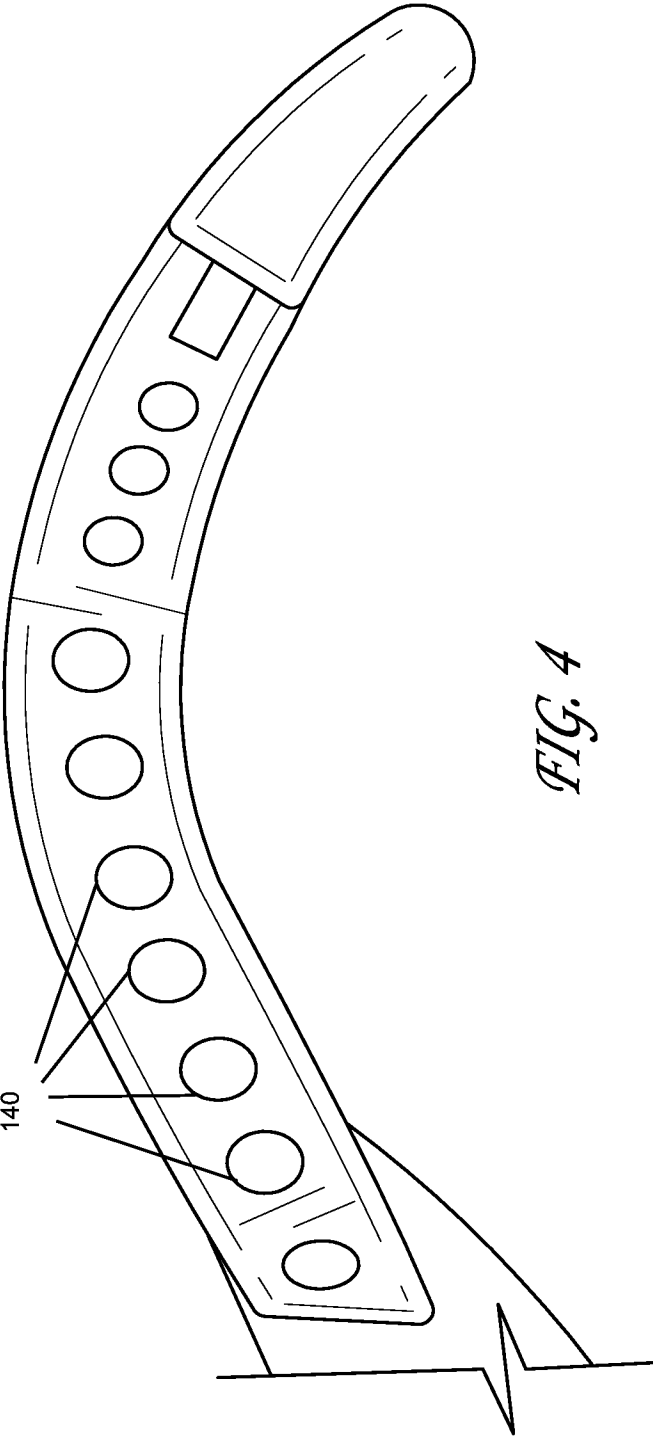


FIG. 3F





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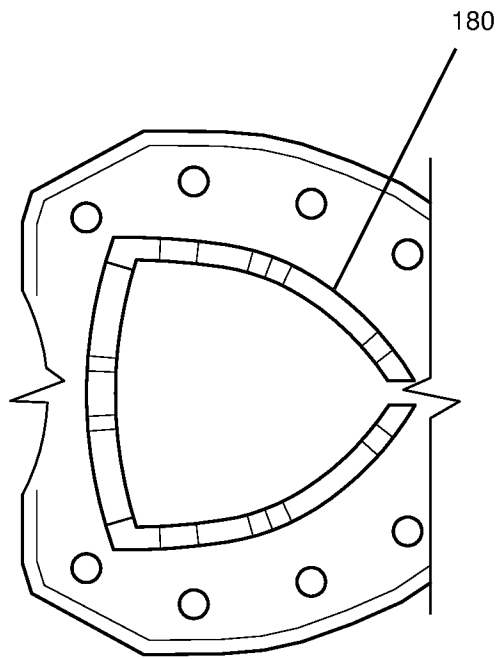


*FIG. 5*

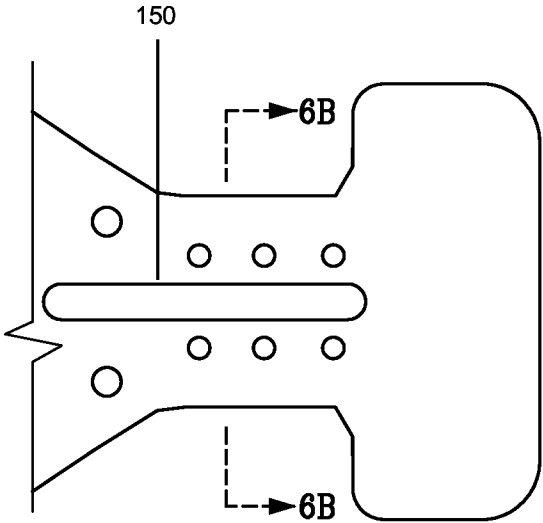


FIG. 6A

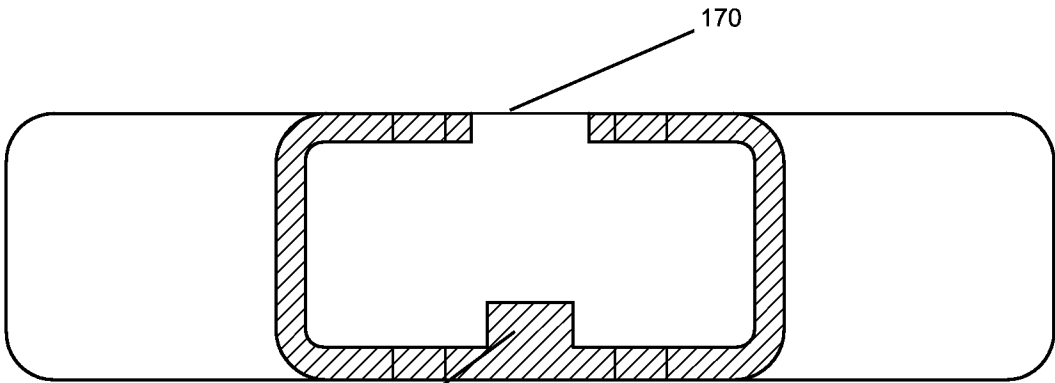


FIG. 6B



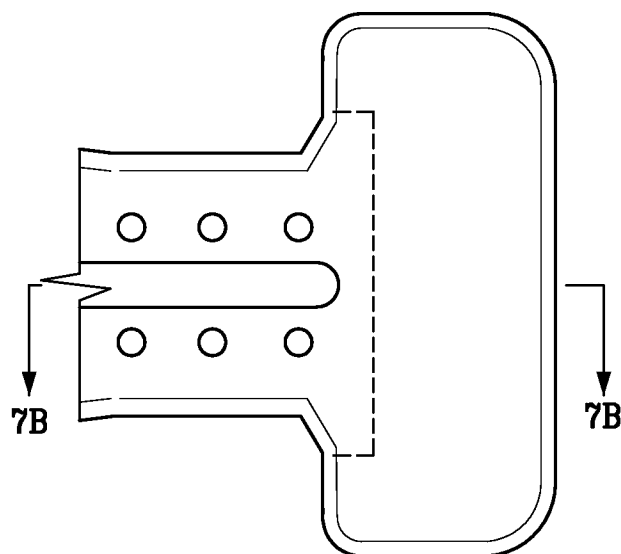


*FIG. 7A*

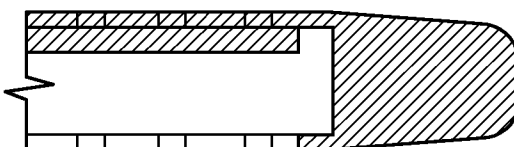


*FIG. 7B*



## **INTRAORAL DEVICE**

### **CROSS-REFERENCE TO RELATED APPLICATIONS**

[0001] The present application is a continuation and claims the priority benefit of U.S. patent application 14/228,057 filed March 27, 2014, which is a continuation and claims the priority benefit of U.S. patent application 14/100,323 filed December 9, 2013, now U.S. patent 8,911,232, which claims the priority benefit of U.S. provisional patent application number 61/734,939 filed December 7, 2012, the disclosures of which are incorporated herein by reference.

### **BACKGROUND OF THE INVENTION**

#### **1. Field of the Invention**

[0002] The present invention generally relates to the field of dental mouthpieces. More specifically, the present invention relates to intraoral dental suction and isolation mouthpieces.

#### **2. Description of Related Art**

[0003] Various mouthpieces are currently used by dental health professionals, dental hygienists, and dental assistants in the field of dentistry. In the past, a dental patient has been treated by a traditional two-person team that comprises a dental professional and a dental assistant. Further, dental treatment may be provided by the team using many different types of dental equipment and materials. Such dental equipment and materials may include such items as an intraoral mirror, a bite block, a slow speed suction ejector, a high speed suction ejector, gauzes, cotton rolls, and dry angles. Each item of dental equipment may be used for different purposes, though some may be used in

combination for some types of dental services. As such, a dental professional seeking to provide such dental services may need to use multiple items of such dental equipment. An important role of the dental assistant is therefore to assist the dental professional in coordinating the use of these multiple items of different equipment and materials.

[0004] There is, therefore, a need in the art for improved systems and methods of providing dental services in a more efficient, comfortable, and safe manner to the dental patient.

## SUMMARY OF THE CLAIMED INVENTION

[0005] Embodiments of the present invention may include a mouthpiece that may be attached to a high-suction dental adapter for the purpose of assisting the dental staff during dental procedures through chair-side, hands-free suction, and isolation. Such a mouthpiece may comprise a main body portion, a cheek retractor portion, and a suction connector portion. In some embodiments, the main body portion, cheek retractor portion, and suction connector portion (and sub-portions thereof) may be molded in one piece, preferably by injection molding. In an exemplary embodiment, the mouthpiece may be made of a material that is flexible, translucent, conducive to injection molding, high heat-resistant, and autoclavable. Such a material may include silicone. Because the mouthpiece may be made of a high heat-resistant and autoclavable material, such a mouthpiece may be reusable.

[0006] The main body portion may comprise an enclosed pocket made up of an anterior wall, a posterior wall, and a side wall in between the anterior and posterior walls. The side wall may be perforated with a plurality of perforations. Such perforations may constitute a mesh. Additional perforations may be located on the anterior and posterior walls. The main body portion may further include a slit along a longitudinal, central axis on the anterior wall. Such openings (*e.g.*, perforations and slit) allow for suction of air, fluids, and small debris from the patient's mouth, through the openings into the interior portion, and into the suction connector portion towards a suction source. Because the mouthpiece is made of a flexible and resilient material (*e.g.*, silicone), the mouthpiece may be bent when placed in a patient's mouth to conform to the shape of the mouth. When properly positioned, the suction connector portion may protrude from one side of the patient's mouth, while the main body lies against the back of the patient's mouth, and the cheek retractor presses against the patient's cheek on the opposite side of the patient's mouth.

[0007] The main body may further include an protruding bridge structure on the

interior surface of the posterior wall. Such a bridge structure may protrude from the interior surface in a wave shape with crests and troughs. The crests provide a plurality of contact points with the anterior wall to keep the anterior wall separated from the posterior wall during suction. Meanwhile, the troughs provide gaps that allow for suction of air, fluids, and small debris through the bridge structure.

## BRIEF DESCRIPTION OF THE FIGURES

- [0008] FIG. 1A is a perspective view of an exemplary mouthpiece with a detachable mouth prop.
- [0009] FIG. 1B is a top view of the exemplary mouthpiece and detachable mouth prop of FIG. 1A.
- [0010] FIG. 1C is a bottom view of the exemplary mouthpiece and detachable mouth prop of FIG. 1A.
- [0011] FIG. 1D is a side view of the exemplary mouthpiece and detachable mouth prop of FIG. 1A.
- [0012] FIG. 1E is a cross-sectional view of the exemplary mouthpiece and detachable mouth prop of FIG. 1A.
- [0013] FIG. 2A is a perspective view of the exemplary mouthpiece of FIG. 1A where the detachable mouth prop has been detached.
- [0014] FIG. 2B is a top view of the exemplary mouthpiece of FIG. 2A.
- [0015] FIG. 2C is a bottom view of the exemplary mouthpiece of FIG. 2A.
- [0016] FIG. 2D is a side view of the exemplary mouthpiece of FIG. 2A.
- [0017] FIG. 2E is a cross-sectional view of the exemplary mouthpiece of FIG. 2A.
- [0018] FIG. 3A is a front view of an exemplary mouth prop.
- [0019] FIG. 3B is a back view of the exemplary mouth prop of FIG. 3A.
- [0020] FIG. 3C is a bottom view of the exemplary mouth prop of FIG. 3A.
- [0021] FIG. 3D is a perspective view of the exemplary mouth prop of FIG. 3A .
- [0022] FIG. 3E is a side view of the exemplary mouth prop of FIG. 3A.
- [0023] FIG. 3F is a top view of the exemplary mouth prop of FIG. 3A.
- [0024] FIG. 4 is a close-up view of exemplary mesh sides in an exemplary mouthpiece.
- [0025] FIG. 5 is a close-up view of an internal bridge in an exemplary mouthpiece.
- [0026] FIG. 6A is a close-up view of an exemplary reinforcing bar in an exemplary mouthpiece.

[0027] FIG. 6B is a cross-sectional view of the exemplary reinforcing bar of FIG. 6A.

[0028] FIG. 7A is a close-up view of an exemplary cheek retractor portion in an exemplary mouthpiece.

[0029] FIG. 7B is a cross-sectional view of the exemplary cheek retractor portion of FIG. 7A.

## DETAILED DESCRIPTION

**[0030]** Embodiments of the present invention provide for a mouthpiece comprising a main body portion, a cheek retractor portion, and a suction connector portion. In some embodiments, the main body portion, cheek retractor portion, and suction connector portion (and sub-portions thereof) may be molded as one-piece, preferably by injection molding. In an exemplary embodiment, the mouthpiece may be made of a material that is flexible, translucent, conducive to injection molding, high heat-resistant, and autoclavable. Such a material may include silicone. Because the mouthpiece may be made of a high heat-resistant and autoclavable material, such a mouthpiece may be reusable.

**[0031]** FIGs. 1A-E are different views of an exemplary mouthpiece with an attachable mouth prop 160, while FIGs. 2A-E are different views of the exemplary mouthpiece of FIG. 1A where the attachable mouth prop 160 has been detached. Such a mouthpiece may include a main body portion 110, a suction connector portion 120, and a cheek retractor portion 130.

**[0032]** The main body portion 110 may include mesh or perforations 140, a stability bar 150, an open slit 170, and an internal bridge 180. The main body portion 110 may connect to a suction connector portion 120 on one end and a cheek retractor portion 130 at the other end. Such a cheek retractor portion 130 may be configured to press against and retract a patient's cheek away from the patient's teeth. When placed in a patient's mouth, the suction connector portion 120 may protrude from one side of the patient's mouth, while the main body portion 110 lies against the back of the patient's mouth, and the cheek retractor portion 130 retracts the patient's cheek on the opposite side of the patient's mouth. The flexibility of the material used to form the mouthpiece allows for some bending when placed in the patient's mouth. The material is, however, resilient enough that the cheek retractor portion presses against the inside of the patient's cheek with such pressure being sufficient to move the cheek away from the patient's teeth.

[0033] An exemplary main body portion 110, when placed in a mouth, may include an anterior wall facing the front of the mouth (*e.g.*, the side with slit 170) and a posterior wall facing the back of the mouth. The two walls may connect at a superior wall and an inferior wall forming a body that is at least partially enclosed.

Superior may be used herein to refer to the side that rests against a roof of a patient's mouth when placed therein, and inferior may be used to refer to the side that rests against the floor of the patient's mouth. The superior and inferior sides may be formed identically, which may allow for the mouthpiece to change orientation such that the superior side may appear as the inferior side and vice versa, in the new orientation. When in use, the respective sides of the main body portion 110 may serve to protect and separate the top of the mouth and the bottom of the mouth/tongue. In addition, the main body portion 110 may also serve to protect the back of the mouth (*e.g.*, throat and airway) from falling debris.

[0034] Much of the main body portion 110 of the mouthpiece may be shaped as a straight-line arrowhead or shield whose base generally conforms to the intraoral shape of a patient's mouth. Differently-sized mouthpieces may be provided for differently-sized mouths of adults and children. Part of the base side of the arrowhead may be formed with thicker walls than the rest of the main body. Such thickening may provide additional stability.

[0035] In addition, the main body portion 110 of the mouthpiece may include a plurality of holes 140 distributed along the superior and inferior sides of the anterior and posterior walls to assist in suctioning of water, saliva and debris from the oral cavity. In some embodiments, a set of holes may also form a mesh along the walls of the superior and inferior edges. FIG. 4 is a close-up view of an exemplary mesh wall in an exemplary mouthpiece.

[0036] At the narrow end of the arrowhead that connects to the cheek retractor portion 130, the main body portion 110 may include a rectangular portion. Narrower than the base of the arrowhead, the rectangle may additionally include a reinforcing bar

(or stability bar) 150 (described in further detail below) and may be at least partially crossed by a slit 170 (described in further detail below) into the interior of the pocket of the main body portion 110.

**[0037]** Stability bar 150 may be a protrusion or otherwise a thickened area that reinforces the stability of the rectangular portion and assist in shaping this region to the intraoral posterior shape of a patient's mouth. FIG. 6A is a close-up view of an exemplary stability bar 150 of an exemplary mouthpiece. FIG. 6B is a cross-sectional view of the exemplary reinforcing bar in the cheek retractor connector portion of FIG. 6A.

**[0038]** In some embodiments, the internal, rectangular-shaped reinforcing or stability bar 150 may be located distally to the internal wavelike bridge structure 180 and attached to both the interior side of the posterior surface of the main body and the rectangular portion. Such a stability bar 150 may be located in the area where a positioned mouthpiece begins to wrap from the lingual side of the most posterior mandibular tooth, around the distal side of the most posterior tooth, and to anterior side of the most posterior mandibular tooth, thereby assisting in shaping the mouthpiece to the general intraoral shape of a patient's mouth.

**[0039]** Various embodiments of the mouthpiece may further include a longitudinal, open slit 170 extending over approximately two-thirds of the main body on the anterior surface. Running along the center of the main body across the rectangle and most of the arrowhead, such a slit 170 may assist in capture and suction of water, saliva and debris, as well as assisting in cleaning and maintenance.

**[0040]** Additionally, the main body of the mouthpiece may include a bridge structure 180 on an interior surface to ensure that the anterior and posterior surfaces remain separated during suction. FIG. 1E is a cross-sectional view of the mouthpiece in which the bridge structure 180 is illustrated. FIG. 5 is a close-up view of the bridge structure 180 without the surrounding walls of the main body portion. Such a bridge structure 180 may be formed as an wave-like protrusion that generally corresponds to the distance

between the anterior and posterior walls extending substantially (*e.g.*, within 1 mm) the full distance at its crest and substantially flush to the surface at its trough. In some embodiments, the bridge structure 180 may be centrally-located in the main body portion 110 of the mouthpiece. The gaps (or troughs) between the waves of the bridge structure 180 assist in the suction-driven transfer of water and saliva to the suction connector portion 120 and ultimately, into a central suction vacuum. In some embodiments, the bridge structure 180 may follow the shape of a logo (*e.g.*, an arrowhead or shield).

**[0041]** The suction connector portion 120 may be oval-shaped and also attached to the main body portion 110. The suction connector portion 120 may be formed with thicker walls than the main body portion 110 and configured to attach to a high-suction vacuum adapter and to assist in transferring water, saliva, and debris from the oral cavity to the external adapter for removal. The suction connector portion 120 may also include an internal stop to assist in sliding the mouthpiece onto the adapter to a desired depth. The suction connector portion 120 may additionally have an external, concave, notched region 210 that corresponds to a removable strap such that when the strap is in place, the external walls of the strap and the rest of the connector portion may be flush.

**[0042]** The cheek retractor portion 130 is illustrated as a hammerhead distal region, which may be attached to the main body portion 110. FIG. 7A is a close-up view of an exemplary cheek retractor portion 130 in an exemplary mouthpiece. FIG. 7B is a cross-sectional view of the exemplary cheek retractor portion 130 of FIG. 7A.

**[0043]** The mouthpiece may be used with a mouth prop 160, as illustrated in FIGs. 1 (with a mouth prop 160) and FIGs. 2 (illustrated without the mouth prop 160). FIGs. 3A-E provide different close-up views of an exemplary mouth prop 160. The removable strap 310 may be attached to mouth prop 160, which may be used to prop open a patient's mouth and teeth. In this regard, the suction connector portion 120 may additionally have an external plug 220 (FIG. 2C) protruding from the posterior side of the suction connector portion 120. Such a plug 220 may correspond to and serve to

connect with an opening in the mouth prop 160. The mouth prop 160 may be reinforced by the presence of the plug 220 in the opening, thereby resulting in a more crush-resistant, nearly incompressible, and stable mouth prop 160. In some embodiments, the suction connector portion 120 may further have a cutout 230 (*e.g.*, which may be shaped as a logo) providing extra interlocking with a corresponding protrusion (*e.g.*, which may also be shaped as a logo) on an external high-suction vacuum adapter.

[0044] The mouth prop 160 may be made of thickened silicone material injection molded in a single piece with an elastic strap corresponding to the circumference of the suction connector portion. The mouth prop 160 has an internal, rectangular-shaped female slot designed to fit snugly with the external, rectangular-shaped male plug 220 of the suction connector portion 120 of the mouthpiece. Mouth props may be made in different sizes for differently sized mouths. Because the mouth prop and mouthpiece are detachable from each other, different sizes of each may be mixed and matched as needed for a particular patient's mouth.

[0045] The mouthpiece as described herein may be used with a one-piece, autoclavable, high-suction vacuum adapter. Such a high-suction vacuum body adapter may be made of a single homogenous material. Having a single lever design, such a vacuum adapter may function in the same manner as all the current high-suction vacuum evacuators and saliva ejectors in controlling the removal of water, saliva, and debris from the oral cavity to the outside vacuum source. The single lever may be designed to control the removal of water, saliva, and debris from the at least partially enclosed so main body through a single, large evacuation conduit within the suction connector portion.

[0046] While various embodiments have been described above, it should be understood that they have been presented by way of example only, and not limitation. The descriptions are not intended to limit the scope of the invention to the particular forms set forth herein. Thus, the breadth and scope of a preferred embodiment should not be limited by any of the above-described exemplary embodiments. It should be

understood that the above description is illustrative and not restrictive. To the contrary, the present descriptions are intended to cover such alternatives, modifications, and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims and otherwise appreciated by one of ordinary skill in the art. The scope of the invention should, therefore, be determined not with reference to the above description, but instead should be determined with reference to the appended claims along with their full scope of equivalents.

## CLAIMS

### WHAT IS CLAIMED IS:

1. A mouthpiece comprising:

a main body having a first end opposite a second end that is narrower than the first end, the main body comprising:

a first wall having a plurality of first edges and extending from the first end to the second end,

a second wall having a plurality of second edges and located at a distance from the first wall, the distance corresponding to an interior space between the first wall and the second wall, wherein the second wall also extends from the first end to the second end,

a connecting wall that connects one of the first edges of the first wall to one of the second edges of the second wall across the distance between the first wall and the second wall, and

a bridge structure that includes a plurality of spaced protrusions integral with and protruding from an interior surface of the second wall, the bridge structure extending through the interior space towards the first wall.

2. The mouthpiece of claim 1, wherein the first edges of the first wall include a superior edge and an inferior edge.

3. The mouthpiece of claim 2, wherein the superior edge is formed so as to appear as the inferior edge in a different orientation, and wherein the inferior edge is formed so as to appear as the superior edge in the different orientation.
4. The mouthpiece of claim 1, wherein the second edges of the second wall include a superior edge and an inferior edge.
5. The mouthpiece of claim 1, further comprising a mouth prop connected to the main body at the first end.
6. The mouthpiece of claim 1, further comprising a suction connector extending from the first end of the main body, wherein an evacuation conduit within the suction connector is in communication with the interior space between the first wall and the second wall.
7. The mouthpiece of claim 6, wherein a wall thickness of the suction connector is greater than a wall thickness of the first wall or the second wall of the main body.
8. The mouthpiece of claim 6, wherein the suction connector is configured to connect to a vacuum adapter associated with a vacuum source.
9. The mouthpiece of claim 8, wherein the suction connector further includes a cutout configured to interlock with a corresponding protrusion of the vacuum adapter.

10. The mouthpiece of claim 9, wherein a shape of the cutout follows a shape of a shield logo.

11. The mouthpiece of claim 8, wherein the evacuation conduit carries fluids from the interior space to the vacuum adapter during suction from the vacuum source.

12. The mouthpiece of claim 1, wherein the protrusions of the bridge structure are spaced to form a plurality of gaps.

13. The mouthpiece of claim 12, wherein the gaps formed by the protrusions of the bridge structure are configured to allow fluids to enter the interior space between the first wall and the second wall.

14. The mouthpiece of claim 1, wherein the protrusions of the bridge structure allow for the first wall to remain separate from the second wall during suction by a vacuum source in communication with the interior space.

15. The mouthpiece of claim 1, wherein at least one of the first wall and the second wall includes one or more perforations that allow fluids to enter the interior space between the first wall and the second wall.

16. The mouthpiece of claim 1, further comprising a stability bar extending along a longitudinal axis of the main body between the first wall and the second wall, wherein a thickness of the stability bar reinforces at least a portion of the main body.

17. The mouthpiece of claim 1, further comprising a cheek retractor connected to the second end of the main body.

18. The mouthpiece of claim 1, wherein the main body and the cheek retractor are molded in one piece from a flexible material that allows for bending, and wherein a resilience of the material results in pressure at the cheek retractor when the material is bent.

19. The mouthpiece of claim 1, wherein the main body is molded from an autoclavable material.

20. The mouthpiece of claim 1, wherein the main body further includes a slit that extends along at least a portion of the main body, and wherein the slit opens into the interior space between the first wall and the second wall to assist in cleaning.

## ABSTRACT

A dental mouthpiece is provided that may be attached to a high-suction dental adapter for the purpose of assisting the dental staff during dental procedures through chair-side, hands-free suction, and isolation. Such a mouthpiece may comprise a main body portion, a cheek retractor portion, and a suction connector portion. In some embodiments, the main body portion, cheek retractor portion, and suction connector portion (and sub-portions thereof) may be molded in one piece, preferably by injection molding. In an exemplary embodiment, the mouthpiece may be made of a material that is flexible, translucent, conducive to injection molding, high heat-resistant, and autoclavable. Such a material may include silicone. Because the mouthpiece may be made of a high heat-resistant and autoclavable material, such a mouthpiece may be reusable.

**CERTIFICATION AND REQUEST FOR PRIORITIZED EXAMINATION  
UNDER 37 CFR 1.102(e) (Page 1 of 1)**

|                       |                  |                                               |  |
|-----------------------|------------------|-----------------------------------------------|--|
| First Named Inventor: | Thien Nguyen     | Nonprovisional Application Number (if known): |  |
| Title of Invention:   | INTRAORAL DEVICE |                                               |  |

**APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS PRIORITIZED EXAMINATION FOR THE ABOVE-IDENTIFIED APPLICATION.**

1. The processing fee set forth in 37 CFR 1.17(i)(1) and the prioritized examination fee set forth in 37 CFR 1.17(c) have been filed with the request. The publication fee requirement is met because that fee, set forth in 37 CFR 1.18(d), is currently \$0. The basic filing fee, search fee, and examination fee are filed with the request or have been already been paid. I understand that any required excess claims fees or application size fee must be paid for the application.
2. I understand that the application may not contain, or be amended to contain, more than four independent claims, more than thirty total claims, or any multiple dependent claims, and that any request for an extension of time will cause an outstanding Track I request to be dismissed.
3. The applicable box is checked below:

**I. ☒ Original Application (Track One) - Prioritized Examination under § 1.102(e)(1)**

- i. (a) The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a). This certification and request is being filed with the utility application via EFS-Web.  
---OR---
- (b) The application is an original nonprovisional plant application filed under 35 U.S.C. 111(a). This certification and request is being filed with the plant application in paper.
- ii. An executed inventor's oath or declaration under 37 CFR 1.63 or 37 CFR 1.64 for each inventor, or the application data sheet meeting the conditions specified in 37 CFR 1.53(f)(3)(i) is filed with the application.

**II. ☐ Request for Continued Examination - Prioritized Examination under § 1.102(e)(2)**

- i. A request for continued examination has been filed with, or prior to, this form.
- ii. If the application is a utility application, this certification and request is being filed via EFS-Web.
- iii. The application is an original nonprovisional utility application filed under 35 U.S.C. 111(a), or is a national stage entry under 35 U.S.C. 371.
- iv. This certification and request is being filed prior to the mailing of a first Office action responsive to the request for continued examination.
- v. No prior request for continued examination has been granted prioritized examination status under 37 CFR 1.102(e)(2).

|                                          |                                               |
|------------------------------------------|-----------------------------------------------|
| Signature <b>/Tam Thanh Pham/</b>        | Date <b>June 30, 2023</b>                     |
| Name (Print/Typed) <b>Tam Thanh Pham</b> | Practitioner Registration Number <b>50565</b> |

**Note:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required.\*

☐

\*Total of \_\_\_\_\_ forms are submitted.

## Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

**STATEMENT UNDER 37 CFR 3.73(c)**Applicant/Patent Owner: SOLMETEX, LLC

Application No./Patent No.: \_\_\_\_\_ Filed/Issue Date: \_\_\_\_\_

Titled: INTRAORAL DEVICESOLMETEX, LLC, a corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose one of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is \_\_\_\_\_%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose one of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Inventors To: INCEPT, INC.The document was recorded in the United States Patent and Trademark Office at  
Reel 032545, Frame 0891, or for which a copy thereof is attached.2. From: INCEPT INCORPORATED To: DRYSHIELD, LLCThe document was recorded in the United States Patent and Trademark Office at  
Reel 042916, Frame 0954, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

**STATEMENT UNDER 37 CFR 3.73(c)**3. From: DRYSHIELD, LLC To: SOLMETEX, LLCThe document was recorded in the United States Patent and Trademark Office at  
Reel 060107, Frame 0030, or for which a copy thereof is attached.

4. From: \_\_\_\_\_ To: \_\_\_\_\_

The document was recorded in the United States Patent and Trademark Office at  
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The document was recorded in the United States Patent and Trademark Office at  
Reel \_\_\_\_\_, Frame \_\_\_\_\_, or for which a copy thereof is attached.☐ Additional documents in the chain of title are listed on a supplemental sheet(s).☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Tam Thanh Pham/

Signature

Tam Thanh Pham

Printed or Typed Name

July 30, 2023

Date

50565

Title or Registration Number

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

| Electronic Patent Application Fee Transmittal                                                    |          |                               |        |                      |
|--------------------------------------------------------------------------------------------------|----------|-------------------------------|--------|----------------------|
| Application Number:                                                                              |          |                               |        |                      |
| Filing Date:                                                                                     |          |                               |        |                      |
| Title of Invention:                                                                              |          | INTRAORAL DEVICE              |        |                      |
| First Named Inventor/Applicant Name:                                                             |          | Thien Nguyen                  |        |                      |
| Filer:                                                                                           |          | TamThanh Thi Pham/Cheri Houle |        |                      |
| Attorney Docket Number:                                                                          |          | INCEP-001COF                  |        |                      |
| Filed as Small Entity                                                                            |          |                               |        |                      |
| Filing Fees for Track I Prioritized Examination - Nonprovisional Application under 35 USC 111(a) |          |                               |        |                      |
| Description                                                                                      | Fee Code | Quantity                      | Amount | Sub-Total in USD(\$) |
| Basic Filing:                                                                                    |          |                               |        |                      |
| UTILITY FILING FEE (ELECTRONIC FILING)                                                           | 4011     | 1                             | 64     | 64                   |
| UTILITY SEARCH FEE                                                                               | 2111     | 1                             | 280    | 280                  |
| UTILITY EXAMINATION FEE                                                                          | 2311     | 1                             | 320    | 320                  |
| REQUEST FOR PRIORITIZED EXAMINATION                                                              | 2817     | 1                             | 1680   | 1680                 |
| Pages:                                                                                           |          |                               |        |                      |
| Claims:                                                                                          |          |                               |        |                      |
| Miscellaneous-Filing:                                                                            |          |                               |        |                      |

|                                                                             |                    |                 |                 |               |                             |
|-----------------------------------------------------------------------------|--------------------|-----------------|-----------------|---------------|-----------------------------|
| Solmetex Ex. 2029<br>Ascentcare Dental Products v. Solmetex - IPR2025-01175 | <b>Description</b> | <b>Fee Code</b> | <b>Quantity</b> | <b>Amount</b> | <b>Sub-Total in USD(\$)</b> |
| PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL                                      |                    | 1504            | 1               | 0             | 0                           |
| PROCESSING FEE, EXCEPT PROV. APPLS.                                         |                    | 2830            | 1               | 56            | 56                          |
| <b>Petition:</b>                                                            |                    |                 |                 |               |                             |
| <b>Patent-Appeals-and-Interference:</b>                                     |                    |                 |                 |               |                             |
| <b>Post-Allowance-and-Post-Issuance:</b>                                    |                    |                 |                 |               |                             |
| <b>Extension-of-Time:</b>                                                   |                    |                 |                 |               |                             |
| <b>Miscellaneous:</b>                                                       |                    |                 |                 |               |                             |
| <b>Total in USD (\$)</b>                                                    |                    |                 |                 |               | <b>2400</b>                 |

**Electronic Acknowledgement Receipt**

|                                             |                               |
|---------------------------------------------|-------------------------------|
| <b>EFS ID:</b>                              | 48237122                      |
| <b>Application Number:</b>                  | 18217304                      |
| <b>International Application Number:</b>    |                               |
| <b>Confirmation Number:</b>                 | 5030                          |
| <b>Title of Invention:</b>                  | INTRAORAL DEVICE              |
| <b>First Named Inventor/Applicant Name:</b> | Thien Nguyen                  |
| <b>Customer Number:</b>                     | 138718                        |
| <b>Filer:</b>                               | TamThanh Thi Pham/Cheri Houle |
| <b>Filer Authorized By:</b>                 | TamThanh Thi Pham             |
| <b>Attorney Docket Number:</b>              | INCEP-001COF                  |
| <b>Receipt Date:</b>                        | 30-JUN-2023                   |
| <b>Filing Date:</b>                         |                               |
| <b>Time Stamp:</b>                          | 18:04:39                      |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)   |

**Payment information:**

|                                          |                  |
|------------------------------------------|------------------|
| Submitted with Payment                   | yes              |
| Payment Type                             | DA               |
| Payment was successfully received in RAM | \$2400           |
| RAM confirmation Number                  | E20236TI05435401 |
| Deposit Account                          | 501662           |
| Authorized User                          | Cheri Houle      |

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

| File Listing:   |                                                     |                               |                                          |                  |                  |
|-----------------|-----------------------------------------------------|-------------------------------|------------------------------------------|------------------|------------------|
| Document Number | Document Description                                | File Name                     | File Size(Bytes)/ Message Digest         | Multi Part /.zip | Pages (if appl.) |
| 1               | Application Data Sheet                              | WebADS.pdf                    | 197843                                   | no               | 8                |
|                 |                                                     |                               | b968f32e93fbc9f305724ea04a93fef09db9884a |                  |                  |
| Warnings:       |                                                     |                               |                                          |                  |                  |
| Information:    |                                                     |                               |                                          |                  |                  |
| 2               | Power of Attorney                                   | INCEP-001COF_POA_6-30-23.pdf  | 119939                                   | no               | 2                |
|                 |                                                     |                               | 3dd0418d434f20f7bbb227a2e44d339effe9aa82 |                  |                  |
| Warnings:       |                                                     |                               |                                          |                  |                  |
| Information:    |                                                     |                               |                                          |                  |                  |
| 3               | Oath or Declaration filed                           | INCEP-001COF_DECS_6-30-23.pdf | 226966                                   | no               | 4                |
|                 |                                                     |                               | 48b67c77d64efc7bb3531130b1fce0a685911b10 |                  |                  |
| Warnings:       |                                                     |                               |                                          |                  |                  |
| Information:    |                                                     |                               |                                          |                  |                  |
| 4               | Drawings-only black and white line drawings         | INCEP-001COF_FIGS_6-30-23.pdf | 108820                                   | no               | 11               |
|                 |                                                     |                               | ad1e60c4c7a03e1f090c2003f147a94a9880fa7f |                  |                  |
| Warnings:       |                                                     |                               |                                          |                  |                  |
| Information:    |                                                     |                               |                                          |                  |                  |
| 5               |                                                     | INCEP-001COF_SPEC_6-30-23.pdf | 182083                                   | yes              | 17               |
|                 |                                                     |                               | b550b3419426a24a6343ac1346a5f6c7400619bb |                  |                  |
|                 | Multipart Description/PDF files in .zip description |                               |                                          |                  |                  |
|                 | Document Description                                |                               | Start                                    | End              |                  |
|                 | Specification                                       |                               | 1                                        | 12               |                  |
|                 | Claims                                              |                               | 13                                       | 16               |                  |
|                 | Abstract                                            |                               | 17                                       | 17               |                  |

|                                                             |                                                  |                                             |                                              |    |   |
|-------------------------------------------------------------|--------------------------------------------------|---------------------------------------------|----------------------------------------------|----|---|
| Warnings:<br>Solmetex Ex. 2029                              |                                                  |                                             |                                              |    |   |
| Information:<br>Dental Products v. Solmetex - IPR2025-01175 |                                                  |                                             |                                              |    |   |
| 6                                                           | Track One Request                                | INCEP-001COF_TRACK_ONE_R<br>EQ2_6-30-23.pdf | 119885                                       | no | 2 |
|                                                             |                                                  |                                             | 19dedd828bf8401e3c0c1cf8a1fe423527a2<br>2350 |    |   |
| Warnings:                                                   |                                                  |                                             |                                              |    |   |
| Information:                                                |                                                  |                                             |                                              |    |   |
| 7                                                           | Assignee showing of ownership per 37<br>CFR 3.73 | INCEP-001COF_373_STMT2_6-<br>30-23.pdf      | 175751                                       | no | 3 |
|                                                             |                                                  |                                             | 427d26266808a6dd20e6f3f13468714e042<br>04f65 |    |   |
| Warnings:                                                   |                                                  |                                             |                                              |    |   |
| Information:                                                |                                                  |                                             |                                              |    |   |
| 8                                                           | Fee Worksheet (SB06)                             | fee-info.pdf                                | 50809                                        | no | 2 |
|                                                             |                                                  |                                             | 395d9a2a118c5678ef10f138bf2ae0e84f8c7<br>905 |    |   |
| Warnings:                                                   |                                                  |                                             |                                              |    |   |
| Information:                                                |                                                  |                                             |                                              |    |   |
| Total Files Size (in bytes):                                |                                                  |                                             | 1182096                                      |    |   |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |                        |              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------|--------------|
| <b>Application Data Sheet 37 CFR 1.76</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  | Attorney Docket Number | INCEP-001COF |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  | Application Number     |              |
| Title of Invention                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | INTRAORAL DEVICE |                        |              |
| The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application. |                  |                        |              |

**Secrecy Order 37 CFR 5.2:**

|                          |                                                                                                                                                                                                                                       |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.) |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Inventor Information:**

|                                                                                                                                             |                   |                                                                                                                                       |                    |                                          |    |
|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------|----|
| <b>Inventor 1</b>                                                                                                                           |                   |                                                                                                                                       |                    |                                          |    |
| <b>Legal Name</b>                                                                                                                           |                   |                                                                                                                                       |                    |                                          |    |
| <b>Prefix</b>                                                                                                                               | <b>Given Name</b> | <b>Middle Name</b>                                                                                                                    | <b>Family Name</b> | <b>Suffix</b>                            |    |
|                                                                                                                                             | Thien             |                                                                                                                                       | Nguyen             |                                          |    |
| <b>Residence Information (Select One)</b>                                                                                                   |                   | <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service |                    |                                          |    |
| <b>City</b>                                                                                                                                 | Santa Ana         | <b>State/Province</b>                                                                                                                 | CA                 | <b>Country of Residence <sup>i</sup></b> | US |
| <b>Mailing Address of Inventor:</b>                                                                                                         |                   |                                                                                                                                       |                    |                                          |    |
| <b>Address 1</b>                                                                                                                            | 50 BEARFOOT RD    |                                                                                                                                       |                    |                                          |    |
| <b>Address 2</b>                                                                                                                            |                   |                                                                                                                                       |                    |                                          |    |
| <b>City</b>                                                                                                                                 | Northborough      | <b>State/Province</b>                                                                                                                 | MA                 |                                          |    |
| <b>Postal Code</b>                                                                                                                          | 01532             | <b>Country <sup>i</sup></b>                                                                                                           | US                 |                                          |    |
| <b>Inventor 2</b>                                                                                                                           |                   |                                                                                                                                       |                    |                                          |    |
| <b>Legal Name</b>                                                                                                                           |                   |                                                                                                                                       |                    |                                          |    |
| <b>Prefix</b>                                                                                                                               | <b>Given Name</b> | <b>Middle Name</b>                                                                                                                    | <b>Family Name</b> | <b>Suffix</b>                            |    |
|                                                                                                                                             | Tam Thanh         |                                                                                                                                       | Pham               |                                          |    |
| <b>Residence Information (Select One)</b>                                                                                                   |                   | <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service |                    |                                          |    |
| <b>City</b>                                                                                                                                 | San Francisco     | <b>State/Province</b>                                                                                                                 | CA                 | <b>Country of Residence <sup>i</sup></b> | US |
| <b>Mailing Address of Inventor:</b>                                                                                                         |                   |                                                                                                                                       |                    |                                          |    |
| <b>Address 1</b>                                                                                                                            | 50 BEARFOOT RD    |                                                                                                                                       |                    |                                          |    |
| <b>Address 2</b>                                                                                                                            |                   |                                                                                                                                       |                    |                                          |    |
| <b>City</b>                                                                                                                                 | Northborough      | <b>State/Province</b>                                                                                                                 | MA                 |                                          |    |
| <b>Postal Code</b>                                                                                                                          | 01532             | <b>Country <sup>i</sup></b>                                                                                                           | US                 |                                          |    |
| All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the <b>Add</b> button. |                   |                                                                                                                                       |                    |                                          |    |

**Correspondence Information:**

|                                           |                        |              |
|-------------------------------------------|------------------------|--------------|
| <b>Application Data Sheet 37 CFR 1.76</b> | Attorney Docket Number | INCEP-001COF |
|                                           | Application Number     |              |
| Title of Invention                        | INTRAORAL DEVICE       |              |

Enter either Customer Number or complete the Correspondence Information section below.  
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence information of this application.

|                 |        |                                          |                                             |
|-----------------|--------|------------------------------------------|---------------------------------------------|
| Customer Number | 138718 |                                          |                                             |
| Email Address   |        | <input type="button" value="Add Email"/> | <input type="button" value="Remove Email"/> |

### Application Information:

|                                         |                  |                                           |                                     |
|-----------------------------------------|------------------|-------------------------------------------|-------------------------------------|
| Title of the Invention                  | INTRAORAL DEVICE |                                           |                                     |
| Attorney Docket Number                  | INCEP-001COF     | Small Entity Status Claimed               | <input checked="" type="checkbox"/> |
| Application Type                        | Nonprovisional   |                                           |                                     |
| Subject Matter                          | Utility          |                                           |                                     |
| Total Number of Drawing Sheets (if any) | 11               | Suggested Figure for Publication (if any) |                                     |

### Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

|                                                        |                          |                                            |
|--------------------------------------------------------|--------------------------|--------------------------------------------|
| Application number of the previously filed application | Filing date (YYYY-MM-DD) | Intellectual Property Authority or Country |
|                                                        |                          |                                            |

### Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

### Representative Information:

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                  |                                              |                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------|---------------------------------------------------------|
| Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing. |                                                  |                                              |                                                         |
| Please Select One:                                                                                                                                                                                                                                                                                                                                                                                                                                              | <input checked="" type="radio"/> Customer Number | <input type="radio"/> US Patent Practitioner | <input type="radio"/> Limited Recognition (37 CFR 11.9) |
| Customer Number                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 138718                                           |                                              |                                                         |

|                                           |                  |                        |              |
|-------------------------------------------|------------------|------------------------|--------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                  | Attorney Docket Number | INCEP-001COF |
|                                           |                  | Application Number     |              |
| Title of Invention                        | INTRAORAL DEVICE |                        |              |

|                                                                                                                    |            |             |             |        |                                       |
|--------------------------------------------------------------------------------------------------------------------|------------|-------------|-------------|--------|---------------------------------------|
| Prefix                                                                                                             | Given Name | Middle Name | Family Name | Suffix | <input type="button" value="Remove"/> |
|                                                                                                                    |            |             |             |        |                                       |
| Registration Number                                                                                                |            |             |             |        |                                       |
| Prefix                                                                                                             | Given Name | Middle Name | Family Name | Suffix | <input type="button" value="Remove"/> |
|                                                                                                                    |            |             |             |        |                                       |
| Registration Number                                                                                                |            |             |             |        |                                       |
| Additional Representative Information blocks may be generated within this form by selecting the <b>Add</b> button. |            |             |             |        |                                       |

### Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

|                                                                                                                       |                               |                                       |                                    |               |                         |
|-----------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------------|------------------------------------|---------------|-------------------------|
| Prior Application Status                                                                                              | Pending                       | <input type="button" value="Remove"/> |                                    |               |                         |
| Application Number                                                                                                    | Continuity Type               | Prior Application Number              | Filing or 371(c) Date (YYYY-MM-DD) |               |                         |
|                                                                                                                       | Continuation of               | 14228057                              | 2014-03-27                         |               |                         |
| Prior Application Status                                                                                              | Patented                      | <input type="button" value="Remove"/> |                                    |               |                         |
| Application Number                                                                                                    | Continuity Type               | Prior Application Number              | Filing Date (YYYY-MM-DD)           | Patent Number | Issue Date (YYYY-MM-DD) |
| 14228057                                                                                                              | Continuation of               | 14100323                              | 2013-12-09                         | 8911232       | 2014-12-16              |
| Prior Application Status                                                                                              | Expired                       | <input type="button" value="Remove"/> |                                    |               |                         |
| Application Number                                                                                                    | Continuity Type               | Prior Application Number              | Filing or 371(c) Date (YYYY-MM-DD) |               |                         |
| 14100323                                                                                                              | Claims benefit of provisional | 61734939                              | 2012-12-07                         |               |                         |
| Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the <b>Add</b> button. |                               |                                       |                                    |               |                         |

### Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

|                                           |                  |                        |              |
|-------------------------------------------|------------------|------------------------|--------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                  | Attorney Docket Number | INCEP-001COF |
|                                           |                  | Application Number     |              |
| Title of Invention                        | INTRAORAL DEVICE |                        |              |

| Application Number                                                                                     | Country <sup>i</sup> | Filing Date (YYYY-MM-DD) | Access Code <sup>i</sup> (if applicable) |
|--------------------------------------------------------------------------------------------------------|----------------------|--------------------------|------------------------------------------|
|                                                                                                        |                      |                          |                                          |
| Additional Foreign Priority Data may be generated within this form by selecting the <b>Add</b> button. |                      |                          |                                          |

## Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> | <p>This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.</p> <p>NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.</p> |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                           |                  |                        |              |
|-------------------------------------------|------------------|------------------------|--------------|
| <b>Application Data Sheet 37 CFR 1.76</b> |                  | Attorney Docket Number | INCEP-001COF |
|                                           |                  | Application Number     |              |
| Title of Invention                        | INTRAORAL DEVICE |                        |              |

## Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

**NOTE:** This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

### 1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

**A. Priority Document Exchange (PDX)** - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

**B. Search Results from U.S. Application to EPO** - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

### 2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

- ☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.
- ☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

**NOTE:** Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

|                                           |                        |              |
|-------------------------------------------|------------------------|--------------|
| <b>Application Data Sheet 37 CFR 1.76</b> | Attorney Docket Number | INCEP-001COF |
|                                           | Application Number     |              |
| Title of Invention                        | INTRAORAL DEVICE       |              |

## Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

**Applicant 1**

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

[Clear](#)

☒ Assignee      ☐ Legal Representative under 35 U.S.C. 117      ☐ Joint Inventor

☐ Person to whom the inventor is obligated to assign.      ☐ Person who shows sufficient proprietary interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name      SOLMETEX, LLC

**Mailing Address Information For Applicant:**

|                      |                |                |       |
|----------------------|----------------|----------------|-------|
| Address 1            | 50 BEARFOOT RD |                |       |
| Address 2            |                |                |       |
| City                 | NORTHBOROUGH   | State/Province | MA    |
| Country <sup>i</sup> | US             | Postal Code    | 01532 |
| Phone Number         |                | Fax Number     |       |
| Email Address        |                |                |       |

Additional Applicant Data may be generated within this form by selecting the Add button.

|                                           |                        |              |
|-------------------------------------------|------------------------|--------------|
| <b>Application Data Sheet 37 CFR 1.76</b> | Attorney Docket Number | INCEP-001COF |
|                                           | Application Number     |              |
| Title of Invention                        | INTRAORAL DEVICE       |              |

**Assignee Information including Non-Applicant Assignee Information:**

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |             |                |                          |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|----------------|--------------------------|--|--|--|
| <b>Assignee 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |             |                |                          |  |  |  |
| Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication. |            |             |                |                          |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |             |                |                          |  |  |  |
| If the Assignee or Non-Applicant Assignee is an Organization check here.                                                                                                                                                                                                                                                                                                                                                                               |            |             |                | <input type="checkbox"/> |  |  |  |
| Prefix                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Given Name | Middle Name | Family Name    | Suffix                   |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |             |                |                          |  |  |  |
| <b>Mailing Address Information For Assignee including Non-Applicant Assignee:</b>                                                                                                                                                                                                                                                                                                                                                                      |            |             |                |                          |  |  |  |
| Address 1                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |             |                |                          |  |  |  |
| Address 2                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |             |                |                          |  |  |  |
| City                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |             | State/Province |                          |  |  |  |
| Country i                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |             | Postal Code    |                          |  |  |  |
| Phone Number                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |             | Fax Number     |                          |  |  |  |
| Email Address                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |             |                |                          |  |  |  |
| Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.                                                                                                                                                                                                                                                                                                                                      |            |             |                |                          |  |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |             |                |                          |  |  |  |

|                                           |                        |              |
|-------------------------------------------|------------------------|--------------|
| <b>Application Data Sheet 37 CFR 1.76</b> | Attorney Docket Number | INCEP-001COF |
|                                           | Application Number     |              |
| Title of Invention                        | INTRAORAL DEVICE       |              |

**Signature:**

**NOTE:** This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

|                                                                                     |                  |           |      |                     |       |
|-------------------------------------------------------------------------------------|------------------|-----------|------|---------------------|-------|
| <b>Signature</b>                                                                    | /Tam Thanh Pham/ |           |      | Date (YYYY-MM-DD)   |       |
| First Name                                                                          | Tam Thanh        | Last Name | Pham | Registration Number | 50565 |
| Additional Signature may be generated within this form by selecting the Add button. |                  |           |      |                     |       |



## UNITED STATES PATENT AND TRADEMARK OFFICE

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| APPLICATION<br>NUMBER | FILING or<br>371(c) DATE | GRP ART<br>UNIT | FIL FEE REC'D | ATTY. DOCKET NO | TOT CLAIMS | IND CLAIMS |
|-----------------------|--------------------------|-----------------|---------------|-----------------|------------|------------|
| 18/217,304            | 06/30/2023               |                 | 664           | INCEP-001COF    | 20         | 1          |

CONFIRMATION NO. 5030

## FILING RECEIPT



0000000059551991

138718  
 Polsinelli LLP  
 PO Box 140310  
 Kansas City, MO 64114-0310

Date Mailed: 07/20/2023

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

**Please verify the accuracy of the data presented on this receipt.** If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

**Inventor(s)**

Thien Nguyen, Santa Ana, CA;  
 Tam Thanh Pham, San Francisco, CA;

**Applicant(s)**

SOLMETEX, LLC, Northborough, MA;

**Power of Attorney:** The patent practitioners associated with Customer Number 138718

**Domestic Priority data as claimed by applicant**

This application is a CON of 14/228,057 03/27/2014  
 which is a CON of 14/100,323 12/09/2013 PAT 8,911,232  
 which claims benefit of 61/734,939 12/07/2012

**Foreign Applications** for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

*Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.*

**Permission to Access Application via Priority Document Exchange:** Yes

**Permission to Access Search Results:** Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

**If Required, Foreign Filing License Granted:** 07/18/2023

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 18/217,304**

**Projected Publication Date:** 10/26/2023

**Non-Publication Request:** No

**Early Publication Request:** No

**\*\* SMALL ENTITY \*\***

**Title**

INTRAORAL DEVICE

**Preliminary Class**

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## **PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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**Title 35, United States Code, Section 184**  
**Title 37, Code of Federal Regulations, 5.11 & 5.15**

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The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

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technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

Substitute for Form PTO-875

## APPLICATION AS FILED - PART I

| (Column 1)                                                                |                                                                                                                                                                                                                               | (Column 2)   | SMALL ENTITY |         | OR | OTHER THAN SMALL ENTITY |         |
|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|---------|----|-------------------------|---------|
| FOR                                                                       | NUMBER FILED                                                                                                                                                                                                                  | NUMBER EXTRA | RATE(\$)     | FEE(\$) |    | RATE(\$)                | FEE(\$) |
| BASIC FEE<br>(37 CFR 1.16(a), (b), or (c))                                | N/A                                                                                                                                                                                                                           | N/A          | N/A          | 64      |    | N/A                     |         |
| SEARCH FEE<br>(37 CFR 1.16(k), (l), or (m))                               | N/A                                                                                                                                                                                                                           | N/A          | N/A          | 280     |    | N/A                     |         |
| EXAMINATION FEE<br>(37 CFR 1.16(o), (p), or (q))                          | N/A                                                                                                                                                                                                                           | N/A          | N/A          | 320     |    | N/A                     |         |
| TOTAL CLAIMS<br>(37 CFR 1.16(i))                                          | 20 minus 20 =                                                                                                                                                                                                                 | 0            | x            | = 0     | OR |                         |         |
| INDEPENDENT CLAIMS<br>(37 CFR 1.16(h))                                    | 1 minus 3 =                                                                                                                                                                                                                   |              | x            | = 0     |    |                         |         |
| APPLICATION SIZE FEE<br>(37 CFR 1.16(s))                                  | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). |              |              | 0       |    |                         |         |
| MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))                         |                                                                                                                                                                                                                               |              |              | 0       |    |                         |         |
| * If the difference in column 1 is less than zero, enter "0" in column 2. |                                                                                                                                                                                                                               |              | TOTAL        | 664     |    | TOTAL                   |         |

## APPLICATION AS AMENDED - PART II

|             | (Column 1)                                                      | (Column 2)                       | (Column 3)                         | SMALL ENTITY  |                    | OR                 | OTHER THAN SMALL ENTITY |                    |   |
|-------------|-----------------------------------------------------------------|----------------------------------|------------------------------------|---------------|--------------------|--------------------|-------------------------|--------------------|---|
|             |                                                                 | CLAIMS REMAINING AFTER AMENDMENT | HIGHEST NUMBER PREVIOUSLY PAID FOR | PRESENT EXTRA | RATE(\$)           | ADDITIONAL FEE(\$) | RATE(\$)                | ADDITIONAL FEE(\$) |   |
| AMENDMENT A | Total<br>(37 CFR 1.16(i))                                       | *                                | Minus **                           | =             | x                  | =                  | OR                      | x                  | = |
|             | Independent<br>(37 CFR 1.16(h))                                 | *                                | Minus ***                          | =             | x                  | =                  | OR                      | x                  | = |
|             | Application Size Fee (37 CFR 1.16(s))                           |                                  |                                    |               |                    |                    | OR                      |                    |   |
|             | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) |                                  |                                    |               |                    |                    | OR                      |                    |   |
|             |                                                                 |                                  |                                    |               | TOTAL<br>ADD'L FEE |                    | OR                      | TOTAL<br>ADD'L FEE |   |
| AMENDMENT B | Total<br>(37 CFR 1.16(i))                                       | *                                | Minus **                           | =             | x                  | =                  | OR                      | x                  | = |
|             | Independent<br>(37 CFR 1.16(h))                                 | *                                | Minus ***                          | =             | x                  | =                  | OR                      | x                  | = |
|             | Application Size Fee (37 CFR 1.16(s))                           |                                  |                                    |               |                    |                    | OR                      |                    |   |
|             | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) |                                  |                                    |               |                    |                    | OR                      |                    |   |
|             |                                                                 |                                  |                                    |               | TOTAL<br>ADD'L FEE |                    | OR                      | TOTAL<br>ADD'L FEE |   |

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

\*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.



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| APPLICATION NO.            | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|----------------------------|-------------|----------------------|---------------------|------------------|
| 18/217,304                 | 06/30/2023  | Thien Nguyen         | INCEP-001COF        | 5030             |
| 138718                     | 7590        | 08/09/2023           | EXAMINER            |                  |
| Polsinelli LLP             |             |                      | CENTRAL, DOCKET     |                  |
| PO Box 140310              |             |                      | ART UNIT            | PAPER NUMBER     |
| Kansas City, MO 64114-0310 |             |                      | OPAP                |                  |
|                            |             |                      | NOTIFICATION DATE   | DELIVERY MODE    |
|                            |             |                      | 08/09/2023          | ELECTRONIC       |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocketing@polsinelli.com  
sfpatent@polsinelli.com

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                      |                                      |                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------|--------------------------------|
| <b><i>Decision Granting Request for Prioritized Examination (Track I)</i></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Application No.</b><br>18/217,304 | <b>Applicant(s)</b><br>Nguyen et al. |                                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Examiner</b><br>FIKIRTE A GEREMEW | <b>Art Unit</b><br>OMBL              | <b>AIA (FITF) Status</b><br>No |
| <p>1. THE REQUEST FILED <u>30 June 2023</u> IS <b>GRANTED</b> .</p> <p>The above-identified application has met the requirements for prioritized examination</p> <p>A. <input checked="" type="checkbox"/> for an original nonprovisional application (Track I).</p> <p>B. <input type="checkbox"/> for an application undergoing continued examination (RCE).</p> <p>2. <b>The above-identified application will undergo prioritized examination.</b> The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:</p> <p>A. filing a <b><u>petition for extension of time</u></b> to extend the time period for filing a reply;</p> <p>B. filing an <b><u>amendment to amend the application to contain more than four independent claims, more than thirty total claims</u></b>, or a multiple dependent claim;</p> <p>C. filing a <b><u>request for continued examination</u></b> ;</p> <p>D. filing a notice of appeal;</p> <p>E. filing a request for suspension of action;</p> <p>F. mailing of a notice of allowance;</p> <p>G. mailing of a final Office action;</p> <p>H. completion of examination as defined in 37 CFR 41.102; or</p> <p>I. abandonment of the application.</p> <p>Telephone inquiries with regard to this decision should be directed to FIKIRTE GEREMEW at (703) 756-1930. In his/her absence, calls may be directed to Petition Help Desk at (571) 272-3282.</p> |                                      |                                      |                                |
| /FIKIRTE A GEREMEW/<br>PROGRAM SUPPORT ASSISTANT, OMBL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                      |                                      |                                |

|                                                                                                                                 |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |           |                                       |                     |     |  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------------|---------------|---------------------------|-----------|---------------------------------------|---------------------|-----|--|--|--|
| <b>PATENT APPLICATION FEE DETERMINATION RECORD</b><br>Substitute for Form PTO-875                                               |                                                                                          |                                                                                                                                                                                                                               |              | Application or Docket Number<br>18/217,304 |               | Filing Date<br>06/30/2023 |           | <input type="checkbox"/> To be Mailed |                     |     |  |  |  |
| ENTITY: <input type="checkbox"/> LARGE <input checked="" type="checkbox"/> SMALL <input type="checkbox"/> MICRO                 |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |           |                                       |                     |     |  |  |  |
| <b>APPLICATION AS FILED - PART I</b>                                                                                            |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |           |                                       |                     |     |  |  |  |
|                                                                                                                                 |                                                                                          | (Column 1)                                                                                                                                                                                                                    | (Column 2)   |                                            |               |                           |           |                                       |                     |     |  |  |  |
| FOR                                                                                                                             |                                                                                          | NUMBER FILED                                                                                                                                                                                                                  | NUMBER EXTRA |                                            | RATE (\$)     |                           | FEE (\$)  |                                       |                     |     |  |  |  |
| <input type="checkbox"/> BASIC FEE<br>(37 CFR 1.16(a), (b), or (c))                                                             |                                                                                          | N/A                                                                                                                                                                                                                           | N/A          |                                            | N/A           |                           |           |                                       |                     |     |  |  |  |
| <input type="checkbox"/> SEARCH FEE<br>(37 CFR 1.16(k), (i), or (m))                                                            |                                                                                          | N/A                                                                                                                                                                                                                           | N/A          |                                            | N/A           |                           |           |                                       |                     |     |  |  |  |
| <input type="checkbox"/> EXAMINATION FEE<br>(37 CFR 1.16(o), (p), or (q))                                                       |                                                                                          | N/A                                                                                                                                                                                                                           | N/A          |                                            | N/A           |                           |           |                                       |                     |     |  |  |  |
| TOTAL CLAIMS<br>(37 CFR 1.16(i))                                                                                                |                                                                                          | minus 20 = *                                                                                                                                                                                                                  |              | x \$40 =                                   |               |                           |           |                                       |                     |     |  |  |  |
| INDEPENDENT CLAIMS<br>(37 CFR 1.16(h))                                                                                          |                                                                                          | minus 3 = *                                                                                                                                                                                                                   |              | x \$192 =                                  |               |                           |           |                                       |                     |     |  |  |  |
| <input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))                                                                  |                                                                                          | If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). |              |                                            |               |                           |           |                                       |                     |     |  |  |  |
| <input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))                                                      |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |           |                                       |                     |     |  |  |  |
| * If the difference in column 1 is less than zero, enter "0" in column 2.                                                       |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               | TOTAL                     |           |                                       |                     |     |  |  |  |
| <b>APPLICATION AS AMENDED - PART II</b>                                                                                         |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |           |                                       |                     |     |  |  |  |
|                                                                                                                                 |                                                                                          | (Column 1)                                                                                                                                                                                                                    | (Column 2)   |                                            | (Column 3)    |                           |           |                                       |                     |     |  |  |  |
| <b>AMENDMENT</b>                                                                                                                | 08/11/2023                                                                               | CLAIMS REMAINING AFTER AMENDMENT                                                                                                                                                                                              |              | HIGHEST NUMBER PREVIOUSLY PAID FOR         | PRESENT EXTRA |                           | RATE (\$) |                                       | ADDITIONAL FEE (\$) |     |  |  |  |
|                                                                                                                                 | Total<br>(37 CFR 1.16(i))                                                                | * 30                                                                                                                                                                                                                          | Minus        | ** 20                                      | = 10          |                           | x \$40 =  |                                       | 400                 |     |  |  |  |
|                                                                                                                                 | Independent<br>(37 CFR 1.16(h))                                                          | * 3                                                                                                                                                                                                                           | Minus        | *** 3                                      | = 0           |                           | x \$192 = |                                       | 0                   |     |  |  |  |
|                                                                                                                                 | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))                           |                                                                                                                                                                                                                               |              |                                            |               |                           |           |                                       |                     |     |  |  |  |
|                                                                                                                                 | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) |                                                                                                                                                                                                                               |              |                                            |               |                           |           |                                       |                     |     |  |  |  |
|                                                                                                                                 |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |           | TOTAL ADD'L FEE                       |                     | 400 |  |  |  |
|                                                                                                                                 |                                                                                          | (Column 1)                                                                                                                                                                                                                    | (Column 2)   |                                            | (Column 3)    |                           |           |                                       |                     |     |  |  |  |
| <b>AMENDMENT</b>                                                                                                                |                                                                                          | CLAIMS REMAINING AFTER AMENDMENT                                                                                                                                                                                              |              | HIGHEST NUMBER PREVIOUSLY PAID FOR         | PRESENT EXTRA |                           | RATE (\$) |                                       | ADDITIONAL FEE (\$) |     |  |  |  |
|                                                                                                                                 | Total<br>(37 CFR 1.16(i))                                                                | *                                                                                                                                                                                                                             | Minus        | **                                         | =             |                           | x \$0 =   |                                       |                     |     |  |  |  |
|                                                                                                                                 | Independent<br>(37 CFR 1.16(h))                                                          | *                                                                                                                                                                                                                             | Minus        | ***                                        | =             |                           | x \$0 =   |                                       |                     |     |  |  |  |
|                                                                                                                                 | <input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))                           |                                                                                                                                                                                                                               |              |                                            |               |                           |           |                                       |                     |     |  |  |  |
|                                                                                                                                 | <input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) |                                                                                                                                                                                                                               |              |                                            |               |                           |           |                                       |                     |     |  |  |  |
|                                                                                                                                 |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |           | TOTAL ADD'L FEE                       |                     |     |  |  |  |
| * If the entry in column 1 is less than the entry in column 2, write "0" in column 3.                                           |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |           | LIE                                   |                     |     |  |  |  |
| ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".                                       |                                                                                          |                                                                                                                                                                                                                               |              |                                            |               |                           |           | /EFREM WARREN/                        |                     |     |  |  |  |
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTOR(S):                    Nguyen et al.

APPLICATION NO.:              18/217,304

FILING DATE:                  June 30, 2023

TITLE:                            Intraoral Device

CONFIRM. NO.:                5030

ATTY.DKT.NO.:                INCEP-001COF

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P.O. BOX 1450  
ALEXANDRIA, VA 22313-1450

PRELIMINARY AMENDMENT

Prior to examination of the present application, please enter the following **amendments** to the **claims**, which commence on **page two**. The **remarks** appear beginning on **page eleven**.

## CLAIMS

### WHAT IS CLAIMED IS:

1. (original) A mouthpiece comprising:

a main body having a first end opposite a second end that is narrower than the first end,  
the main body comprising:

a first wall having a plurality of first edges and extending from the first end to the second end,

a second wall having a plurality of second edges and located at a distance from the first wall, the distance corresponding to an interior space between the first wall and the second wall, wherein the second wall also extends from the first end to the second end,

a connecting wall that connects one of the first edges of the first wall to one of the second edges of the second wall across the distance between the first wall and the second wall, and

a bridge structure that includes a plurality of spaced protrusions integral with and protruding from an interior surface of the second wall, the bridge structure extending through the interior space towards the first wall.

2. (currently amended) The mouthpiece of claim 1, wherein one or more of the first edges of the first wall and the second edges of the second wall include a superior edge and an inferior edge.

3. (original) The mouthpiece of claim 2, wherein the superior edge is formed so as to appear as the inferior edge in a different orientation, and wherein the inferior edge is formed so as to appear as the superior edge in the different orientation.

4. - 5. (cancelled)

6. (original) The mouthpiece of claim 1, further comprising a suction connector extending from the first end of the main body, wherein an evacuation conduit within the suction connector is in communication with the interior space between the first wall and the second wall.

7. (original) The mouthpiece of claim 6, wherein a wall thickness of the suction connector is greater than a wall thickness of the first wall or the second wall of the main body.

8. (cancelled)

9. (currently amended) The mouthpiece of claim [[8]] 6, wherein the suction connector further includes a cutout configured to interlock with a corresponding protrusion of [[the]] a vacuum adapter, wherein a shape of the cutout follows a shape of a shield logo.

10. - 15. (cancelled)

16. (currently amended) The mouthpiece of claim 1, further comprising a stability bar corresponding to a thickened area of the main body, the stability bar extending along a longitudinal axis of the main body between the first wall and the second wall, wherein a thickness of the stability bar reinforces at least a portion of the main body.

17. – 19. (cancelled)

20. (original) The mouthpiece of claim 1, wherein the main body further includes a slit that extends along at least a portion of the main body, and wherein the slit opens into the interior space between the first wall and the second wall to assist in cleaning.

21. (new) An isolation mouthpiece for use with a suction system in a dental procedure, the mouthpiece comprising:

a main body portion having a first end and a second end, the main body portion including:

a first wall having a first edge and a second edge extending from the first end of the main body portion towards the second end of the main body portion, the first wall including a first plurality of perforations formed adjacent to and extending along a portion of the first edge and a second plurality of perforations formed adjacent to and extending along a portion of the second edge,

a second wall having a third edge and a fourth edge extending from the first end of the main body portion towards the second end of the main body portion, the second wall including a first plurality of perforations formed adjacent to and extending along a portion of the third edge, and a second plurality of perforations formed adjacent to and extending along a portion of the fourth edge, wherein the second wall further includes a plurality of protrusions extending from an interior surface of the second wall towards the first wall in a shape having one or more crests and one or more troughs, and

a third wall connecting the first wall and the second wall such that the first wall is spaced from the second wall to define an inner cavity, wherein a portion of the first wall has a first width adjacent to the first end of the main body portion and a second width adjacent to the second end of the main body portion and a portion of the second wall has a third width adjacent to the first end of the main body portion and a fourth width adjacent to the second end of the main body portion, wherein the first width is greater than the second width and the third width is greater than the fourth width;

a suction connector portion extending from the first end of the main body portion, the suction connector portion including:  
a generally tubular conduit including:  
an opening extending through the conduit and in fluid communication with the inner cavity, the opening being configured to receive a vacuum portion of the suction system therein, and  
a cutout configured to engage a protrusion on the suction system to aid in coupling the mouthpiece to the suction system;  
a mouth prop including a first side and a second side that are inwardly tapered from a top surface of the mouth prop towards a bottom surface of the mouth prop, the first side and the second each including a plurality of ridges; and  
a cheek retractor portion having a first cheek-retractor end coupled to the second end of the main body portion and a second cheek-retractor end, the first cheek-retractor end and the second cheek-retractor end each having rounded edges.

22. (new) The mouthpiece of claim 21, wherein the cutout has a shield shape.

23. (new) The mouthpiece of claim 21, wherein the cutout is generally triangular and has a top edge, a first curved edge, and a second curved edge.

24. (new) The mouthpiece of claim 21, wherein a wall thickness of the conduit is greater than a wall thickness of the first wall or the second wall of the main body.

25. (new) The mouthpiece of claim 21, wherein the first plurality of perforations of the first wall and the second plurality of perforations of the first wall each include at least five perforations.

26. (new) The mouthpiece of claim 25, wherein the first plurality of perforations of the second wall and the second plurality of perforations of the second wall each include at least three perforations.

27. (new) The mouthpiece of claim 21, wherein the first plurality of perforations of the first wall and the second plurality of perforations of the first wall each include at least seven perforations.

28. (new) The mouthpiece of claim 27, wherein the first plurality of perforations of the second wall and the second plurality of perforations of the second wall each include at least four perforations.

29. (new) The mouthpiece of claim 21, wherein the third wall connects the first edge of the first wall to the third edge of the second wall.

30. (new) The mouthpiece of claim 21, wherein the third wall connects the second edge of the first wall to the fourth edge of the second wall.

31. (new) The mouthpiece of claim 21, wherein the first wall and the second wall are shaped such that the first edge of the first wall corresponds to the third edge of the second wall and the second edge of the first wall corresponds to the fourth edge of the second wall.

32. (new) The mouthpiece of claim 21, wherein the mouth prop is removably coupled to the generally tubular conduit of the suction connector portion.

33. (new) An isolation mouthpiece for use with a suction system in a dental procedure, the mouthpiece comprising:

- a main body portion having a first end and a second narrower end that is narrower than the first end, the main body portion including:

- a first wall having first and second edges extending from the first end towards the second narrower end of the main body portion, the first wall having a first-wall width defined between the first and second edges, the first-wall width being at a maximum in a region between the first and second ends and being at a minimum at the second narrower end, the first wall including a first plurality of perforations formed adjacent to and extending along a substantial portion of the first edge and a second plurality of perforations formed adjacent to and extending along a substantial portion the second edge, at least one of the first plurality of perforations and at least one of the second plurality of perforations being located adjacent to the minimum width of the first wall at the second narrower end of the main body;

- a second wall spaced apart from the first wall to define an inner cavity of the main body between the second wall and the first wall, the second wall having third and fourth edges extending from the first end towards the second end of the main body portion, the second wall having a second-wall width defined between the third and fourth edges, the second-wall width being at a maximum in a region between the first and second ends and being at a minimum at the second narrower end, the second wall including a third plurality of perforations formed adjacent to and extending along a substantial portion of the third edge and a fourth plurality of perforations formed adjacent to and extending along a substantial portion the fourth edge, at least one of the third plurality of perforations and at least one of the fourth plurality of perforations being

- located adjacent to the minimum width of the second wall at the second end of the main body;
- a stability bar located along a center of the first wall at least adjacent to the second narrow end of the main body, the at least one of the first plurality of perforations being positioned on one side of the stability bar and the at least one of the second plurality of perforations being positioned on another side of the stability bar; and
- a bridge structure extending from an interior surface of the first wall toward the second wall, the bridge structure including a plurality of wave-like protrusions to ensure the first wall remains separated from the second wall during suction from the suction system;
- a suction-connector portion extending from the first end of the main body portion, the suction connector portion including:
  - a generally tubular conduit including an opening extending through the conduit and in fluid communication with the inner cavity of the main body, the opening being configured to receive a vacuum portion of the suction system therein for providing suction to the inner cavity; and
  - a mouth prop that extends away from the tubular conduit, the mouth prop at least partially defined by a first side and a second side that generally taper inwardly in a direction away from the tubular conduit towards a bottom surface of the mouth prop, the first side and the second side including a plurality of ridges; and
- a cheek-retractor portion connected to the second narrower end of the main body portion and expanding outwardly away from the second narrower end, the first and second walls of the main body transitioning into and being connected in the cheek-retractor portion to form the cheek-retractor portion.

34. (new) The mouthpiece of claim 33, wherein the generally tubular conduit of the suction-connector portion includes a cutout configured to engage a protrusion on the suction system to aid in coupling the mouthpiece to the suction system.

35. (new) The mouthpiece of claim 34, wherein the cutout is on the same side of the suction-connector portion as the mouth prop.

36. (new) The mouthpiece of claim 33, wherein the first plurality of perforations of the first wall and the second plurality of perforations of the first wall each include at least five perforations.

37. (new) The mouthpiece of claim 33, wherein the stability bar extends upwardly from the first wall toward the second wall.

38. (new) The mouthpiece of claim 37, wherein the stability bar does not contact the second wall.

39. (new) The mouthpiece of claim 33, wherein the bridge structure is located centrally in the main body.

40. (new) The mouthpiece of claim 33, wherein the narrower second end is part of a rectangular portion of the main body.

41. (new) The mouthpiece of claim 33, wherein the first and second walls of the main body that transition into the cheek-retractor portion remain unconnected from each other for a distance within the cheek-retractor portion before being connected to each other in the cheek-retractor portion.

42. (new) The mouthpiece of claim 41, wherein the at least one of the first plurality of perforations and the at least one of the second plurality of perforations located adjacent to the second narrower end of the main body are near the unconnected portion of the first and second walls within the cheek-retractor portion.

## REMARKS

The Applicants have amended claims 2, 9, and 16; cancelled claims 4, 5, 8, 10-15, and 17-19; and added new claims 21-42. The amended/new claims concern subject matter fully supported by the specification and drawings, and to which the Applicant believes that it is entitled to claim. As such, no new matter has been added, and entry and consideration of the same is respectfully requested.

Applicant submits that the claims are in a condition for allowance and action toward that end is earnestly solicited. The Examiner is invited to contact the Applicant's undersigned representative with any questions concerning the present amendment.

Applicant is submitting excess claim fees (10 claims in excess of 20 x \$40) herewith. It is believed that no additional fees are due; however, should any additional fees be required (except for payment of the issue fee), the Commissioner is authorized to deduct the fees from deposit account 50-1662.

Respectfully submitted,

**August 11, 2023**

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| Electronic Patent Application Fee Transmittal |                               |          |        |                      |
|-----------------------------------------------|-------------------------------|----------|--------|----------------------|
| Application Number:                           | 18217304                      |          |        |                      |
| Filing Date:                                  | 30-Jun-2023                   |          |        |                      |
| Title of Invention:                           | INTRAORAL DEVICE              |          |        |                      |
| First Named Inventor/Applicant Name:          | Thien Nguyen                  |          |        |                      |
| Filer:                                        | TamThanh Thi Pham/Cheri Houle |          |        |                      |
| Attorney Docket Number:                       | INCEP-001COF                  |          |        |                      |
| Filed as Small Entity                         |                               |          |        |                      |
| Filing Fees for Utility under 35 USC 111(a)   |                               |          |        |                      |
| Description                                   | Fee Code                      | Quantity | Amount | Sub-Total in USD(\$) |
| Basic Filing:                                 |                               |          |        |                      |
| Pages:                                        |                               |          |        |                      |
| Claims:                                       |                               |          |        |                      |
| CLAIMS IN EXCESS OF 20                        | 2202                          | 10       | 40     | 400                  |
| Miscellaneous-Filing:                         |                               |          |        |                      |
| Petition:                                     |                               |          |        |                      |
| Patent-Appeals-and-Interference:              |                               |          |        |                      |
| Post-Allowance-and-Post-Issuance:             |                               |          |        |                      |

|                                                        |             |          |          |        |                      |
|--------------------------------------------------------|-------------|----------|----------|--------|----------------------|
| Solmetex Ex. 2029                                      | Description | Fee Code | Quantity | Amount | Sub-Total in USD(\$) |
| Ascentcare Dental Products v. Solmetex - IPR2025-01175 |             |          |          |        |                      |
| Extension-of-Time:                                     |             |          |          |        |                      |
| Miscellaneous:                                         |             |          |          |        |                      |
| Total in USD (\$)                                      |             |          |          |        | 400                  |

**Electronic Acknowledgement Receipt**

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|---------------------------------------------|-------------------------------|
| <b>EFS ID:</b>                              | 48430123                      |
| <b>Application Number:</b>                  | 18217304                      |
| <b>International Application Number:</b>    |                               |
| <b>Confirmation Number:</b>                 | 5030                          |
| <b>Title of Invention:</b>                  | INTRAORAL DEVICE              |
| <b>First Named Inventor/Applicant Name:</b> | Thien Nguyen                  |
| <b>Customer Number:</b>                     | 138718                        |
| <b>Filer:</b>                               | TamThanh Thi Pham/Cheri Houle |
| <b>Filer Authorized By:</b>                 | TamThanh Thi Pham             |
| <b>Attorney Docket Number:</b>              | INCEP-001COF                  |
| <b>Receipt Date:</b>                        | 11-AUG-2023                   |
| <b>Filing Date:</b>                         | 30-JUN-2023                   |
| <b>Time Stamp:</b>                          | 15:49:41                      |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)   |

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| RAM confirmation Number                  | E20238AF50237606 |
| Deposit Account                          | 501662           |
| Authorized User                          | Cheri Houle      |

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.21 (Miscellaneous fees and charges)

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Solmetex Ex. 2029

37 CFR 1.17 (Patent application and reexamination processing fees)  
Ascentcare Dental Products v. Solmetex IPR 2019-01975

37 CFR 1.16 (National application filing, search, and examination fees)

File Listing:

| Document Number              | Document Description                                | File Name                             | File Size(Bytes)/ Message Digest         | Multi Part /.zip | Pages (if appl.) |
|------------------------------|-----------------------------------------------------|---------------------------------------|------------------------------------------|------------------|------------------|
| 1                            |                                                     | INCEP-001COF_PRELIM_AMEND_8-11-23.pdf | 173527                                   | yes              | 11               |
|                              |                                                     |                                       | 888055cbd1a32410e2ea2d7740f225be7981232e |                  |                  |
|                              | Multipart Description/PDF files in .zip description |                                       |                                          |                  |                  |
|                              | Document Description                                |                                       | Start                                    | End              |                  |
|                              | Preliminary Amendment                               |                                       | 1                                        | 1                |                  |
|                              | Claims                                              |                                       | 2                                        | 10               |                  |
|                              | Applicant Arguments/Remarks Made in an Amendment    |                                       | 11                                       | 11               |                  |
| Warnings:                    |                                                     |                                       |                                          |                  |                  |
| Information:                 |                                                     |                                       |                                          |                  |                  |
| 2                            | Fee Worksheet (SB06)                                | fee-info.pdf                          | 37425                                    | no               | 2                |
|                              |                                                     |                                       | e8c99120aa327dd6b3daf74e6f264ac707d3bc92 |                  |                  |
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**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Substitute for Form 1449/PTO

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

**Complete if Known**

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18/217,304             |
| Filing Date            | June 30, 2023          |
| First Named Inventor:  | Thien Nguyen           |
| Art Unit               | 3772                   |
| Examiner Name          | APONTE, MIRAYDA ARLENE |
| Attorney Docket Number | INCEP-001COF           |

Sheet

1

of

2

## U.S. PATENT DOCUMENTS

| Examiner Initials* | Cite No. <sup>1</sup> | Document Number                          |          | Publication Date<br>MM-DD-YYYY | Name of Patentee or<br>Applicant of Cited Document | Pages, Columns, Lines,<br>Where Relevant<br>Passages or Relevant<br>Figures Appear |
|--------------------|-----------------------|------------------------------------------|----------|--------------------------------|----------------------------------------------------|------------------------------------------------------------------------------------|
|                    |                       | Number-Kind Code <sup>2</sup> (If known) |          |                                |                                                    |                                                                                    |
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|                    | 2                     | US-                                      | D364,456 | 11-21-1995                     | Solnit et al.                                      |                                                                                    |
|                    | 3                     | US-                                      | D495,799 | 09-07-2004                     | Hirsch et al.                                      |                                                                                    |
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|                    | 8                     | US-                                      | D696,779 | 12-31-2013                     | Hirsch et al.                                      |                                                                                    |
|                    | 9                     | US-                                      | D734,851 | 07-21-2015                     | Nguyen et al.                                      |                                                                                    |
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|  | 55  | US- | 6022214      | 02-08-2000 | Hirsch et al.     |  |
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Japanese patent documents, the indication of the year of reign of the Emperor must precede the serial number of the patent document. <sup>5</sup>Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup>Applicant is to place a check mark here if English language translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SENT FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.**

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| <b>Substitute for Form 1449/PTO</b><br><br><b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b><br><i>(use as many sheets as necessary)</i> |          | <b>Complete if Known</b>                                                                                                                                                                                                                                                                                             |                        |
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|                                                                                                                                                 |          | Application Number                                                                                                                                                                                                                                                                                                   | 18/217,304             |
|                                                                                                                                                 |          | Filing Date                                                                                                                                                                                                                                                                                                          | June 30, 2023          |
|                                                                                                                                                 |          | First Named Inventor:                                                                                                                                                                                                                                                                                                | Thien Nguyen           |
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|                                                                                                                                                 |          | Examiner Name                                                                                                                                                                                                                                                                                                        | APONTE, MIRAYDA ARLENE |
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**PCT****INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

|                                                                                                                                         |                                                                                          |                                                                                 |                  |
|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|------------------|
| Applicant's or agent's file reference<br><b>INCEP-001PCT</b>                                                                            | <b>FOR FURTHER ACTION</b>                                                                |                                                                                 | See item 4 below |
| International application No.<br><b>PCT/US2014/032892</b>                                                                               | International filing date ( <i>day/month/year</i> )<br><b>03 April 2014 (03.04.2014)</b> | Priority date ( <i>day/month/year</i> )<br><b>09 December 2013 (09.12.2013)</b> |                  |
| International Patent Classification (8th edition unless older edition indicated)<br><b>See relevant information in Form PCT/ISA/237</b> |                                                                                          |                                                                                 |                  |
| Applicant<br><b>INCEPT, INC.</b>                                                                                                        |                                                                                          |                                                                                 |                  |

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- |                                     |              |                                                                                                                                                                 |
|-------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report                                                                                                                                             |
| <input type="checkbox"/>            | Box No. II   | Priority                                                                                                                                                        |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability                                                                |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention                                                                                                                                      |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited                                                                                                                                         |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application                                                                                                                |
| <input type="checkbox"/>            | Box No. VIII | Certain observations on the international application                                                                                                           |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

|                                                                                               |  |                                                                     |
|-----------------------------------------------------------------------------------------------|--|---------------------------------------------------------------------|
|                                                                                               |  | Date of issuance of this report<br><b>14 June 2016 (14.06.2016)</b> |
| The International Bureau of WIPO<br>34, chemin des Colombettes<br>1211 Geneva 20, Switzerland |  | Authorized officer<br><br><b>Kihwan Moon</b>                        |
| Facsimile No. +41 22 338 82 70                                                                |  | e-mail: pt01.pct@wipo.int                                           |

Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175

**PATENT COOPERATION TREATY**From the  
INTERNATIONAL SEARCHING AUTHORITYTo: TAM THANH PHAM  
LEWIS ROCA ROTHGERBER LLP  
2440 W EL CAMINO REAL, 6TH FLOOR  
MOUNTAIN VIEW, CA 94040**PCT**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing  
(day/month/year)**04 SEP 2014**Applicant's or agent's file reference  
INCEP-001PCT**FOR FURTHER ACTION**

See paragraph 2 below

International application No.

PCT/US2014/032892

International filing date (day/month/year)

03 April 2014

Priority date (day/month/year)

09 December 2013

International Patent Classification (IPC) or both national classification and IPC

IPC(8) - A41C 17/00, 17/06 (2014.01)

CPC - A41C 17/00 (2014.07)

Applicant INCEPT, INC.

## 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US  
Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450, Alexandria, Virginia 22313-1450  
Facsimile No. 571-273-3201

Date of completion of this opinion

22 August 2014

Authorized officer:

Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300  
PCT OSP: 571-272-7774

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US2014/032892

**Box No. 1      Basis of this opinion**

1. With regard to the **language**, this opinion has been established on the basis of:



the international application in the language in which it was filed.



a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

a. (means)



on paper



in electronic form

b. (time)



in the international application as filed



together with the international application in electronic form



subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US2014/032892

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

## 1. Statement

|                               |        |             |     |
|-------------------------------|--------|-------------|-----|
| Novelty (N)                   | Claims | 5-11, 13-18 | YES |
|                               | Claims | 1-4, 12     | NO  |
| Inventive step (IS)           | Claims | None        | YES |
|                               | Claims | 1-18        | NO  |
| Industrial applicability (IA) | Claims | 1-18        | YES |
|                               | Claims | None        | NO  |

## 2. Citations and explanations:

Claims 1-4 and 12 lack novelty under PCT Article 33(2) as being anticipated by Hirsch et al hereinafter referred to as Hirsch. Regarding claim 1, Hirsch teaches a dental mouthpiece (intraoral device 20; Fig. 2; para [0042]) composed of a material (Abstract), the dental mouthpiece comprising:

- a main body portion (main body portion 50; Fig. 2; para [0047]) comprising a defined pocket (main receiving channel 62; Fig. 2; para [0047]) having an anterior wall (shown in Fig. 3), a posterior wall (shown in Fig. 4), and a side wall (shown in Figs. 5 and 8A-8B) in between the anterior wall and the posterior wall, wherein the anterior wall, the posterior wall, and the side wall define an interior portion of the defined pocket;
- a cheek retractor portion (cheek retractor portion 52 of retractor 22; Fig. 2; para [0046]) configured to press against a cheek of a patient when placed in a mouth of the patient (para [0043]), wherein resilience of the material causes the cheek retractor portion to retract a cheek of the patient away from the teeth of the patient (para [0043]); and
- a suction connector portion (exit port 108; Fig. 3; para[0058]) for connecting the interior portion of the main body to a vacuum suction source (vacuum source 110; Fig. 1; para [0062]).

Regarding claim 2, Hirsch teaches the mouthpiece of claim 1, wherein the side wall includes a plurality of perforations (evacuation holes 60; Figs. 3-4; para [0047]).

Regarding claim 3, Hirsch teaches the mouthpiece of claim 1, wherein the anterior wall and the posterior wall each includes a plurality of perforations (evacuation holes 60; Figs. 3-4).

Regarding claim 4, Hirsch teaches the mouthpiece of claim 1, wherein the anterior wall further includes a slit along a central axis (shown in Fig. 2 near channels 66).

Regarding claim 12, Hirsch teaches the mouthpiece of claim 1, further comprising a detachable (via pivot pins 92; para [0055]) mouth prop (bite block 26; Fig. 2).

Claims 5, 6, 17 and 18 lack an inventive step under PCT Article 33(3) as being obvious over Hirsch.

Regarding claim 5, Hirsch teaches the mouthpiece of claim 1, further comprising a stability bar (dispersion piece 24; Fig. 3). Hirsch fails to teach the stability bar protruding from an interior surface of the posterior wall. In Fig. 3, Hirsch shows the stability bar protruding from an interior of the anterior wall.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch to include the stability bar protruding from the interior wall of the posterior wall, since a mere reversal of essential working parts of a device involves only routine skill in the art. The motivation for doing so would be to provide a mouthpiece that would come in two different configurations, depending on the side of the mouth being examined (para [0045]).

Hirsch further fails to teach wherein a thickness of the stability bar increases resilience of the cheek retractor portion during bending.

However, Hirsch teaches a combined thickness when the stability bar is connected to the mouthpiece (using pivot pins 92) (see Figs. 2 and 3 which shows the main body 50 before and after attachment of the stability bar).

Further, Hirsch teaches both the stability bar (dispersion piece 24) and the cheek retractor portion (cheek retractor portion 52) are made of flexible material and are in pivot connection (para [0045]; [0049]).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch with increased resilience of the cheek retractor portion during bending in order to provide a mouthpiece to better accommodate different mouth sizes and shapes.

(Continued in Supplemental Boxes)

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US2014/032892

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Box V

Regarding claim 6, Hirsch teaches the mouthpiece of claim 1, wherein the main body portion, the cheek retractor portion, and the suction connector portion, but lacks the teaching that they are formed by injection-molded as one piece.

However, in an alternate embodiment shown in Fig. 18A, Hirsch teaches intraoral device (200) preferably has a single-piece, integrated homogenous-material, injection-molded construction (para [0074]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch, as taught in the alternate embodiment, for the purpose of minimize the cost of construction of each device, thus eliminating the need for reuse.

Regarding claim 17, Hirsch teaches the mouthpiece of claim 1, but lacks the teaching of the suction connector portion comprises a cutout corresponding to a protrusion on a vacuum adapter for an interlocking fit.

However, in alternate embodiment shown in Fig. 18B, Hirsch teaches the suction connector portion (connection section 570) comprises a cutout (slots 630) corresponding to a protrusion (barbs 690) on a vacuum adapter (vacuum-only adapter 230 by way of plug portion 640; Fig. 18B; para [0092]) for an interlocking fit (para [0092]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch, as taught in the alternate embodiment, for the purpose of providing a more secure connection between the suction connection portion and the vacuum.

Regarding claim 18, Hirsch teaches the mouthpiece of claim 1, but lacks the teaching of the anterior wall and the posterior wall having different thicknesses.

However, Hirsch teaches the intraoral device "may also come in different sizes...to accommodate different mouth sizes and shapes" (para [0056]). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch to include an anterior wall and posterior wall having different thicknesses, for the purpose of providing a device that may accommodate a variety of patients' mouths.

Claim 7 lacks an inventive step under PCT Article 33(3) as being obvious over Hirsch in view of Bowman et al hereinafter referred to as Bowman.

Regarding claim 7, Hirsch teaches the mouthpiece of claim 1, wherein the material used in the injection molding is autoclavable.

Hirsch teaches "the bite piece 26 and dispersion piece 24 are autoclaved" (para [0060]). However, Hirsch lacks the teaching wherein the material used in the injection-molding is a flexible, translucent material.

However, in an alternate embodiment shown in Figs. 18A-18B, Hirsch teaches the "intraoral device is preferably injection molded out of a translucent, flexible...elastomer" (para [0074]).

Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device, as taught by the alternate embodiment for the purpose of minimizing construction costs a provide a device that may accommodate many different patients mouths.

Hirsch also fails to teach the mouthpiece wherein the material used in the injection molding is a high heat-resistant, silicone-based material.

Bowman teaches dental positioners where the use of "silicone became very acceptable because of its...resistance to heat" (para [0018]). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the intraoral device of Hirsch to include a heat resistant silicone-based material, as taught by Bowman, since selection of a known material on the basis of its suitability for an intended use involves only routine skill in the art. The motivation for doing so would be to provide a device with enhanced efficacy and patient comfort.

Claims 8-10 and 13-16 lack an inventive step under PCT Article 33(3) as being obvious over Hirsch in view Black et al hereinafter referred to as Black.

Regarding claim 8, Hirsch teaches the mouthpiece of claim 1, but lacks the teaching of the mouthpiece further comprising a bridge structure protruding from an interior surface of the posterior wall, the protruding bridge structure comprising a plurality of spaced contact points that keep the anterior wall separated from the posterior wall during suction.

Black teaches an intraoral device comprising a bridge structure (transverse walls 348c; Figs. 23A and 23C) protruding from an interior surface of the posterior wall (posterior layer 348a), the protruding bridge structure comprising a plurality of spaced contact points that keep the anterior wall (anterior layer 348b) separated from the posterior wall during suction (para [0122]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch, as taught by Black, for the purpose of providing enhanced efficacy during suction.

Regarding claim 9, Hirsch and Black teach the mouthpiece of claim 8, but lack the teaching wherein the bridge structure protrudes from the interior surface of the posterior wall in a wave shape, and wherein the contact points are at crests of the wave shape.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the intraoral device of Hirsch to include bridge structures with the contact points are at crests of the wave shape, since a change in shape of an element involves only routine skill in the art. The motivation for doing so would be to provide enhanced efficacy during suction.

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/US2014/032892

**Supplemental Box**

**In case the space in any of the preceding boxes is not sufficient.**  
Continuation of:

Regarding claim 10, Hirsch and Black teach the mouthpiece of claim 9, wherein troughs are configured to allow suction through the bridge structure. Black teaches "in this way the channels 342,343 (troughs)...thereby allowing for simultaneous aspiration of debris and fluid" para [0122]). However, Hirsch and Black lack the teaching wherein the bridge structure protrudes from the interior surface of the posterior wall in a wave shape, and wherein the contact points are at crests of the wave shape.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the intraoral device of Hirsch to include bridge structures with the contact points are at crests of the wave shape, since a change in shape of an element involves only routine skill in the art. The motivation for doing so would be to provide enhanced efficacy during suction.

Regarding claim 13, Hirsch teaches the mouthpiece of claim 12, but lacks the teaching of wherein the detachable mouth prop comprises a strap configured to fit around the suction connector portion, wherein an external surface of the suction connector portion comprises a notch region corresponding to the strap, and wherein an external surface of the strap is substantially flush with a remaining external surface of the suction connector portion when the strap sits in the notch region.

Hirsch does teach a notch region (plug portion 640) for matingly corresponding to connection section 570 of tube 590; Fig. 18B; para [0092]).

Black teaches an intraoral device comprising a strap (conduit 312; Fig. 20B; para [0114]) configured to fit around the suction connector portion ("neck of tongue..."; para [0114]) wherein an external surface of the suction connector portion (Figs. 23B-23C; neck 346; para [0126]), comprises a region corresponding to the strap, and wherein an external surface of the strap is substantially flush with a remaining external surface of the suction connector portion when the strap sits in the region (para [0126]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch, as taught by Black, for the purpose of providing a more secure connection between the mouth prop and suction connection portion.

Regarding claim 14, Hirsch and Black teach the mouthpiece of claim 13, but lack the teaching wherein the strap is injection-molded in a single piece with the mouth prop.

Hirsch teaches the use of injection molding for the intraoral device ("one piece, flexible injection-molded body; Abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Hirsch device, since the use of a one piece construction instead of the structure disclosed in the prior art would have required only routine skill in the art. The motivation for doing so would be to provide enhanced efficacy during suction.

Regarding claim 15, Hirsch teaches the mouthpiece of claim 1, but lacks the teaching wherein the suction connector portion further comprises an external plug protrusion corresponding to an opening in a mouth prop associated with the strap.

Black teaches an intraoral device wherein the suction connector portion further comprises an external plug protrusion (longitudinal projection 344; para [0126]) corresponding to an opening (groove 311; Fig. 20D; para [0126]) in a mouth prop associated with the strap (para [0126]). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Hirsch, with the intraoral device as taught by Black, in order to provide a more secure connection at the suction connection portion.

Regarding claim 16, Hirsch and Black teach the mouthpiece of claim 15, wherein the plug protrusion fits into the opening to provide additional crush-resistance and decreased compressibility during biting by the patient.

Hirsch does teach, when adding plug 640 into connection section 570, "the plug...helps keep bite piece 250 from collapsing; para [0092]). Specifically, Black teaches the plug protrusion (longitudinal projection 344) fits into the opening (groove 311).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Hirsch, with the plug protrusion as taught by Black, for the purpose of providing a more secure connection at the suction connection portion.

Claims 11 lacks an inventive step under PCT Article 33(3) as being obvious over Hirsch in view of Oliva et al hereinafter referred to as Oliva.

Regarding claim 11, Hirsch teaches the mouthpiece of claim 1, but lacks the teaching wherein the suction connector portion comprises an internal stop to assist in positioning of a vacuum suction source or a vacuum adaptor.

Oliva teaches a dental instrument that comprises an internal stop (spring-loaded valve stem 239; Fig. 14; col.8, lns. 15-22).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch to include an internal stop, as taught by Oliva, for the purpose of manually stopping the suctioning during positioning of the vacuum source.

Claims 1-18 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry

Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175

## PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To: TAM THANH PHAM  
LEWIS ROCA ROTHGERBER LLP  
2440 W EL CAMINO REAL, 6TH FLOOR  
MOUNTAIN VIEW, CA 94040

PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT AND  
THE WRITTEN OPINION OF THE INTERNATIONAL  
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing  
(day/month/year)

04 SEP 2014

Applicant's or agent's file reference

INCEP-001PCT

FOR FURTHER ACTION See paragraphs 1 and 4 below

International application No.

PCT/US2014/032892

International filing date

(day/month/year)

03 April 2014

Applicant INCEPT, INC.

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

**Filing of amendments and statement under Article 19:**

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

**When?** The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

**How?** Directly to the International Bureau of WIPO preferably through ePCT or on paper to, 34 chemin des Colombettes  
1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

**For more detailed instructions, see** *PCT Applicant's Guide*, International Phase, paragraphs 9.004 – 9.011.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:
- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.
- ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

**4. Reminders**

The applicant may **submit comments on an informal basis on the written opinion of the International Searching Authority** to the International Bureau. These comments will be made available to the public after international publication. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established.

Shortly after the expiration of **18 months from the priority date, the international application will be published** by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for **entry into the national phase** before those designated Offices. In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months. For details about the applicable time limits, Office by Office, see [www.wipo.int/pct/en/texts/time\\_limits.html](http://www.wipo.int/pct/en/texts/time_limits.html) and the *PCT Applicant's Guide*, National Chapters.

Within **19 months from the priority date, the applicant may request that a supplementary international search be carried out** by a different International Searching Authority that offers this service (Rule 45bis.1). The procedure for requesting supplementary international search is described in the *PCT Applicant's Guide*, International Phase, paragraphs 8.006-8.032.

Name and mailing address of the ISA/  
Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450, Alexandria, Virginia 22313-1450  
Facsimile No. 571-273-3201

Authorized officer

Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300  
Telephone No. PCT OSP: 571-272-7774

Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175

## PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To: TAM THANH PHAM  
LEWIS ROCA ROTHGERBER LLP  
2440 W EL CAMINO REAL, 6TH FLOOR  
MOUNTAIN VIEW, CA 94040

**PCT**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing  
(day/month/year)

**04 SEP 2014**

Applicant's or agent's file reference  
INCEP-001PCT

**FOR FURTHER ACTION**

See paragraph 2 below

International application No.

PCT/US2014/032892

International filing date (day/month/year)

03 April 2014

Priority date (day/month/year)

09 December 2013

International Patent Classification (IPC) or both national classification and IPC

IPC(8) - A41C 17/00, 17/06 (2014.01)

CPC - A41C 17/00 (2014.07)

Applicant INCEPT, INC.

## 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

## 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US  
Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450, Alexandria, Virginia 22313-1450  
Facsimile No. 571-273-3201

Date of completion of this opinion

22 August 2014

Authorized officer:

Blaine R. Copenheaver

PCT Helpdesk: 571-272-4300  
PCT OSP: 571-272-7774

Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US2014/032892

**Box No. I      Basis of this opinion**

1. With regard to the **language**, this opinion has been established on the basis of:
  - ☒ the international application in the language in which it was filed.
  - ☐ a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:
  - a. (means)
    - ☐ on paper
    - ☐ in electronic form
  - b. (time)
    - ☐ in the international application as filed
    - ☐ together with the international application in electronic form
    - ☐ subsequently to this Authority for the purposes of search
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US2014/032892

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

## 1. Statement

|                               |        |             |     |
|-------------------------------|--------|-------------|-----|
| Novelty (N)                   | Claims | 5-11, 13-18 | YES |
|                               | Claims | 1-4, 12     | NO  |
| Inventive step (IS)           | Claims | None        | YES |
|                               | Claims | 1-18        | NO  |
| Industrial applicability (IA) | Claims | 1-18        | YES |
|                               | Claims | None        | NO  |

## 2. Citations and explanations:

Claims 1-4 and 12 lack novelty under PCT Article 33(2) as being anticipated by Hirsch et al hereinafter referred to as Hirsch. Regarding claim 1, Hirsch teaches a dental mouthpiece (intraoral device 20; Fig. 2; para [0042]) composed of a material (Abstract), the dental mouthpiece comprising:

a main body portion (main body portion 50; Fig. 2; para [0047]) comprising a defined pocket (main receiving channel 62; Fig. 2; para [0047]) having an anterior wall (shown in Fig. 3), a posterior wall (shown in Fig. 4), and a side wall (shown in Figs. 5 and 8A-8B) in between the anterior wall and the posterior wall, wherein the anterior wall, the posterior wall, and the side wall define an interior portion of the defined pocket;

a cheek retractor portion (cheek retractor portion 52 of retractor 22; Fig. 2; para [0046]) configured to press against a cheek of a patient when placed in a mouth of the patient (para [0043]), wherein resilience of the material causes the cheek retractor portion to retract a cheek of the patient away from the teeth of the patient (para [0043]); and

a suction connector portion (exit port 108; Fig. 3; para[0058]) for connecting the interior portion of the main body to a vacuum suction source (vacuum source 110; Fig. 1; para [0062]).

Regarding claim 2, Hirsch teaches the mouthpiece of claim 1, wherein the side wall includes a plurality of perforations (evacuation holes 60; Figs. 3-4; para [0047]).

Regarding claim 3, Hirsch teaches the mouthpiece of claim 1, wherein the anterior wall and the posterior wall each includes a plurality of perforations (evacuation holes 60; Figs. 3-4).

Regarding claim 4, Hirsch teaches the mouthpiece of claim 1, wherein the anterior wall further includes a slit along a central axis (shown in Fig. 2 near channels 66).

Regarding claim 12, Hirsch teaches the mouthpiece of claim 1, further comprising a detachable (via pivot pins 92; para [0055]) mouth prop (bite block 26; Fig. 2).

Claims 5, 6, 17 and 18 lack an inventive step under PCT Article 33(3) as being obvious over Hirsch.

Regarding claim 5, Hirsch teaches the mouthpiece of claim 1, further comprising a stability bar (dispersion piece 24; Fig. 3). Hirsch fails to teach the stability bar protruding from an interior surface of the posterior wall. In Fig. 3, Hirsch shows the stability bar protruding from an interior of the anterior wall.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch to include the stability bar protruding from the interior wall of the posterior wall, since a mere reversal of essential working parts of a device involves only routine skill in the art. The motivation for doing so would be to provide a mouthpiece that would come in two different configurations, depending on the side of the mouth being examined (para [0045]).

Hirsch further fails to teach wherein a thickness of the stability bar increases resilience of the cheek retractor portion during bending. However, Hirsch teaches a combined thickness when the stability bar is connected to the mouthpiece (using pivot pins 92) (see Figs. 2 and 3 which shows the main body 50 before and after attachment of the stability bar).

Further, Hirsch teaches both the stability bar (dispersion piece 24) and the cheek retractor portion (cheek retractor portion 52) are made of flexible material and are in pivot connection (para [0045]; [0049]).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch with increased resilience of the cheek retractor portion during bending in order to provide a mouthpiece to better accommodate different mouth sizes and shapes.

(Continued in Supplemental Boxes)

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US2014/032892

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Box V

Regarding claim 6, Hirsch teaches the mouthpiece of claim 1, wherein the main body portion, the cheek retractor portion, and the suction connector portion, but lacks the teaching that they are formed by injection-molded as one piece.

However, in an alternate embodiment shown in Fig. 18A, Hirsch teaches intraoral device (200) preferably has a single-piece, integrated homogenous-material, injection-molded construction (para [0074]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch, as taught in the alternate embodiment, for the purpose of minimize the cost of construction of each device, thus eliminating the need for reuse.

Regarding claim 17, Hirsch teaches the mouthpiece of claim 1, but lacks the teaching of the suction connector portion comprises a cutout corresponding to a protrusion on a vacuum adapter for an interlocking fit.

However, in alternate embodiment shown in Fig. 18B, Hirsch teaches the suction connector portion (connection section 570) comprises a cutout (slots 630) corresponding to a protrusion (barbs 690) on a vacuum adapter (vacuum-only adapter 230 by way of plug portion 640; Fig. 18B; para [0092]) for an interlocking fit (para [0092]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch, as taught in the alternate embodiment, for the purpose of providing a more secure connection between the suction connection portion and the vacuum.

Regarding claim 18, Hirsch teaches the mouthpiece of claim 1, but lacks the teaching of the anterior wall and the posterior wall having different thicknesses.

However, Hirsch teaches the intraoral device "may also come in different sizes...to accommodate different mouth sizes and shapes" (para [0056]). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch to include an anterior wall and posterior wall having different thicknesses, for the purpose of providing a device that may accommodate a variety of patients' mouths.

Claim 7 lacks an inventive step under PCT Article 33(3) as being obvious over Hirsch in view of Bowman et al hereinafter referred to as Bowman.

Regarding claim 7, Hirsch teaches the mouthpiece of claim 1, wherein the material used in the injection molding is autoclavable.

Hirsch teaches "the bite piece 26 and dispersion piece 24 are autoclaved" (para [0060]). However, Hirsch lacks the teaching wherein the material used in the injection-molding is a flexible, translucent material.

However, in an alternate embodiment shown in Figs. 18A-18B, Hirsch teaches the "intraoral device is preferably injection molded out of a translucent, flexible...elastomer" (para [0074]).

Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device, as taught by the alternate embodiment for the purpose of minimizing construction costs a provide a device that may accommodate many different patients mouths.

Hirsch also fails to teach the mouthpiece wherein the material used in the injection molding is a high heat-resistant, silicone-based material.

Bowman teaches dental positioners where the use of "silicone became very acceptable because of its...resistance to heat" (para [0018]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the intraoral device of Hirsch to include a heat resistant silicone-based material, as taught by Bowman, since selection of a known material on the basis of its suitability for an intended use involves only routine skill in the art. The motivation for doing so would be to provide a device with enhanced efficacy and patient comfort.

Claims 8-10 and 13-16 lack an inventive step under PCT Article 33(3) as being obvious over Hirsch in view Black et al hereinafter referred to as Black.

Regarding claim 8, Hirsch teaches the mouthpiece of claim 1, but lacks the teaching of the mouthpiece further comprising a bridge structure protruding from an interior surface of the posterior wall, the protruding bridge structure comprising a plurality of spaced contact points that keep the anterior wall separated from the posterior wall during suction.

Black teaches an intraoral device comprising a bridge structure (transverse walls 348c; Figs. 23A and 23C) protruding from an interior surface of the posterior wall (posterior layer 348a), the protruding bridge structure comprising a plurality of spaced contact points that keep the anterior wall (anterior layer 348b) separated from the posterior wall during suction (para [0122]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch, as taught by Black, for the purpose of providing enhanced efficacy during suction.

Regarding claim 9, Hirsch and Black teach the mouthpiece of claim 8, but lack the teaching wherein the bridge structure protrudes from the interior surface of the posterior wall in a wave shape, and wherein the contact points are at crests of the wave shape.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the intraoral device of Hirsch to include bridge structures with the contact points are at crests of the wave shape, since a change in shape of an element involves only routine skill in the art. The motivation for doing so would be to provide enhanced efficacy during suction.

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/US2014/032892

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.  
Continuation of:

Regarding claim 10, Hirsch and Black teach the mouthpiece of claim 9, wherein troughs are configured to allow suction through the bridge structure. Black teaches "in this way the channels 342,343 (troughs)...thereby allowing for simultaneous aspiration of debris and fluid" para [0122]). However, Hirsch and Black lack the teaching wherein the bridge structure protrudes from the interior surface of the posterior wall in a wave shape, and wherein the contact points are at crests of the wave shape.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the intraoral device of Hirsch to include bridge structures with the contact points are at crests of the wave shape, since a change in shape of an element involves only routine skill in the art. The motivation for doing so would be to provide enhanced efficacy during suction.

Regarding claim 13, Hirsch teaches the mouthpiece of claim 12, but lacks the teaching of wherein the detachable mouth prop comprises a strap configured to fit around the suction connector portion, wherein an external surface of the suction connector portion comprises a notch region corresponding to the strap, and wherein an external surface of the strap is substantially flush with a remaining external surface of the suction connector portion when the strap sits in the notch region.

Hirsch does teach a notch region (plug portion 640) for matingly corresponding to connection section 570 of tube 590; Fig. 18B; para [0092]).

Black teaches an intraoral device comprising a strap (conduit 312; Fig. 20B; para [0114]) configured to fit around the suction connector portion ("neck of tongue..."; para [0114]) wherein an external surface of the suction connector portion (Figs. 23B-23C; neck 346; para [0126]), comprises a region corresponding to the strap, and wherein an external surface of the strap is substantially flush with a remaining external surface of the suction connector portion when the strap sits in the region (para [0126]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch, as taught by Black, for the purpose of providing a more secure connection between the mouth prop and suction connection portion.

Regarding claim 14, Hirsch and Black teach the mouthpiece of claim 13, but lack the teaching wherein the strap is injection-molded in a single piece with the mouth prop.

Hirsch teaches the use of injection molding for the intraoral device ("one piece, flexible injection-molded body; Abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Hirsch device, since the use of a one piece construction instead of the structure disclosed in the prior art would have required only routine skill in the art. The motivation for doing so would be to provide enhanced efficacy during suction.

Regarding claim 15, Hirsch teaches the mouthpiece of claim 1, but lacks the teaching wherein the suction connector portion further comprises an external plug protrusion corresponding to an opening in a mouth prop associated with the strap.

Black teaches an intraoral device wherein the suction connector portion further comprises an external plug protrusion (longitudinal projection 344; para [0126]) corresponding to an opening (groove 311; Fig. 20D; para [0126]) in a mouth prop associated with the strap (para [0126]). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Hirsch, with the intraoral device as taught by Black, in order to provide a more secure connection at the suction connection portion.

Regarding claim 16, Hirsch and Black teach the mouthpiece of claim 15, wherein the plug protrusion fits into the opening to provide additional crush-resistance and decreased compressibility during biting by the patient.

Hirsch does teach, when adding plug 640 into connection section 570, "the plug...helps keep bite piece 250 from collapsing; para [0092]). Specifically, Black teaches the plug protrusion (longitudinal projection 344) fits into the opening (groove 311).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Hirsch, with the plug protrusion as taught by Black, for the purpose of providing a more secure connection at the suction connection portion.

Claims 11 lacks an inventive step under PCT Article 33(3) as being obvious over Hirsch in view of Oliva et al hereinafter referred to as Oliva.

Regarding claim 11, Hirsch teaches the mouthpiece of claim 1, but lacks the teaching wherein the suction connector portion comprises an internal stop to assist in positioning of a vacuum suction source or a vacuum adaptor.

Oliva teaches a dental instrument that comprises an internal stop (spring-loaded valve stem 239; Fig. 14; col.8, Ins. 15-22).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the intraoral device of Hirsch to include an internal stop, as taught by Oliva, for the purpose of manually stopping the suctioning during positioning of the vacuum source.

Claims 1-18 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry

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## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

|                                                       |                                                                                                  |                                                               |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| Applicant's or agent's file reference<br>INCEP-001PCT | <b>FOR FURTHER ACTION</b><br>see Form PCT/ISA/220<br>as well as, where applicable, item 5 below. |                                                               |
| International application No.<br>PCT/US2014/032892    | International filing date (day/month/year)<br>03 April 2014                                      | (Earliest) Priority Date (day/month/year)<br>09 December 2013 |
| Applicant<br>INCEPT, INC.                             |                                                                                                  |                                                               |

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed.  
☐ a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the rectification of an obvious mistake authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (see Box No. II).

3. ☐ Unity of invention is lacking (see Box No. III).

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant.  
☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- ☒ the text is approved as submitted by the applicant.  
☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No. 4  
☐ as suggested by the applicant.  
☐ as selected by this Authority, because the applicant failed to suggest a figure.  
☒ as selected by this Authority, because this figure better characterizes the invention.
- b. ☐ none of the figures is to be published with the abstract.

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2014/032892

| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>IPC(8) - A41C 17/00, 17/06 (2014.01)<br>CPC - A41C 17/00 (2014.07)<br>According to International Patent Classification (IPC) or to both national classification and IPC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                    |                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>B. FIELDS SEARCHED</b><br>Minimum documentation searched (classification system followed by classification symbols)<br>IPC(8) - A41C 17/00, 17/06 (2014.01)<br>CPC - A41C 17/00 (2014.07)<br>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched<br>USPC - 433/91, 92, 93, 140<br>Electronic data base consulted during the international search (name of data base and; where practicable, search terms used)<br>Orbit, Google Patents, Google Scholar, PubMed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                    |                                                                                                     |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                    |                                                                                                     |
| Category*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No.                                                                               |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | US 2006/0084031 A1 (HIRSCH et al) 20 April 2006 (20.04.2006) entire document       | 1-6, 12, 17, 18                                                                                     |
| -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                    |                                                                                                     |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                    | 7-11, 13-16                                                                                         |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | US 2013/0252193 A1 (BOWMAN et al) 26 September 2013 (26.09.2013) entire document   | 7                                                                                                   |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | US 2011/0311942 A1 (BLACK et al) 22 December 2011 (22.12.2011) entire document     | 8-10, 13-16                                                                                         |
| Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | US 4,822,278 A (OLIVA et al) 18 April 1989 (18.04.1989) entire document            | 11                                                                                                  |
| <input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                    |                                                                                                     |
| * Special categories of cited documents:<br>"A" document defining the general state of the art which is not considered to be of particular relevance<br>"E" earlier application or patent but published on or after the international filing date<br>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)<br>"O" document referring to an oral disclosure, use, exhibition or other means<br>"P" document published prior to the international filing date but later than the priority date claimed<br>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention<br>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone<br>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art<br>"&" document member of the same patent family |                                                                                    |                                                                                                     |
| Date of the actual completion of the international search<br>22 August 2014                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                    | Date of mailing of the international search report<br><b>04 SEP 2014</b>                            |
| Name and mailing address of the ISA/US<br>Mail Stop PCT, Attn: ISA/US, Commissioner for Patents<br>P.O. Box 1450, Alexandria, Virginia 22313-1450<br>Facsimile No. 571-273-3201                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                    | Authorized officer:<br>Blaine R. Copenheaver<br>PCT Helpdesk: 571-272-4300<br>PCT OSP: 571-272-7774 |

## PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

|                                                                                                                                  |                                                                                 |                                                                     |                  |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------|------------------|
| Applicant's or agent's file reference<br>INCEP-005PCT                                                                            | <b>FOR FURTHER ACTION</b>                                                       |                                                                     | See item 4 below |
| International application No.<br>PCT/US2020/032228                                                                               | International filing date ( <i>day/month/year</i> )<br>08 May 2020 (08.05.2020) | Priority date ( <i>day/month/year</i> )<br>10 May 2019 (10.05.2019) |                  |
| International Patent Classification (8th edition unless older edition indicated)<br>See relevant information in Form PCT/ISA/237 |                                                                                 |                                                                     |                  |
| Applicant<br>DRYSHIELD, LLC                                                                                                      |                                                                                 |                                                                     |                  |

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- |                                     |              |                                                                                                                                                                 |
|-------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report                                                                                                                                             |
| <input type="checkbox"/>            | Box No. II   | Priority                                                                                                                                                        |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability                                                                |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention                                                                                                                                      |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited                                                                                                                                         |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application                                                                                                                |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application                                                                                                           |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

|                                                                                               |                                                                         |
|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
|                                                                                               | Date of issuance of this report<br>16 November 2021 (16.11.2021)        |
| The International Bureau of WIPO<br>34, chemin des Colombettes<br>1211 Geneva 20, Switzerland | Authorized officer<br><br>Nora Lindner<br><br>e-mail pct.team5@wipo.int |

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Ascentcare Dental Products v. Solmetex - IPR2025-01175

## PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To: JACEK MAREK WNUK  
 POLSINELLI LLP  
 THREE EMBARCADERO CENTER, SUITE  
 2400  
 SAN FRANCISCO, CA 94111

**PCT**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing  
(day/month/year)**12 AUG 2020**Applicant's or agent's file reference  
INCEP-005PCT**FOR FURTHER ACTION**

See paragraph 2 below

International application No.

PCT/US 20/32228

International filing date (day/month/year)

08 May 2020 (08.05.2020)

Priority date (day/month/year)

10 May 2019 (10.05.2019)

International Patent Classification (IPC) or both national classification and IPC

IPC - A61B 1/24, A61C 17/00, A61C 17/06, A61C 17/10, A61C 5/14 (2020.01)

CPC - A61B 1/24, A61C 17/00, A61C 17/06, A61C 17/10, A61C 5/14, A61C 5/90

Applicant **DRYSHIELD, LLC**

## 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US  
 Mail Stop PCT, Attn: ISA/US  
 Commissioner for Patents  
 P.O. Box 1450, Alexandria, Virginia 22313-1450  
 Facsimile No. 571-273-8300

Date of completion of this opinion

27 JULY 2020

Authorized officer

Lee Young

PCT Help Desk

Telephone No. 571-272-4300

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 20/32228

**Box No. I      Basis of this opinion**

1. With regard to the language, this opinion has been established on the basis of:
  - ☒ the international application in the language in which it was filed.
  - ☐ a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(b)).
3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
  - a. ☐ forming part of the international application as filed:
    - ☐ in the form of an Annex C/ST.25 text file.
    - ☐ on paper or in the form of an image file.
  - b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
  - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
    - ☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
    - ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US 20/32228

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement**

1. Statement

|                               |        |      |     |
|-------------------------------|--------|------|-----|
| Novelty (N)                   | Claims | 1-20 | YES |
|                               | Claims | none | NO  |
| Inventive step (IS)           | Claims | none | YES |
|                               | Claims | 1-20 | NO  |
| Industrial applicability (IA) | Claims | 1-20 | YES |
|                               | Claims | none | NO  |

2. Citations and explanations:

Claims 1-20 lack an inventive step under PCT Article 33(3) as being obvious over US 2017/0156832 A1 to Reyes in view of US 2014/0212838 A1 to Incept, Inc. (hereinafter Incept).

Regarding claim 1, Reyes teaches a dental mouthpiece (see fig. 1-9; para [0022]) the dental mouthpiece comprising: a main body portion at a central part of the mouthpiece having a first end and a second end (fig. 3 see in closed configuration the dental mouthpiece comprises a main body portion which is centrally circular with ends at suction piece 28 and the opposite, tapered distal end; para [0022]; para [0031]), the main body portion having an anterior wall (fig. 3, 5 see anterior wall 32; para [0028]) and a posterior wall (fig. 3, 5 see posterior wall 34; para [0028]), the anterior wall and the posterior wall defining an interior space (fig. 3, 5 see walls 32, 34 define space therebetween when the mouthpiece is closed), at least one connector connecting the anterior wall to the posterior wall (fig. 1 see connector 36/38 on trough 18/20; para [0028]; para [0032]), at least one anterior intervening wall extending from the anterior wall partially towards the posterior wall (fig. 1-5 see anterior intervening wall 8; para [0024]-[0025]), and at least one posterior intervening wall extending from the posterior wall partially towards the anterior wall (fig. 1-5 see posterior intervening wall 10; para [0024]-[0025]), the at least one anterior intervening wall and the at least one posterior intervening wall each having alternating crests and troughs (fig. 1-5 see crests 12 and troughs between crests 12; para [0034]; para [0027]); a suction connector portion connected to the first end (fig. 1-7 see suction connector portion 26; para [0031]), the connector portion connecting the interior space to a vacuum suction source (para [0029]; para [0031]); and a cheek retractor portion connected to the second end (fig. 1-3 see tapered distal end; para [0036]), but does not explicitly teach the dental mouthpiece formed in a curve, the main body at a central part of the curve, the anterior wall inside the curve nor the posterior wall outside the curve. However, in similar art, Incept teaches a dental mouthpiece formed in a curve (see fig. 1A, 1D-E; para [0033]) comprising a main body portion at a central part of the curve (fig. 1E see main body portion at the center of the curve between the left open channel and the right distal tip), the main body portion having an anterior wall inside the curve (fig. 1A-1D see anterior wall inside curve) and a posterior wall outside the curve (fig. 1A-1D see posterior wall outside the curve). Curved shaped of dental mouthpieces are well known in the art for improved fit within the mouth for retracting a cheek. Accordingly, it would have been obvious to a person having ordinary skill in the art to have shaped the mouthpiece taught by Reyes in a curve as taught by Incept, such that the main body is at a central part of the curve, the anterior wall is inside the curve, and the posterior wall is outside the curve, in order to optimize the shape of the mouthpiece to improve fit in mouth of a patient.

Regarding claim 2, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the at least one connector is a cylindrical shaped pillar (Reyes fig. 1 see connector includes cylindrical shaped pillar 36; para [0032]).

Regarding claim 3, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the at least one connector is a wall spanning longitudinally in the main body portion in the interior space (Reyes fig. 1 see connector includes wall 18/20; para [0028]).

Regarding claim 4, Reyes in view of Incept teach the mouthpiece of claim 1, but Reyes modified by Incept does not explicitly teach the mouthpiece further comprising a bridge structure in the interior space protruding from the posterior wall, wherein the bridge comprises protrusions, wherein the protrusions are battlement-shaped, with spaced crests. However, Incept teaches a mouthpiece comprising a bridge structure in an interior space (fig. 1E see bridge 180; para [0042]), wherein the bridge comprises protrusions (fig. 1E see protruding crests of bridge 180), wherein the protrusions are battlement-shaped, with spaced crests (fig. 1E see spaced crests form a battlement-shape; para [0042]). It would have been obvious to a person having ordinary skill in the art to have included a bridge structure as taught by Incept in the mouthpiece taught by Reyes in order to improve the transfer of fluids to the vacuum connection (see Incept para [0042]), thus improving the suction capabilities of the mouthpiece.

Regarding claim 5, Reyes in view of Incept teach the mouthpiece of claim 4, but Reyes modified by Incept does not explicitly teach wherein the protrusions near the suction connector is in greater height and length. However, Incept teaches wherein the protrusions near the suction connector are greater in size (see fig. 1E; para [0042]). Furthermore, Incept teaches the protrusions are shaped to improve the suction of fluids through the interior space (para [0042]). Accordingly, it would have been obvious to a person having ordinary skill in the art to have increased both the height and length of the protrusions near the suction connector in order to improve the suction of fluids through the interior space and thus improve the suction capabilities of the device.

-\*-Continued in Supplemental Box-\*

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 20/32228

**Box No. VIII Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 4: Regarding claim 4, the claim language is confusing and lacks clarity. Specifically, the recitation "protrusions" lacks proper antecedent basis. In order to give meaning to this claim such that an opinion may be rendered, it has been interpreted to read "The mouthpiece of claim 1, further comprising a bridge structure in the interior space protruding from the posterior wall, wherein the bridge comprises protrusions, wherein the protrusions are battlement-shaped, with spaced crests," which gives proper antecedent basis.

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 20/32228

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

\*-Box V.2 - Citations and Explanations-\*

Regarding claim 6, Reyes in view of Incept teach the mouthpiece of claim 4, and Reyes modified by Incept further teaches wherein spaces between the crests are troughs of the battlement shape (see Incept fig. 1A spaces between crests are battlement-shaped troughs; para [0042]).

Regarding claim 7, Reyes in view of Incept teach the mouthpiece of claim 1, but Reyes modified by Incept does not explicitly teach wherein the alternating crests and troughs on the anterior intervening wall and the posterior intervening wall are semi-circle shaped. However, optimization of shape is within the ordinary skill of a person with the art. Furthermore, Reyes teaches the crests and troughs comprise sharp corners (see fig. 1-3; para [0034]; para [0025]-[0027]), but it is well known in the art that sharp corners are difficult and expensive to manufacture. Accordingly, it would have been obvious to a person having ordinary skill in the art to have optimized the shape of the crests and troughs to a semi-circle in order to prevent the presence of sharp corners to improve ease of manufacturing.

Regarding claim 8, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the anterior intervening wall and the posterior intervening wall have varying heights to maintain integrity of the main body portion (Reyes fig. 1-3 see presence of crests 12 and troughs therebetween varies the heights of intervening walls 8, 10 in order to provide integrity to the structure of the interior space; para [0034]).

Regarding claim 9, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the troughs of the anterior intervening wall and the posterior intervening wall decrease in size as the troughs approach the cheek retractor portion (Reyes fig. 1 see troughs between crests 12 become smaller in length as they approach the cheek retractor portion at the distal end).

Regarding claim 10, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the anterior intervening wall and the posterior intervening wall meet at a point where the suction connector meets the main body (Reyes fig. 1-3; para [0034]).

Regarding claim 11, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the anterior intervening wall and the posterior intervening wall meet at a point where the main body meets the cheek retractor portion (Reyes fig. 1-3; para [0034]).

Regarding claim 12, Reyes in view of Incept teach the mouthpiece of claim 1, but Reyes modified by Incept does not explicitly teach further comprising a bite block integrated to the suction connector portion, wherein the bite block provide additional crush-resistance and decreased compressibility during biting by a patient. However, Incept teaches the mouthpiece may provide a bite block (see claim 18-19). Bite blocks are well known in the art to prevent compression of a device entering the mouth cavity and to ensure that the mouth or airway remains open during a procedure. Accordingly, it would have been obvious to a person having ordinary skill in the art to have provided a bite block in the mouthpiece to protect the suction tube and maintain the mouth in an open position during a procedure.

Regarding claim 13, Reyes in view of Incept teach the mouthpiece of claim 1, but Reyes modified by Incept does not explicitly teach wherein the main body portion, the suction connector portion, and the cheek retractor portion are formed by injection-molding as one piece. However, Reyes teaches the device may be manufactured by any simplified process (para [0010]). Furthermore, Incept teaches the mouthpiece may be formed by injection-molding (para [0032]). Injection molding is well known in the art for easy and inexpensive manufacturing of a one-piece polymer. Accordingly, it would have been obvious to a person having ordinary skill in the art to have manufactured the mouthpiece by injection-molding in order to provide a cost-effective production of the device.

Regarding claim 14, Reyes in view of Incept teach the mouthpiece of claim 1, but Reyes modified by Incept does not explicitly teach wherein a material that forms the main body, the suction connector portion, and the cheek retractor portion is a flexible, translucent, high heat-resistant, autoclavable silicon-based material. However, Reyes teaches wherein the material of the mouthpiece is a suitable, flexible polymer (para [0023]). Furthermore, Incept teaches a mouthpiece formed of a flexible, translucent, high heat-resistant, autoclavable silicon-based material (para [0032]). It would have been obvious to a person having ordinary skill in the art to have provided a flexible, translucent, high heat-resistant, autoclavable silicon-based material to construct the mouthpiece in order to optimize the mouthpiece for strength and manufacturing properties.

Regarding claim 15, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the posterior wall further includes a stability bar protruding from an interior surface of the posterior wall and along a longitudinal axis of the main body (Reyes fig. 1-5 see stability bar 18/20 comprises connector 36/38; para [0028]; para [0032]).

Regarding claim 16, Reyes in view of Incept teach the mouthpiece of claim 15, and Reyes modified by Incept further teaches wherein the at least one connector lies evenly spaced along the stability bar (Reyes fig. 1-5 see stability bar 18/20 comprises connector 36/38; para [0028]; para [0032]).

Regarding claim 17, Reyes in view of Incept teach the mouthpiece of claim 1, but Reyes modified by Incept does not explicitly teach wherein the suction connector portion comprises a cutout corresponding to a protrusion on a vacuum adapter interlocking fit. However, Incept teaches wherein the dental mouthpiece comprises a suction connector (Incept fig. 2A-E see connector 120; para [0045]) which connects to a vacuum source with an interlocking fit by a cutout (Incept see fig. 2A-E cutout 230; para [0045]). It would have been obvious to a person having ordinary skill in the art to have included an interlocking fit to a vacuum source as taught by Incept in the connector portion taught by Reyes in order to improve the integrity of the connector and prevent failure during use.

\*-Continued in next Supplemental Box-\*

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US 20/32228

## Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

-\*-Supplemental Box - Box V.2 - Citations and Explanations--\*

Regarding claim 18, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches where in the suction connector portion connects to a vacuum source (Reyes para [0030]-[0031]; para [0036]-[0038]), wherein activation of the vacuum source provides suction of fluids from the interior space of the main body (Reyes para [0036]-[0038]).

Regarding claim 19, Reyes in view of Incept teach the mouthpiece of claim 18, and Reyes modified by Incept further teaches wherein the activation of the vacuum source draws fluids from an exterior of the main body through the crests and troughs of the anterior intervening wall and the posterior intervening wall, into the interior space of the main body (Reyes para [0036]-[0038]).

Regarding claim 20, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the cheek retractor portion includes a surface that applies pressure based on resilience of the cheek retractor portion (Reyes fig. 1-5 see outer surface of cheek retractor portion at distal end; para [0036]; para [0023] device is flexible).

Claims 1-20 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used by industry.

Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175

## PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

**PCT**

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT AND  
THE WRITTEN OPINION OF THE INTERNATIONAL  
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

|                                                                                                              |                                                                               |                                                        |
|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------|
| To: JACEK MAREK WNUK<br>POLSINELLI LLP<br>THREE EMBARCADERO CENTER, SUITE<br>2400<br>SAN FRANCISCO, CA 94111 |                                                                               | Date of mailing<br>(day/month/year) <b>12 AUG 2020</b> |
| Applicant's or agent's file reference<br><b>INCEP-005PCT</b>                                                 | <b>FOR FURTHER ACTION</b> See paragraphs 1 and 4 below                        |                                                        |
| International application No.<br><b>PCT/US 20/32228</b>                                                      | International filing date<br>(day/month/year) <b>08 May 2020 (08.05.2020)</b> |                                                        |
| Applicant <b>DRYSHIELD, LLC</b>                                                                              |                                                                               |                                                        |

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

**Filing of amendments and statement under Article 19:**

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

**When?** The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

**How?** Directly to the International Bureau preferably through ePCT, or on paper to:  
 The International Bureau of WIPO, 34, chemin des Colombettes, 1211 Geneva 20, Switzerland

**For more detailed instructions, see the PCT Applicant's Guide, International Phase, paragraphs 9.004 – 9.011.**

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to any protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:**

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with any request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

**4. Reminders**

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. These comments will be made available to the public after international publication. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established.

Shortly after the expiration of **18 months from the priority date, the international application will be published** by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau before the completion of the technical preparations for international publication (Rules 90bis.1 and 90bis.3).

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices. In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months. For details about the applicable time limits, Office by Office, see [www.wipo.int/pct/en/texts/time\\_limits.html](http://www.wipo.int/pct/en/texts/time_limits.html) and the *PCT Applicant's Guide, National Chapters*.

Within **22 months from the priority date, the applicant may request that a supplementary international search be carried out** by a different International Searching Authority that offers this service (Rule 45bis.1). The procedure for requesting supplementary international search is described in the *PCT Applicant's Guide, International Phase, paragraphs 8.006-8.032*.

|                                                                                                                                                                                   |                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Name and mailing address of the ISA/US<br>Mail Stop PCT, Attn: ISA/US<br>Commissioner for Patents<br>P.O. Box 1450, Alexandria, Virginia 22313-1450<br>Facsimile No. 571-273-8300 | Authorized officer<br><br><b>Lee Young</b><br><br>Telephone No. PCT Helpdesk: 571-272-4300 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|

Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175

## PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To: JACEK MAREK WNUK  
POL SINELLI LLP  
THREE EMBARCADERO CENTER, SUITE  
2400  
SAN FRANCISCO, CA 94111

**PCT**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing  
(day/month/year)

**12 AUG 2020**

Applicant's or agent's file reference  
INCEP-005PCT

**FOR FURTHER ACTION**

See paragraph 2 below

International application No.

PCT/US 20/32228

International filing date (day/month/year)

08 May 2020 (08.05.2020)

Priority date (day/month/year)

10 May 2019 (10.05.2019)

International Patent Classification (IPC) or both national classification and IPC

IPC - A61B 1/24, A61C 17/00, A61C 17/06, A61C 17/10, A61C 5/14 (2020.01)

CPC - A61B 1/24, A61C 17/00, A61C 17/06, A61C 17/10, A61C 5/14, A61C 5/90

Applicant DRYSHIELD, LLC

## 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/US  
Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450, Alexandria, Virginia 22313-1450  
Facsimile No. 571-273-8300

Date of completion of this opinion

27 JULY 2020

Authorized officer

Lee Young

PCT Help Desk

Telephone No. 571-272-4300

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 20/32228

**Box No. I      Basis of this opinion**

1. With regard to the **language**, this opinion has been established on the basis of:

- ☒ the international application in the language in which it was filed.  
☐ a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(b)).

3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:

- a. ☐ forming part of the international application as filed:  
☐ in the form of an Annex C/ST.25 text file.  
☐ on paper or in the form of an image file.
- b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
- c. ☐ furnished subsequent to the international filing date for the purposes of international search only:  
☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).  
☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 20/32228

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement**

**1. Statement**

|                               |        |      |     |
|-------------------------------|--------|------|-----|
| Novelty (N)                   | Claims | 1-20 | YES |
|                               | Claims | none | NO  |
| Inventive step (IS)           | Claims | none | YES |
|                               | Claims | 1-20 | NO  |
| Industrial applicability (IA) | Claims | 1-20 | YES |
|                               | Claims | none | NO  |

**2. Citations and explanations:**

Claims 1-20 lack an inventive step under PCT Article 33(3) as being obvious over US 2017/0156832 A1 to Reyes in view of US 2014/0212838 A1 to Incept, Inc. (hereinafter Incept).

Regarding claim 1, Reyes teaches a dental mouthpiece (see fig. 1-9; para [0022]) the dental mouthpiece comprising: a main body portion at a central part of the mouthpiece having a first end and a second end (fig. 3 see in closed configuration the dental mouthpiece comprises a main body portion which is centrally circular with ends at suction piece 28 and the opposite, tapered distal end; para [0022]; para [0031]), the main body portion having an anterior wall (fig. 3, 5 see anterior wall 32; para [0028]) and a posterior wall (fig. 3, 5 see posterior wall 34; para [0028]), the anterior wall and the posterior wall defining an interior space (fig. 3, 5 see walls 32, 34 define space therebetween when the mouthpiece is closed), at least one connector connecting the anterior wall to the posterior wall (fig. 1 see connector 36/38 on trough 18/20; para [0028]; para [0032]), at least one anterior intervening wall extending from the anterior wall partially towards the posterior wall (fig. 1-5 see anterior intervening wall 8; para [0024]-[0025]), and at least one posterior intervening wall extending from the posterior wall partially towards the anterior wall (fig. 1-5 see posterior intervening wall 10; para [0024]-[0025]), the at least one anterior intervening wall and the at least one posterior intervening wall each having alternating crests and troughs (fig. 1-5 see crests 12 and troughs between crests 12; para [0034]; para [0027]); a suction connector portion connected to the first end (fig. 1-7 see suction connector portion 26; para [0031]), the connector portion connecting the interior space to a vacuum suction source (para [0029]; para [0031]); and a cheek retractor portion connected to the second end (fig. 1-3 see tapered distal end; para [0036]), but does not explicitly teach the dental mouthpiece formed in a curve, the main body at a central part of the curve, the anterior wall inside the curve nor the posterior wall outside the curve. However, in similar art, Incept teaches a dental mouthpiece formed in a curve (see fig. 1A, 1D-E; para [0033]) comprising a main body portion at a central part of the curve (fig. 1E see main body portion at the center of the curve between the left open channel and the right distal tip), the main body portion having an anterior wall inside the curve (fig. 1A-1D see anterior wall inside curve) and a posterior wall outside the curve (fig. 1A-1D see posterior wall outside the curve). Curved shaped of dental mouthpieces are well known in the art for improved fit within the mouth for retracting a cheek. Accordingly, it would have been obvious to a person having ordinary skill in the art to have shaped the mouthpiece taught by Reyes in a curve as taught by Incept, such that the main body is at a central part of the curve, the anterior wall is inside the curve, and the posterior wall is outside the curve, in order to optimize the shape of the mouthpiece to improve fit in mouth of a patient.

Regarding claim 2, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the at least one connector is a cylindrical shaped pillar (Reyes fig. 1 see connector includes cylindrical shaped pillar 36; para [0032]).

Regarding claim 3, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the at least one connector is a wall spanning longitudinally in the main body portion in the interior space (Reyes fig. 1 see connector includes wall 18/20; para [0028]).

Regarding claim 4, Reyes in view of Incept teach the mouthpiece of claim 1, but Reyes modified by Incept does not explicitly teach the mouthpiece further comprising a bridge structure in the interior space protruding from the posterior wall, wherein the bridge comprises protrusions, wherein the protrusions are battlement-shaped, with spaced crests. However, Incept teaches a mouthpiece comprising a bridge structure in an interior space (fig. 1E see bridge 180; para [0042]), wherein the bridge comprises protrusions (fig. 1E see protruding crests of bridge 180), wherein the protrusions are battlement-shaped, with spaced crests (fig. 1E see spaced crests form a battlement-shape; para [0042]). It would have been obvious to a person having ordinary skill in the art to have included a bridge structure as taught by Incept in the mouthpiece taught by Reyes in order to improve the transfer of fluids to the vacuum connection (see Incept para [0042]), thus improving the suction capabilities of the mouthpiece.

Regarding claim 5, Reyes in view of Incept teach the mouthpiece of claim 4, but Reyes modified by Incept does not explicitly teach wherein the protrusions near the suction connector is in greater height and length. However, Incept teaches wherein the protrusions near the suction connector are greater in size (see fig. 1E; para [0042]). Furthermore, Incept teaches the protrusions are shaped to improve the suction of fluids through the interior space (para [0042]). Accordingly, it would have been obvious to a person having ordinary skill in the art to have increased both the height and length of the protrusions near the suction connector in order to improve the suction of fluids through the interior space and thus improve the suction capabilities of the device.

-Continued in Supplemental Box-

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US 20/32228

**Box No. VIII** Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 4: Regarding claim 4, the claim language is confusing and lacks clarity. Specifically, the recitation "protrusions" lacks proper antecedent basis. In order to give meaning to this claim such that an opinion may be rendered, it has been interpreted to read "The mouthpiece of claim 1, further comprising a bridge structure in the interior space protruding from the posterior wall, wherein the bridge comprises protrusions, wherein the protrusions are battlement-shaped, with spaced crests," which gives proper antecedent basis.

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US 20/32228

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

-\*-Box V.2 - Citations and Explanations--\*-

Regarding claim 6, Reyes in view of Incept teach the mouthpiece of claim 4, and Reyes modified by Incept further teaches wherein spaces between the crests are troughs of the battlement shape (see Incept fig. 1A spaces between crests are battlement-shaped troughs; para [0042]).

Regarding claim 7, Reyes in view of Incept teach the mouthpiece of claim 1, but Reyes modified by Incept does not explicitly teach wherein the alternating crests and troughs on the anterior intervening wall and the posterior intervening wall are semi-circle shaped. However, optimization of shape is within the ordinary skill of a person with the art. Furthermore, Reyes teaches the crests and troughs comprise sharp corners (see fig. 1-3; para [0034]; para [0025]-[0027]), but it is well known in the art that sharp corners are difficult and expensive to manufacture. Accordingly, it would have been obvious to a person having ordinary skill in the art to have optimized the shape of the crests and troughs to a semi-circle in order to prevent the presence of sharp corners to improve ease of manufacturing.

Regarding claim 8, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the anterior intervening wall and the posterior intervening wall have varying heights to maintain integrity of the main body portion (Reyes fig. 1-3 see presence of crests 12 and troughs therebetween varies the heights of intervening walls 8, 10 in order to provide integrity to the structure of the interior space; para [0034]).

Regarding claim 9, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the troughs of the anterior intervening wall and the posterior intervening wall decrease in size as the troughs approach the cheek retractor portion (Reyes fig. 1 see troughs between crests 12 become smaller in length as they approach the cheek retractor portion at the distal end).

Regarding claim 10, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the anterior intervening wall and the posterior intervening wall meet at a point where the suction connector meets the main body (Reyes fig. 1-3; para [0034]).

Regarding claim 11, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the anterior intervening wall and the posterior intervening wall meet at a point where the main body meets the cheek retractor portion (Reyes fig. 1-3; para [0034]).

Regarding claim 12, Reyes in view of Incept teach the mouthpiece of claim 1, but Reyes modified by Incept does not explicitly teach further comprising a bite block integrated to the suction connector portion, wherein the bite block provide additional crush-resistance and decreased compressibility during biting by a patient. However, Incept teaches the mouthpiece may provide a bite block (see claim 18-19). Bite blocks are well known in the art to prevent compression of a device entering the mouth cavity and to ensure that the mouth or airway remains open during a procedure. Accordingly, it would have been obvious to a person having ordinary skill in the art to have provided a bite block in the mouthpiece to protect the suction tube and maintain the mouth in an open position during a procedure.

Regarding claim 13, Reyes in view of Incept teach the mouthpiece of claim 1, but Reyes modified by Incept does not explicitly teach wherein the main body portion, the suction connector portion, and the cheek retractor portion are formed by injection-molding as one piece. However, Reyes teaches the device may be manufactured by any simplified process (para [0010]). Furthermore, Incept teaches the mouthpiece may be formed by injection-molding (para [0032]). Injection molding is well known in the art for easy and inexpensive manufacturing of a one-piece polymer. Accordingly, it would have been obvious to a person having ordinary skill in the art to have manufactured the mouthpiece by injection-molding in order to provide a cost-effective production of the device.

Regarding claim 14, Reyes in view of Incept teach the mouthpiece of claim 1, but Reyes modified by Incept does not explicitly teach wherein a material that forms the main body, the suction connector portion, and the cheek retractor portion is a flexible, translucent, high heat-resistant, autoclavable silicon-based material. However, Reyes teaches wherein the material of the mouthpiece is a suitable, flexible polymer (para [0023]). Furthermore, Incept teaches a mouthpiece formed of a flexible, translucent, high heat-resistant, autoclavable silicon-based material (para [0032]). It would have been obvious to a person having ordinary skill in the art to have provided a flexible, translucent, high heat-resistant, autoclavable silicon-based material to construct the mouthpiece in order to optimize the mouthpiece for strength and manufacturing properties.

Regarding claim 15, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the posterior wall further includes a stability bar protruding from an interior surface of the posterior wall and along a longitudinal axis of the main body (Reyes fig. 1-5 see stability bar 18/20 comprises connector 36/38; para [0028]; para [0032]).

Regarding claim 16, Reyes in view of Incept teach the mouthpiece of claim 15, and Reyes modified by Incept further teaches wherein the at least one connector lies evenly spaced along the stability bar (Reyes fig. 1-5 see stability bar 18/20 comprises connector 36/38; para [0028]; para [0032]).

Regarding claim 17, Reyes in view of Incept teach the mouthpiece of claim 1, but Reyes modified by Incept does not explicitly teach wherein the suction connector portion comprises a cutout corresponding to a protrusion on a vacuum adapter interlocking fit. However, Incept teaches wherein the dental mouthpiece comprises a suction connector (Incept fig. 2A-E see connector 120; para [0045]) which connects to a vacuum source with an interlocking fit by a cutout (Incept see fig. 2A-E cutout 230; para [0045]). It would have been obvious to a person having ordinary skill in the art to have included a interlocking fit to a vacuum source as taught by Incept in the connector portion taught by Reyes in order to improve the integrity of the connector and prevent failure during use.

-\*-Continued in next Supplemental Box--\*-

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US 20/32228

## Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

-\*-Supplemental Box - Box V.2 - Citations and Explanations--\*

Regarding claim 18, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches where in the suction connector portion connects to a vacuum source (Reyes para [0030]-[0031]; para [0036]-[0038]), wherein activation of the vacuum source provides suction of fluids from the interior space of the main body (Reyes para [0036]-[0038]).

Regarding claim 19, Reyes in view of Incept teach the mouthpiece of claim 18, and Reyes modified by Incept further teaches wherein the activation of the vacuum source draws fluids from an exterior of the main body through the crests and troughs of the anterior intervening wall and the posterior intervening wall, into the interior space of the main body (Reyes para [0036]-[0038]).

Regarding claim 20, Reyes in view of Incept teach the mouthpiece of claim 1, and Reyes modified by Incept further teaches wherein the cheek retractor portion includes a surface that applies pressure based on resilience of the cheek retractor portion (Reyes fig. 1-5 see outer surface of cheek retractor portion at distal end; para [0036]; para [0023] device is flexible).

Claims 1-20 have industrial applicability as defined by PCT Article 33(4) because the subject matter can be made or used by industry.

Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

|                                                       |                                                                                 |                                                                                               |  |
|-------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--|
| Applicant's or agent's file reference<br>INCEP-005PCT |                                                                                 | <b>FOR FURTHER ACTION</b><br>see Form PCT/ISA/220 as well as, where applicable, item 5 below. |  |
| International application No.<br>PCT/US 20/32228      | International filing date ( <i>day/month/year</i> )<br>08 May 2020 (08.05.2020) | (Earliest) Priority Date ( <i>day/month/year</i> )<br>10 May 2019 (10.05.2019)                |  |
| Applicant<br>DRYSHIELD, LLC                           |                                                                                 |                                                                                               |  |

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed.  
☐ a translation of the international application into \_\_\_\_\_ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☐ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

- ☒ the text is approved as submitted by the applicant.  
☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant.  
☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

- a. the figure of the drawings to be published with the abstract is Figure No. 1  
☒ as suggested by the applicant.  
☐ as selected by this Authority, because the applicant failed to suggest a figure.  
☐ as selected by this Authority, because this figure better characterizes the invention.
- b. ☐ none of the figures is to be published with the abstract.

Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 20/32228

## A. CLASSIFICATION OF SUBJECT MATTER

IPC - A61B 1/24, A61C 17/00, A61C 17/06, A61C 17/10, A61C 5/14 (2020.01)

CPC - A61B 1/24, A61C 17/00, A61C 17/06, A61C 17/10, A61C 5/14, A61C 5/90

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History document

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|-----------|-------------------------------------------------------------------------------------|-----------------------|
| Y         | US 2017/0156832 A1 (Reyes) 8 June 2017 (08.06.2017), entire document                | 1-20                  |
| Y         | US 2014/0212838 A1 (Incept, Inc.) 31 July 2014 (31.07.2014), entire document        | 1-20                  |
| A         | US 2015/0335409 A1 (Innerlite, Inc.) 26 November 2015 (26.11.2015), entire document | 1-20                  |
| A         | US 2009/0274991 A1 (Black et al.) 5 November 2009 (05.11.2009), entire document     | 1-20                  |
| A         | US 2001/0008752 A1 (Hirsch et al.) 19 July 2001 (19.07.2001), entire document       | 1-20                  |

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"D" document cited by the applicant in the international application

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

27 JULY 2020

Date of mailing of the international search report

12 AUG 2020

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents  
P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-8300

Authorized officer

Lee Young

Telephone No. PCT Helpdesk: 571-272-4300

**Electronic Acknowledgement Receipt**

|                                             |                               |
|---------------------------------------------|-------------------------------|
| <b>EFS ID:</b>                              | 48526547                      |
| <b>Application Number:</b>                  | 18217304                      |
| <b>International Application Number:</b>    |                               |
| <b>Confirmation Number:</b>                 | 5030                          |
| <b>Title of Invention:</b>                  | INTRAORAL DEVICE              |
| <b>First Named Inventor/Applicant Name:</b> | Thien Nguyen                  |
| <b>Customer Number:</b>                     | 138718                        |
| <b>Filer:</b>                               | TamThanh Thi Pham/Jasmine Han |
| <b>Filer Authorized By:</b>                 | TamThanh Thi Pham             |
| <b>Attorney Docket Number:</b>              | INCEP-001COF                  |
| <b>Receipt Date:</b>                        | 01-SEP-2023                   |
| <b>Filing Date:</b>                         | 30-JUN-2023                   |
| <b>Time Stamp:</b>                          | 17:13:02                      |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)   |

**Payment information:**

|                        |    |
|------------------------|----|
| Submitted with Payment | no |
|------------------------|----|

**File Listing:**

| Document Number | Document Description | File Name                        | File Size(Bytes)/<br>Message Digest                | Multi Part /.zip | Pages (if appl.) |
|-----------------|----------------------|----------------------------------|----------------------------------------------------|------------------|------------------|
| 1               | Transmittal Letter   | INCEP-001COF_IDS_Transmittal.pdf | 105968<br>b30c1747ac3194370a9f72dc6b936d3206b238b4 | no               | 3                |

**Warnings:**

|                                                        |                                                    |                                         |                                          |    |   |
|--------------------------------------------------------|----------------------------------------------------|-----------------------------------------|------------------------------------------|----|---|
| Solmetex Ex. 2029                                      |                                                    |                                         |                                          |    |   |
| Ascentcare Dental Products v. Solmetex - IPR2025-01175 |                                                    |                                         |                                          |    |   |
| 2                                                      | Miscellaneous Incoming Letter                      | INCEP-001COF_List_of_Copending_Apps.pdf | 102586                                   | no | 1 |
|                                                        |                                                    |                                         | e7478c89d7b876b3c50071ee93a8adca7b169c74 |    |   |
| Warnings:                                              |                                                    |                                         |                                          |    |   |
| Information:                                           |                                                    |                                         |                                          |    |   |
| 3                                                      | Information Disclosure Statement (IDS) Form (SB08) | INCEP-001COF_IDS_1449_9-1-23.pdf        | 265239                                   | no | 9 |
|                                                        |                                                    |                                         | dd432397ce78063655036dd1f96d759633335cce |    |   |
| Warnings:                                              |                                                    |                                         |                                          |    |   |
| Information:                                           |                                                    |                                         |                                          |    |   |
| This is not an USPTO supplied IDS fillable form        |                                                    |                                         |                                          |    |   |
| 4                                                      | Non Patent Literature                              | N1_INCEP-001PCT_IPRP.pdf                | 335668                                   | no | 6 |
|                                                        |                                                    |                                         | 2324fe168fdb4eb3ddb024b3c429b1ffa3fa36b  |    |   |
| Warnings:                                              |                                                    |                                         |                                          |    |   |
| Information:                                           |                                                    |                                         |                                          |    |   |
| 5                                                      | Non Patent Literature                              | N2_INCEP-001PCT_ISR-WO.pdf              | 460454                                   | no | 8 |
|                                                        |                                                    |                                         | 499b7320449d5d173abeba3543ec2e2f8c3b12d2 |    |   |
| Warnings:                                              |                                                    |                                         |                                          |    |   |
| Information:                                           |                                                    |                                         |                                          |    |   |
| 6                                                      | Non Patent Literature                              | N3_INCEP-005PCT_IPRP.pdf                | 353331                                   | no | 7 |
|                                                        |                                                    |                                         | 4d64937408daeb0a443353f689c19e13067b5c05 |    |   |
| Warnings:                                              |                                                    |                                         |                                          |    |   |
| Information:                                           |                                                    |                                         |                                          |    |   |
| 7                                                      | Non Patent Literature                              | N4_INCEP-005PCT_ISR-WO.pdf              | 479409                                   | no | 9 |
|                                                        |                                                    |                                         | 7eba4ffff57705beb15844b6e11be75973c47c56 |    |   |
| Warnings:                                              |                                                    |                                         |                                          |    |   |
| Information:                                           |                                                    |                                         |                                          |    |   |
| Total Files Size (in bytes):                           |                                                    |                                         | 2102655                                  |    |   |

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

**Thien Nguyen et al.**

Confirmation No. 5030

Application No. 18/217,304

Filed: June 30, 2023

For: **INTRAORAL DEVICE**

Group Art Unit: 3772

Examiner: APONTE, MIRAYDA ARLENE

Attorney Docket No. INCEP-001COF

INFORMATION DISCLOSURE STATEMENT

TO THE COMMISSIONER FOR PATENTS:

1. Documents listed on the accompanying Form PTO/SB/08a (or equivalent) are presented for the Examiner's consideration.
  - ☒ Copies of listed U.S. patents and U.S. patent application publications are not required for submission. (37 C.F.R. § 1.98(a)(2)(ii))
  - ☒ Copies of listed foreign patent documents and/or non-patent literature are enclosed. (37 C.F.R. § 1.98(a)(2))
  - ☒ Copies of the documents listed at sheet no. 3, cite nos. 1-21 and sheet nos. 5-9, cite nos. 1-4 and 9-14 of the attached Form PTO/SB/08a (or equivalent) are omitted because (1) they are already of record in U.S. Patent Application No. 14/228,057, filed March 27, 2014, on which this application relies for an earlier filing date under 35 U.S.C. § 120; and (2) any information disclosure statement filed in the prosecution of Application No. 14/228,057, complies with 37 CFR §§ 1.98(a) through (c). (37 C.F.R. § 1.98(d))
  - ☐ A copy of copending U.S. Patent Application No., filed \_\_\_\_\_, for \_\_\_\_\_, listed at (sheet/cite no.) of the attached Form PTO-1449 (or equivalent), ☐ is enclosed / ☐ is omitted. (Copy not required if available via IFW. 1287 OG 162 (Oct. 19, 2004).).
2. This information disclosure statement is being submitted (check box a., b., or c.):
  - a. ☒ Within three months of the filing date of a national application or entry of the national stage in an international application; or before the mailing of a first Office action on the merits; or before the mailing of a first Office

action after the filing of a request for continued examination under 37 CFR 1.114. (No statement under 37 CFR 1.97(e) is required.); or

- b. ☐ After the period set forth in paragraph 2a, but before the mailing date of either a final action, a notice of allowance, or an action that otherwise closes prosecution in the application. (Check box i. or ii.)
- i. ☐ The information disclosure statement submission fee set forth in 37 CFR 1.17(p) is paid herewith, or
- ii. ☐ A statement specified by 37 CFR 1.97(e) is set forth below; or
- c. ☐ After the mailing date of a final action or notice of allowance and on or before payment of the issue fee. A statement specified by 37 CFR 1.97(e) is set forth below. Enclosed is the information disclosure statement processing fee set forth in 37 CFR 1.17(p).

3. Fee Payment

- a. ☐ A check in the amount of \$\_\_\_\_\_ is enclosed.
- b. ☐ Payment by credit card.
- c. ☐ Please charge our Deposit Account No. 50-1662 in the amount of \$\_\_\_\_\_.
- d. ☐ The Commissioner is hereby authorized to charge any additional fees which may be required in connection with filing of these papers, or credit overpayment to Deposit Account No. 50-1662.

4. If a statement specified by 37 CFR 1.97(e) is required, the attorney or agent signing below hereby states that (check box a. or b.):

- a. ☐ Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement
- ☐ Such communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of this information disclosure statement. (37 C.F.R. § 1.97(e))
- b. ☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in this information disclosure statement was known to any

individual designated in 37 CFR 1.56(c) more than three months prior to the filing of this information disclosure statement.

5. ☐ A concise explanation of the relevance of each document not in the English language and/or selected documents in the English language is set forth below.

Respectfully submitted,

Date: September 1, 2023

By: /Tam Thanh Pham  
Tam Thanh Pham  
Registration No. 50,565

Polsinelli LLP  
Three Embarcadero Center  
Suite 2400  
San Francisco, CA 94111  
(415) 248-2100

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group Art Unit: 3772

Examiner: APONTE, MIRAYDA ARLENE

Serial No.: 18/217,304

Filed: June 30, 2023

In re Application of: Thien Nguyen et al.

Confirmation No.: 5030

Customer No.: 138718

Title: INTRAORAL DEVICE

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**List of Co-Pending Patents or Patent Applications That May Be Directed Towards Similar  
Subject Matter**

| Examiner's<br>Initials   | Application<br>Number | Docket<br>Number | First<br>Named<br>Inventor | Title                    | Filing<br>Date |
|--------------------------|-----------------------|------------------|----------------------------|--------------------------|----------------|
|                          | 16/870,745            | INCEP-005        | Thien Nguyen               | DENTAL MOUTHPIECE        | 05-08-2020     |
|                          | 29/780,960            | INCEP-007D       | Thien Nguyen               | MOUTHPIECE MOUTH<br>PROP | 04-27-2021     |
|                          | 29/893,986            | INCEP-011D       | Thien Nguyen               | MOUTHPIECE               | 06-05-2023     |
| Examiner's<br>Signature: |                       |                  |                            |                          | Date:          |

Respectfully submitted,

Polsinelli LLP

Date: September 1, 2023

By: /Tam Thanh Pham/  
Tam Thanh Pham, Reg. No. 50,565  
Three Embarcadero Center  
Suite 2400  
San Francisco, CA 94111  
Phone: (415) 248-2100  
Email: [patentdocketing@polsinelli.com](mailto:patentdocketing@polsinelli.com)

**Notice of References Cited**Application/Control No.  
402175804Applicant(s)/Patent Under  
Reexamination  
Nguyen et al.Examiner  
MIRAYDA A APONTEArt Unit  
3772

Page 1 of 1

**U.S. PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Name             | CPC Classification | US Classification |
|---|---|--------------------------------------------------|-----------------|------------------|--------------------|-------------------|
| * | A | US-20030134253-A1                                | 07-2003         | Hirsch, James A. | A61C5/90           | 433/29            |
| * | B | US-6974321-B2                                    | 12-2005         | Hirsch, James A. | A61C17/10          | 433/140           |
|   | C |                                                  |                 |                  |                    |                   |
|   | D |                                                  |                 |                  |                    |                   |
|   | E |                                                  |                 |                  |                    |                   |
|   | F |                                                  |                 |                  |                    |                   |
|   | G |                                                  |                 |                  |                    |                   |
|   | H |                                                  |                 |                  |                    |                   |
|   | I |                                                  |                 |                  |                    |                   |
|   | J |                                                  |                 |                  |                    |                   |
|   | K |                                                  |                 |                  |                    |                   |
|   | L |                                                  |                 |                  |                    |                   |
|   | M |                                                  |                 |                  |                    |                   |

**FOREIGN PATENT DOCUMENTS**

| * |   | Document Number<br>Country Code-Number-Kind Code | Date<br>MM-YYYY | Country | Name | CPC Classification |
|---|---|--------------------------------------------------|-----------------|---------|------|--------------------|
|   | N |                                                  |                 |         |      |                    |
|   | O |                                                  |                 |         |      |                    |
|   | P |                                                  |                 |         |      |                    |
|   | Q |                                                  |                 |         |      |                    |
|   | R |                                                  |                 |         |      |                    |
|   | S |                                                  |                 |         |      |                    |
|   | T |                                                  |                 |         |      |                    |

**NON-PATENT DOCUMENTS**

| * |   | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|-------------------------------------------------------------------------------------------|
|   | U |                                                                                           |
|   | V |                                                                                           |
|   | W |                                                                                           |
|   | X |                                                                                           |

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)

Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

***Index of Claims***

18/217,304

Nguyen et al.

Examiner

Art Unit

MIRAYDA A APONTE

3772

|   |                 |
|---|-----------------|
| ✓ | <b>Rejected</b> |
| = | <b>Allowed</b>  |

|   |                   |
|---|-------------------|
| - | <b>Cancelled</b>  |
| ÷ | <b>Restricted</b> |

|   |                     |
|---|---------------------|
| N | <b>Non-Elected</b>  |
| I | <b>Interference</b> |

|   |                 |
|---|-----------------|
| A | <b>Appeal</b>   |
| O | <b>Objected</b> |

**CLAIMS**
☐ Claims renumbered in the same order as presented by applicant

☐ CPA

☐ T.D.

☐ R.1.47

| CLAIM |          | DATE       |  |  |  |  |  |  |  |  |  |
|-------|----------|------------|--|--|--|--|--|--|--|--|--|
| Final | Original | 09/23/2023 |  |  |  |  |  |  |  |  |  |
|       | 1        | ✓          |  |  |  |  |  |  |  |  |  |
|       | 2        | ✓          |  |  |  |  |  |  |  |  |  |
|       | 3        | ✓          |  |  |  |  |  |  |  |  |  |
|       | 4        | ✓          |  |  |  |  |  |  |  |  |  |
|       | 5        | ✓          |  |  |  |  |  |  |  |  |  |
|       | 6        | ✓          |  |  |  |  |  |  |  |  |  |
|       | 7        | ✓          |  |  |  |  |  |  |  |  |  |
|       | 8        | ✓          |  |  |  |  |  |  |  |  |  |
|       | 9        | ✓          |  |  |  |  |  |  |  |  |  |
|       | 10       | ✓          |  |  |  |  |  |  |  |  |  |
|       | 11       | ✓          |  |  |  |  |  |  |  |  |  |
|       | 12       | ✓          |  |  |  |  |  |  |  |  |  |
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|       | 27       | ✓          |  |  |  |  |  |  |  |  |  |
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|       | 37       | ✓          |  |  |  |  |  |  |  |  |  |
|       | 38       | O          |  |  |  |  |  |  |  |  |  |
|       | 39       | ✓          |  |  |  |  |  |  |  |  |  |
|       | 40       | ✓          |  |  |  |  |  |  |  |  |  |
|       | 41       | O          |  |  |  |  |  |  |  |  |  |
|       | 42       | O          |  |  |  |  |  |  |  |  |  |

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------|
| Ascentcare Dental Products v. Solmetex - IPR2025-01175<br><b>Search Notes</b><br> | Application/Control No.<br>18/217,304 | Applicant(s)/Patent Under Reexamination<br>Nguyen et al. |
|                                                                                                                                                                    | Examiner<br>MIRAYDA A APONTE          | Art Unit<br>3772                                         |

| CPC - Searched*                |            |          |
|--------------------------------|------------|----------|
| Symbol                         | Date       | Examiner |
| A61C17/08,0208,06,00,02,43,046 | 09/23/2023 | MA       |
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| A61B1/24                       | 09/23/2023 | MA       |

| CPC Combination Sets - Searched* |      |          |
|----------------------------------|------|----------|
| Symbol                           | Date | Examiner |
|                                  |      |          |

| US Classification - Searched* |           |            |          |
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| Class                         | Subclass  | Date       | Examiner |
| 433                           | 91-93,140 | 09/23/2023 | MA       |

\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

| Search Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |          |
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| Search Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Date       | Examiner |
| PE2ESearch                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 09/23/2023 | MA       |
| Word search on tongue WITH restrain*, (suction vacuum ) AND ( tongue retract*), dental AND cheek WITH retractor AND suction, ( suction vacuum ) AND (tongue retract*) AND connection, dental AND tube SAME connector SAME protrusion, dental AND vacuum SAME tube SAME connector SAME protrusion, medical AND vacuum SAME tube SAME connector SAME protrusion, dental AND vacuum SAME tube SAME locking ADJ mecha*, dental AND vacuum SAME tube SAME ((locking ADJ mecha*) ((wedge clip) lock) ((snap) ADJ fit) ), surfaces WITH vacum WITH support WITH (structure wall), tube AND vacum WITH support WITH (structure wall), dental AND (wall surface) SAME spacer WITH wave SAME vacu*, (wall surface) WITH spacer WITH wave SAME vacu* | 09/23/2023 | MA       |

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| /MIRAYDA A APONTE/<br>Examiner, Art Unit 3772 |  |
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**Search Notes****Application/Control No.**

18/217,304

**Applicant(s)/Patent Under Reexamination**

Nguyen et al.

**Examiner**

MIRAYDA A APONTE

**Art Unit**

3772

**Interference Search****US Class/CPC  
Symbol****US Subclass/CPC Group****Date****Examiner**/MIRAYDA A APONTE/  
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Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175

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# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

**Complete if Known**

|                        |                        |
|------------------------|------------------------|
| Application Number     | 18/217,304             |
| Filing Date            | June 30, 2023          |
| First Named Inventor:  | Thien Nguyen           |
| Art Unit               | 3772                   |
| Examiner Name          | APONTE, MIRAYDA ARLENE |
| Attorney Docket Number | INCEP-001COF           |

Sheet

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of

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| Examiner<br>Signature | /MIRAYDA A APONTE/ | Date Considered | 09/22/2023 |
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## Ascentcare Dental Products v. Solmetex - IPR2025-01175

Japanese patent documents, the indication of the year of reign of the Emperor must precede the serial number of the patent document. <sup>5</sup>Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup>Applicant is to place a check mark here if English language translation is attached.

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Ascentcare Dental Products v. Solmetex - IPR2025-01175

|                                                                                                                                                 |          |                                                                                                                                                                                                                                                                                                                      |                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <b>Substitute for Form 1449/PTO</b><br><br><b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b><br><i>(use as many sheets as necessary)</i> |          | <b>Complete if Known</b>                                                                                                                                                                                                                                                                                             |                        |
|                                                                                                                                                 |          | Application Number                                                                                                                                                                                                                                                                                                   | 18/217,304             |
|                                                                                                                                                 |          | Filing Date                                                                                                                                                                                                                                                                                                          | June 30, 2023          |
|                                                                                                                                                 |          | First Named Inventor:                                                                                                                                                                                                                                                                                                | Thien Nguyen           |
|                                                                                                                                                 |          | Art Unit                                                                                                                                                                                                                                                                                                             | 3772                   |
|                                                                                                                                                 |          | Examiner Name                                                                                                                                                                                                                                                                                                        | APONTE, MIRAYDA ARLENE |
| <b>Sheet</b>                                                                                                                                    | <b>2</b> | <b>of</b>                                                                                                                                                                                                                                                                                                            | <b>2</b>               |
|                                                                                                                                                 |          | Attorney Docket Number                                                                                                                                                                                                                                                                                               | INCEP-001COF           |
| <b>NON PATENT LITERATURE DOCUMENTS</b>                                                                                                          |          |                                                                                                                                                                                                                                                                                                                      |                        |
| Examiner Initials*                                                                                                                              | Cite No' | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published                                                       | T <sup>2</sup>         |
|                                                                                                                                                 | 1        | Dryshield brochure. Dryshield.com. Publish date: May 2019. Retrieval date: 15 September 2021. Retrieved from internet: <a href="https://dryshield.com/ds/Brochure_May2019.pdf">https://dryshield.com/ds/Brochure_May2019.pdf</a> (Year: 2019)                                                                        |                        |
|                                                                                                                                                 | 2        | "Dryshield (single-use) vs. Zryis/Isolite (single-use) mouthpieces" posted by Mark Frias, RDH. Youtube. Posting date: 18 January 2020. Retrieval date: 15 September 2021. Retrieved from internet: <a href="https://www.youtube.com/watch?v=uKX9XahOEY">https://www.youtube.com/watch?v=uKX9XahOEY</a> (Year: 2020)  |                        |
|                                                                                                                                                 | 3        | "Dryshield Presentation (Learn all about Dryshield)" posted by Dryshield isolation System. Youtube. Posting date: 27 October 2014. Retrieval date: 15 September 2021. Retrieved from internet: <a href="https://www.youtube.com/watch?v=fcbpz3ixvis">https://www.youtube.com/watch?v=fcbpz3ixvis</a> (Year: 2014)    |                        |
|                                                                                                                                                 | 4        | "Dryshield Tutorial - Maximize Your Dryshield Experience" posted by Dryshield Isolation System. Youtube. Posting date: 15 April 2015. Retrieval date: 15 September 2021. Retrieved from internet: <a href="https://www.youtube.com/watch?v=L2OSYPS8Rc4">https://www.youtube.com/watch?v=L2OSYPS8Rc4</a> (Year: 2015) |                        |
|                                                                                                                                                 | 5        | PCT Application No. PCT/US2014/032892 International Preliminary Report on Patentability dated 6/14/16                                                                                                                                                                                                                |                        |
|                                                                                                                                                 | 6        | PCT Application No. PCT/US2014/032892 International Search Report and Written Opinion dated 9/4/14                                                                                                                                                                                                                   |                        |
|                                                                                                                                                 | 7        | PCT Application No. PCT/US2020/032228 International Preliminary Report on Patentability dated 11/16/21                                                                                                                                                                                                               |                        |
|                                                                                                                                                 | 8        | PCT Application No. PCT/US2020/032228 International Search Report and Written Opinion dated 8/12/20                                                                                                                                                                                                                  |                        |
|                                                                                                                                                 | 9        | Australian Patent Application No. 2014202637; AU Examination Report dated 1/23/15                                                                                                                                                                                                                                    |                        |
|                                                                                                                                                 | 10       | Brazilian Patent Application No. BR1120140116377 Preliminary Office Action 1/7/20                                                                                                                                                                                                                                    |                        |
|                                                                                                                                                 | 11       | Canadian Patent Application No. 2,919,142; CA Examination Report dated 5/31/16                                                                                                                                                                                                                                       |                        |
|                                                                                                                                                 | 12       | Chinese Patent Application No. 201480039991.2 First Office Action dated 12/29/16                                                                                                                                                                                                                                     |                        |
|                                                                                                                                                 | 13       | European Patent Application No. 14721736.8; Extended European Search Report dated 10/20/15                                                                                                                                                                                                                           |                        |
|                                                                                                                                                 | 14       | European Patent Application No. 17150671.0; Extended European Search Report dated 5/29/17                                                                                                                                                                                                                            |                        |
|                                                                                                                                                 | 15       | European Patent Application No. 20804801.7; Extended European Search Report dated 4/20/23                                                                                                                                                                                                                            |                        |

Solmetex Ex. 2029

~~Ascentcare Dental Products v. Solmetex - IPR2025-01175~~

|  |    |                                                                                                |  |
|--|----|------------------------------------------------------------------------------------------------|--|
|  | 16 | European Patent Application No. 20804801.7; Supplementary European Search Report dated 5/10/23 |  |
|  | 17 | U.S. Patent Application 14/100,323; Final Office Action mailed 10/24/14                        |  |
|  | 18 | U.S. Patent Application 14/100,323; Office Action mailed 5/6/14                                |  |
|  | 19 | U.S. Patent Application 14/228,046; Office Action mailed 10/6/21                               |  |
|  | 20 | U.S. Patent Application 14/228,046; Final Office Action mailed 11/27/20                        |  |
|  | 21 | U.S. Patent Application 14/228,046; Office Action mailed 1/10/20                               |  |
|  | 22 | U.S. Patent Application 14/228,046; Final Office Action mailed 7/15/19                         |  |
|  | 23 | U.S. Patent Application 14/228,046; Office Action mailed 10/5/18                               |  |
|  | 24 | U.S. Patent Application 14/228,046; Final Office Action mailed 1/16/18                         |  |
|  | 25 | U.S. Patent Application 14/228,046; Office Action mailed 6/5/17                                |  |
|  | 26 | U.S. Patent Application 14/228,046; Office Action mailed 11/7/16                               |  |
|  | 27 | U.S. Patent Application 14/228,046; Final Office Action mailed 6/6/16                          |  |
|  | 28 | U.S. Patent Application 14/228,046; Office Action mailed 11/6/15                               |  |
|  | 29 | U.S. Patent Application 14/228,050; Office Action mailed 11/4/16                               |  |
|  | 30 | U.S. Patent Application 14/228,050; Final Office Action mailed 5/20/16                         |  |
|  | 31 | U.S. Patent Application 14/228,050; Office Action mailed 11/6/15                               |  |
|  | 32 | U.S. Patent Application 14/228,054; Final Office Action mailed 1/3/22                          |  |
|  | 33 | U.S. Patent Application 14/228,054; Office Action mailed 6/25/21                               |  |
|  | 34 | U.S. Patent Application 14/228,054; Final Office Action mailed 12/22/20                        |  |
|  | 35 | U.S. Patent Application 14/228,054; Office Action mailed 1/13/20                               |  |

Solmetex Ex. 2029

~~Ascentcare Dental Products v. Solmetex - IPR2025-01175~~

|  |    |                                                                         |  |
|--|----|-------------------------------------------------------------------------|--|
|  | 36 | U.S. Patent Application 14/228,054; Final Office Action mailed 8/8/19   |  |
|  | 37 | U.S. Patent Application 14/228,054; Office Action mailed 11/29/18       |  |
|  | 38 | U.S. Patent Application 14/228,054; Final Office Action mailed 11/2/17  |  |
|  | 39 | U.S. Patent Application 14/228,054; Office Action mailed 4/24/17        |  |
|  | 40 | U.S. Patent Application 14/228,054; Office Action mailed 12/3/15        |  |
|  | 41 | U.S. Patent Application 14/228,057; Final Office Action mailed 1/5/23   |  |
|  | 42 | U.S. Patent Application 14/228,057; Office Action mailed 9/2/22         |  |
|  | 43 | U.S. Patent Application 14/228,057; Final Office Action mailed 11/12/21 |  |
|  | 44 | U.S. Patent Application 14/228,057; Office Action mailed 5/5/21         |  |
|  | 45 | U.S. Patent Application 14/228,057; Final Office Action mailed 5/19/20  |  |
|  | 46 | U.S. Patent Application 14/228,057; Office Action mailed 10/7/19        |  |
|  | 47 | U.S. Patent Application 14/228,057; Final Office Action mailed 3/22/19  |  |
|  | 48 | U.S. Patent Application 14/228,057; Office Action mailed 9/7/18         |  |
|  | 49 | U.S. Patent Application 14/228,057; Final Office Action mailed 11/2/17  |  |
|  | 50 | U.S. Patent Application 14/228,057; Office Action mailed 4/13/17        |  |
|  | 51 | U.S. Patent Application 14/228,057; Final Office Action mailed 6/7/16   |  |
|  | 52 | U.S. Patent Application 14/228,057; Office Action mailed 11/20/15       |  |
|  | 53 | U.S. Patent Application 14/228,061; Office Action mailed 12/8/21        |  |
|  | 54 | U.S. Patent Application 14/228,061; Final Office Action mailed 4/29/21  |  |
|  | 55 | U.S. Patent Application 14/228,061; Office Action mailed 11/27/20       |  |

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~~Ascentcare Dental Products v. Solmetex - IPR2025-01175~~

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|--|----|-------------------------------------------------------------------------|--|
|  | 56 | U.S. Patent Application 14/228,061; Final Office Action mailed 1/10/20  |  |
|  | 57 | U.S. Patent Application 14/228,061; Final Office Action mailed 7/11/19  |  |
|  | 58 | U.S. Patent Application 14/228,061; Office Action mailed 10/4/18        |  |
|  | 59 | U.S. Patent Application 14/228,061; Final Office Action mailed 10/20/17 |  |
|  | 60 | U.S. Patent Application 14/228,061; Office Action mailed 4/12/17        |  |
|  | 61 | U.S. Patent Application 14/228,061; Final Office Action mailed 6/30/16  |  |
|  | 62 | U.S. Patent Application 14/228,061; Office Action mailed 12/4/15        |  |
|  | 63 | U.S. Patent Application 29/491,367 Final Office Action mailed 3/4/15    |  |
|  | 64 | U.S. Patent Application 29/491,367 Office Action mailed 11/14/14        |  |
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|  | 66 | U.S. Patent Application 29/477,887 Office Action mailed 11/27/15        |  |
|  | 67 | U.S. Patent Application 29/477,887 Final Office Action mailed 5/1/15    |  |
|  | 68 | U.S. Patent Application 29/477,887 Office Action mailed 11/14/14        |  |
|  | 69 | U.S. Patent Application 29/477,888 Office Action mailed 3/21/17         |  |
|  | 70 | U.S. Patent Application 29/477,888 Final Office Action mailed 6/1/16    |  |
|  | 71 | U.S. Patent Application 29/477,888 Office Action mailed 12/2/15         |  |
|  | 72 | U.S. Patent Application 29/477,888 Final Office Action mailed 5/1/15    |  |
|  | 73 | U.S. Patent Application 29/477,888 Office Action mailed 11/14/14        |  |
|  | 74 | U.S. Patent Application 16/870,745 Office Action mailed 2/17/23         |  |
|  | 75 | U.S. Patent Application 16/870,745 Final Office Action mailed 5/12/22   |  |

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~~Ascentcare Dental Products v. Solmetex - IPR2025-01175~~

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|--|----|-----------------------------------------------------------------------|--|
|  | 76 | U.S. Patent Application 16/870,745 Office Action mailed 12/3/21       |  |
|  | 77 | U.S. Patent Application 29/782,645 Office Action mailed 10/4/21       |  |
|  | 78 | U.S. Patent Application 29/782,638 Office Action mailed 10/4/21       |  |
|  | 79 | U.S. Patent Application 29/782,644 Final Office Action mailed 5/11/22 |  |
|  | 80 | U.S. Patent Application 29/782,644 Office Action mailed 10/4/21       |  |
|  | 81 | U.S. Patent Application 29/782,643 Final Office Action mailed 5/11/22 |  |
|  | 82 | U.S. Patent Application 29/782,643 Office Action mailed 10/4/21       |  |

|                       |  |                    |  |
|-----------------------|--|--------------------|--|
| Examiner<br>Signature |  | Date<br>Considered |  |
|-----------------------|--|--------------------|--|

\*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

'Applicant's unique citation designation number (optional). 'Applicant is to place a check mark here if English Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SENT FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.**

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Solmetex Ex. 2029

Ascentcare Dental Products v. Solmetex - IPR2025-01175

PATENT  
INCEP-001COF

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group Art Unit: 3772

Examiner: APONTE, MIRAYDA ARLENE

Serial No.: 18/217,304

Filed: June 30, 2023

In re Application of: Thien Nguyen et al.

Confirmation No.: 5030

Customer No.: 138718

Title: INTRAORAL DEVICE

**List of Co-Pending Patents or Patent Applications That May Be Directed Towards Similar  
Subject Matter**

| Examiner's Initials   | Application Number | Docket Number | First Named Inventor | Title                 | Filing Date         |
|-----------------------|--------------------|---------------|----------------------|-----------------------|---------------------|
|                       | 16/870,745         | INCEP-005     | Thien Nguyen         | DENTAL MOUTHPIECE     | 05-08-2020          |
|                       | 29/780,960         | INCEP-007D    | Thien Nguyen         | MOUTHPIECE MOUTH PROP | 04-27-2021          |
|                       | 29/893,986         | INCEP-011D    | Thien Nguyen         | MOUTHPIECE            | 06-05-2023          |
| Examiner's Signature: | /MIRAYDA A APONTE/ |               |                      |                       | Date:<br>09/22/2023 |

Respectfully submitted,

Polsinelli LLP

Date: September 1, 2023

By: /Tam Thanh Pham/  
Tam Thanh Pham, Reg. No. 50,565  
Three Embarcadero Center  
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San Francisco, CA 94111  
Phone: (415) 248-2100  
Email: [patentdocketing@polsinelli.com](mailto:patentdocketing@polsinelli.com)

**Bibliographic Data**

Application No: 18/217,304

Foreign Priority claimed:

☐ Yes☒ No

35 USC 119 (a-d) conditions met:

☐ Yes☐ No☐ Met After Allowance

Verified and Acknowledged:

/MIRAYDA A APONTE/

Examiner's Signature

Initials

Title:

INTRAORAL DEVICE

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| FILING or 371(c) DATE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|-----------------------|-------|----------------|---------------------|
| 06/30/2023            | 433   | 3772           | INCEP-001COF        |
| RULE                  |       |                |                     |

**APPLICANTS**

SOLMETEX, LLC,

**INVENTORS**

Thien Nguyen, Santa Ana, CA, UNITED STATES

Tam Thanh Pham, San Francisco, CA, UNITED STATES

**CONTINUING DATA**

This application is a CON of 14228057 03/27/2014 PAT 11744686

14228057 is a CON of 14100323 12/09/2013 PAT 8911232

14100323 has PRO of 61734939 12/07/2012

**FOREIGN APPLICATIONS****IF REQUIRED, FOREIGN LICENSE GRANTED\*\***

07/18/2023

**\*\* SMALL ENTITY \*\*****STATE OR COUNTRY**

UNITED STATES

**ADDRESS**

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PO Box 140310

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UNITED STATES

**FILING FEE RECEIVED**

\$0

## PE2E SEARCH - Search History (Prior Art)

| Ref # | Hits  | Search Query                                                                                                                                                                                                                                                                                | DBs                                                                          | Default Operator | Plurals | British Equivalents | Time Stamp          |
|-------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------|---------|---------------------|---------------------|
| L1    | 11074 | (A61C17/08 OR A61C17/0208 OR A61C17/06 OR A61C17/00 OR A61C17/02).cpc. OR (433/93).ccls.                                                                                                                                                                                                    | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2022/07/19 02:25 PM |
| L2    | 6     | ("20040033468" OR "20140349249" OR "3453735" OR "3516160" OR "D364456" OR "D663831").pn.                                                                                                                                                                                                    | (US-PGPUB; USPAT)                                                            | OR               | ON      | ON                  | 2022/07/19 02:26 PM |
| L3    | 5     | ("20060063129" OR "3758950" OR "4167814" OR "20030134253" OR "2019612").pn.                                                                                                                                                                                                                 | (US-PGPUB; USPAT)                                                            | OR               | ON      | ON                  | 2022/07/19 02:34 PM |
| L4    | 8     | ("10390734" OR "10390916" OR "20120015317" OR "20170156831" OR "20170156833" OR "20200155284" OR "5720275" OR "6672305").pn.                                                                                                                                                                | (US-PGPUB; USPAT)                                                            | OR               | ON      | ON                  | 2022/07/19 02:36 PM |
| L5    | 35    | ("2992161" "10654392" "0042939" "0061031" "2018126150").pn.                                                                                                                                                                                                                                 | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2022/07/19 02:38 PM |
| L6    | 1     | ("4975057").pn.                                                                                                                                                                                                                                                                             | (US-PGPUB; USPAT)                                                            | OR               | ON      | ON                  | 2022/07/19 02:50 PM |
| L7    | 26    | (US-0153637-\$   US-0383560-\$   US-10939979-\$   US-20180153637-\$   US-20200383560-\$   US-4975057-\$   US-5730599-\$   US-6652276-\$   US-6655960-\$   US-6716029-\$   US-D267586-\$).DID. OR (CA-3139689-\$   CN-104490483-\$   EP-3965637-\$   TW-202108088-\$   VA-223131450-\$).DID. | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR               | ON      | ON                  | 2022/07/19 02:52 PM |
| L8    | 3     | ("20060063129").did.                                                                                                                                                                                                                                                                        | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO;                        | OR               | ON      | ON                  | 2022/07/20 08:00 AM |

|     |      |                                                                                                                                                                                                                   |                                                                                                                       |    |    |    |                        |
|-----|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L9  | 526  | (aponte).xa.                                                                                                                                                                                                      | JPO; DERWENT;<br>IBM_TDB)<br>(US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/07/20<br>08:47 AM |
| L12 | 8    | L9 AND retractor                                                                                                                                                                                                  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2022/07/20<br>08:48 AM |
| L13 | 1    | L9 AND L1                                                                                                                                                                                                         | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2022/07/20<br>08:50 AM |
| L16 | 54   | L9 AND (tongue)                                                                                                                                                                                                   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2022/07/20<br>08:52 AM |
| L17 | 3    | ("5730599"   "6022214"<br>  "20030134253").pn.<br>OR ("9827071").urpn.<br>AND (PGPB   USPT  <br>USOC).dbnm.                                                                                                       | (US-PGPUB; USPAT;<br>USOCR)                                                                                           | OR | ON | ON | 2022/07/20<br>08:57 AM |
| L18 | 33   | ("20905"   "2220674"  <br>"3924333"   "4053984"  <br>"4167814"   "5340313"  <br>"5588836"   "5590643"  <br>"5735691"   "5890899"  <br>"6244866").pn. OR<br>("6655960").urpn. AND<br>(PGPB   USPT  <br>USOC).dbnm. | (US-PGPUB; USPAT;<br>USOCR)                                                                                           | OR | ON | ON | 2022/07/20<br>09:00 AM |
| L19 | 8    | ("2006/0063129").urpn.<br>AND (PGPB   USPT  <br>USOC).dbnm.                                                                                                                                                       | (US-PGPUB; USPAT;<br>USOCR)                                                                                           | OR | ON | ON | 2022/07/21<br>07:57 AM |
| L20 | 26   | L1 AND tongue WITH<br>restrain*                                                                                                                                                                                   | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2022/07/21<br>08:51 AM |
| L21 | 240  | L1 AND tongue WITH<br>retract*                                                                                                                                                                                    | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2022/07/21<br>08:54 AM |
| L22 | 1282 | L1 AND (suction<br>vacuum ) AND (tongue<br>retract*)                                                                                                                                                              | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2022/07/21<br>09:13 AM |

|     |       |                                                                                                                                                                                                                                             |                                                                              |    |    |    |                     |
|-----|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|----|----|----|---------------------|
| L23 | 594   | L1 AND (suction vacuum ) AND (retract*)                                                                                                                                                                                                     | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/07/21 09:13 AM |
| L24 | 14    | ("4802851" "5890899" "20090274991" "20060063129").did.                                                                                                                                                                                      | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/07/21 10:54 AM |
| L25 | 65    | ("9788924" "2851861" "105578986" "102026587" "102247140" "4083115" "5762496" "9084656" "9358086" "20030134253" "2019612" "9788924").did.                                                                                                    | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/07/21 11:01 AM |
| L26 | 361   | dental AND cheek WITH retractor AND suction                                                                                                                                                                                                 | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/08/19 01:12 PM |
| L27 | 14170 | (A61C5/90 OR A61B1/24 OR A61C17/08).cpc.                                                                                                                                                                                                    | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/08/19 02:00 PM |
| L28 | 218   | L27 AND cheek WITH retractor AND suction                                                                                                                                                                                                    | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/08/19 02:01 PM |
| L29 | 60    | ("1122086"   "4495945"   "4592344"   "4643172"   "4802851"   "4975057"   "4996976"   "5009595"   "5152686"   "5232362"   "5281134"   "5588836"   "5762496"   "5769635").pn. OR ("6022214").urpn. AND (PGPB   USPT   USOC).dbnm.             | (US-PGPUB; USPAT; USOCR)                                                     | OR | ON | ON | 2022/08/19 02:19 PM |
| L30 | 42    | ("1122086"   "4495945"   "4592344"   "4643172"   "4802851"   "4975057"   "4996976"   "5009595"   "5152686"   "5232362"   "5281134"   "5588836"   "5762496"   "5769635"   "6022214").pn. OR ("6338627").urpn. AND (PGPB   USPT   USOC).dbnm. | (US-PGPUB; USPAT; USOCR)                                                     | OR | ON | ON | 2022/08/19 02:22 PM |

|     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                          |    |    |    |                        |
|-----|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L31 | 72  | ("1122086"   "3049806"<br>  "3881254"   "4071026"<br>  "4167814"   "4259067"<br>  "4495945"   "4592344"<br>  "4643172"   "4802851"<br>  "4865545"   "4975057"<br>  "4992046"   "4996976"<br>  "5009595"   "5071347"<br>  "5078602"   "5152686"<br>  "5232362"   "5281134"<br>  "5462435"   "5513986"<br>  "5588836"   "5762496"<br>  "5769635"   "5873718"<br>  "6022214"   "6338627"<br>  "20030143512").pn.<br>OR ("D495799").urpn.<br>AND (PGPB   USPT  <br>USOC).dbnm. | (US-PGPUB; USPAT;<br>USOCR)                                                              | OR | ON | ON | 2022/08/19<br>02:23 PM |
| L32 | 3   | ("20060063129").did.                                                                                                                                                                                                                                                                                                                                                                                                                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/08/21<br>06:25 AM |
| L33 | 6   | ("2017156832"<br>"20140212838").did.                                                                                                                                                                                                                                                                                                                                                                                                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/08/21<br>07:45 AM |
| L34 | 4   | ("20170156832"<br>"20140212838").did.                                                                                                                                                                                                                                                                                                                                                                                                                                      | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/08/21<br>07:46 AM |
| L35 | 10  | ("2014/0212838").urpn.<br>AND (PGPB   USPT  <br>USOC).dbnm.                                                                                                                                                                                                                                                                                                                                                                                                                | (US-PGPUB; USPAT;<br>USOCR)                                                              | OR | ON | ON | 2022/08/21<br>07:47 AM |
| L36 | 3   | ("20060063129").did.                                                                                                                                                                                                                                                                                                                                                                                                                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/08/21<br>09:55 AM |
| L37 | 752 | (A61C17/043 OR<br>A61C17/046).cpc.                                                                                                                                                                                                                                                                                                                                                                                                                                         | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/08/21<br>11:02 AM |
| L38 | 8   | L37 AND cheek WITH<br>retractor AND suction                                                                                                                                                                                                                                                                                                                                                                                                                                | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/08/21<br>11:02 AM |
| L39 | 43  | (433/91-92,140).ccls.<br>AND cheek WITH<br>retractor AND suction                                                                                                                                                                                                                                                                                                                                                                                                           | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;             | OR | ON | ON | 2022/08/21<br>11:04 AM |

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|-----|-------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L40 | 2     | (D962438<br>D965439).did.                                                                                                                       | IBM_TDB)<br>(US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2022/12/29<br>06:14 AM |
| L41 | 2     | (D962438<br>D962439).did.                                                                                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)             | OR | ON | ON | 2022/12/29<br>06:15 AM |
| L42 | 1     | ("2022533276").did.                                                                                                                             | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)             | OR | ON | ON | 2022/12/29<br>06:16 AM |
| L43 | 2066  | (A61C17/043 OR<br>A61C17/046).cpc. OR<br>(433/91-92,140).ccls.                                                                                  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)             | OR | ON | ON | 2022/12/29<br>06:19 AM |
| L44 | 50    | L43 AND cheek WITH<br>retractor AND suction                                                                                                     | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)             | OR | ON | ON | 2022/12/29<br>06:23 AM |
| L45 | 83    | L43 AND retractor AND<br>suction                                                                                                                | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)             | OR | ON | ON | 2022/12/29<br>06:24 AM |
| L46 | 98    | L43 AND retractor AND<br>(suction vacuum)                                                                                                       | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)             | OR | ON | ON | 2022/12/29<br>08:18 AM |
| L47 | 308   | L43 AND (suction<br>vacuum ) AND (tongue<br>retract*)                                                                                           | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)             | OR | ON | ON | 2022/12/29<br>08:19 AM |
| L48 | 15919 | (A61C17/043 OR<br>A61C17/046 OR<br>A61C5/90 OR<br>A61B1/24 OR<br>A61C17/08).cpc.                                                                | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)             | OR | ON | ON | 2022/12/29<br>08:45 AM |
| L49 | 24458 | (A61C17/043 OR<br>A61C17/046 OR<br>A61C5/90 OR<br>A61B1/24 OR<br>A61C17/08 OR<br>A61C17/08 OR<br>A61C17/0208 OR<br>A61C17/06 OR<br>A61C17/00 OR | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)             | OR | ON | ON | 2022/12/29<br>08:46 AM |

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| L50 | 1926 | A61C17/02).cpc. OR (433/93).ccls.<br>L49 AND (suction vacuum ) AND (tongue retract*) | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2022/12/29 08:46 AM |
| L51 | 8    | ("11576764" "11589969" "11589970" "20220378563").did.                                | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/05/25 09:05 AM |
| L52 | 1155 | L49 AND (suction vacuum ) AND (tongue retract*) AND connection                       | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/05/25 11:51 AM |
| L56 | 304  | orthodontic AND shell AND mold AND micro WITH (structure surface)                    | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/05/25 01:45 PM |
| L57 | 197  | orthodontic AND shell AND mold AND micro WITH (structure surface) AND film           | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/05/25 01:46 PM |
| L58 | 1724 | (433/91-93,140).ccls.                                                                | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/05/25 02:10 PM |
| L59 | 174  | L58 AND (suction vacuum ) AND (tongue retract*) AND connection                       | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/05/25 02:11 PM |
| L60 | 69   | L58 AND retractor AND (suction vacuum ) AND (tongue retract*) AND connection         | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/05/25 02:11 PM |
| L61 | 255  | L49 AND retractor AND (suction vacuum ) AND (tongue retract*) AND connection         | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/05/25 02:11 PM |
| L62 | 7    | (D734851 "2015088577").did.                                                          | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/05/25 03:09 PM |
| L63 | 4    | ("102026587").did.                                                                   | (US-PGPUB; USPAT; USOCR; FIT (CN, FR,                                        | OR | ON | ON | 2023/07/03 07:54 AM |

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| L64 | 17 | ("2017156832"<br>"2014212838"<br>"2015335409").did.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)<br>(US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/08/01<br>02:48 PM |
| L65 | 6  | ("2017156832"<br>"2014212838"<br>"2015335409").did.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                 | OR | ON | ON | 2023/08/01<br>02:48 PM |
| L66 | 6  | ("20170156832"<br>"20140212838"<br>"20150335409").did.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                 | OR | ON | ON | 2023/08/01<br>02:52 PM |
| L67 | 59 | ((US-20140349249-A1<br>OR US-20040033468-<br>A1 OR US-<br>20060063129-A1 OR<br>US-20030134253-A1<br>OR US-20200155284-<br>A1 OR US-<br>20090274991-A1 OR<br>US-20140162209-A1<br>OR US-20170156832-<br>A1 OR US-<br>20140212841-A1 OR<br>US-20140212838-A1<br>OR US-20150335409-<br>A1).did. AND<br>PGPB.dbnm.) OR ((US-<br>4167814-A OR US-<br>10390734-B2 OR US-<br>6716029-B2 OR US-<br>6655960-B2 OR US-<br>9827071-B2 OR US-<br>6022214-A OR US-<br>5730599-A OR US-<br>10939979-B2 OR US-<br>9358086-B2 OR US-<br>8029280-B2 OR US-<br>5152686-A OR US-<br>5588836-A OR US-<br>5762496-A OR US-<br>6338627-B1 OR US-<br>D495799-S OR US-<br>4992046-A OR US-<br>D735858-S OR US-<br>8297973-B2 OR US-<br>6974321-B2 OR US-<br>7287981-B2 OR US-<br>6213772-B1 OR US-<br>D962439-S OR US-<br>8545401-B2 OR US- | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                                                 | OR | ON | ON | 2023/08/30<br>08:25 AM |

|     |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                              |    |    |    |                     |
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|     |       | 7238023-B1 OR US-3768477-A OR US-4265621-A).did. AND USPT.dbnm.) OR ((WO-2018126150-A1 OR WO-0042939-A1 OR US-20200352680-A1 OR CN-104490483-A OR WO-03037205-A2 OR US-20020039715-A1 OR US-20030017433-A1 OR US-20140212841-A1 OR US-20140212840-A1 OR WO-2009134295-A1 OR US-20060063129-A1 OR US-20080008977-A1 OR US-20160270890-A1 OR US-20110112372-A1 OR DE-102009034143-A1).did. AND DWPI.dbnm.) OR ((WO-2018126150-A1 OR FR-2992161-A1 OR WO-0061031-A1 OR CN-104490483-A OR WO-0042939-A1 OR FR-2677538-A1 OR CN-101068503-A).did. AND FTDB.dbnm.) |                                                                              |    |    |    |                     |
| L68 | 3     | ("20060063129").did.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/08/30 10:44 AM |
| L69 | 225   | (hirsch).inv. AND dental                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/08/30 10:45 AM |
| L70 | 0     | (hirsch ADJ "et" ADJ "al").inv.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/08/30 10:49 AM |
| L71 | 17788 | (hirsch).inv.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/08/30 10:49 AM |
| L72 | 94    | (hirsch).inv. AND intraoral                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT;          | OR | ON | ON | 2023/08/30 10:50 AM |

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| L73 | 60 | ((US-20140349249-A1 OR US-20040033468-A1 OR US-20060063129-A1 OR US-20030134253-A1 OR US-20200155284-A1 OR US-20090274991-A1 OR US-20140162209-A1 OR US-20170156832-A1 OR US-20140212841-A1 OR US-20140212838-A1 OR US-20150335409-A1).did. AND PGPB.dbnm.) OR ((US-4167814-A OR US-10390734-B2 OR US-6716029-B2 OR US-6655960-B2 OR US-9827071-B2 OR US-6022214-A OR US-5730599-A OR US-10939979-B2 OR US-9358086-B2 OR US-8029280-B2 OR US-5152686-A OR US-5588836-A OR US-5762496-A OR US-6338627-B1 OR US-D495799-S OR US-4992046-A OR US-D735858-S OR US-8297973-B2 OR US-6974321-B2 OR US-7287981-B2 OR US-6213772-B1 OR US-D962439-S OR US-8545401-B2 OR US-7238023-B1 OR US-3768477-A OR US-4265621-A).did. AND USPT.dbnm.) OR ((WO-2018126150-A1 OR WO-0042939-A1 OR US-20200352680-A1 OR CN-104490483-A OR WO-03037205-A2 OR US-20020039715-A1 OR US-20030017433-A1 OR US-20140212841-A1 OR US-20140212840-A1 OR WO-2009134295-A1 OR US-20060063129-A1 OR US- | IBM_TDB)<br>(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) | OR | ON | ON | 2023/08/31<br>07:05 AM |
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|-----|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----|----|----|------------------------|
|     |     | 20080008977-A1 OR<br>US-20160270890-A1<br>OR US-20110112372-<br>A1 OR US-<br>20150335409-A1 OR<br>DE-102009034143-<br>A1).did. AND<br>DWPI.dbnm.) OR<br>((WO-2018126150-A1<br>OR FR-2992161-A1 OR<br>WO-0061031-A1 OR<br>CN-104490483-A OR<br>WO-0042939-A1 OR<br>FR-2677538-A1 OR<br>CN-101068503-A).did.<br>AND FTDB.dbnm.) |                                                                                          |    |    |    |                        |
| L74 | 16  | L73 AND (hirsch).inv.                                                                                                                                                                                                                                                                                                         | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/08/31<br>07:06 AM |
| L75 | 214 | dental AND tube SAME<br>connector SAME<br>protrusion                                                                                                                                                                                                                                                                          | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/08/31<br>07:59 AM |
| L77 | 8   | dental AND vacuum<br>SAME tube SAME<br>connector SAME<br>protrusion                                                                                                                                                                                                                                                           | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/08/31<br>07:59 AM |
| L78 | 80  | medical AND vacuum<br>SAME tube SAME<br>connector SAME<br>protrusion                                                                                                                                                                                                                                                          | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/08/31<br>08:01 AM |
| L79 | 8   | ("2015/0335409").urpn.<br>AND (PGPB   USPT  <br>USOC).dbnm.                                                                                                                                                                                                                                                                   | (US-PGPUB; USPAT;<br>USOCR)                                                              | OR | ON | ON | 2023/09/12<br>01:18 PM |
| L80 | 2   | ("20210346134").did.                                                                                                                                                                                                                                                                                                          | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/09/12<br>01:19 PM |
| L81 | 0   | ("2021/0346134").urpn.<br>AND (PGPB   USPT  <br>USOC).dbnm.                                                                                                                                                                                                                                                                   | (US-PGPUB; USPAT;<br>USOCR)                                                              | OR | ON | ON | 2023/09/12<br>01:19 PM |
| L82 | 2   | ("20110311945").did.                                                                                                                                                                                                                                                                                                          | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/09/12<br>01:20 PM |
| L83 | 2   | ("20110311942").did.                                                                                                                                                                                                                                                                                                          | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;                              | OR | ON | ON | 2023/09/12<br>01:20 PM |

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|-----|-----|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L84 | 18  | dental AND vacuum<br>SAME tube SAME<br>locking ADJ mecha*                                                | JPO; DERWENT;<br>IBM_TDB)<br>(US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/09/12<br>01:34 PM |
| L85 | 298 | dental AND vacuum<br>SAME tube SAME<br>((locking ADJ mecha*)<br>((wedge clip) lock)<br>((snap) ADJ fit)) | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2023/09/12<br>01:46 PM |
| L86 | 3   | ("20150057664").did.                                                                                     | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2023/09/13<br>11:27 AM |
| L87 | 3   | ("20060063129").did.                                                                                     | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2023/09/14<br>06:43 AM |
| L88 | 0   | surfaces WITH vacum<br>WITH support WITH<br>collap WITH (structure<br>wall)                              | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2023/09/15<br>08:05 AM |
| L89 | 1   | surfaces WITH vacum<br>WITH support WITH<br>(structure wall)                                             | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2023/09/15<br>08:05 AM |
| L90 | 5   | (wall surfaces) WITH<br>vacum WITH support<br>WITH (structure wall)                                      | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2023/09/15<br>08:05 AM |
| L91 | 0   | dental AND (internal<br>WITH surfaces) WITH<br>vacum WITH support<br>WITH (structure wall)               | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2023/09/15<br>08:59 AM |
| L92 | 0   | dental AND vacum<br>WITH support WITH<br>(structure wall)                                                | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2023/09/15<br>08:59 AM |
| L93 | 2   | tube AND vacum WITH<br>support WITH (structure<br>wall)                                                  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB)                              | OR | ON | ON | 2023/09/15<br>08:59 AM |
| L94 | 10  | ("2006/0063129").urpn.<br>AND (PGPB   USPT                                                               | (US-PGPUB; USPAT;<br>USOCR)                                                                                           | OR | ON | ON | 2023/09/22<br>06:58 AM |

|     |     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                          |    |    |    |                        |
|-----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----|----|----|------------------------|
| L95 | 65  | USOC).dbnm.<br>("2111859"   "2937445"<br>  "3090122"   "4024642"<br>  "4167814"   "4259067"<br>  "4425911"   "4583527"<br>  "4802851"   "4906188"<br>  "4975057"   "5152686"<br>  "5232362"   "5366489"<br>  "5438976"   "5496363"<br>  "5513986"   "5516286"<br>  "5588836"   "5725370"<br>  "5762496"   "5873718"<br>  "5924866"   "6022214"<br>  "6149430"   "6213772"<br>  "6244866"   "6338627"<br>  "6379147"   "6575746"<br>  "6634884"   "6652276"<br>  "6655960"   "6939134"<br>  "6974321"   "6981870"<br>  "7293990"  <br>"20040033468"  <br>"20060063129"  <br>"20070231773"  <br>"20070259307"  <br>"20080318183").pn. OR<br>("8029280").urpn. AND<br>(PGPB   USPT  <br>USOC).dbnm. | (US-PGPUB; USPAT;<br>USOCR)                                                              | OR | ON | ON | 2023/09/22<br>07:05 AM |
| L96 | 281 | (US-0004478-\$   US-<br>0008752-\$   US-<br>0015317-\$   US-<br>0015320-\$   US-<br>0033468-\$   US-<br>0063126-\$   US-<br>0063129-\$   US-<br>0084031-\$   US-<br>0095450-\$   US-<br>0123886-\$   US-<br>0134253-\$   US-<br>0153637-\$   US-<br>0155284-\$   US-<br>0156831-\$   US-<br>0156832-\$   US-<br>0156833-\$   US-<br>0162209-\$   US-<br>0166684-\$   US-<br>0207076-\$   US-<br>0212837-\$   US-<br>0212838-\$   US-<br>0212839-\$   US-<br>0212840-\$   US-<br>0212841-\$   US-<br>0237894-\$   US-<br>0252193-\$   US-<br>0274991-\$   US-<br>0305842-\$   US-<br>0311942-\$   US-                                                                                             | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/09/22<br>01:37 PM |

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|  |  | D267586-\$ | US- |  |  |  |  |  |
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|      |     |                                                                                                                                                                                                                                                                                                                                                                      |                                                                                          |    |    |    |                        |
|------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|----|----|----|------------------------|
|      |     | D495799-\$   US-<br>D497426-\$   US-<br>D615203-\$   US-<br>D663831-\$   US-<br>D666726-\$   US-<br>D696779-\$   US-<br>D734851-\$   US-<br>D735858-\$   US-<br>D737964-\$   US-<br>D782047-\$   US-<br>D782048-\$   US-<br>D787069-\$   US-<br>D787070-\$   US-<br>D809660-\$   US-<br>D868958-\$   US-<br>D876627-\$   US-<br>D962438-\$   US-<br>D962439-\$).DID. |                                                                                          |    |    |    |                        |
| L97  | 6   | ("16870745"<br>"29780960"<br>"29893986")                                                                                                                                                                                                                                                                                                                             | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/09/22<br>01:39 PM |
| L98  | 0   | dental AND (wall<br>surface) WITH spacer<br>WITH wave SAME<br>vacume                                                                                                                                                                                                                                                                                                 | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/09/22<br>01:53 PM |
| L99  | 0   | dental AND (wall<br>surface) SAME spacer<br>WITH wave SAME<br>vacume                                                                                                                                                                                                                                                                                                 | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/09/22<br>01:53 PM |
| L100 | 1   | dental AND (wall<br>surface) SAME spacer<br>WITH wave SAME<br>vacu*                                                                                                                                                                                                                                                                                                  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/09/22<br>01:54 PM |
| L101 | 1   | dental AND (wall<br>surface) WITH spacer<br>WITH wave SAME<br>vacu*                                                                                                                                                                                                                                                                                                  | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/09/22<br>01:55 PM |
| L102 | 126 | (wall surface) WITH<br>spacer WITH wave<br>SAME vacu*                                                                                                                                                                                                                                                                                                                | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/09/22<br>01:55 PM |
| L103 | 4   | ("6974321").did.                                                                                                                                                                                                                                                                                                                                                     | (US-PGPUB; USPAT;<br>USOCR; FIT (CN, FR,<br>WO); FPRS; EPO;<br>JPO; DERWENT;<br>IBM_TDB) | OR | ON | ON | 2023/09/23<br>05:51 AM |

## PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.



Solmetex, Ex. 1029 UNITED STATES PATENT AND TRADEMARK OFFICE  
Ascentcare Dental Products v. Solmetex - IPR2025-01175

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO.                                               | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.    | CONFIRMATION NO. |
|---------------------------------------------------------------|-------------|----------------------|------------------------|------------------|
| 18/217,304                                                    | 06/30/2023  | Thien Nguyen         | INCEP-001COF           | 5030             |
| 138718                                                        | 7590        | 09/29/2023           | EXAMINER               |                  |
| Polsinelli LLP<br>PO Box 140310<br>Kansas City, MO 64114-0310 |             |                      | APONTE, MIRAYDA ARLENE |                  |
|                                                               |             |                      | ART UNIT               | PAPER NUMBER     |
|                                                               |             |                      | 3772                   |                  |
|                                                               |             |                      | NOTIFICATION DATE      | DELIVERY MODE    |
|                                                               |             |                      | 09/29/2023             | ELECTRONIC       |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocketing@polsinelli.com  
sfpatent@polsinelli.com



**DETAILED ACTION*****Notice of Pre-AIA or AIA Status***

1. The present application is being examined under the pre-AIA first to invent provisions.

***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: the reference number 320 of Fig. 3A is not found.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Objections***

3. **Claim 21** is objected to because of the following informalities: In lines 21-26 is considered a run-on sentence. The sentence in question is grammatically faulty **sentence** in which two or more main or independent clauses are joined without a word to connect them or a punctuation mark to separate them. Where on type of run-on sentence is a polysyndeton, that is when a sentence uses too many conjunctions or more

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conjunctions than necessary. Wherein lines 21-26 uses the “and” conjunction more than necessary. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of 35 U.S.C. 112(b):  
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claim 21** is rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.
6. **Regarding claim 21**, in line 39 uses the term “second”, in which it is confusing. It is not understood what structure the term “second” refers to. For examination purposes, the recitation will be treated as the term “second” refers to the “second side”, described in line 37 of the claim.

### ***Claim Rejections - 35 USC § 102***

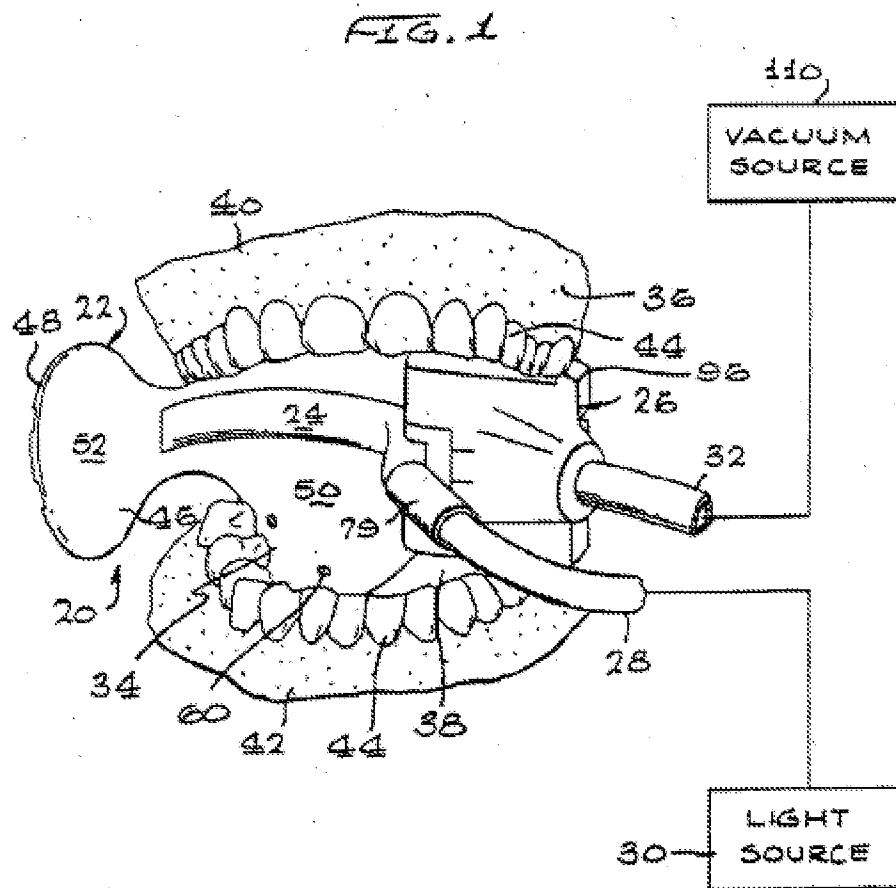
7. The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

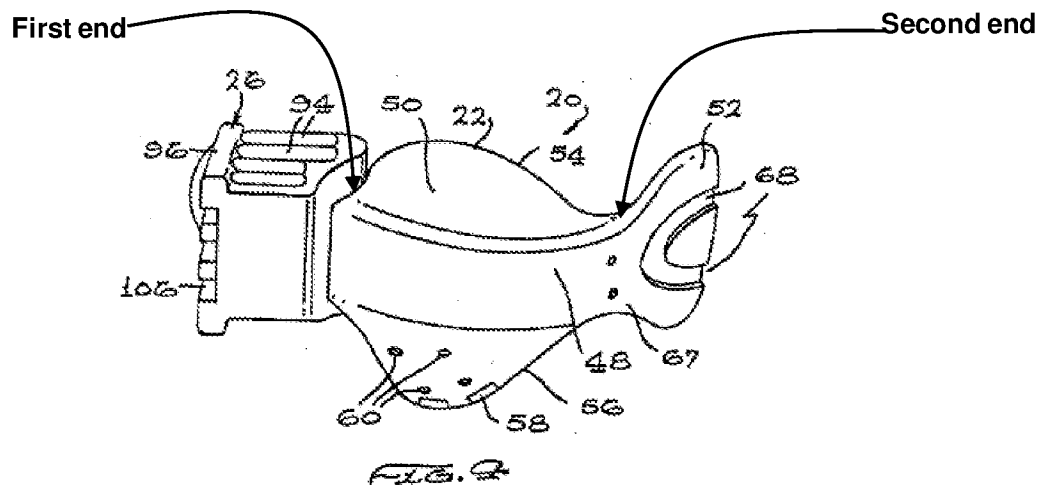
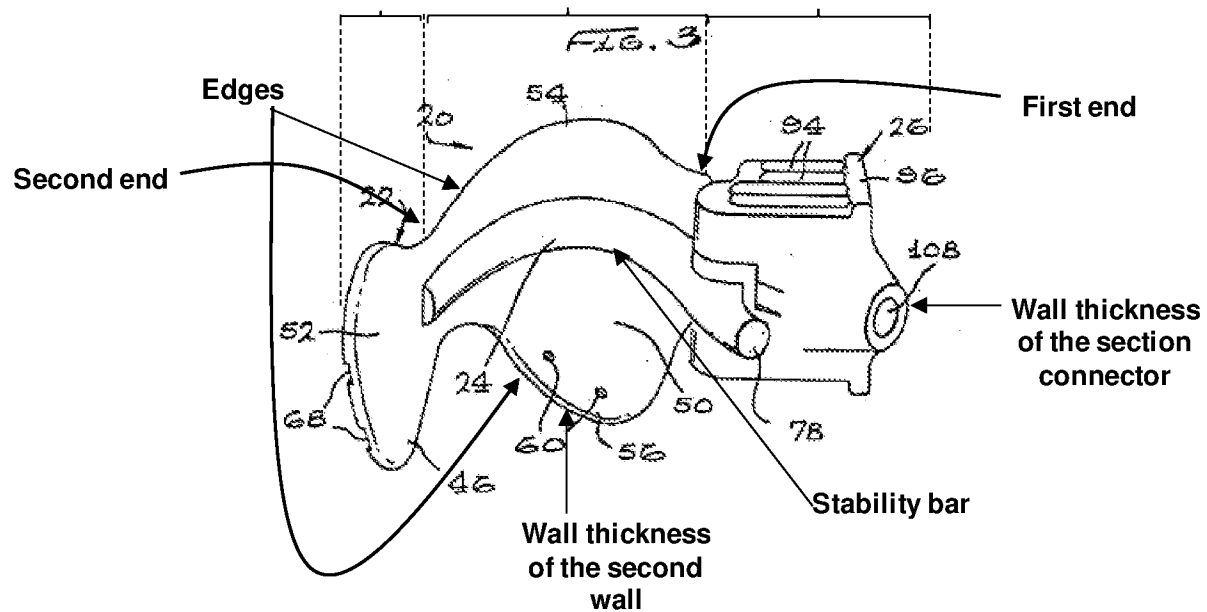
- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

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8. Claims 1-3, 6, 7, 16 and 20 are rejected under pre-AIA 35 U.S.C. 102(a) as being anticipated by Hirsch (US 20030134253 A1).



### Suction connector



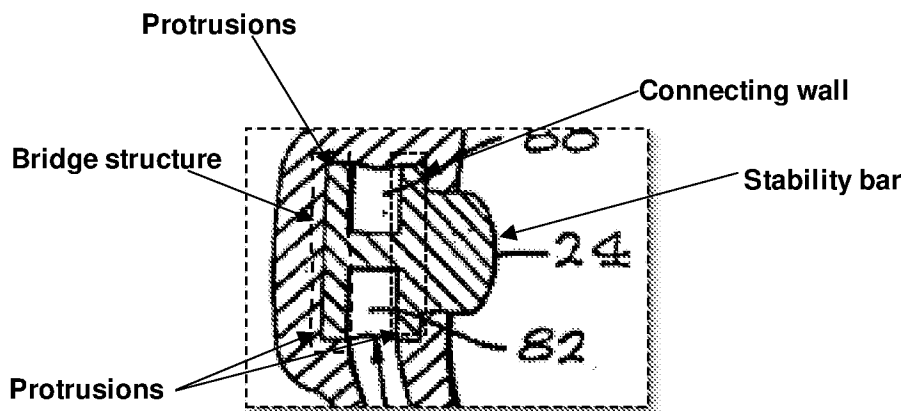
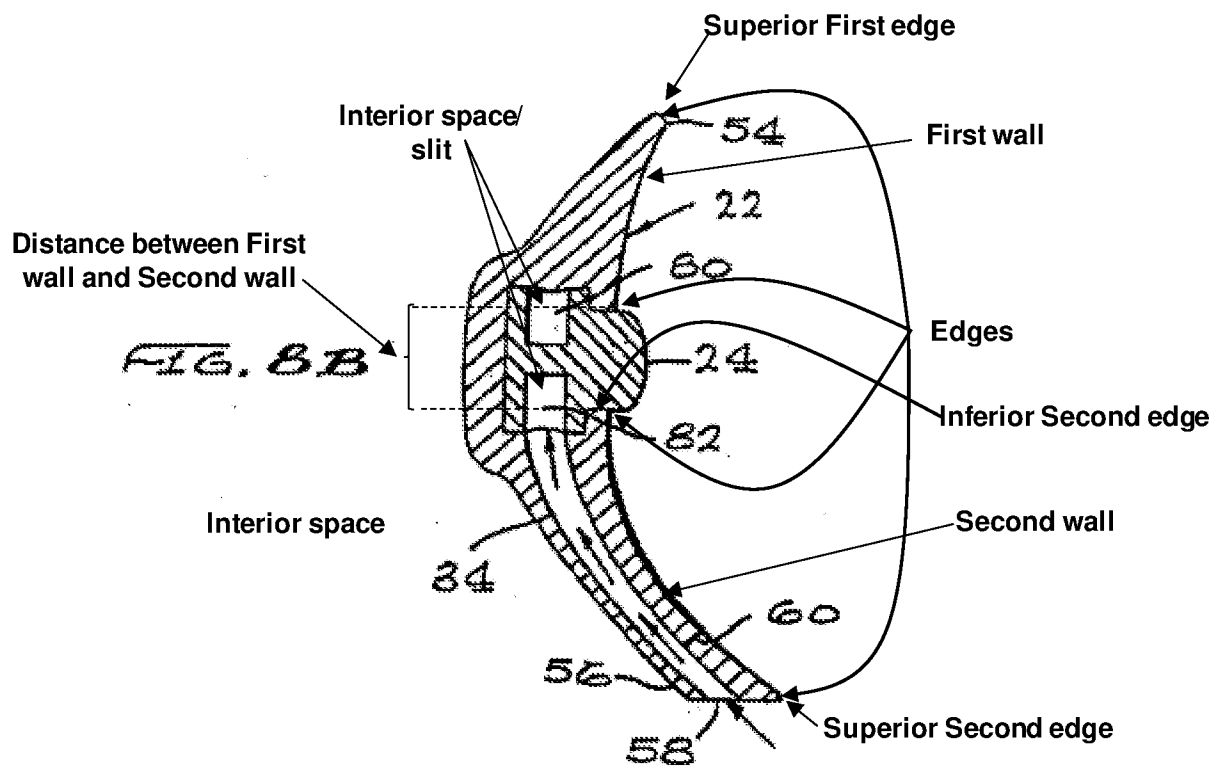


Fig. 8B zoomed portion

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9. **Regarding claim 1**, Hirsch et al. discloses a mouthpiece including:

a main body having a first end opposite a second end that is narrower than the first end (see annotated Fig. 3 above), the main body including:

a first wall having a plurality of first edges and extending from the first end to the second end (see annotated Fig. 3 and 8B above),

a second wall having a plurality of second edges and located at a distance from the first wall (see annotated Fig. 8B above), the distance corresponding to an interior space between the first wall and the second wall, wherein the second wall also extends from the first end to the second end (see annotated Fig. 8B above),

a connecting wall (see enclosed portion in element 24 highlighted in Fig. 8B zoomed portion above) that connects one of the first edges of the first wall to one of the second edges of the second wall across the distance between the first wall and the second wall (see annotated Fig. 8B and 8B zoomed portion above), and

a bridge structure that includes a plurality of spaced protrusions integral with and protruding from an interior surface of the second wall, the bridge structure extending through the interior space towards the first wall (see the half of the H internal structure of element 24 enclosed in the annotated Fig. 8B zoomed portion).

10. **Regarding claim 2**, Hirsch et al. discloses that one of the one or more of the first edges of the first wall and the second edges of the second wall include a superior edge and an inferior edge (see annotated Fig. 8B above).

11. **Regarding claim 3**, Hirsch et al. discloses that the superior edge is formed so as to appear as the inferior edge in a different orientation, and wherein the inferior edge is

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formed so as to appear as the superior edge in the different orientation (see annotated Fig. 8B above – where the edges change the superior and inferior orientation when the device changes its orientation when the first wall is a down location and the second wall is in the superior location).

12. **Regarding claim 6**, Hirsch et al. discloses further including a suction connector extending from the first end of the main body (see annotated Fig. 3 above), wherein an evacuation conduit (ending in tube 32 see Fig. 1 above) within the suction connector is in communication with the interior space between the first wall and the second wall (through the interior spaces 80 and 82 shown in Fig. 8B above).

13. **Regarding claim 7**, Hirsch et al. discloses that a wall thickness of the suction connector is greater than a wall thickness of the first wall or the second wall of the main body (see annotated Fig. 3 above).

14. **Regarding claim 16**, Hirsch et al. discloses a stability bar (24) corresponding to a thickened area of the main body, the stability bar (24) extending along a longitudinal axis of the main body between the first wall and the second wall, wherein a thickness of the stability bar reinforces at least a portion of the main body (see annotated Fig. 3 and 9B zoomed portion above).

15. **Regarding claim 20**, Hirsch et al. discloses that the main body further includes a slit that extends along at least a portion of the main body, and wherein the slit opens into the interior space between the first wall and the second wall to assist in cleaning (see annotated Fig. 8B and [0052-0053]).

***Claim Rejections - 35 USC § 103***

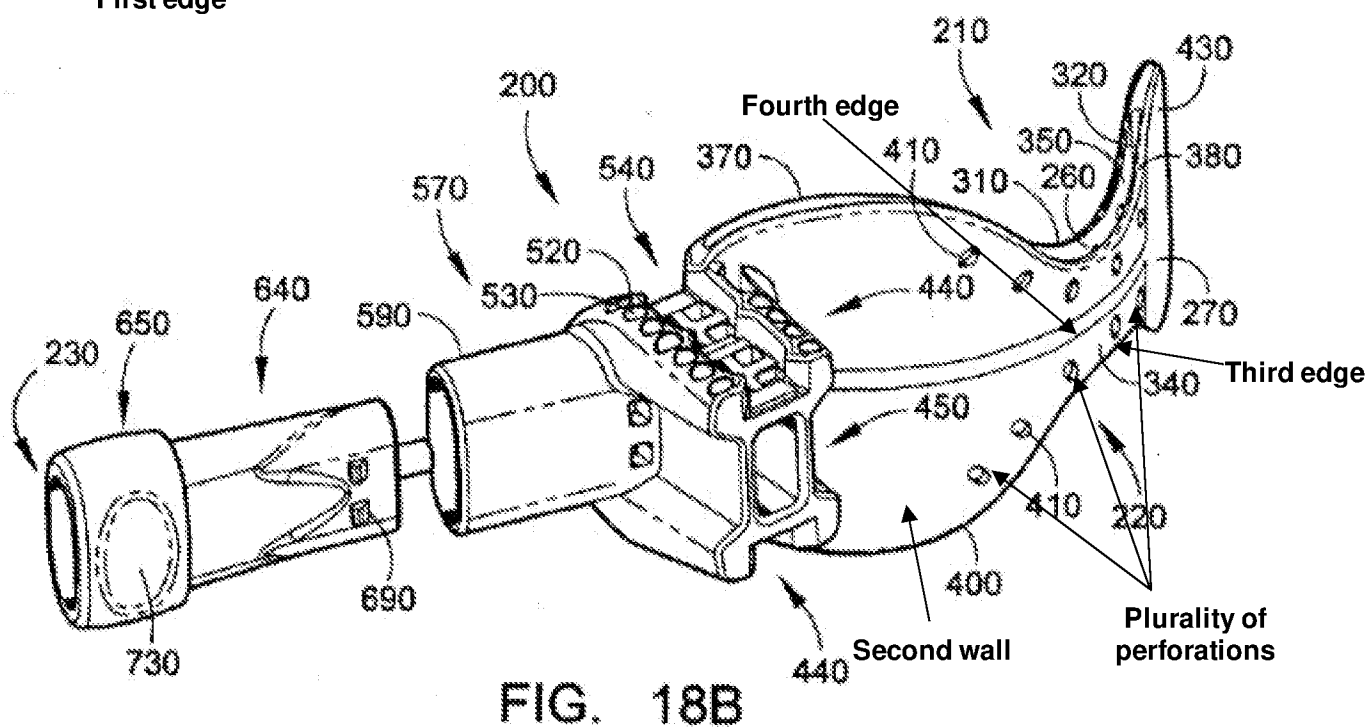
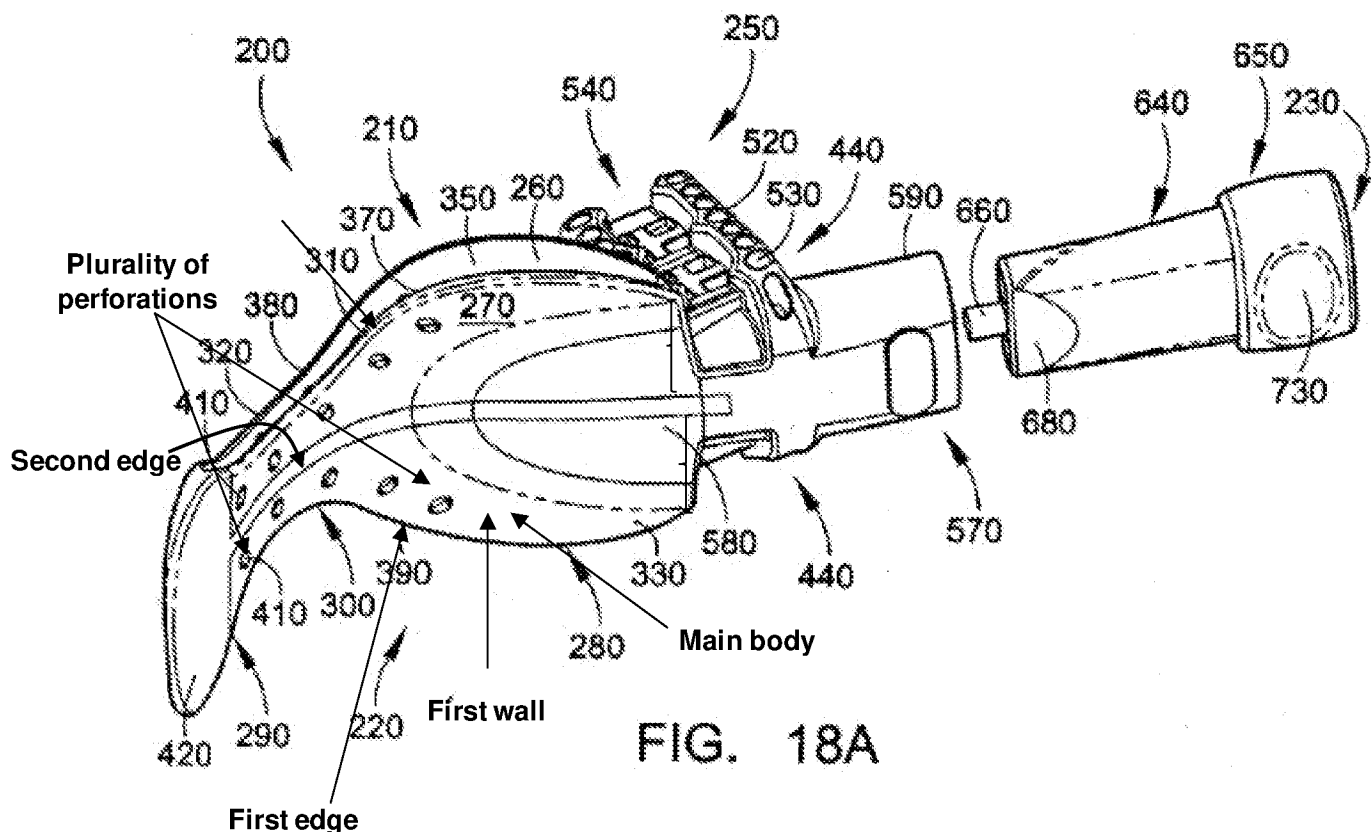
16. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. **Claims 9, 21, 22-30, 32-37, 39 and 40 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Hirsch et al. (US 6974321 B2).**

18. **Regarding claim 9**, Hirsch (1<sup>st</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 6.

19. However, Hirsch (1<sup>st</sup> embodiment) does not disclose that the suction connector further includes a cutout configured to interlock with a corresponding protrusion of a vacuum adapter, wherein a shape of the cutout follows a shape of a shield logo.



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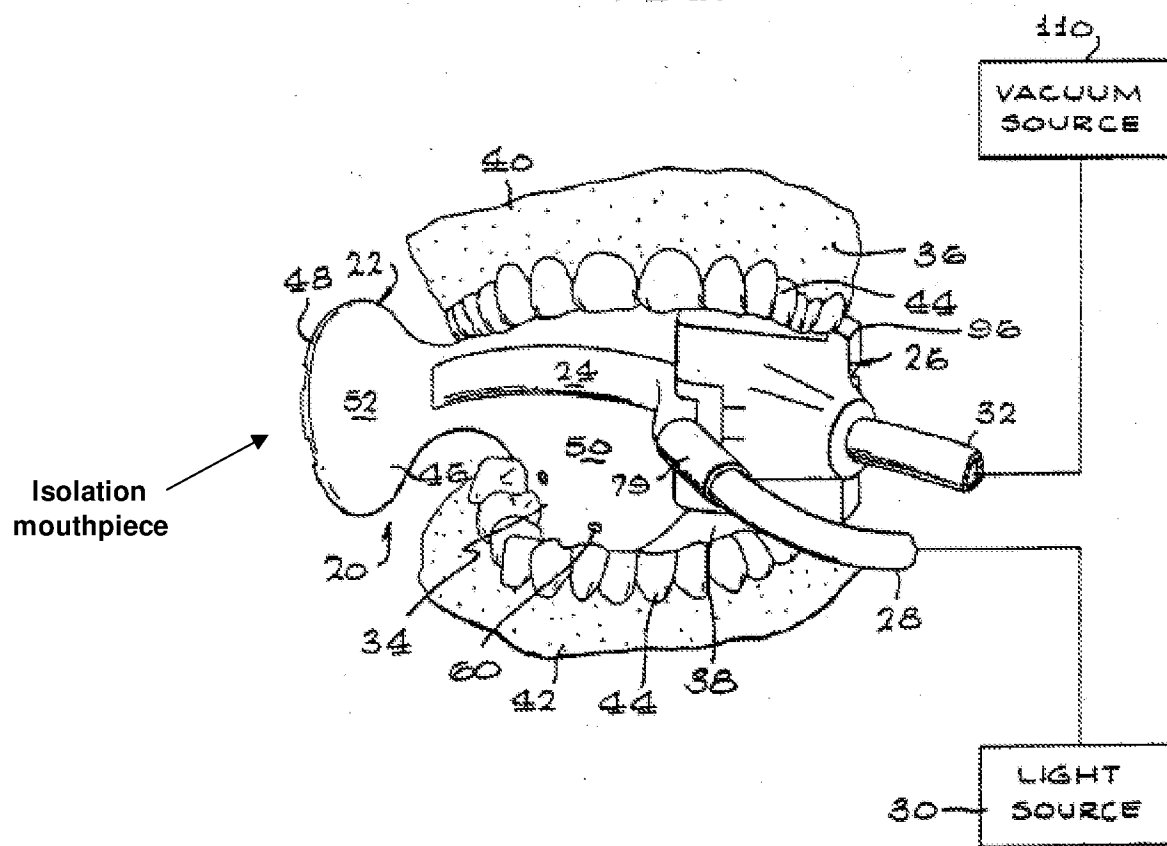
20. On the other hand, Hirsch et al. (aka Hirsch 2<sup>nd</sup> embodiment) also discloses another embodiment in Fig. 18A and 18B including in the area of the suction connector portion includes a cutout configured to engage a protrusion on the suction system to aid in coupling the mouthpiece to the suction system (see annotated Fig. 18A and 18B above and col. 14, lines 46-51 and col. 12, lines 1-17).

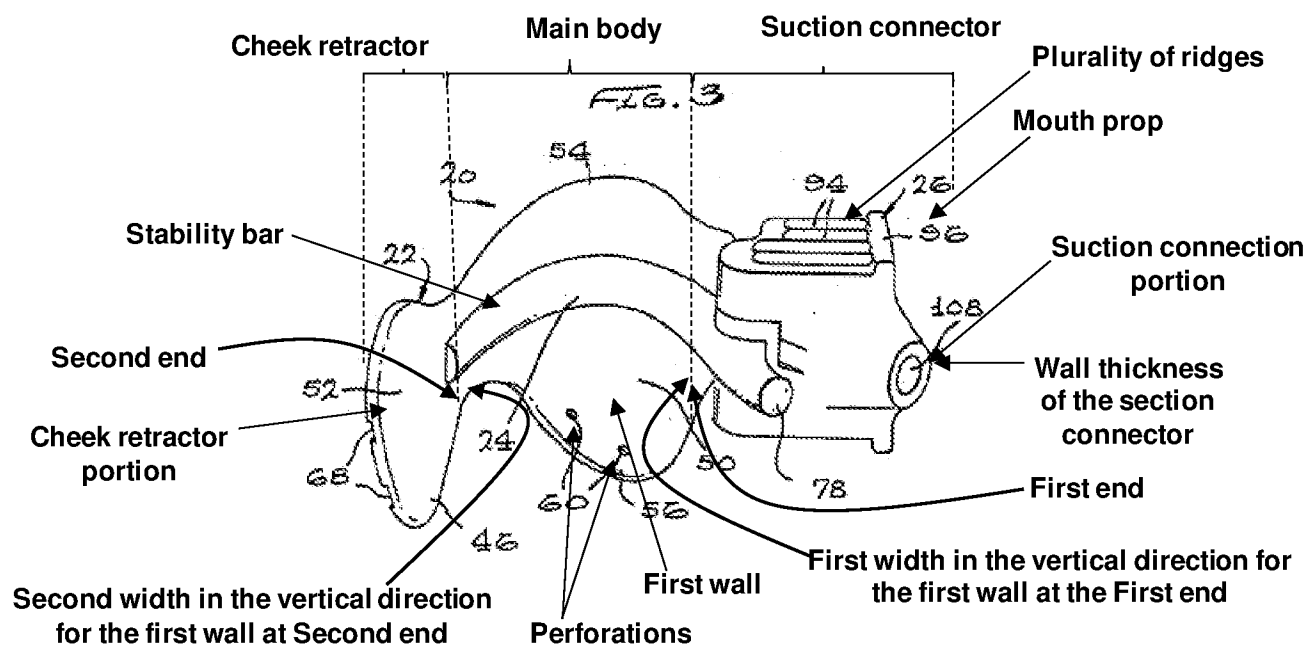
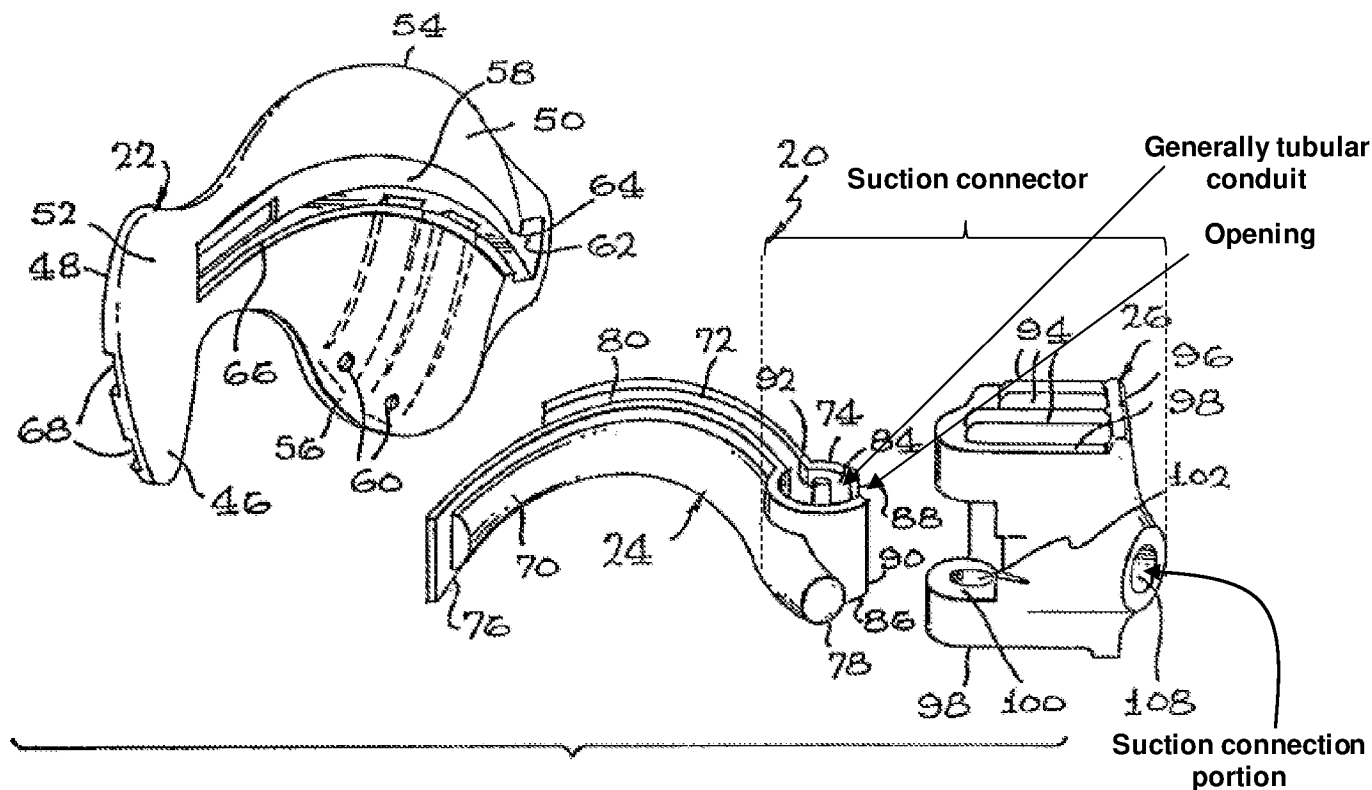
21. It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to modify the engagement of the suction system to the suction connector portion of the embodiment of Fig. 1 of Hirsch, with the cutout on the suction connector portion with a protrusion on the coupling section of the suction system of the embodiment of Fig. 18 of Hirsch, in order for the cutout in the suction connector portion to be able to releasably connect with the protrusions on the external surface of the hose of the suction system and its connection be retained during its use.

22. However, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) does not disclose that the cutout has a shield shape.

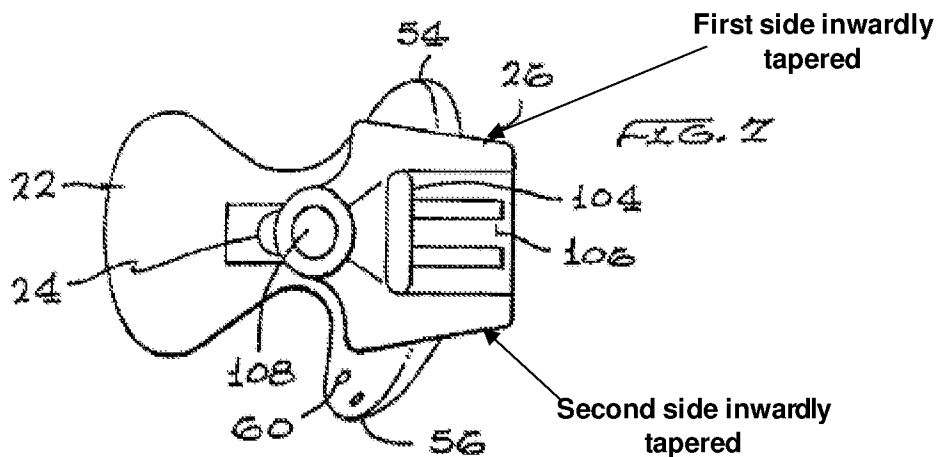
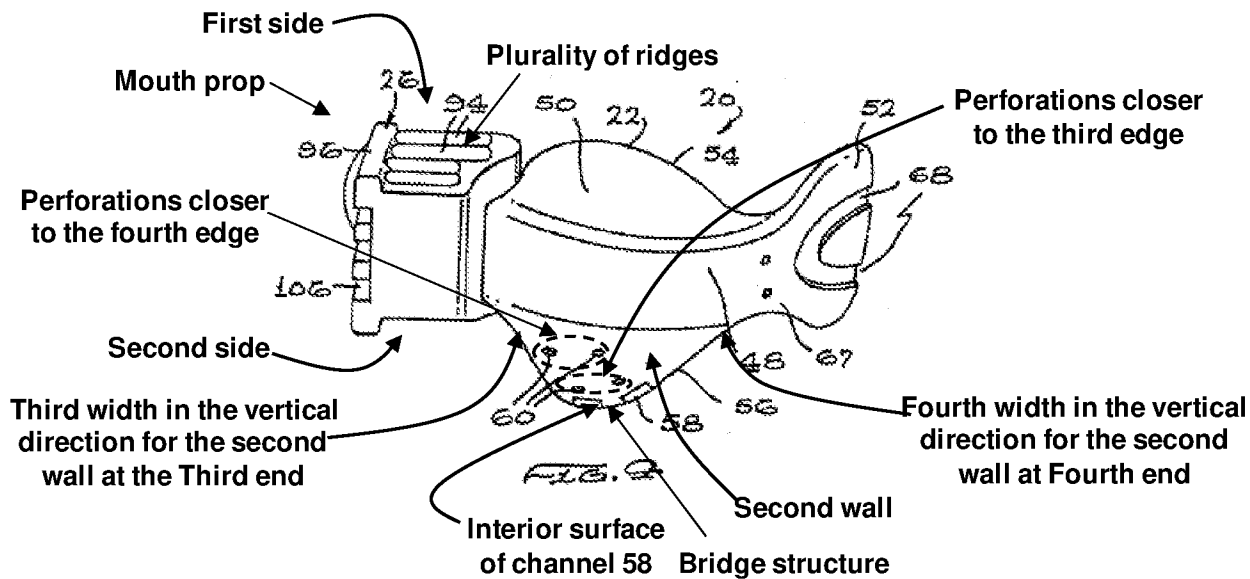
23. On the other hand, having a particular shape for the cutout is a matter of choice in which a person of ordinary skill in the art would have found obvious by the absence of persuasive evidence in the present application, that the particular configuration of the claimed shape of the cutout is significant. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)

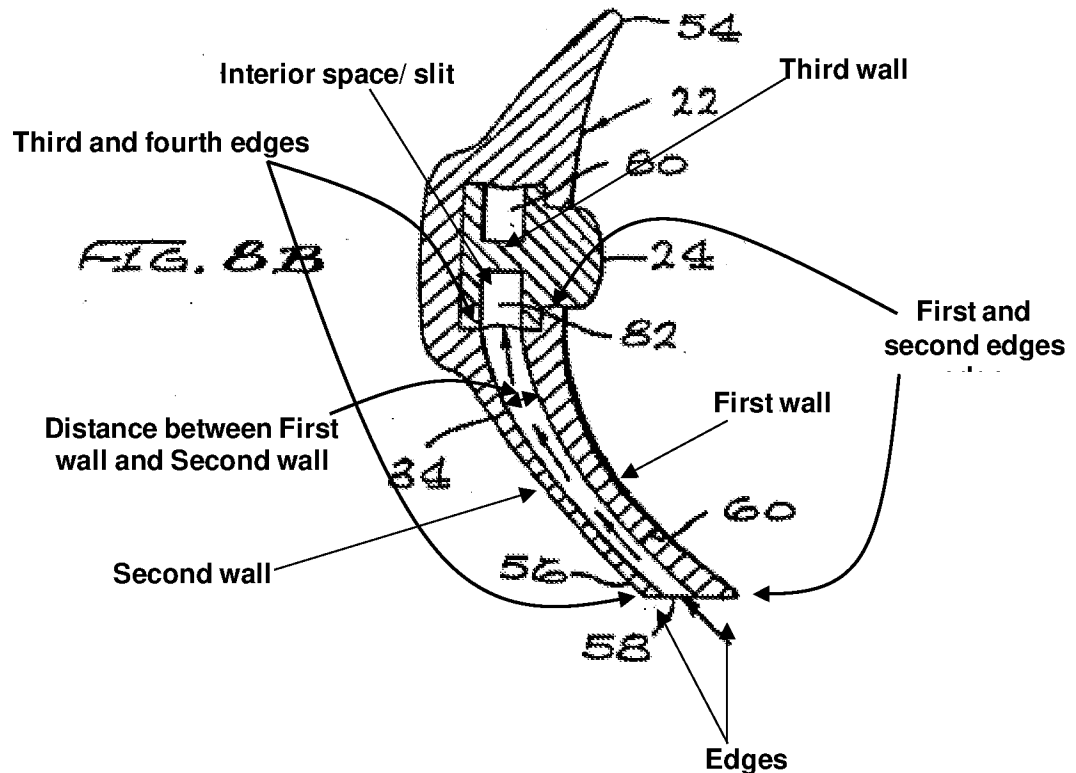
FIG. 1





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24. **Regarding claim 21**, Hirsch discloses an isolation mouthpiece (see Fig. 1 above) for use with a suction system (110) in a dental procedure (see annotated Fig. 1 above), the mouthpiece including:

a main body portion having a first end and a second end (see annotated Fig. 3 above), the main body portion including:

a first wall having a first edge and a second edge extending from the first end of the main body portion towards the second end of the main body portion (see annotated Fig. 8B above), the first wall including a first plurality of perforations (60) formed adjacent to and extending along a portion of the first edge (see annotated Fig. 3 above),

a second wall having a third edge and a fourth edge extending from the first end of the main body portion towards the second end of the main body portion (see annotated Fig. 8B above), the second wall including a first plurality of perforations (60) formed

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adjacent to and extending along a portion of the third edge, and a second plurality of perforations formed adjacent to and extending along a portion of the fourth edge (see annotated Fig. 8B above), wherein the second wall further includes a plurality of protrusions extending from an interior surface of the second wall towards the first wall in a shape having one or more crests and one or more troughs (see annotated Fig. 4 above – where the channels 58 are formed by interior surfaces extending from one wall to the opposite wall, so that the interior wall extends from a trough to a crest by the distance between the two walls), and

a third wall connecting the first wall and the second wall such that the first wall is spaced from the second wall to define an inner cavity (see annotated Fig. 8B above - where the horizontal wall of element 24 forms a wall, that dictates the space between the first and second wall), wherein a portion of the first wall has a first width adjacent to the first end of the main body portion and a second width adjacent to the second end of the main body portion (see annotated Fig. 3 above), and a portion of the second wall has a third width adjacent to the first end of the main body portion and a fourth width adjacent to the second end of the main body portion (see annotated Fig. 4 above), wherein the first width is greater than the second width and the third width is greater than the fourth width (see annotated Fig. 4 above – where the width in the vertical direction of both first wall and second wall are bigger at the first end than the width in the same direction at the second end);

a suction connector portion (108) extending from the first end of the main body portion (see annotated Fig. 2 and 3 above), the suction connector portion (108) including:

a generally tubular conduit (84) (see annotated Fig. 3 above) including:

an opening extending through the conduit and in fluid communication with the inner cavity, the opening being configured to receive a vacuum portion of the suction system therein (see annotated Fig. 2 above and col. 7, lines 27-31 – where “fluids are vacuumed from the internal evacuation channel 104 of the bite block 26 through an exit port 108”); and

mouth prop (26) including a first side and a second side that are inwardly tapered from a top surface of the mouth prop towards a bottom surface of the mouth prop, the first side and the second each including a plurality of ridges (94) (see annotated Fig. 3, 4 and 7 above); and

a cheek retractor portion (52) having a first cheek-retractor end coupled to the second end of the main body portion and a second cheek-retractor end, the first cheek-retractor end and the second cheek-retractor end each having rounded edges (see annotated Fig. 3 above).

25. However, Hirsch (1<sup>st</sup> embodiment) does not disclose a second plurality of perforations formed adjacent to and extending along a portion of the second edge on the first wall, and the suction connector portion includes a cutout configured to engage a protrusion on the suction system to aid in coupling the mouthpiece to the suction system.

26. On the other hand, Hirsch et al. (aka Hirsch 2<sup>nd</sup> embodiment) also discloses another embodiment in Fig. 18A and 18B including an isolation mouthpiece, where the main body includes a plurality of perforations (410) in both first and second walls, that a portion of said plurality of perforations on the first wall are adjacent to the first edge and another portion are adjacent to the second edge, and portion of said plurality of perforations on the second wall are adjacent to the third edge and another portion are

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adjacent to the fourth edge. Furthermore, in the area of the suction connector portion includes a cutout configured to engage a protrusion on the suction system to aid in coupling the mouthpiece to the suction system (see annotated Fig. 18A and 18B above and col. 14, lines 46-51 and col. 12, lines 1-17).

27. It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to modify the plurality of perforation of the first wall and the engagement of the suction system to the suction connector portion of the embodiment of Fig. 1 of Hirsch, with additional perforations on the first wall closer to the second edge and a cutout on the suction connector portion with a protrusion on the coupling section of the suction system of the embodiment of Fig. 18 of Hirsch, in order for the plurality of perforation on the first wall to cover a bigger area in the mouth to maintain the working area free of debris and fluids, and for the cutout in the suction connector portion to be able to releasably connect with the protrusions on the external surface of the hose of the suction system and its connection be retained during its use.

**Regarding claims 22 and 23:**

28. **Regarding claim 22**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 21, and where the cutout has a generally square shape.

29. However, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) does not disclose that the cutout has a shield shape.

30. **Regarding claim 23**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 21, and where the cutout has a generally square shape.

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31. However, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) does not disclose that the cutout is generally triangular and has a top edge, a first curved edge, and a second curved edge

32. On the other hand, having a particular shape for the cutout is a matter of choice in which a person of ordinary skill in the art would have found obvious by the absent of persuasive evidence in the present application, that the particular configuration of the claimed shapes of the cutout is significant. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)

33. **Regarding claim 24**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 21, and where in the 1<sup>st</sup> embodiment of Hirsch discloses a wall thickness of the conduit is greater than a wall thickness of the first wall or the second wall of the main body (see Fig. 3 above).

**Regarding claim 25-28:**

34. **Regarding claim 25**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 21.

35. However, Hirsch (1<sup>st</sup> embodiment) does not disclose that the first plurality of perforations of the first wall and the second plurality of perforations of the first wall each include at least five perforations.

36. **Regarding claim 26**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 25.

37. However, Hirsch (1<sup>st</sup> embodiment) does not disclose that the first plurality of perforations of the second wall and the second plurality of perforations of the second wall each include at least three perforations.

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38. **Regarding claim 27**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 21.

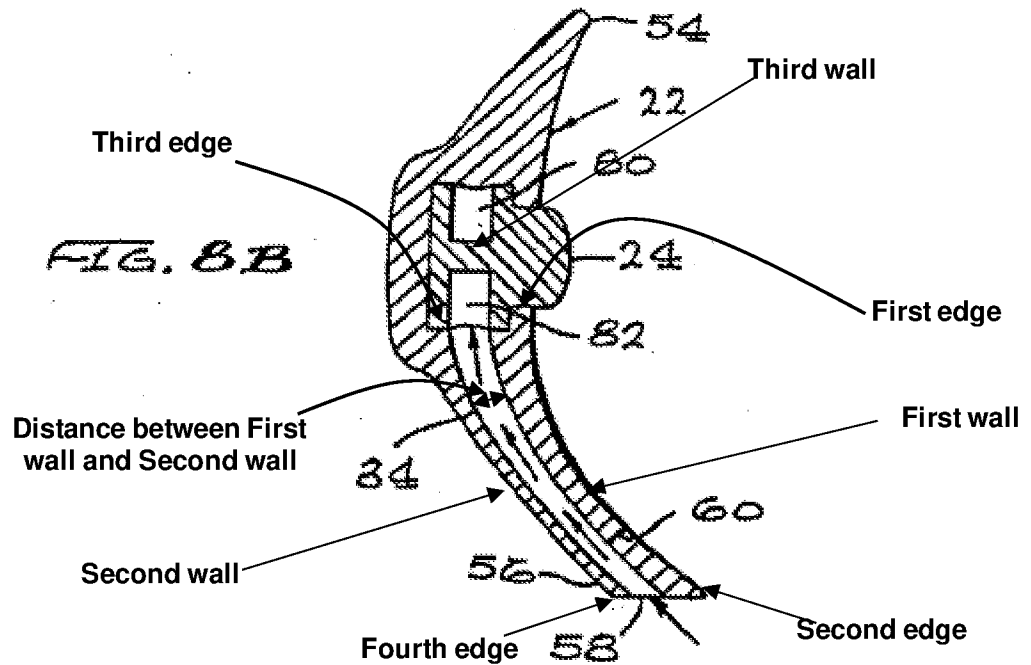
39. However, Hirsch (1<sup>st</sup> embodiment) does not disclose that the first plurality of perforations of the first wall and the second plurality of perforations of the first wall each include at least seven perforations.

40. **Regarding claim 28**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 27.

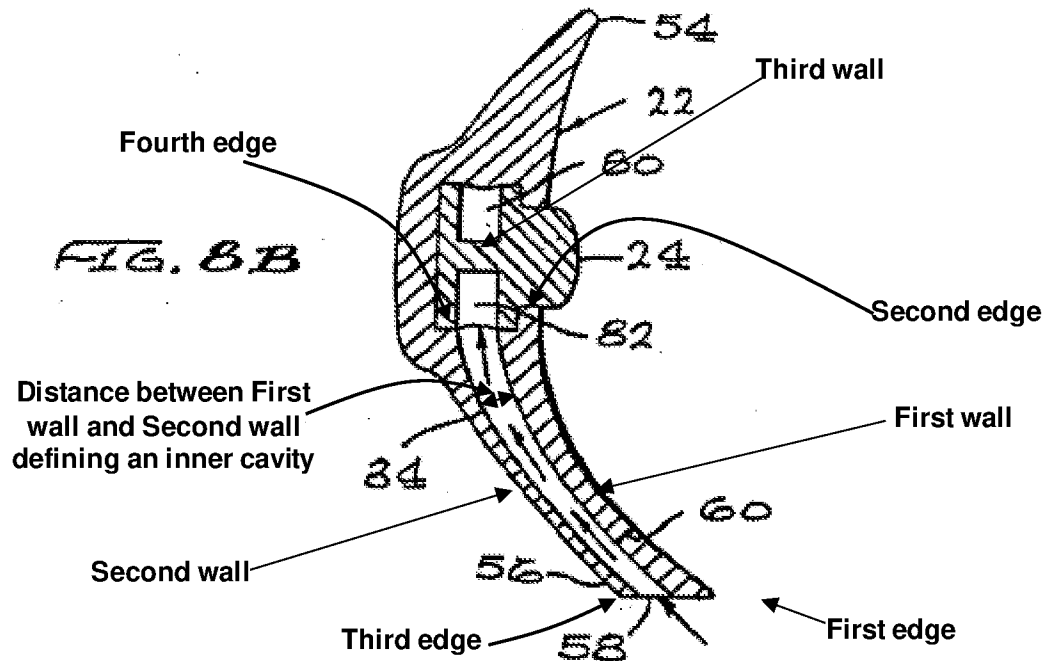
41. However, Hirsch (1<sup>st</sup> embodiment) does not disclose that the first plurality of perforations of the second wall and the second plurality of perforations of the second wall each include at least four perforations.

42. Hirsch, in the 2<sup>nd</sup> embodiment teaches five perforations (410) on each wall (see annotated Fig. 18A and 18B, and that the number of perforations 410 may vary (see col. 12, lines 9-11).

43. Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to modify Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) to include at least five perforations or at least three perforations on each wall, because it has been held that discovering an optimum value of a results effective variable involves only routine skill in the art. See MPEP 2144.05.

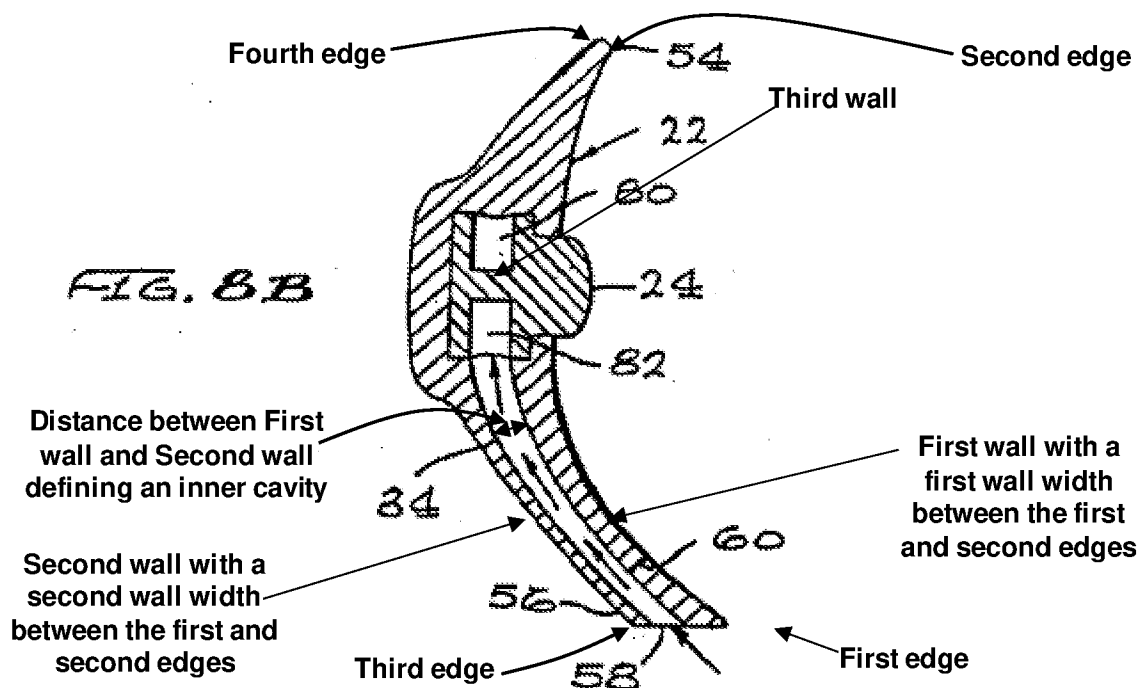


44. **Regarding claim 29**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 21, and where Hirsch (1<sup>st</sup> embodiment) discloses that the third wall connects the first edge of the first wall to the third edge of the second wall (see annotated Fig. 8B just above).



45. **Regarding claim 30**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 21, and where Hirsch (1<sup>st</sup> embodiment) discloses that the third wall connects the second edge of the first wall to the fourth edge of the second wall (see annotated Fig. 8B just above).

46. **Regarding claim 32**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 21, and where Hirsch (1<sup>st</sup> embodiment) discloses that the mouth prop (26) is removably coupled to the generally tubular conduit of the suction connector portion (see annotated Fig. 2 above).



47. **Regarding claims 33 and 39**, Hirsch discloses an isolation mouthpiece for use with a suction system (110) in a dental procedure (see Fig. 1 above), the mouthpiece including:

a main body portion having a first end and a second narrower end that is narrower than the first end (see annotated 3 above), the main body portion including:

a first wall having first and second edges extending from the first end towards the second narrower end of the main body portion (see annotated Fig. 3 and 8B just above), the first wall having a first-wall width defined between the first and second edges (see annotated Fig. 8B just above – where the width is measured in the vertical direction),

the first-wall width being at a maximum in a region between the first and second ends and being at a minimum at the second narrower end (see annotated Fig. 3 just above – where the width is measured in the vertical direction),

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the first wall including a first plurality of perforations (60) formed adjacent to and extending along a substantial portion of the first edge (see annotated Fig. 3 above);

a second wall spaced apart from the first wall to define an inner cavity of the main body between the second wall and the first wall (see annotated Fig. 8B just above), the second wall having third and fourth edges extending from the first end towards the second end of the main body portion (see annotated Fig. 4 and 8B above),

the second wall having a second- wall width defined between the third and fourth edges (see annotated Fig. 4 and 8B above), the second-wall width being at a maximum in a region between the first and second ends and being at a minimum at the second narrower end (see annotated Fig. 4 just above – where the width is measured in the vertical direction), the second wall including a third plurality of perforations (60) formed adjacent to and extending along a substantial portion of the third edge (see annotated Fig. 4 above);

a stability bar (24) located along a center of the first wall at least adjacent to the second narrow end of the main body (see annotated Fig. 3 above); and

a bridge structure extending from an interior surface of the first wall toward the second wall, the bridge structure including a plurality of square-like protrusions to ensure the first wall remains separated from the second wall during suction from the suction system (110), and that the bridge structure is located centrally in the main body (for claim 39) (for **claim 39**) (see annotated Fig. 2 and 4 above – where adjacent to the first and third edges includes channels 58 formed by a plurality of square or rectangular protrusions extending from the first wall to the second wall in the center of the main body);

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a suction-connector portion (108) extending from the first end of the main body portion (see annotated Fig. 2 and 3 above), the suction connector portion (108) including:

a generally tubular conduit including an opening extending through the conduit and in fluid communication with the inner cavity of the main body (see annotated Fig. 3 above), the opening being configured to receive a vacuum portion of the suction system therein for providing suction to the inner cavity (see col. 7, lines 27-31 – where “fluids are vacuumed from the internal evacuation channel 104 of the bite block 26 through an exit port 108”); and

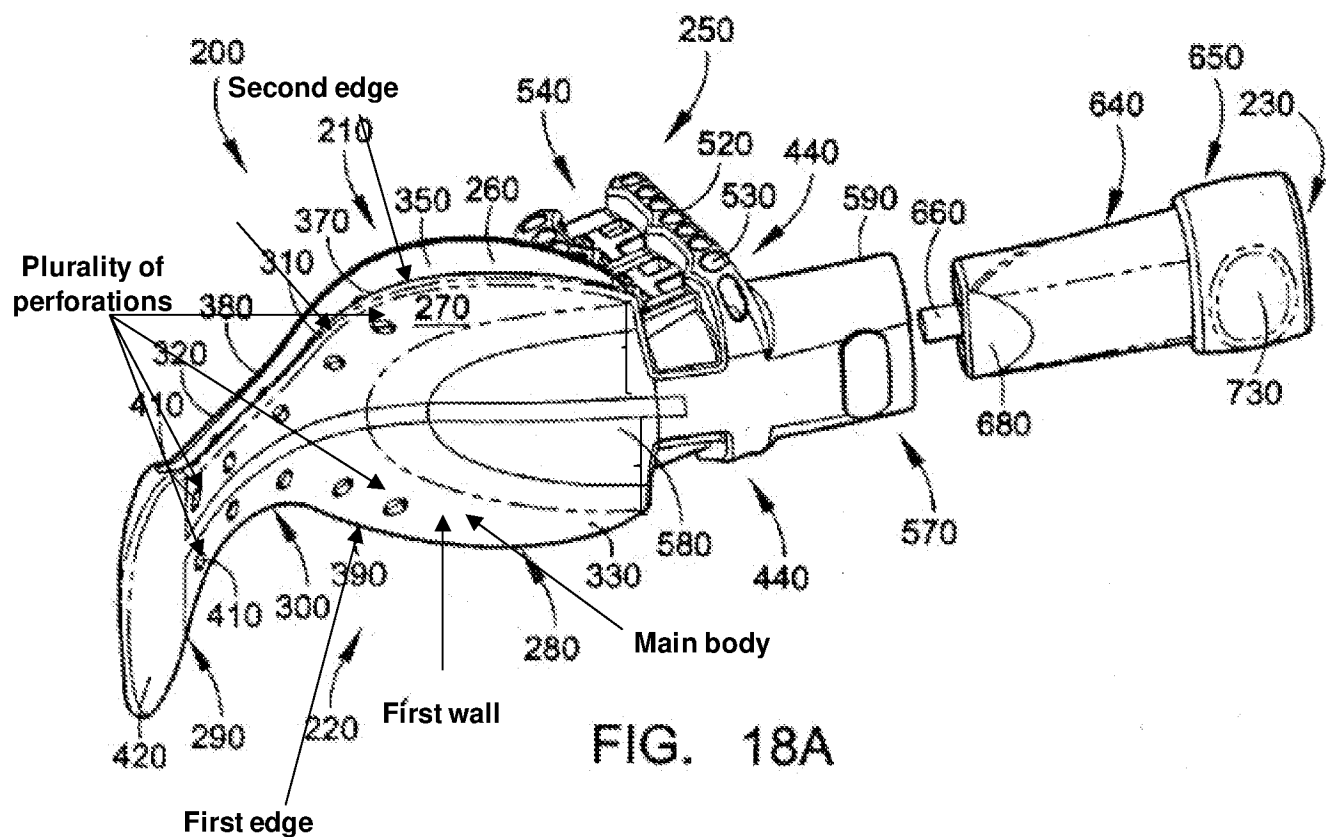
a mouth prop (26) that extends away from the tubular conduit (see Fig. 3 above), the mouth prop (26) at least partially defined by a first side and a second side that generally taper inwardly in a direction away from the tubular conduit towards a bottom surface of the mouth prop (see annotated Fig. 4 and 7 above), the first side and the second side including a plurality of ridges (94) (see annotated Fig. 4 above); and

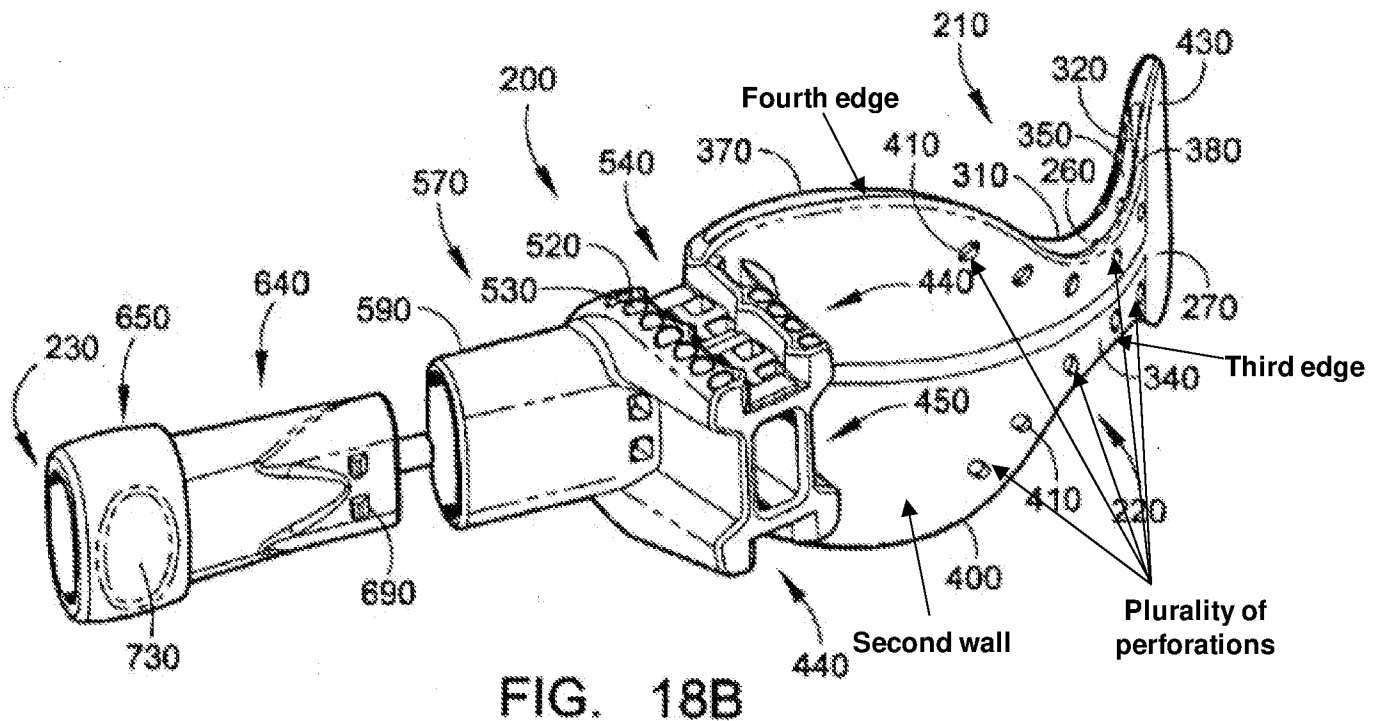
a cheek-retractor portion (52) connected to the second narrower end of the main body portion and expanding outwardly away from the second narrower end (see annotated Fig. 3 above), the first and second walls of the main body transitioning into and being connected in the cheek-retractor portion to form the cheek-retractor portion (see annotated Fig. 3 above) (for claim 33).

48. However, the 1<sup>st</sup> embodiment of Hirsch does not disclose a second plurality of perforations formed adjacent to and extending along a substantial portion the second edge, that at least one of the first plurality of perforations and at least one of the second plurality of perforations being located adjacent to the minimum width of the first wall at the

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second narrower end of the main body; a fourth plurality of perforations formed adjacent to and extending along a substantial portion the fourth edge, that at least one of the third plurality of perforations and at least one of the fourth plurality of perforations being located adjacent to the minimum width of the second wall at the second end of the main body; that the at least one of the first plurality of perforations being positioned on one side of the stability bar and the at least one of the second plurality of perforations being positioned on another side of the stability bar; and that the protrusions forming the bridge structure includes a plurality of wave-like protrusions.





49. On the other hand, Hirsch et al. (aka Hirsch 2<sup>nd</sup> embodiment) also discloses another embodiment in Fig. 18A and 18B including an isolation mouthpiece, where the main body includes a plurality of perforations (410) in both first and second walls, where a portion of said plurality of perforations on the first wall are adjacent to the first edge and another portion are adjacent to the second edge, and portion of said plurality of perforations on the second wall are adjacent to the third edge and another portion are adjacent to the fourth edge (see annotated Fig. 18A and 18B above and col. 12, lines 1-17).

50. It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to modify the plurality of perforations of the first and second walls of the embodiment of Fig. 1 of Hirsch, with additional perforations on the first and second walls closer to the second and fourth edges of the embodiment of

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Fig. 18 of Hirsch, in order for the plurality of perforation on the first and second walls to cover an bigger area in the mouth to maintain the working area free of debris and fluids, and by having the plurality of perforations adjacent to both edges located on opposite locations on the walls allows to turn around the mouthpiece so that the vacuum port can be on the left or the right of the mouth of the patient, depending on the necessity of the treatment at hand.

51. However, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) does not disclose that the protrusions forming the bridge structure includes a plurality of wave-like protrusions.

52. On the other hand, having a particular shape for the protrusions is a matter of choice in which a person of ordinary skill in the art would have found obvious by the absent of persuasive evidence in the present application, that the particular configuration of the claimed shape of the protrusions is significant over other shapes. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966)

53. **Regarding claim 34 and 35**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 33, and where Hirsch (1<sup>st</sup> embodiment) discloses a generally tubular conduit of the suction-connector portion (108).

54. However, Hirsch (1<sup>st</sup> embodiment) does not include a cutout configured to engage a protrusion on the suction system to aid in coupling the mouthpiece to the suction system (for **claim 34**); and that the cutout is on the same side of the suction-connector portion as the mouth prop (for **claim 35**).

55. On the other hand, Hirsch 2<sup>nd</sup> embodiment also discloses an area of the suction connector portion on the same side as the mouth prop that includes a cutout configured

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to engage a protrusion on the suction system to aid in coupling the mouthpiece to the suction system (see annotated Fig. 18A and 18B above and col. 14, lines 46-51 and col. 12, lines 1-17).

56. It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to modify the suction connector portion of Hirsch (1<sup>st</sup> embodiment), with the cutout on the suction connector portion the embodiment of Fig. 18 of Hirsch, in order for the cutout in the suction connector portion to be able to releasably connect with the protrusions on the external surface of the hose of the suction system and its connection be retained during its use.

57. **Regarding claim 36**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 33.

58. However, Hirsch (1<sup>st</sup> embodiment) does not disclose that the first plurality of perforations of the first wall and the second plurality of perforations of the first wall each include at least five perforations.

59. On the other hand, in the 2<sup>nd</sup> embodiment of Hirsch teaches five perforations (410) on each wall (see annotated Fig. 18A and 18B, and that the number of perforations 410 may vary (see col. 12, lines 9-11).

60. Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to modify Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) to include at least five perforations on each wall, because it has been held that discovering an optimum value of a results effective variable involves only routine skill in the art. See MPEP 2144.05.

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61. **Regarding claim 37**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 33, and where Hirsch (1<sup>st</sup> embodiment) discloses that the stability bar (24) extends upwardly from the first wall toward the second wall (see annotated Fig. 8B above).

62. **Regarding claim 39**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 33, and where Hirsch (1<sup>st</sup> embodiment) the bridge structure is located centrally in the main body (see annotated Fig. 4 above – due to the bridge structure is between the two walls is considered located centrally).

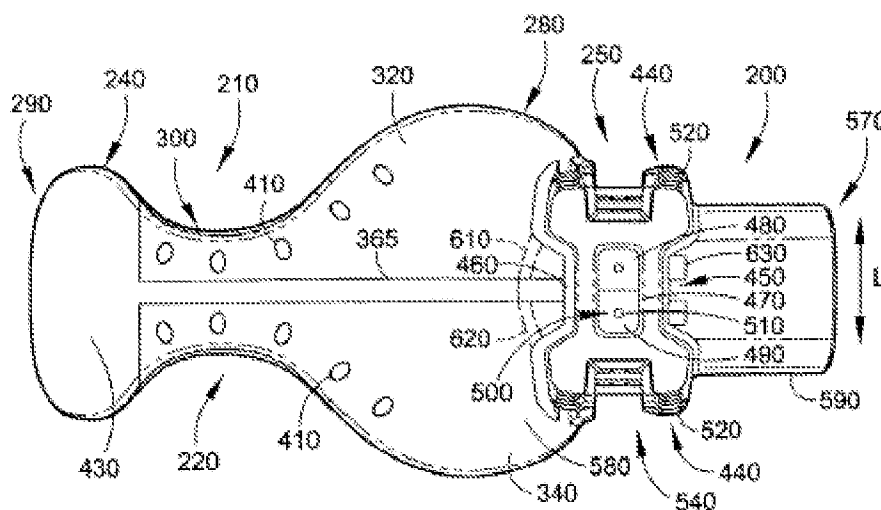


FIG. 19E

63. **Regarding claim 40**, Hirsch (1<sup>st</sup> embodiment)/Hirsch (2<sup>nd</sup> embodiment) discloses the claimed invention substantially as claimed, as set forth above for claim 33, and where Hirsch (1<sup>st</sup> embodiment) discloses that at least a small portion of the isthmus portion between the main body and the check retractor has a small rectangular shape portion.

***Allowable Subject Matter***

64. **Claims 31, 38, 41 and 42** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

65. The following is a statement of reasons for the indication of allowable subject matter:

- a. **Regarding claim 31**, the new claim describes that the first wall and the second wall are shaped such that the first edge of the first wall corresponds to the third edge of the second wall and the second edge of the first wall corresponds to the fourth edge of the second wall.
- b. **Regarding claim 38**, the new claim describes a stability bar not contacting the second wall, in which is not found in the prior art of Hirsch.
- c. **Regarding claim 41**, the new claim describes the first and second walls of the main body that transition into the cheek-retractor portion remain unconnected from each other for a distance within the cheek-retractor portion before being connected to each other in the cheek-retractor portion, in which is not found in the prior arts of Hirsch.

***Conclusion***

66. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MIRAYDA ARLENE APONTE whose telephone number is (571)270-1933. The examiner can normally be reached M-F 8-5.

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67. Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

68. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cris Rodriguez can be reached on 571-272-4964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

69. Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: <https://patentcenter.uspto.gov>. Visit <https://www.uspto.gov/patents/apply/patent-center> for more information about Patent Center and <https://www.uspto.gov/patents/docx> for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MIRAYDA A APONTE/  
Examiner, Art Unit 3772

/RALPH A LEWIS/  
Primary Examiner, Art Unit 3772

|                                                                                                     |                        |                        |
|-----------------------------------------------------------------------------------------------------|------------------------|------------------------|
| <b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b><br>( Not for submission under 37 CFR 1.99) | Application Number     | 18217304               |
|                                                                                                     | Filing Date            | 2023-06-30             |
|                                                                                                     | First Named Inventor   | Thien Nguyen           |
|                                                                                                     | Art Unit               | 3772                   |
|                                                                                                     | Examiner Name          | APONTE, MIRAYDA ARLENE |
|                                                                                                     | Attorney Docket Number | INCEP-001COF           |

|                                                                                                            |         |                                                                                                                                                                                                                                                                 |                           |                        |                                                 |                                                                        |                                                                        |                     |
|------------------------------------------------------------------------------------------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------|-------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------|---------------------|
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|                                                                                                                                                                     |                        |                        |            |
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| Solmetex Ex. 2029<br>Ascentcare Dental Products v. Solmetex<br><b>INFORMATION DISCLOSURE<br/> STATEMENT BY APPLICANT</b><br>( Not for submission under 37 CFR 1.99) | Application Number     |                        | 18217304   |
|                                                                                                                                                                     | Filing Date            |                        | 2023-06-30 |
|                                                                                                                                                                     | First Named Inventor   | Thien Nguyen           |            |
|                                                                                                                                                                     | Art Unit               | 3772                   |            |
|                                                                                                                                                                     | Examiner Name          | APONTE, MIRAYDA ARLENE |            |
|                                                                                                                                                                     | Attorney Docket Number | INCEP-001COF           |            |

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|                                                                                                                                                                     | Filing Date            |                        | 2023-06-30 |
|                                                                                                                                                                     | First Named Inventor   | Thien Nguyen           |            |
|                                                                                                                                                                     | Art Unit               | 3772                   |            |
|                                                                                                                                                                     | Examiner Name          | APONTE, MIRAYDA ARLENE |            |
|                                                                                                                                                                     | Attorney Docket Number | INCEP-001COF           |            |

### CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

|            |                  |                     |            |
|------------|------------------|---------------------|------------|
| Signature  | /Tam Thanh Pham/ | Date (YYYY-MM-DD)   | 2023-10-02 |
| Name/Print | Tam Thanh Pham   | Registration Number | 50565      |

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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| <b>International Application Number:</b>    |                               |
| <b>Confirmation Number:</b>                 | 5030                          |
| <b>Title of Invention:</b>                  | INTRAORAL DEVICE              |
| <b>First Named Inventor/Applicant Name:</b> | Thien Nguyen                  |
| <b>Customer Number:</b>                     | 138718                        |
| <b>Filer:</b>                               | TamThanh Thi Pham/Jasmine Han |
| <b>Filer Authorized By:</b>                 | TamThanh Thi Pham             |
| <b>Attorney Docket Number:</b>              | INCEP-001COF                  |
| <b>Receipt Date:</b>                        | 02-OCT-2023                   |
| <b>Filing Date:</b>                         | 30-JUN-2023                   |
| <b>Time Stamp:</b>                          | 19:08:13                      |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)   |

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| Information: 2029                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |                              |                                          |    |   |
| Ascentcare Dental Products v. Solmetex - IPR2025-01175                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                    |                              |                                          |    |   |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Information Disclosure Statement (IDS) Form (SB08) | INCEP-001COF_IDS_10-2-23.pdf | 1350521                                  | no | 4 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                    |                              | 325f6806063dba53f6b97f4e2cb3b6f19571d403 |    |   |
| Warnings:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                    |                              |                                          |    |   |
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

**Thien Nguyen et al.**

Confirmation No. 5030

Application No. 18/217,304

Filed: June 30, 2023

For: **INTRAORAL DEVICE**

Group Art Unit: 3772

Examiner: APONTE, MIRAYDA ARLENE

Attorney Docket No. INCEP-001COF

INFORMATION DISCLOSURE STATEMENT

TO THE COMMISSIONER FOR PATENTS:

1. Documents listed on the accompanying Form PTO/SB/08a (or equivalent) are presented for the Examiner's consideration.

- ☒ Copies of listed U.S. patents and U.S. patent application publications are not required for submission. (37 C.F.R. § 1.98(a)(2)(ii))
- ☐ Copies of listed foreign patent documents and/or non-patent literature are enclosed. (37 C.F.R. § 1.98(a)(2))
- ☐ Copies of the documents listed at sheet/cite nos. \_\_\_\_\_ of the attached Form PTO/SB/08a (or equivalent) are omitted because (1) they are already of record in U.S. Patent Application No. \_\_\_\_\_, filed \_\_\_\_\_, on which this application relies for an earlier filing date under 35 U.S.C. § 120; and (2) any information disclosure statement filed in the prosecution of Application No. \_\_\_\_\_, complies with 37 CFR §§ 1.98(a) through (c). (37 C.F.R. § 1.98(d))
- ☐ A copy of copending U.S. Patent Application No., filed \_\_\_\_\_, for \_\_\_\_\_, listed at (sheet/cite no.) of the attached Form PTO-1449 (or equivalent), ☐ is enclosed / ☐ is omitted. (Copy not required if available via IFW. 1287 OG 162 (Oct. 19, 2004).).

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5. ☐ A concise explanation of the relevance of each document not in the English language and/or selected documents in the English language is set forth below.

Respectfully submitted,

Date: October 2, 2023

By: /Tam Thanh Pham  
Tam Thanh Pham  
Registration No. 50,565

Polsinelli LLP  
Three Embarcadero Center  
Suite 2400  
San Francisco, CA 94111  
(415) 248-2100



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|--------------------|-----------------------|-----------------------|------------------------|
| 18/217,304         | 06/30/2023            | Thien Nguyen          | INCEP-001COF           |

**CONFIRMATION NO. 5030**

138718

Polsinelli LLP

PO Box 140310

Kansas City, MO 64114-0310

**PUBLICATION NOTICE**

\*OC000000063776495\*

Date Mailed: 10/26/2023

**Title:**INTRAORAL DEVICE**Publication No.**US-2023-0338124-A1**Publication Date:**10/26/2023**NOTICE OF PUBLICATION OF APPLICATION**

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

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| <b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b><br>( Not for submission under 37 CFR 1.99) | Application Number     |  | 18217304               |  |
|                                                                                                     | Filing Date            |  | 2023-06-30             |  |
|                                                                                                     | First Named Inventor   |  | Thien Nguyen           |  |
|                                                                                                     | Art Unit               |  | 3772                   |  |
|                                                                                                     | Examiner Name          |  | APONTE, MIRAYDA ARLENE |  |
|                                                                                                     | Attorney Docket Number |  | INCEP-001COF           |  |

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|                                                                                                            | 1       | 112021022474                         | BR                        | A2                     | 2022-01-04                                      | DRYSHIELD, LLC                                                         | Corresponds to US 2020/0352680 A1                                      | ×              |
|                                                                                                            | 2       | 114302667                            | CN                        | A                      | 2022-04-08                                      | DRYSHIELD, LLC                                                         | Corresponds to US 2020/0352680 A1                                      | ☒              |
|                                                                                                            | 3       | 20220103035                          | KR                        | A                      | 2022-07-21                                      | DRYSHIELD, LLC                                                         | Corresponds to US 2020/0352680 A1                                      | ☒              |

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| Solmetex Ex. 2029<br>Ascentcare Dental Products v. Solmetex<br><b>INFORMATION DISCLOSURE<br/>         STATEMENT BY APPLICANT</b><br>( Not for submission under 37 CFR 1.99) | Application Number     |                        | 18217304   |  |
|                                                                                                                                                                             | Filing Date            |                        | 2023-06-30 |  |
|                                                                                                                                                                             | First Named Inventor   | Thien Nguyen           |            |  |
|                                                                                                                                                                             | Art Unit               | 3772                   |            |  |
|                                                                                                                                                                             | Examiner Name          | APONTE, MIRAYDA ARLENE |            |  |
|                                                                                                                                                                             | Attorney Docket Number | INCEP-001COF           |            |  |

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|---|------------|----|---|------------|----------------|--------------------------------------|-------------------------------------|
| 4 | 2021013694 | MX | A | 2022-04-07 | DRYSHIELD, LLC | Corresponds to<br>US 2020/0352680 A1 | <input checked="" type="checkbox"/> |
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| Solmetex Ex. 2029<br>Ascentcare Dental Products v. Solmetex<br><b>INFORMATION DISCLOSURE<br/> STATEMENT BY APPLICANT</b><br>( Not for submission under 37 CFR 1.99) | Application Number     |                        | 18217304   |
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|                                                                                                                                                                     | Examiner Name          | APONTE, MIRAYDA ARLENE |            |
|                                                                                                                                                                     | Attorney Docket Number | INCEP-001COF           |            |

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

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The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

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| Signature  | /Tam Thanh Pham/ | Date (YYYY-MM-DD)   | 2023-11-02 |
| Name/Print | Tam Thanh Pham   | Registration Number | 50565      |

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| <b>Application Number:</b>                  | 18217304                      |
| <b>International Application Number:</b>    |                               |
| <b>Confirmation Number:</b>                 | 5030                          |
| <b>Title of Invention:</b>                  | INTRAORAL DEVICE              |
| <b>First Named Inventor/Applicant Name:</b> | Thien Nguyen                  |
| <b>Customer Number:</b>                     | 138718                        |
| <b>Filer:</b>                               | TamThanh Thi Pham/Jasmine Han |
| <b>Filer Authorized By:</b>                 | TamThanh Thi Pham             |
| <b>Attorney Docket Number:</b>              | INCEP-001COF                  |
| <b>Receipt Date:</b>                        | 02-NOV-2023                   |
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| <b>Time Stamp:</b>                          | 21:59:04                      |
| <b>Application Type:</b>                    | Utility under 35 USC 111(a)   |

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| 1               | Foreign Reference    | F1_BR112021022474A2.pdf | 5428968                                     | no               | 31               |
|                 |                      |                         | c254aa98d685fbc093f3ea7c9bf605ff13fbd<br>fc |                  |                  |

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| Ascentcare Dental Products v. Solmetex - IPR2025-01175                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                    |                                         |                                          |    |    |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Foreign Reference                                  | F2_CN114302667A.pdf                     | 6970622                                  | no | 21 |
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| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Foreign Reference                                  | F3_KR20220103035A.pdf                   | 5989859                                  | no | 21 |
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| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Foreign Reference                                  | F4_MX2021013694A.pdf                    | 5482527                                  | no | 41 |
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| 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Transmittal Letter                                 | INCEP-001COF_List_of_Copending_Apps.pdf | 102233                                   | no | 1  |
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| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Transmittal Letter                                 | INCEP-001COF_IDS_Transmittal.pdf        | 106039                                   | no | 3  |
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| <b>Warnings:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                    |                                         |                                          |    |    |
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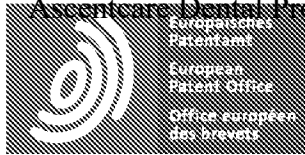
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Espacenet

BR112021022474A2 Aparelho dentário

Applicants: DRYSHIELD LLC [US]

Inventors: NGUYEN ETHAN [US], NGUYEN LAUREN [US], TAM THANH PHAM [US], NGUYEN THIEN [US]

Classifications:

IPC **A61B1/24; A61C17/00; A61C17/06; A61C17/10;**

CPC **A61B1/24 (KR,US); A61C17/06 (KR); A61C17/08 (EP,KR,US); A61C17/092 (EP,KR);  
A61C5/90 (KR,US); B29C45/0001 (KR); A61C2201/00 (KR); B29K2021/003 (KR); B29K2083/00 (KR);**

Priorities: US201962846353P 2019-05-10; US2020032228W 2020-05-08

Application: BR112021022474A-2020-05-08

Publication: BR112021022474A2-2022-01-04

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Aparelho dentário

Abstract

aparelho dentário. trata-se de um aparelho dentário que é fornecido, que pode ser fixo a um adaptador odontológico de alta sucção com a finalidade de auxiliar a equipe odontológica durante procedimentos odontológicos por meio de sucção com as mãos livres e isolamento na cadeira lateral. tal aparelho pode compreender uma parte de corpo principal, uma parte de afastador de bochecha e uma parte de conector de sucção. em uma modalidade, a parte de corpo principal, a parte de afastador de bochecha e a parte de conector de sucção podem ser moldadas em uma peça, de preferência, por moldagem por injeção. a parte de corpo principal tem uma parede anterior dentro da curva e uma parede posterior fora da curva, e pelo menos um conector que conecta a parede anterior e a parede posterior. a parte de corpo principal tem uma parede intermediária anterior e uma parede intermediária posterior entre as e paredes anterior e posterior. a parede intermediária anterior e a parede intermediária posterior têm cristas alternadas e canais.



República Federativa do Brasil  
Ministério da Economia  
Instituto Nacional da Propriedade Industrial

**(21) BR 112021022474-2 A2**



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**(54) Título:** APARELHO DENTÁRIO

**(51) Int. Cl.:** A61B 1/24; A61C 17/00; A61C 17/06; A61C 17/10; A61C 5/14.

**(30) Prioridade Unionista:** 10/05/2019 US 62/846,353.

**(71) Depositante(es):** DRYSHIELD, LLC.

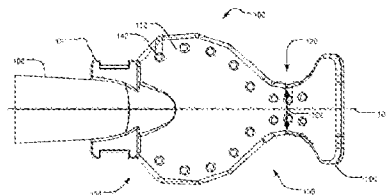
**(72) Inventor(es):** THIEN NGUYEN; TAM THANH PHAM; ETHAN NGUYEN; LAUREN NGUYEN.

**(86) Pedido PCT:** PCT US2020032228 de 08/05/2020

**(87) Publicação PCT:** WO 2020/231864 de 19/11/2020

**(85) Data da Fase Nacional:** 09/11/2021

**(57) Resumo:** APARELHO DENTÁRIO. Trata-se de um aparelho dentário que é fornecido, que pode ser fixo a um adaptador odontológico de alta sucção com a finalidade de auxiliar a equipe odontológica durante procedimentos odontológicos por meio de sucção com as mãos livres e isolamento na cadeira lateral. Tal aparelho pode compreender uma parte de corpo principal, uma parte de afastador de bochecha e uma parte de conector de sucção. Em uma modalidade, a parte de corpo principal, a parte de afastador de bochecha e a parte de conector de sucção podem ser moldadas em uma peça, de preferência, por moldagem por injeção. A parte de corpo principal tem uma parede anterior dentro da curva e uma parede posterior fora da curva, e pelo menos um conector que conecta a parede anterior e a parede posterior. A parte de corpo principal tem uma parede intermediária anterior e uma parede intermediária posterior entre as paredes anterior e posterior. A parede intermediária anterior e a parede intermediária posterior têm cristas alternadas e canais.



## “APARELHO DENTÁRIO”

### Referência Cruzada aos Pedidos Relacionados

[001] O presente pedido reivindica o benefício de prioridade do Pedido de Patente Provisório U.S. N° de série 62/846.353, depositado no dia 10 de maio de 2019, intitulado, “Dental Mouthpiece”, as descrições do qual são incorporadas aqui a título de referência.

### Fundamentos da Invenção

#### Campo da Invenção

[002] Esta invenção refere-se, em geral, ao campo de aparelhos dentários. Mais especificamente, a presente invenção refere-se aos relatos aparelhos dentários intraorais de sucção e isolamento.

#### Descrição da Técnica Relacionada

[003] Vários aparelhos são atualmente usados por profissionais de saúde bucal, higienistas dentais e assistentes dentais no campo de odontologia. Antigamente, um paciente odontológico era tratado por uma equipe tradicional composta por duas pessoas, um dentista e um assistente odontológico. Além disso, o tratamento dentário pode ser fornecido pela equipe com o uso de muitos tipos diferentes de equipamentos e materiais odontológicos. Tais equipamentos e materiais odontológicos podem incluir itens como um espelho intraoral, um bloco de mordida, um ejetor de sucção de baixa velocidade, um ejetor de sucção de alta velocidade, gases, rolos de algodão e “dri-angles”. Cada item de equipamento odontológico pode ser usado para diferentes finalidades, embora alguns possam ser usados em combinação para alguns tipos de serviços odontológicos. Assim, um profissional de odontologia que busca fornecer tais serviços odontológicos pode precisar usar vários itens de tal equipamento odontológico. Um papel importante do assistente de dentista é, portanto, auxiliar o profissional de odontologia na coordenação do uso desses vários itens de diferentes equipamentos e materiais.

[004] Há, portanto, uma necessidade na técnica de sistemas e métodos aprimorados para fornecer serviços odontológicos de maneira mais eficiente, confortável e segura ao paciente odontológico.

#### Sumário da Invenção

[005] As modalidades de um aparelho dentário formado em uma curva são descritas. Tal aparelho pode compreender uma parte de corpo principal em uma parte central da curva que tem uma primeira extremidade e uma segunda extremidade, uma parte de conector de sucção conectada à parte de corpo principal na primeira extremidade, e uma parte de afastador de bochecha conectada à parte de corpo principal na segunda extremidade.

[006] Em algumas modalidades, a parte de corpo principal, a parte de conector de sucção e a parte de afastador de bochecha podem ser moldadas em uma peça, de preferência, por moldagem por injeção. Em uma modalidade de exemplo, o aparelho pode ser produzido a partir de um material que é flexível, translúcido, condutivo para moldagem por injeção, alta resistência ao calor e autoclavável. Tal material pode incluir silicone. Devido ao fato de que o aparelho pode ser produzido a partir de um material com alta resistência ao calor e autoclavável, tal aparelho pode ser reutilizável.

[007] A parte de corpo principal pode compreender uma parede anterior dentro da curva e uma parede posterior fora da curva. A parede anterior e a parede posterior podem definir um espaço interno, dentro do qual pelo menos um conector conecta a parede anterior à parede posterior. Pelo menos uma parede intermediária anterior se estende a partir da parede anterior parcialmente em direção à parede posterior, e pelo menos uma parede intermediária posterior se estende a partir da parede posterior parcialmente em direção à parede anterior. As paredes intermediárias anteriores e as paredes intermediárias posteriores têm, cada uma, cristas alternadas e canais.

#### Breve Descrição das Figuras

a figura 1 é uma vista de topo do aparelho dentário;

a figura 2 é uma vista isométrica de um aparelho dentário mostrado na figura 1;

a figura 3 é uma vista traseira do aparelho dentário mostrado na figura 1;

a figura 4 é uma vista de fundo do aparelho dentário mostrado na figura 1;

a figura 5 é uma vista de corte transversal superior coronal do aparelho dentário mostrado na figura 1; e

a figura 6 é uma vista lateral do aparelho dentário mostrado na figura 1;

a figura 7 é uma vista lateral do aparelho dentário mostrado na figura 1 com uma parede anterior do aparelho afastada de uma parede posterior do aparelho;

a figura 8 é uma vista de seção transversal do aparelho dentário mostrado na figura 1 na intersecção entre o conector de sucção e o corpo principal;

a figura 9 é uma vista de seção transversal do aparelho dentário mostrado na figura 1 na intersecção entre o conector de sucção e o corpo principal;

a figura 10 é uma vista de seção transversal longitudinal de uma modalidade do aparelho dentário mostrado na figura 1 com um conector de parede;

a figura 11 é uma vista de seção transversal longitudinal de uma modalidade do aparelho dentário mostrado na figura 1 com conectores de coluna.

#### Descrição Detalhada

[008] As modalidades da presente invenção podem incluir um aparelho que pode ser fixo a um adaptador odontológico de alta sucção com a finalidade de auxiliar a equipe odontológica durante procedimentos odontológicos por meio de sucção na cadeira, com as mãos livres e isolamento. Tal aparelho pode compreender uma parte de corpo principal, uma parte de afastador de bochecha, uma parte de conector de sucção, uma barra de estabilidade e um bloco de mordida. Em algumas modalidades, qualquer combinação da parte de corpo principal, da

parte de afastador de bochecha, da parte de conector de sucção, da barra de estabilidade e do bloco de mordida (e suas subpartes) pode ser moldada em uma peça, de preferência, por moldagem por injeção. Em uma modalidade de exemplo, o aparelho pode ser produzido a partir de um material que é flexível, resiliente, pelo menos translúcido, e condutivo para moldagem por injeção. Tal material pode incluir os elastômeros termoplásticos conhecidos na técnica.

[009] A figura 1 é uma vista de topo do aparelho dentário. Um aparelho dentário 100 inclui uma parte de corpo principal 102 que tem uma primeira extremidade 104 e uma segunda extremidade 106 oposta à primeira extremidade 104. Um eixo longitudinal 103 pode se estender a partir da primeira extremidade 104 para a segunda extremidade 106. Na modalidade ilustrada, uma parte de conector de sucção 108 pode ser acoplada à primeira extremidade 104 e uma parte de afastador de bochecha 110 pode ser acoplada à segunda extremidade 106, embora em outros exemplos, o aparelho 100 pode não ter uma parte de conector de sucção 108 e/ou uma parte de afastador de bochecha 110. Um bloco de mordida 101 também pode ser integrado à parte de conector de sucção 108 próxima à primeira extremidade 104 da parte de corpo principal 102, embora o bloco de mordida 101 possa ser posicionado em qualquer local na parte de conector de sucção 108.

[010] A parte de corpo principal 101 pode incluir um gargalo 120 que se estende a partir da segunda extremidade 106 até a parte de afastador de bochecha 110. O gargalo 120 pode ter uma largura 122 que é inferior a uma largura da parte de corpo principal 102, uma largura da parte de afastador de bochecha 110, e/ou uma largura da parte de conector de sucção 108, embora a largura 122 possa ser maior que a largura da parte de corpo principal 102, da parte de afastador de bochecha 110 e/ou da parte de conector de sucção 108 em outros exemplos.

[011] Na modalidade ilustrada, a parte de conector de sucção 108, a parte de afastador de bochecha 110, o bloco de mordida 101 e a parte de corpo principal

102 são construídas como uma peça, embora em outros exemplos, cada um da parte de conector de sucção 108, da parte de afastador de bochecha 110, do bloco de mordida 101 e/ou do corpo principal 102 possa ser uma peça separada. Por exemplo, em algumas modalidades, a parte de corpo principal 102, a parte de afastador de bochecha 110 e a parte de conector de sucção 108 (e suas subpartes) podem ser moldadas como uma peça, de preferência, por moldagem por injeção, e o bloco de mordida 101 pode ser uma peça separada que pode ser fixa à parte de conector de sucção 108. Em uma modalidade de exemplo, o aparelho 100 pode ser produzido a partir de um material que é flexível, resiliente, translúcido e condutivo para moldagem por injeção. Tal material pode incluir elastômero termoplástico.

[012] A figura 2 é uma vista isométrica de um aparelho dentário mostrado na figura 1. Como ilustrado na figura 2, a parte de corpo principal 102 pode ser formada em uma curva. Devido ao fato de que o aparelho 100 é produzido a partir de um material flexível e resiliente (por exemplo, elastômero termoplástico), o aparelho 100 pode ser flexionado quando posicionado na boca do paciente para se ajustar ao formato da boca. Quando posicionada de maneira adequada, a parte de conector de sucção 108 pode se projetar de um lado da boca do paciente, enquanto a parte de corpo principal 102 fica contra a parte de trás da boca do paciente, e a parte de afastador de bochecha 110 pressiona contra a bochecha do paciente no lado oposto da boca do paciente.

[013] A parte de afastador de bochecha 110 pode ser configurada para pressionar e afastar a bochecha de um paciente para longe dos dentes do paciente em um lado oposto da boca do paciente do lado a partir do qual a parte de conexão 108 se estende. A flexibilidade do material usado para formar o aparelho 100 permite alguma flexibilidade quando posicionado na boca do paciente, mas a resiliência do material permite ainda que o aparelho 100 aplique pressão contra uma parte da boca do paciente quando o aparelho 100 é liberado da flexão. O material é

suficientemente resiliente, por exemplo, para permitir que a parte de afastador de bochecha 110 pressione contra o interior da bochecha do paciente, sendo essa pressão suficiente para afastar a bochecha dos dentes do paciente. A parte de afastador de bochecha 110 é ilustrada como uma região distal de cabeça de martelo, que pode ser fixa à parte de corpo principal 102. A parte de afastador de bochecha 110 pode ser sólida em alguns exemplos, embora possa ser oca em outros exemplos.

[014] A parte de corpo principal 102 pode compreender uma parede anterior 112 em uma parte interna da curva e uma parede posterior 114 (também vista na figura 4) em uma parte externa da curva. A parede anterior 112 pode ficar voltada para frente da boca do paciente e a parede posterior 114 pode ficar voltada para trás da boca do paciente. A parede anterior 112 e a parede posterior 114 da parte de corpo principal 102 podem ser configuradas em paralelo umas às outras. A parede anterior 112 tem um formato definido que pode corresponder ao formato definido da parede posterior 114, embora a parede anterior 112 possa ter um formato diferente da parede posterior 114 em outros exemplos. O formato definido pode ser mais amplo na primeira extremidade 104 e mais estreito na segunda extremidade 106. Em algumas modalidades, o formato corresponde a uma forma de escudo, embora a forma possa ser, por exemplo, um quadrado, uma seta de linha reta, um retângulo, uma estrela, uma oval, um círculo ou uma forma que geralmente se adapta à forma intraoral da boca do paciente. Os aparelhos de tamanhos diferentes podem ser fornecidos para bocas de adultos e crianças de tamanhos diferentes. A parte da forma na primeira extremidade 104 pode ser formada com paredes mais espessas do que o resto da parte de corpo principal 102. Tal espessamento pode fornecer estabilidade adicional na primeira extremidade 104. Quando posicionada dentro da boca de um paciente, a parede anterior 112 e a parede posterior 114 são capazes de bloquear uma via aérea do paciente, enquanto o bloco de mordida 101 é

posicionado entre os dentes do paciente, a parte do conector de sucção 108 se estende de um lado da boca do paciente e a parte de afastador de bochecha 110 pressiona a bochecha no lado oposto da boca do paciente.

[015] A parte de corpo principal 102 também pode incluir aberturas 140 localizadas na parede anterior 112 e/ou na parede posterior 114. Tais aberturas 140 (por exemplo, perfurações, fenda, abertura, etc.) permitem a sucção de ar, fluidos e pequenos detritos da boca do paciente através das aberturas 140 e no espaço interno 126 e na parte conector de sucção 108 em direção a uma fonte de sucção. As aberturas 140 podem ser posicionadas em um perímetro da forma da parede anterior 112 e/ou da parede posterior 114. No mesmo exemplo, as aberturas 140 podem ser posicionadas em qualquer lado do gargalo 120 na parede anterior 112 e/ou na parede posterior 114. Em outro exemplo, as aberturas 140 são aberturas. No mesmo exemplo, as aberturas têm o mesmo tamanho, embora em outros exemplos algumas ou todas as aberturas possam ter tamanhos diferentes.

[016] A figura 3 é uma vista traseira do aparelho dentário mostrado na figura 1. Como visto na figura 3, a parte de conector de sucção 108 pode ter o formato oval e também ser fixa à parte de corpo principal 102. A parte de conector de sucção 108 pode ser formada com paredes mais espessas do que a parte de corpo principal 102 e configurado para se conectar a um adaptador a vácuo de alta sucção e para auxiliar na transferência de água, saliva e detritos do espaço interno 126 para o adaptador externo para a remoção. A parte de conector de sucção 108 também pode incluir um bloqueio interno para ajudar a deslizar o aparelho sobre o adaptador até a profundidade desejada.

[017] A parede superior 116 in figura 3 pode ser usada neste documento para se referir ao lado que repousa contra o céu da boca de um paciente quando posicionada nele, e a parede inferior 118 pode ser usada para se referir ao lado que repousa contra o assoalho da boca do paciente. A parede superior 116 e a parede

inferior 118 podem ser formadas de forma idêntica, o que pode permitir que o aparelho mude de orientação de modo que a parede superior 116 possa aparecer como a parede inferior 118 e vice-versa, na nova orientação. Quando em uso, a parede superior 116 e a parede inferior 118 da parte de corpo principal 101 podem servir para proteger e separar a parte superior da boca e a parte inferior da boca/língua. Além disso, a parte de corpo principal 101 também pode servir para proteger a parte posterior da boca (por exemplo, garganta e vias aéreas) dos detritos que caem.

[018] A figura 4 é uma vista de fundo do aparelho dentário mostrado na figura 1. A parede anterior 112 e a parede posterior 114 podem ser conectadas umas às outras por pelo menos um conector 124. Em algumas modalidades, a parte de conector de sucção 108 pode ter um corte 142 (por exemplo, que pode ter a forma de um logotipo, um entalhe retangular, um entalhe quadrado ou um entalhe circular, ou qualquer forma de entalhe) que fornece a trava extra com uma saliência correspondente (por exemplo, que também pode ser em forma de um logotipo, uma saliência retangular, uma saliência quadrada ou uma saliência circular ou qualquer forma de saliência) em um adaptador a vácuo de alta sucção externo.

[019] O bloco de mordida 101 pode ser reforçado por aberturas de bloco de mordida 141 para criar cavidades no bloco de mordida para resultar em um bloco de mordida mais estável. Em uma modalidade, as aberturas de bloco de mordida 141 podem ser duas aberturas retangulares paralelas que se abrem no fundo do bloco de mordida. As aberturas de bloco de mordida 141 podem se estender até a parte de conector de sucção 108, mas não se estendem além da espessura da parte de conector de sucção 108.

[020] A figura 5 é uma vista de corte transversal superior coronal do aparelho dentário mostrado na figura 1. A parte de corpo principal 102 pode incluir a estrutura de ponte 136 que se projeta a partir da superfície interna 135 da parede posterior

114, como mostrado na figura 5 e também visível nas figuras 7 e 8. Em algumas modalidades, a estrutura de ponte 136 pode seguir o formato de um logotipo (por exemplo, uma ponta de seta ou escudo). A estrutura de ponte pode ter uma lacuna na extremidade da forma de ponta de seta, criando um arco aberto em vez de uma ponta de seta. Em algumas modalidades, a estrutura de ponte 136 pode estar localizada de modo central na parte de corpo principal 110 do aparelho 100. Em alguns exemplos, tal estrutura de ponte 136 pode se projetar a partir da superfície interna 135 em uma forma de onda com cristas de ponte 137 e canais de ponte 138. Em outras modalidades, a estrutura de ponte 136 pode se projetar na forma de ameias ou trapézios. As cristas de ponte 137 fornecem uma pluralidade de pontos de contato que é, em geral, separada da parede anterior 112. As cristas de ponte 137 perto da abertura 146 da parte de conector de sucção 108 podem ter uma altura maior do que as cristas de ponte 137 distantes da abertura 146, como visto nas figuras 7 e 8. As cristas de ponte 137 perto da abertura 146 da parte de conector de sucção 108 também podem ser mais longas do que as cristas de ponte 137 mais distantes da parte de conector de sucção 108, como mostrado mais adiante na figura 8. Os canais da ponte 138 podem ser substancialmente nivelados ou podem se estender acima da superfície interna 135. As cristas de ponte 137 ficam em contato com a parede anterior 112 durante a sucção para manter a parede anterior 112 afastada da parede posterior 114 durante a sucção, evitando assim o colapso da parede anterior 112 ou da parede posterior 114 para o espaço interno 126, de modo que os detritos e/ou a água possam ser retirados através do espaço interno 126. Enquanto isso, os canais da ponte 138 fornecem lacunas que permitem a sucção de ar, fluidos e pequenos detritos através a estrutura de ponte 136. Em outros exemplos, a estrutura de ponte 136 pode ser lisa, pode incluir cristas agudas e canais afiadas, cristas circulares e canais circulares, cristas quadradas e canais quadradas ou forma ou combinação de formas de cristas e canais.

[021] A parte de corpo principal 102 pode ainda incluir uma barra de estabilidade 143, mostrada na figura 5 e também visível na figura 7, que se estende de aproximadamente o centro da parte de corpo principal 102 em direção à parte de afastador de bochecha 110. Tal barra de estabilidade 143 pode se projetar a partir da superfície interna 135 da parede posterior 114 ao longo do eixo longitudinal 103. Em uma modalidade, a barra de estabilidade 143 começa a partir do arco aberto da estrutura de ponte 136 e continua ao longo do eixo longitudinal 103 em direção à segunda extremidade 106 após o gargalo 120 e termina antes de alcançar a parte de afastador de bochecha 110. A barra de estabilidade 143 pode se projetar a partir da superfície interna 135 da parede posterior 114 em direção à superfície interna 113 da parede anterior 112. A barra de estabilidade 143 pode ser de qualquer altura variando da altura do espaço interno 126 ou qualquer altura menor do que o espaço interno 126. Em uma modalidade, a barra de estabilidade 143 pode ter conectores 124 em locais específicos que podem fixar a parede anterior 112 à parede posterior 114. Os conectores 124 na barra de estabilidade 143 podem ajudar na retração, estabilidade, suporte e curvatura do aparelho 100 durante a sucção. Em uma modalidade exemplar, pode haver vários conectores 124 alinhados com a barra de estabilidade 143 e a barra de estabilidade 143, embora a barra de estabilidade 143 possa não estar alinhada com pelo menos um conector 124 em outros exemplos.

[022] A figura 6 é uma vista lateral do aparelho dentário mostrado na figura 1. A figura 6 ilustra a vista do lado inferior que fica contra o assoalho da boca do paciente. A parede anterior 112 e a parede posterior 114 estão espaçadas uma da outra e definem o espaço interno 126. Além de pelo menos um conector 124, uma barra de estabilidade 143 e uma estrutura de ponte 136, o espaço interno 126 é, em geral, aberto e desobstruído, permitindo assim que a sucção flua através do espaço interno 126. O espaço interno 126 entre a parede anterior 112 e a parede posterior 114 segue, em geral, a mesma forma definida da parede anterior 112 e da parede

posterior 114. Em um exemplo, o espaço interno 126 se estende através do gargalo 120, embora em outros exemplos, o espaço interno 126 possa não se estender através do gargalo 120. Em ainda outros exemplos, o espaço interno 126 se estende através do gargalo 120 e para a parte de afastador de bochecha 120.

[023] Pelo menos uma parede intermediária anterior 127 pode se estender de pelo menos uma borda 128 da parede anterior 112 parcialmente em direção à parede posterior 114 e pode ter uma espessura que se estende de pelo menos uma borda 128 a um ponto médio entre a parede anterior 112 e a parede posterior 114. A extensão de tal parede intermediária anterior 127, portanto, pode não se estender por toda a distância entre a parede anterior 112 e a parede posterior 114. A espessura de tal parede intermediária anterior 127 pode aumentar a partir da parte de afastador de bochecha 110, através do gargalo 120 e para a primeira extremidade 104. Tal aumento de profundidade pode proporcionar maior rigidez na primeira extremidade 104. Tal parede intermediária anterior 127 pode ainda ser estriada em algumas modalidades, ou pode ter uma borda lisa em outras modalidades. Em um exemplo, a parede intermediária anterior 127 inclui uma crista alternada 130 e canal 132. Na modalidade ilustrada, as cristas 130 são uma superfície plana e os canais 132 são uma superfície de recorte cilíndrica, embora as cristas 130 e os canais 132 possam ter qualquer forma. Em alguns exemplos, as cristas 130 e os canais 132 se estendem por toda a profundidade da parede intermediária anterior 127, embora em outros exemplos as cristas 130 e/ou os canais 132 possam se estender parcialmente ao longo da parede intermediária anterior 127. As cristas 130 e os canais 132 podem fornecer retração, estabilidade, suporte e curvatura adicionais para o aparelho 100.

[024] A parede posterior 114 pode ter pelo menos uma parede intermediária posterior 134 correspondente que se estende a partir de pelo menos uma borda 133 da parede posterior 114 e se estende parcialmente em direção à parede anterior

112. A parede intermediária posterior 134 pode igualmente exibir cristas que são iguais, uma imagem de espelho, ou diferentes da parede intermediária anterior 127. Em um exemplo, as saliências da parede intermediária anterior 127 podem ser alinhadas com as saliências da parede intermediária posterior 134, como mostrado na figura 6. Em combinação, a parede intermediária anterior 127 e a parede intermediária posterior 134 e suas respectivas cristas alinhadas podem formar uma malha aberta entre a parede anterior 112 e a parede posterior 114. Essa malha aberta pode seguir as bordas 128, 133 de cada uma da parede anterior 112 e da parede posterior 114 da primeira extremidade 104 para a segunda extremidade 106. A malha aberta entre a parede intermediária anterior 127 e a parede intermediária posterior 134 permite a sucção de ar, fluidos e pequenos detritos do paciente boca, através da malha para o espaço interno 126 e para a parte de conector de sucção 108 em direção a uma fonte de sucção.

[025] A parede intermediária anterior 127 pode se juntar à parede intermediária posterior 134 na parede superior 116 e à parede inferior 118 perto da parte de conector de sucção 108 do corpo principal na primeira extremidade 104. A parede intermediária anterior 127 também pode se unir à parede intermediária posterior 134 na parede superior 116 e à parede inferior 118 perto da parte de afastador de bochecha 110 na segunda extremidade 106. Em algumas modalidades, a parede intermediária anterior 127 pode se juntar à parede intermediária posterior 134 no afastador de bochecha porção 110.

[026] A figura 7 é um lado do aparelho dentário mostrado na figura 1 com uma parede anterior do aparelho afastada de uma parede posterior do aparelho. Pelo menos um conector 124 pode abranger a distância entre a parede anterior 112 e a parede posterior 114 dentro do espaço interno 126. Em outras palavras, o conector 124 pode ser fixo a uma superfície interna 135 da parede posterior 114 e a uma superfície interna 113 da parede anterior 112. Pelo menos um conector 124

pode fornecer rigidez estrutural ao aparelho 100 e pode ser um pilar, coluna, parede e similares. No exemplo ilustrado, pelo menos um conector 124 inclui três conectores, cada um na forma de um pilar e linearmente espaçados um do outro.

[027] A figura 8 é uma vista em corte transversal do aparelho dentário mostrado na figura 1. As cristas de ponte 137 perto da abertura 146 da parte de conector de sucção 108 podem ter uma altura maior do que as cristas de ponte 137 mais longe da abertura 146. As cristas de ponte 137 perto da abertura 146 da parte de conector de sucção 108 também podem ser mais longas do que as cristas de ponte 137 mais distantes da parte de conector de sucção 108.

[028] A figura 9 é uma vista em seção transversal do aparelho dentário na figura 1. A figura 9 ilustra onde o conector de sucção se conecta ao corpo principal. Como visto na figura 9, a parte de conector de sucção 108 pode ser de forma oval e também fixa à parte de corpo principal 102 em uma transição contínua até o corpo principal alcançar a estrutura de ponte 136, onde as cristas de ponte 137 e os canais da ponte 138 podem bloquear parcialmente a abertura da parte de corpo principal 102 perto da parte do conector de sucção 108. O bloco de mordida 101 é fixo do lado de fora da parte do conector de sucção 108, de maneira que o bloco de mordida não interrompe a abertura da poção do conector de sucção 108.

[029] O bloco de mordida 101 pode incluir cristas de bloco de mordida 147 e canais de bloco de mordida 148 em ambos os lados do bloco de mordida para criar maior tração e suporte para o bloco de mordida. Em uma modalidade, as cristas do bloco de mordida 147 e os canais do bloco de mordida 148 podem criar uma forma irregular ou forma de onda em ambos os lados do bloco de mordida, embora as cristas do bloco de mordida 147 e os canais do bloco de mordida 148 possam ter qualquer forma.

[030] A figura 10 é uma vista em seção transversal de uma modalidade do aparelho dentário mostrado na figura 1 com um conector de parede. Nesta

modalidade, o conector 124 conecta a parede anterior 112 com a parede posterior 114 no eixo longitudinal 103 como uma parede sólida. O conector 124 se estende a partir do gargalo 120 na segunda extremidade 106 a alguma distância da parte de afastador de bochecha 110 em direção à primeira extremidade 104 ao longo do eixo longitudinal 103 e para perto da abertura da estrutura de ponte 136 em torno do ponto médio da linha principal parte de corpo 102. Em outra modalidade, o conector 124 pode se estender ao longo do eixo longitudinal 103 e parar em qualquer lugar dentro do espaço interno 126 da parte de corpo principal.

[031] A figura 11 é uma vista em seção transversal longitudinal de uma modalidade do aparelho dentário mostrado na figura 1 com conectores de coluna. Nesta modalidade, o conector 124 conecta a parede anterior 112 com a parede posterior 114 no eixo longitudinal 103, como três pilares cilíndricos espaçados de maneira uniforme em linha com a barra de estabilidade 143. Um primeiro conector é posicionado na parte de corpo principal 102, um segundo o conector é posicionado perto do gargalo 120 e um terceiro conector é espaçado perto da parte de afastador de bochecha 110. O espaçamento linear dos três conectores pode fornecer rigidez adicional ao gargalo 120, enquanto mantém uma largura estreita 122 do gargalo 120. Em outros exemplos, tais conectores 124 podem estar localizados na área onde um aparelho posicionado 100 começa a envolver de um lado da boca, para a parte de trás da boca e, em seguida, para o outro lado da boca, ajudando assim a moldar o aparelho 100 para a forma intraoral geral da boca do paciente. Em outros exemplos, pelo menos um conector 124 pode incluir um conector, dois conectores ou mais de dois conectores e cada conector pode ser posicionado em qualquer lugar no aparelho 100. Em um exemplo, pelo menos um conector 124 é uma nervura que se estende a partir da parte de corpo principal 102, através do gargalo 120 e para a parte de afastador de bochecha 110.

[032] O aparelho, conforme descrito neste documento, pode ser usado com

um adaptador a vácuo de alta sucção e autoclavável em uma peça. Tal adaptador de corpo a vácuo de alta sucção pode ser produzido a partir de um único material homogêneo. Tendo um design de alavanca única, tal adaptador a vácuo pode funcionar da mesma maneira que todos os atuais evacuadores de alta sucção a vácuo e ejetores de saliva no controle da remoção de água, saliva e detritos da cavidade oral para a fonte de vácuo externa. A alavanca única pode ser projetada para controlar a remoção de água, saliva e detritos do corpo principal pelo menos parcialmente fechado por meio de um único conduíte de evacuação grande dentro da parte de conector de sucção.

[033] Embora várias modalidades tenham sido descritas acima, deve ser entendido que elas foram apresentadas apenas a título de exemplo, e não como limitação. As descrições não se destinam a limitar o escopo da invenção às formas específicas estabelecidas aqui. Assim, a amplitude e o escopo de uma modalidade preferencial não devem ser limitados por qualquer uma das modalidades de exemplo descritas acima. Deve ser entendido que a descrição acima é ilustrativa e não restritiva. Ao contrário, as atuais descrições se destinam a abranger tais alternativas, modificações e equivalentes, que podem ser incluídos dentro do espírito e do escopo da invenção, conforme definido pelas reivindicações anexas e de outra forma observado por um versado na técnica. O escopo da invenção deve, portanto, ser determinado não com referência à descrição acima, mas em vez disso, deve ser determinado com referência às reivindicações anexas, juntamente com seu escopo completo de equivalentes.

### REIVINDICAÇÕES

1. Aparelho dentário formado em uma curva, **CARACTERIZADO** pelo fato de que compreende:

uma parte de corpo principal em uma parte central da curva que tem uma primeira extremidade e uma segunda extremidade, a parte de corpo principal que tem uma parede anterior dentro da curva e uma parede posterior fora da curva, a parede anterior e a parede posterior que definem um espaço interno, pelo menos um conector que conecta a parede anterior à parede posterior, pelo menos uma parede intermediária anterior que se estende a partir da parede anterior parcialmente em direção à parede posterior, e pelo menos uma parede intermediária posterior que se estende a partir da parede posterior parcialmente em direção à parede anterior, pelo menos uma parede intermediária anterior e pelo menos uma parede intermediária posterior que têm, cada uma, cristas alternadas e canais;

uma parte de conector de sucção conectada à primeira extremidade, a parte de conector que conecta a espaço interno a uma fonte de sucção a vácuo; e

uma parte de afastador de bochecha conectada à segunda extremidade.

2. Aparelho, de acordo com a reivindicação 1, **CARACTERIZADO** pelo fato de que pelo menos um conector é um pilar em formato cilíndrico.

3. Aparelho, de acordo com a reivindicação 1, **CARACTERIZADO** pelo fato de que pelo menos um conector é uma parede que se estende de modo longitudinal na parte de corpo principal no espaço interno.

4. Aparelho, de acordo com a reivindicação 1, **CARACTERIZADO** pelo fato de que compreende ainda uma estrutura de ponte no espaço interno que se projeta a partir da parede posterior, em que as saliências são em forma de ameia, com cristas espaçadas.

5. Aparelho, de acordo com a reivindicação 4, **CARACTERIZADO** pelo fato de que as saliências próximas ao conector de sucção estão em maior altura e

comprimento.

6. Aparelho, de acordo com a reivindicação 4, **CHARACTERIZADO** pelo fato de que os espaços entre as cristas são canais do em formato de ameia.

7. Aparelho, de acordo com a reivindicação 1, **CHARACTERIZADO** pelo fato de que as cristas alternadas e canais na parede intermediária anterior e na parede intermediária posterior são em formato de semicírculo.

8. Aparelho, de acordo com a reivindicação 1, **CHARACTERIZADO** pelo fato de que a parede intermediária anterior e a parede intermediária posterior têm alturas variadas para manter a integridade da parte de corpo principal.

9. Aparelho, de acordo com a reivindicação 1, **CHARACTERIZADO** pelo fato de que os canais da parede intermediária anterior e da parede intermediária posterior diminuem de tamanho à medida que os canais se aproximam da parte de afastador de bochecha.

10. Aparelho, de acordo com a reivindicação 1, **CHARACTERIZADO** pelo fato de que a parede intermediária anterior e a parede intermediária posterior se encontram em um ponto em que o conector de sucção encontra o corpo principal.

11. Aparelho, de acordo com a reivindicação 1, **CHARACTERIZADO** pelo fato de que a parede intermediária anterior e a parede intermediária posterior se encontram em um ponto em que o corpo principal encontra a parte de afastador de bochecha.

12. Aparelho, de acordo com a reivindicação 1, **CHARACTERIZADO** pelo fato de que compreende ainda um bloco de mordida integrado à parte de conector de sucção, em que o bloco de mordida fornece resistência adicional ao esmagamento e redução da compressibilidade durante a mordida por um paciente.

13. Aparelho, de acordo com a reivindicação 1, **CHARACTERIZADO** pelo fato de que a parte de corpo principal, a parte de conector de sucção e a parte de afastador de bochecha são formadas por moldagem por injeção como uma peça.

14. Aparelho, de acordo com a reivindicação 1, **CHARACTERIZADO** pelo fato de que um material que forma o corpo principal, a parte de conector de sucção e a parte de afastador de bochecha é um material à base de silicone, flexível, translúcido, com alta resistência ao calor e autoclavável.

15. Aparelho, de acordo com a reivindicação 1, **CHARACTERIZADO** pelo fato de que a parede posterior inclui ainda uma barra de estabilidade que se projeta a partir de uma superfície interna da parede posterior e ao longo de um eixo longitudinal do corpo principal.

16. Aparelho, de acordo com a reivindicação 15, **CHARACTERIZADO** pelo fato de que pelo menos um conector encontra-se espaçado de maneira uniforme ao longo da barra de estabilidade.

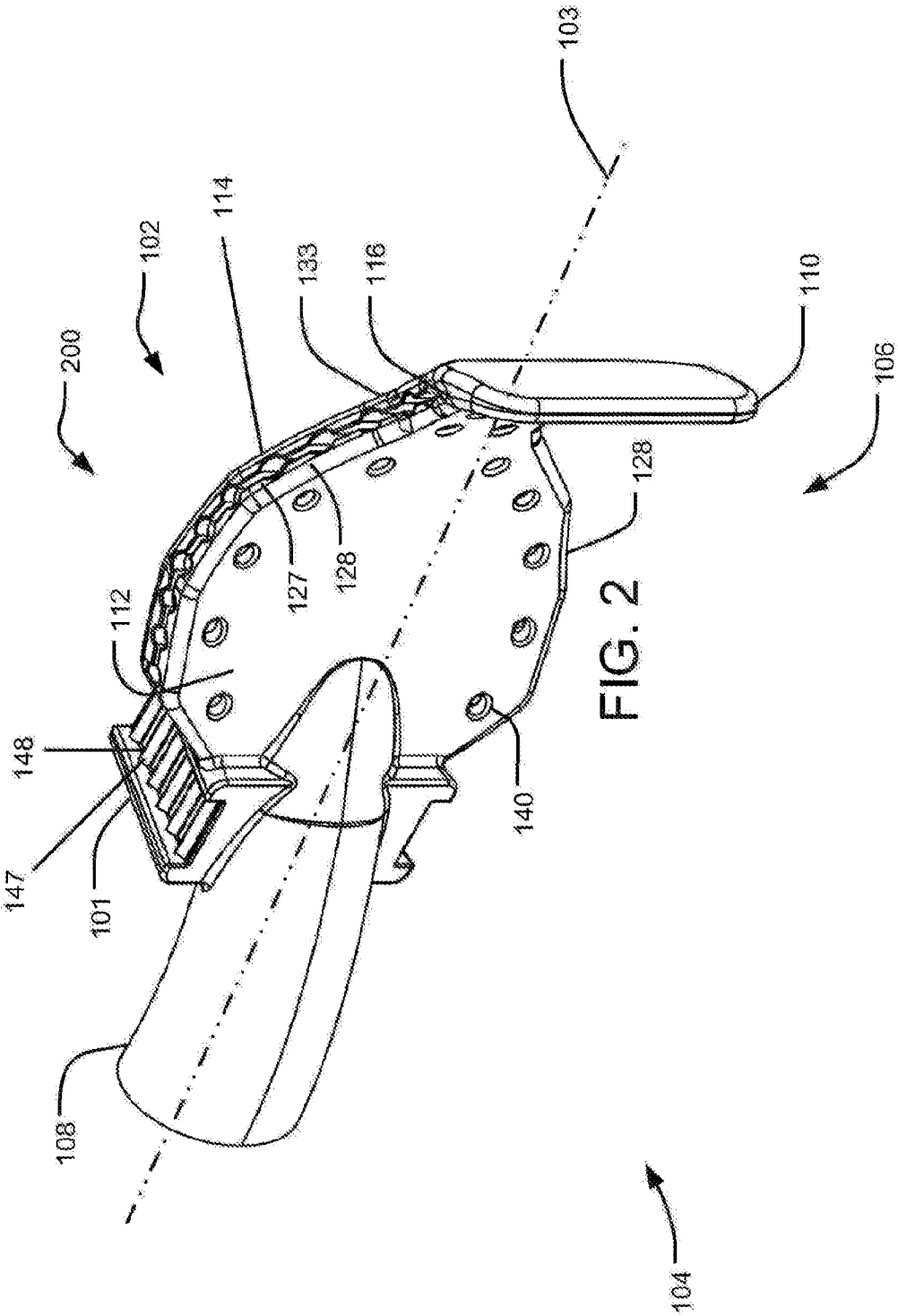
17. Aparelho, de acordo com a reivindicação 1, **CHARACTERIZADO** pelo fato de que a parte de conector de sucção compreende um corte que corresponde a uma saliência em um encaixe de trava de adaptador a vácuo.

18. Aparelho, de acordo com a reivindicação 1, **CHARACTERIZADO** pelo fato de que a parte de conector de sucção se conecta a uma fonte de vácuo, em que a ativação da fonte de vácuo fornece sucção de fluidos a partir do espaço interno do corpo principal.

19. Aparelho, de acordo com a reivindicação 18, **CHARACTERIZADO** pelo fato de que ativação da fonte de vácuo retira os fluidos a partir de um exterior do corpo principal através de cristas e canais da parede intermediária anterior e da parede intermediária posterior, para o espaço interno do corpo principal.

20. Aparelho, de acordo com a reivindicação 1, **CHARACTERIZADO** pelo fato de que a parte de afastador de bochecha inclui uma superfície que aplica pressão com base na resiliência da parte de afastador de bochecha





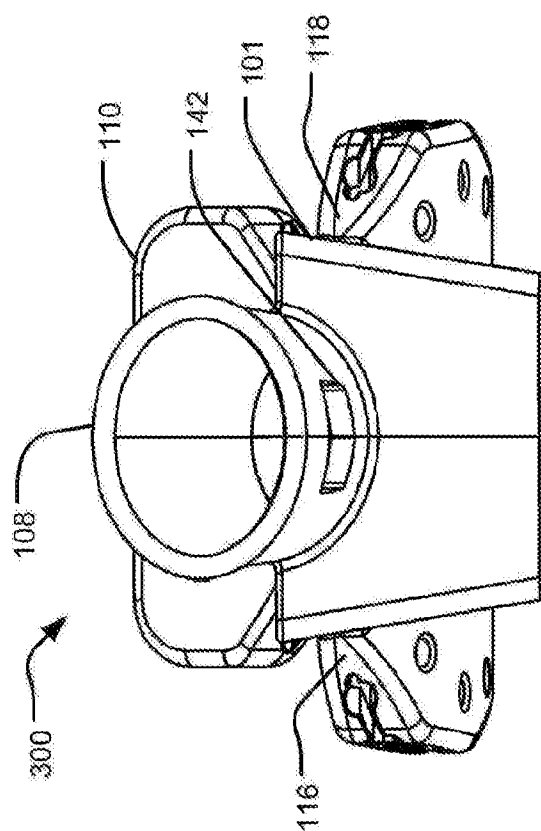
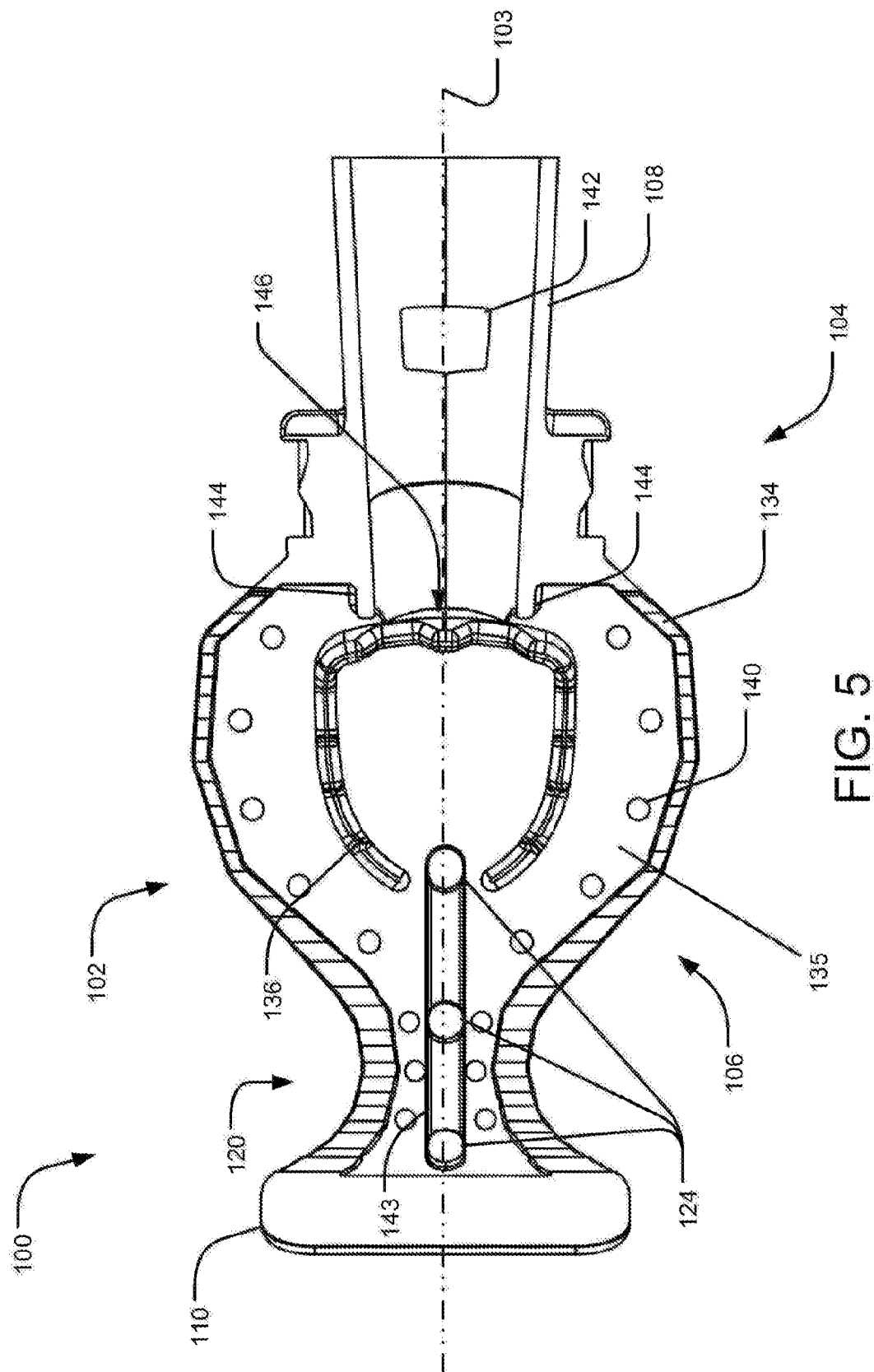
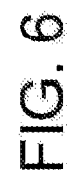


FIG. 3









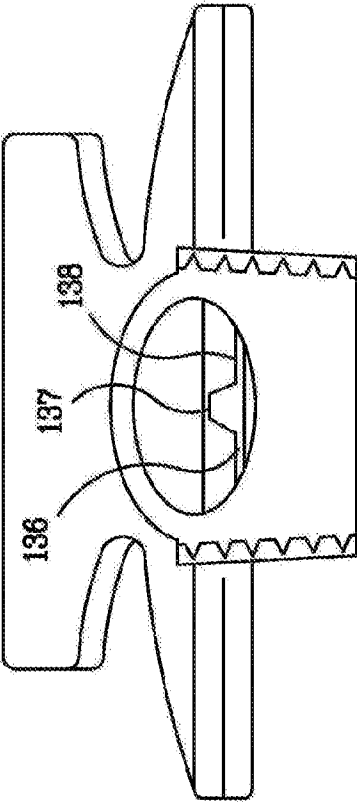
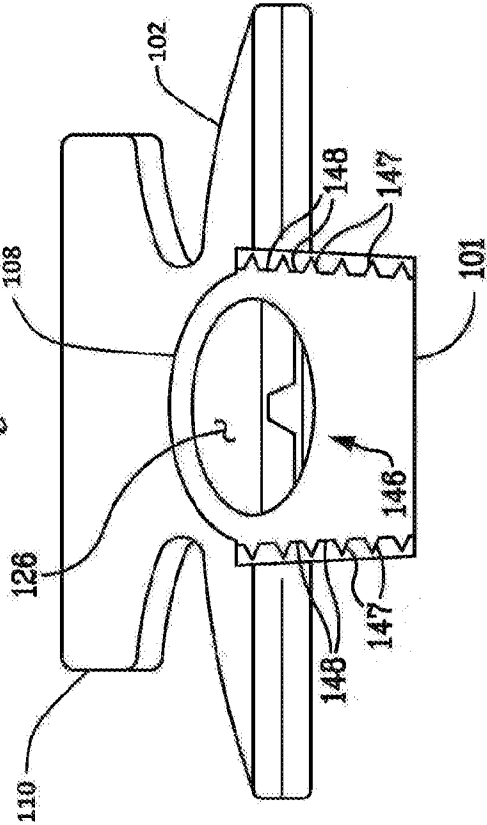


FIG. 8

FIG. 9



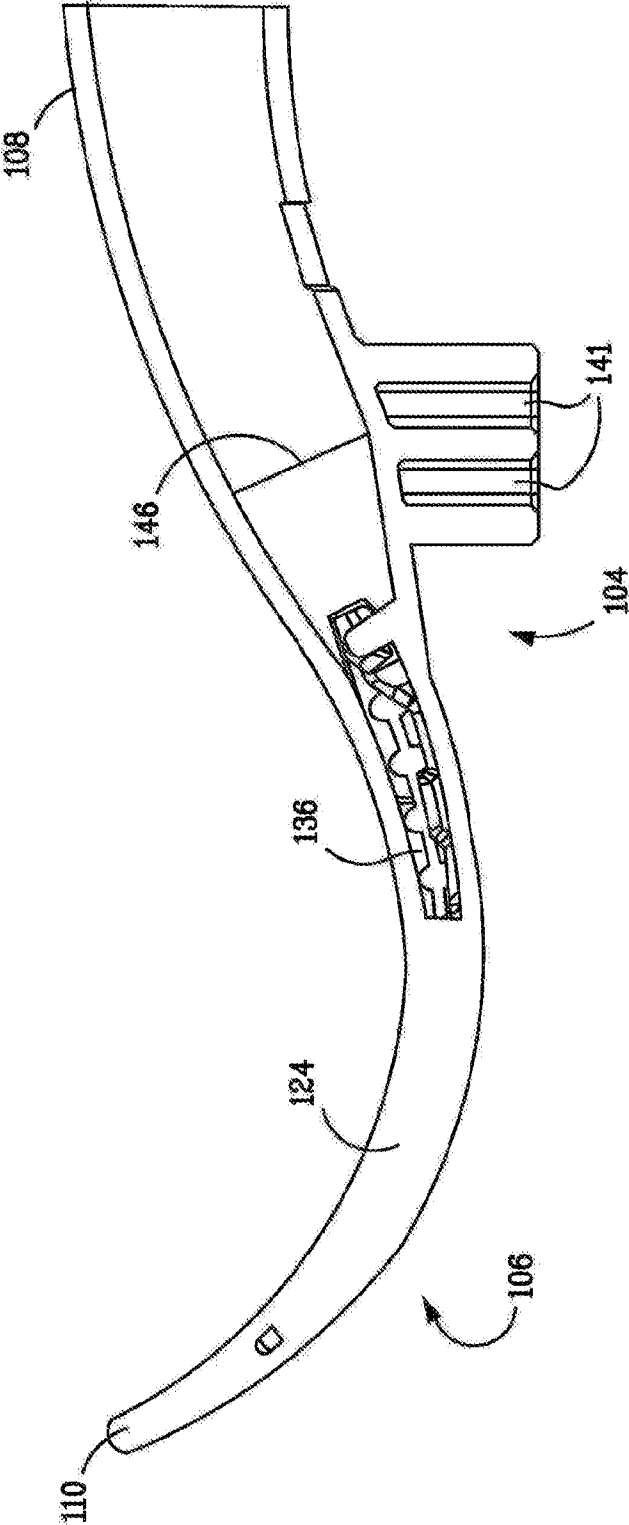


FIG. 10

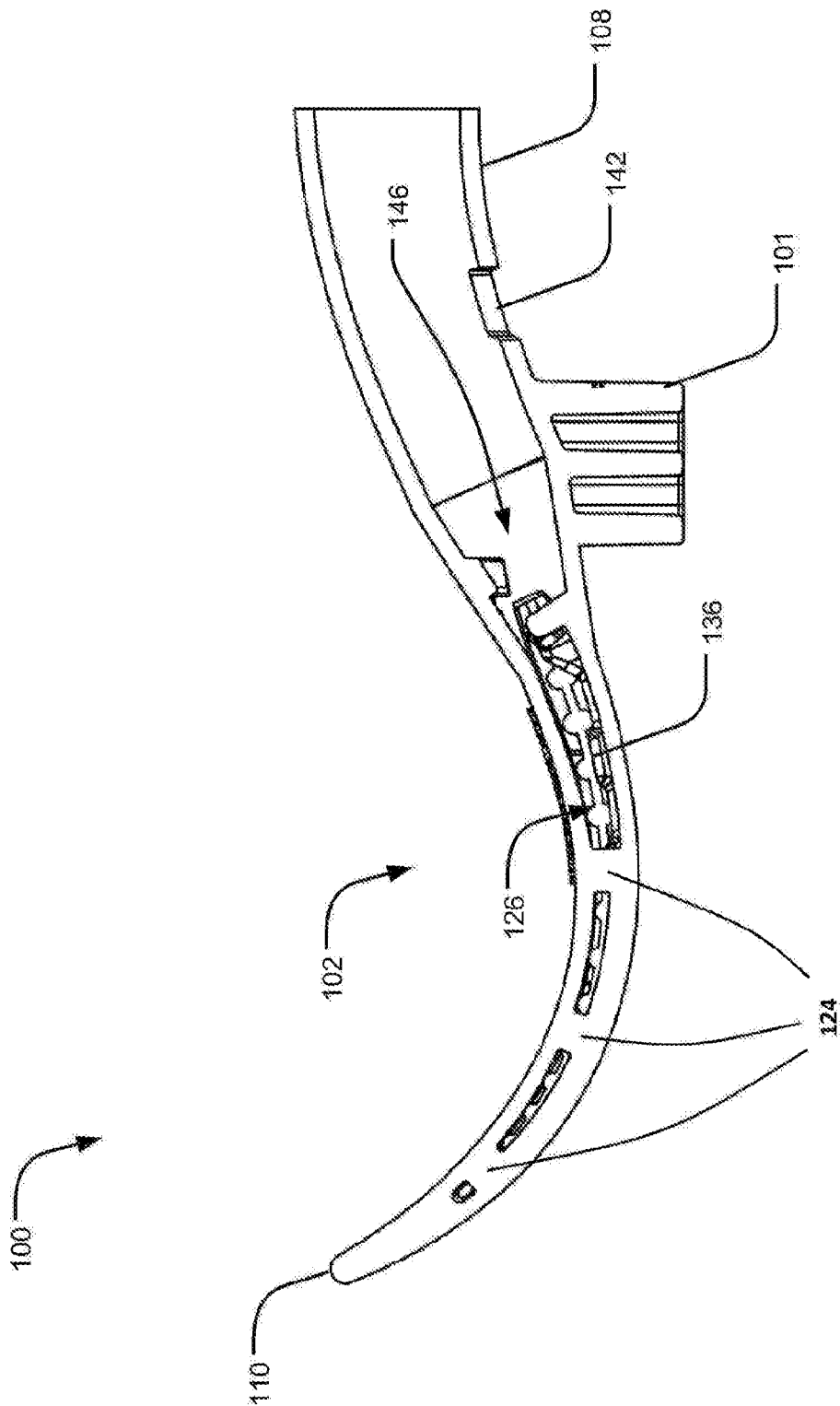
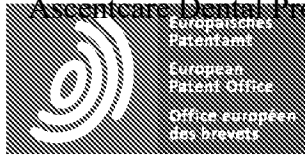


FIG. 11

## RESUMO

### “APARELHO DENTÁRIO”

Trata-se de um aparelho dentário que é fornecido, que pode ser fixo a um adaptador odontológico de alta sucção com a finalidade de auxiliar a equipe odontológica durante procedimentos odontológicos por meio de sucção com as mãos livres e isolamento na cadeira lateral. Tal aparelho pode compreender uma parte de corpo principal, uma parte de afastador de bochecha e uma parte de conector de sucção. Em uma modalidade, a parte de corpo principal, a parte de afastador de bochecha e a parte de conector de sucção podem ser moldadas em uma peça, de preferência, por moldagem por injeção. A parte de corpo principal tem uma parede anterior dentro da curva e uma parede posterior fora da curva, e pelo menos um conector que conecta a parede anterior e a parede posterior. A parte de corpo principal tem uma parede intermediária anterior e uma parede intermediária posterior entre as e paredes anterior e posterior. A parede intermediária anterior e a parede intermediária posterior têm cristas alternadas e canais.



Espacenet

CN114302667A Dental mouth piece

Applicants: DERAILED LTD RESPONSIBILITY COMPANY

Inventors: NGUYEN THANH, PHAM THI THANH, NGUYEN ERIC, NGUYEN LAM

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Dental mouth piece

Abstract

A dental mouthpiece is provided that may be attached to a high suction dental connector for assisting a dental worker during a dental procedure through chair-side hands-free suction and isolation. The mouthpiece may include a body portion, a cheek retractor portion, and a suction connector portion. In one embodiment, the body portion, the cheek retractor portion, and the suction connector portion may be molded in a single piece, preferably by injection molding. The body portion has a front wall located inside the curvilinear and a rear wall located outside the curvilinear, and at least one connector connecting the front wall and the rear wall. The body portion has a front intermediate wall and a rear intermediate wall between the front wall and the rear wall. The front intermediate wall and the rear intermediate wall have alternating peaks and valleys.



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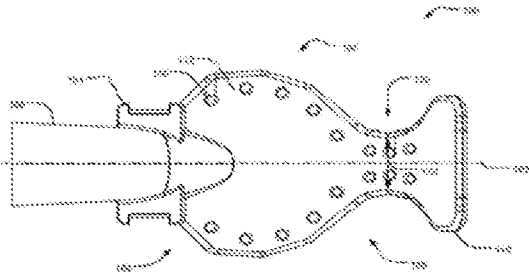
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权利要求书2页 说明书6页 附图11页

(54) 发明名称  
牙科用口腔件

(57) 摘要  
提供了一种牙科用口腔件，其可以附接到高吸力牙科接头，用于在牙科手术过程中通过椅侧免提抽吸和隔离来帮助牙科工作人员。这种口腔件可以包括主体部分、脸颊牵开器部分和抽吸连接器部分。在一实施例中，主体部分、脸颊牵开器部分和抽吸连接器部分可以模制成单件，优选通过注射模制。主体部分具有位于曲线内部的前壁和位于曲线外部的后壁，以及连接前壁和后壁的至少一个连接器。主体部分具有前中间壁和在前壁和后壁之间的后中间壁。前中间壁和后中间壁具有交替的峰和谷。



1. 一种以曲线形成的牙科用口腔件, 该牙科用口腔件包括:

位于曲线中心部的主体部分, 其具有第一端和第二端, 主体部分具有在曲线内部的前壁和在曲线外部的后壁, 前壁和后壁限定内部空间, 至少一个连接器将前壁连接至后壁, 至少一个前中间壁从前壁部分地朝向后壁延伸, 并且至少一个后中间壁从后壁部分地朝向前壁延伸, 至少一个前中间壁和至少一个后中间壁各自具有交替的峰和谷;

连接到第一端的抽吸连接器部分, 该连接器部分将内部空间连接到真空抽吸源; 以及连接到第二端的脸颊牵开器部分。

2. 根据权利要求1所述的口腔件, 其中, 所述至少一个连接器是圆柱形支柱。

3. 根据权利要求1所述的口腔件, 其中, 所述至少一个连接器是在所述内部空间中的主体部分中纵向跨越的壁。

4. 根据权利要求1所述的口腔件, 还包括在所述内部空间中从所述后壁突出的桥结构, 其中突出部是具有间隔开的峰的城垛形。

5. 根据权利要求4所述的口腔件, 其中, 靠近所述抽吸连接器的突出部具有更大的高度和长度。

6. 根据权利要求4所述的口腔件, 其中, 所述峰之间的空间是所述城垛形的谷。

7. 根据权利要求1所述的口腔件, 其中, 所述前中间壁和后中间壁上的交替的峰和谷是半圆形的。

8. 根据权利要求1所述的口腔件, 其中, 所述前中间壁和后中间壁具有不同的高度, 以维持所述主体部分的完整性。

9. 根据权利要求1所述的口腔件, 其中, 随着所述谷接近所述脸颊牵开器部分, 所述前中间壁和后中间壁的谷的尺寸减小。

10. 根据权利要求1所述的口腔件, 其中, 所述前中间壁和后中间壁在所述抽吸连接器与所述主体相遇的点处相遇。

11. 根据权利要求1所述的口腔件, 其中, 所述前中间壁和后中间壁在所述主体与所述脸颊牵开器部分相遇的点处相遇。

12. 根据权利要求1所述的口腔件, 还包括集成到所述抽吸连接器部分的咬合块, 其中, 所述咬合块在患者咬合期间提供额外的抗挤压性和减小的可压缩性。

13. 根据权利要求1所述的口腔件, 其中, 所述主体部分、抽吸连接器部分和脸颊牵开器部分通过注射模制形成为单件。

14. 根据权利要求1所述的口腔件, 其中, 形成所述主体、抽吸连接器部分和脸颊牵开器部分的材料是柔性、半透明、高耐热性、可高压灭菌的硅基材料。

15. 根据权利要求1所述的口腔件, 其中, 所述后壁还包括从后壁的内表面并沿着所述主体的纵向轴线突出的稳定杆。

16. 根据权利要求15所述的口腔件, 其中, 所述至少一个连接器沿着所述稳定杆均匀地间隔开。

17. 根据权利要求1所述的口腔件, 其中, 所述抽吸连接器部分包括对应于真空接头互锁配合上的突出部的切口。

18. 根据权利要求1所述的口腔件, 其中, 所述抽吸连接器部分连接到真空源, 其中, 所述真空源的启动提供从所述主体的内部空间的流体抽吸。

19. 根据权利要求18所述的口腔件, 其中, 所述真空源的启动将流体从所述主体的外部通过所述前中间壁和后中间壁的峰和谷吸入主体的内部空间。

20. 根据权利要求1所述的口腔件, 其中, 所述脸颊牵开器部分包括基于脸颊牵开器部分的弹性施加压力的表面。

## 牙科用口腔件

[0001] 相关申请的交叉引用

[0002] 本申请要求2019年5月10日提交的题为“牙科用口腔件”的美国临时专利申请序列号62/846353的优先权权益，其公开内容通过引用结合于此。

### 技术领域

[0003] 本发明总体涉及牙科用口腔件领域。更具体地，本发明涉及口腔内牙科抽吸和隔离口腔件。

### 背景技术

[0004] 牙科保健专业人员、牙科保健员和牙科助理目前在牙科领域使用各种口腔件。过去，牙科患者由包括一名牙科专业人员和一名牙科助理的传统两人团队治疗。此外，该团队可以使用许多不同类型的牙科设备和材料来提供牙科治疗。这种牙科设备和材料可以包括诸如口内镜、咬合块、低速抽吸喷射器、高速抽吸喷射器、纱布、棉卷和吸唾片等物品。牙科设备的每个物品都可以用于不同的目的，尽管有些可以结合用于某些类型的牙科服务。因此，寻求提供这种牙科服务的牙科专业人员可能需要使用这种牙科设备的多个物品。因此，牙科助理的重要作用是协助牙科专业人员协调这些不同设备和材料的多个物品的使用。

[0005] 因此，本领域需要以更有效、舒适和安全的方式向牙科患者提供牙科服务的改进系统和方法。

### 发明内容

[0006] 公开了一种以曲线形成的牙科用口腔件的实施例。这种口腔件可以包括具有第一端和第二端的位于曲线中心部的主体部分、在第一端连接到主体部分的抽吸连接器部分以及在第二端连接到主体部分的脸颊牵开器部分。

[0007] 在一些实施例中，主体部分、抽吸连接器部分和脸颊牵开器部分可以模制成单件，优选通过注射模制。在示例性实施例中，口腔件可以由柔性、半透明、有利于注射模制、高耐热性和可高压灭菌的材料制成。这种材料可以包括硅树脂。因为口腔件可以由高耐热性和可高压灭菌的材料制成，所以这种口腔件可以重复使用。

[0008] 主体部分可以包括在曲线内部的前壁和在曲线外部的后壁。前壁和后壁可以限定内部空间，在该内部空间内，至少一个连接器将前壁连接到后壁。至少一个前中间壁从前壁部分地朝向后壁延伸，并且至少一个后中间壁从后壁部分地朝向前壁延伸。前中间壁和后中间壁各自具有交替的峰和谷。

### 附图说明

[0009] 图1是牙科用口腔件的俯视图；

[0010] 图2是图1所示的牙科用口腔件的等距视图；

[0011] 图3是图1所示的牙科用口腔件的后视图；

- [0012] 图4是图1所示的牙科用口腔件的仰视图；
- [0013] 图5是图1所示的牙科用口腔件的冠状顶部截面图；
- [0014] 图6是图1所示的牙科用口腔件的侧视图；
- [0015] 图7是图1所示的牙科用口腔件的侧视图，其中口腔件的前壁被拉离口腔件的后壁；
- [0016] 图8是图1所示的牙科用口腔件在抽吸连接器和主体相交处的横截面视图；
- [0017] 图9是图1所示的牙科用口腔件在抽吸连接器和主体相交处的横截面视图。
- [0018] 图10是具有壁连接器的图1所示的牙科用口腔件实施例的纵向剖视图。
- [0019] 图11是具有柱状连接器的图1所示的牙科用口腔件实施例的纵向剖视图。

### 具体实施方式

[0020] 本发明的实施例可以包括口腔件，其可以附接到高吸力牙科接头，用于在牙科手术过程中通过椅侧免提抽吸和隔离来协助牙科工作人员。这种口腔件可包括主体部分、面颊牵开器部分、抽吸连接器部分、稳定杆和咬合块。在一些实施例中，主体部分、脸颊牵开器部分、抽吸连接器部分、稳定杆和咬合块（及其子部分）的任何组合可以模制成单件，优选通过注射模制。在示例性实施例中，口腔件可以由柔性、弹性、至少半透明并且有利于注射模制的材料制成。这种材料可以包括本领域已知的热塑性弹性体。

[0021] 图1是牙科用口腔件的俯视图。牙科用口腔件100包括具有第一端104和与第一端104相对的第二端106的主体部分102。纵向轴线103可以从第一端104延伸到第二端106。在图示的实施例中，抽吸连接器部分108可以联接到第一端104，脸颊牵开器部分110可以联接到第二端106，尽管在其他示例中，口腔件100可以不具有抽吸连接器部分108和/或脸颊牵开器部分110。咬合块101也可以在主体部分102的第一端104附近集成到抽吸连接器部分108，尽管咬合块101可以位于抽吸连接器部分108上的任何位置。

[0022] 主体部分101可以包括从第二端106延伸到脸颊牵开器部分110的颈部120。颈部120的宽度122可以小于主体部分102的宽度、面颊牵开器部分110的宽度和/或抽吸连接器部分108的宽度，尽管在其他示例中，宽度122可以大于主体部分102、面颊牵开器部分110和/或抽吸连接器部分108的宽度。

[0023] 在图示的实施例中，抽吸连接器部分108、面颊牵开器部分110、咬合块101和主体部分102构造成单件，尽管在其他示例中，抽吸连接器部分108、面颊牵开器部分110、咬合块101和/或主体102中的每个可以是单独件。例如，在一些实施例中，主体部分102、脸颊牵开器部分110和抽吸连接器部分108（及其子部分）可以模制成单件，优选通过注射模制，并且咬合块101可以是可附接到抽吸连接器部分108的单独件。在示例性实施例中，口腔件100可以由柔性、弹性、半透明且有利于注射模制的材料制成。这种材料可以包括热塑性弹性体。

[0024] 图2是图1所示的牙科用口腔件的等距视图。如图2所示，主体部分102可以是曲线形状。因为口腔件100由柔性且弹性的材料（例如热塑性弹性体）制成，所以口腔件100在被放置在患者的口腔中时可以弯曲以符合口腔的形状。当正确定位时，抽吸连接器部分108可以从患者口腔的一侧突出，而主体部分102靠在患者口腔的后部，并且脸颊牵开器部分110在患者口腔的相对侧压靠患者的脸颊。

[0025] 脸颊牵开器部分110可以构造成在患者口腔的与连接部分108延伸的一侧相反的

一侧压靠患者的脸颊并使其远离患者的牙齿。用于形成口腔件100的材料的柔性允许当放置在患者口腔中时有一些弯曲,但当口腔件100从弯曲释放时,材料的弹性进一步允许口腔件100对患者口腔的一部分施加压力。该材料具有足够的弹性,例如允许面颊牵开器部分110压靠在患者面颊的内侧,这样的压力足以使面颊远离患者的牙齿。脸颊牵开器部分110被图示为锤头远端区域,其可以附接到主体部分102。脸颊牵开器部分110在一些示例中可以是实心的,但在其他示例中可以是空心的。

[0026] 主体部分102可以包括位于曲线内部的前壁112和位于曲线外部的后壁114(也见图4)。前壁112可以面向患者口腔的前部,后壁114可以面向患者口腔的后部。主体部分102的前壁112和后壁114可以彼此平行地构造。前壁112的限定形状可以对应于后壁114的限定形状,尽管在其他示例中,前壁112可以是与后壁114不同的形状。限定形状可以在第一端104较宽,而在第二端106较窄。在一些实施例中,该形状对应于护罩形状,尽管该形状可以是例如方形、直线箭头、矩形、星形、椭圆形、圆形或通常符合患者口腔内部形状的形状。可以为成人和儿童的不同尺寸的口腔提供不同尺寸的口腔件。第一端104处的部分形状可以形成为具有比主体部分102的其余部分更厚的壁。这种增厚可以在第一端104提供额外的稳定性。当定位在患者口腔内时,前壁112和后壁114能够阻塞患者的气道,而咬合块101定位在患者牙齿之间,抽吸连接器部分108从患者口腔的一侧延伸,脸颊牵开器部分110压靠在患者口腔相对侧的脸颊上。

[0027] 主体部分102还可以包括位于前壁112和/或后壁114上的开口140。这种开口140(例如穿孔、狭缝、孔等)允许通过开口140从患者口腔中抽吸空气、流体和小碎屑,并将其吸入内部空间126,且朝向抽吸源进入抽吸连接器部分108。开口140可以位于前壁112和/或后壁114的形状的周边上。在同一示例中,开口140可以位于前壁112和/或后壁114上的颈部120的任一侧。在另一示例中,开口140是孔。在同一示例中,每个孔的尺寸相同,尽管在其他示例中,一些或所有孔的尺寸可以不同。

[0028] 图3是图1所示的牙科用口腔件的后视图。如图3所示,抽吸连接器部分108可以是椭圆形的,并且也附接到主体部分102。抽吸连接器部分108可以形成为具有比主体部分102更厚的壁,并且构造为附接到高抽吸真空接头,并且有助于将水、唾液和碎屑从内部空间126转移到外部接头以移除。抽吸连接器部分108还可以包括内部止动件,以帮助将口腔件滑动到接头上至期望的深度。

[0029] 图3中的上壁116在这里可以用来指放置在患者口腔中时靠在患者口腔顶部的一侧,下壁118可以用来指靠在患者口腔底部的一侧。上壁116和下壁118可以相同地形成,这可以允许口腔件改变定向,使得上壁116在新的定向上可以表现为下壁118,反之亦然。当使用时,主体部分101的上壁116和下壁118可用于保护和分开口腔的顶部和口腔/舌头的底部。此外,主体部分101还可用于保护口腔后部(例如咽喉和气道)免受掉落碎屑的影响。

[0030] 图4是图1所示的牙科用口腔件的仰视图。前壁112和后壁114可以通过至少一个连接器124彼此连接。在一些实施例中,抽吸连接器部分108可以具有切口142(例如其可以成形为标志、矩形凹口、方形凹口或圆形凹口或者任何形状的凹口),从而提供与外部高抽吸真空接头上的相应突出部(例如其也可以成形为标志、矩形突出部、方形突出部或圆形突出部或者任何形状的突出部)的额外互锁。

[0031] 咬合块101可以通过咬合块开口141加强,以在咬合块中产生腔,从而产生更稳定

的咬合块。在一实施例中,咬合块开口141可以是在咬合块底部敞开的两个平行的矩形开口。咬合块开口141可以延伸到抽吸连接器部分108,但不延伸超过抽吸连接器部分108的厚度。

[0032] 图5是图1所示的牙科用口腔件的冠状顶部截面图。主体部分102可以包括从后壁114的内表面135突出的桥结构136,如图5所示,并且在图7和8中也可见。在一些实施例中,桥结构136可以遵循标志(例如箭头或盾牌)的形状。桥结构可能在箭头形状的尖端具有间隙,从而产生开放的弧而不是箭头的点。在一些实施例中,桥结构136可以居中地位于口腔件100的主体部分110中。在一些示例中,这种桥结构136可以具有桥峰137和桥谷138的波形从内表面135突出。在其他实施例中,桥结构136可以城垛或梯形的形状突出。桥峰137提供了通常与前壁112分开的多个接触点。如图7和8所示,靠近抽吸连接器部分108的开口146的桥峰137可以具有比远离开口146的桥峰137更大的高度。抽吸连接部分108的开口146附近的桥峰137也可以比远离抽吸连接部分108的桥峰137更长,如稍后在图8中所示。桥谷138可以基本齐平或延伸到内表面135之上。桥峰137在抽吸期间接触前壁112,以在抽吸期间保持前壁112与后壁114间隔开,从而防止前壁112或后壁114塌陷到内部空间126中,使得碎屑和/或水可以通过内部空间126排出。同时,桥谷138提供允许通过桥结构136抽吸空气、流体和小碎屑的间隙。在其他示例中,桥结构136可以是平滑的,可以包括尖峰和尖谷、圆形峰和圆形谷、方形峰和方形谷或者峰和谷的形状或形状组合。

[0033] 主体部分102还可以包括稳定杆143,如图5所示,也可在图7中看到,该稳定杆从主体部分102的大致中心朝向面颊牵开器部分110延伸。这种稳定杆143可以沿着纵向轴线103从后壁114的内表面135突出。在一实施例中,稳定杆143从桥结构136的开放弧开始,并沿着纵向轴线103朝向第二端106继续,经过颈部120,并在到达面颊牵开器部分110之前结束。稳定杆143可以从后壁114的内表面135朝向前壁112的内表面113突出。稳定杆143可以具有从内部空间126的高度或小于内部空间126的任何高度范围内的任何高度。在一实施例中,稳定杆143可以在特定位置具有附接的连接器124,其可以将前壁112附接到后壁114。稳定杆143上的连接器124可以有助于口腔件100在抽吸过程中的牵开、稳定、支撑和弯曲。在示例性实施例中,可以有与稳定杆143对准的多个连接器124,尽管在其他示例中,稳定杆143可以不与至少一个连接器124对准。

[0034] 图6是图1所示的牙科用口腔件的侧视图。图6示出了靠在患者口腔底部的下侧视图。前壁112和后壁114彼此隔开,并限定内部空间126。除了至少一个连接器124、稳定杆143和桥结构136之外,内部空间126通常是开放且无阻碍的,从而允许吸力流过整个内部空间126。前壁112和后壁114之间的内部空间126通常遵循前壁112和后壁114的相同限定形状。在一示例中,内部空间126延伸穿过颈部120,尽管在其他示例中,内部空间126可以不延伸穿过颈部120。在另一些示例中,内部空间126延伸穿过颈部120并进入面颊牵开器部分120。

[0035] 至少一个前中间壁127可以从前壁112的至少一个边缘128部分地朝向后壁114延伸,并且可以具有从至少一个边缘128延伸到前壁112和后壁114之间的中点的厚度。因此,这种前中间壁127的跨度可能不会延伸前壁112和后壁114之间的整个距离。这种前中间壁127的厚度可以从面颊牵开器部分110开始增加,穿过颈部120并到达第一端104。这种增加的深度可以在第一端104提供增加的刚性。在一些实施例中,这种前中间壁127可以进一步成脊状,或者在其他实施例中具有平滑的边缘。在一示例中,前中间壁127包括交替的峰130

和谷132。在所示实施例中,峰130是平坦表面,而谷132是圆柱形切口表面,尽管峰130和谷132可以是任何形状。在一些示例中,峰130和谷132延伸前中间壁127的整个深度,尽管在其他示例中,峰130和/或谷132可以部分地沿着前中间壁127延伸。峰130和谷132可以为口腔件100提供进一步的牵开、稳定、支撑和弯曲。

[0036] 后壁114可以具有相应的至少一个后中间壁134,其从后壁114的至少一个边缘133延伸且部分地朝向前壁112延伸。后中间壁134同样可以呈现与前中间壁127相同、镜像或不同的脊。在一示例中,前中间壁127的脊可以与后中间壁134的脊对准,如图6所示。组合地,前中间壁127和后中间壁134以及它们各自对准的脊可以在前壁112和后壁114之间形成开放网。这种开放网可以沿着前壁112和后壁114的边缘128、133从第一端104到第二端106。前中间壁127和后中间壁134之间的开放网允许从患者口腔中抽吸空气、流体和小碎屑,通过网进入内部空间126并朝向抽吸源进入抽吸连接器部分108。

[0037] 前中间壁127可以在第一端104处主体的抽吸连接器部分108附近的上壁116和下壁118处与后中间壁134接合。前中间壁127还可以在第二端106处面颊牵开器部分110附近的上壁116和下壁118处与后中间壁134接合。在一些实施例中,前中间壁127可以在面颊牵开器部分110处与后中间壁134接合。

[0038] 图7是图1所示的牙科用口腔件的侧视图,其中口腔件的前壁被拉离口腔件的后壁。至少一个连接器124可以跨越内部空间126内的前壁112和后壁114之间的距离。换句话说,连接器124可以附接到后壁114的内表面135和前壁112的内表面113。至少一个连接器124可以为口腔件100提供结构刚性,并且可以是支柱、柱、壁等。在示出的示例中,至少一个连接器124包括三个连接器,每个连接器呈支柱状并且彼此线性地隔开。

[0039] 图8是图1所示的牙科用口腔件的横截面视图。靠近抽吸连接器部分108的开口146的桥峰137可以比远离开口146的桥峰137具有更大的高度。靠近抽吸连接部分108的开口146的桥峰137也可以比远离抽吸连接部分108的桥峰137更长。

[0040] 图9是图1中的牙科用口腔件的横截面视图。图9示出了抽吸连接器附接到主体的位置。如图9中可见,抽吸连接器部分108可以是椭圆形的,并且也无缝过渡地附接到主体部分102,直到主体到达桥结构136,在桥结构136处,桥峰137和桥谷138可以部分地阻塞抽吸连接器部分108附近的主体部分102的开口。咬合块101附接在抽吸连接器部分108的外部,使得咬合块不中断抽吸连接器部分108的开口。

[0041] 抽吸连接器部分108可以包括开口146(也在图5中示出),其通向主体部分102的内部空间126,以允许内部空间126和抽吸连接器部分108之间的流体连通。至少一个抽吸连接器部分壁144可以从前壁112延伸到靠近抽吸连接器部分108的开口146的后壁114,以防止前壁112和后壁114在抽吸过程中塌陷。至少一个抽吸连接器部分壁144包括位于抽吸连接器部分108的开口146两侧的一对壁。

[0042] 咬合块101可以包括位于咬合块两侧的咬合块峰147和咬合块谷148,以对咬合块产生更大的牵引力和支撑。在一实施例中,咬合块峰147和咬合块谷148可以在咬合块的任一侧形成锯齿形或波形,尽管咬合块峰147和咬合块谷148可以是任何形状。

[0043] 图10是具有壁连接器的图1所示的牙科用口腔件实施例的横截面图。

[0044] 在该实施例中,连接器124在纵向轴线103处将前壁112与后壁114连接为实心壁。连接器124从第二端106处的颈部120沿着纵向轴线103远离面颊牵开器部分110朝向第一端

104延伸一定距离,并在主体部分102的中点周围的桥结构136的开口附近停止。在其他实施例中,连接器124可以沿着纵向轴线103延伸,并且在主体部分的内部空间126内的任何地方停止。

[0045] 图11是具有柱连接器的图1所示的牙科用口腔件实施例的纵向剖视图。在该实施例中,连接器124在纵向轴线103处将前壁112与后壁114连接,作为与稳定杆143成一直线的三个均匀间隔的圆柱形支柱。第一连接器位于主体部分102中,第二连接器位于颈部120附近,第三连接器位于面颊牵开器部分110附近。三个连接器的线性间隔可以为颈部120提供额外刚性,同时维持颈部120的窄宽度122。在其他示例中,这种连接器124可以位于所定位的口腔件100开始从口腔的一侧缠绕到口腔的后部然后缠绕到口腔的另一侧从而有助于将口腔件100成形为患者口腔的大致口内形状的区域。在其他示例中,至少一个连接器124可以包括一个连接器、两个连接器或两个以上的连接器,并且每个连接器可以位于口腔件100上的任何位置。在一示例中,至少一个连接器124是从主体部分102延伸、穿过颈部120并到达面颊牵开器部分110的肋。

[0046] 本文所述的口腔件可以与单件式高压灭菌高吸力真空接头一起使用。这种高吸力真空主体接头可以由单一同质材料制成。具有单杆设计,这种真空接头在控制水、唾液和碎屑从口腔到外部真空源的去除了方面可以与所有当前高吸力真空抽吸器和排涎器相同的方式起作用。单杆可以设计成通过抽吸连接器部分内的单个大的排出导管来控制水、唾液和碎屑从至少部分封闭的主体的移除。

[0047] 虽然上面已经描述了各种实施例,但应当理解,它们仅作为示例而非限制来呈现。这些描述并不旨在将本发明的范围限制在这里阐述的特定形式。因此,优选实施例的宽度和范围不应该受到任何上述示例性实施例的限制。应当理解,以上描述是说明性的,而不是限制性的。相反,本说明书旨在覆盖可能包含在由所附权利要求书限定的本发明的精神和范围内以及由本领域普通技术人员以其他方式理解的替代、修改和等同物。因此,本发明的范围不应参照上述说明书来确定,而是应参照所附权利要求书及其等同物的全部范围来确定。

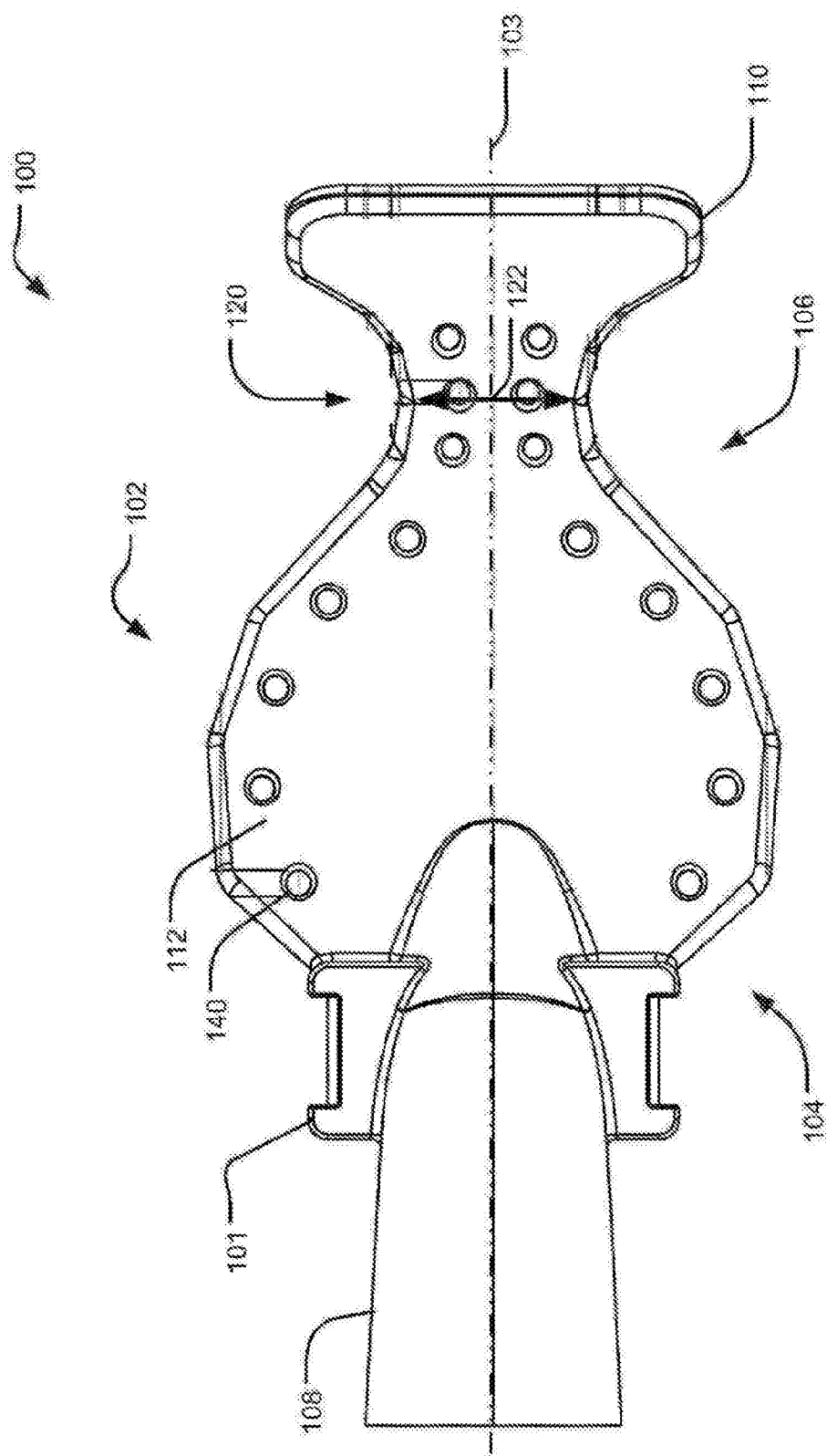


图1

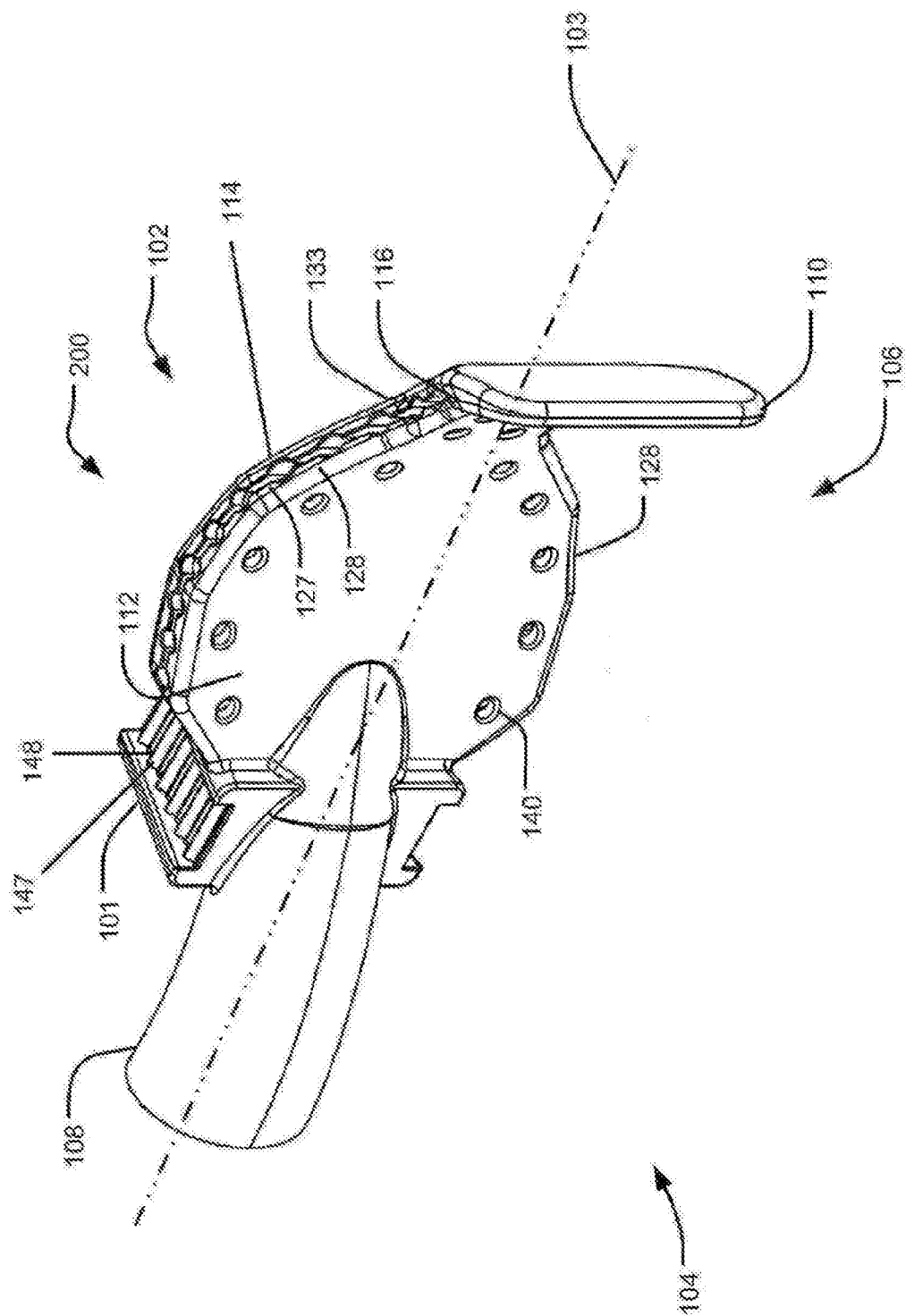


图2

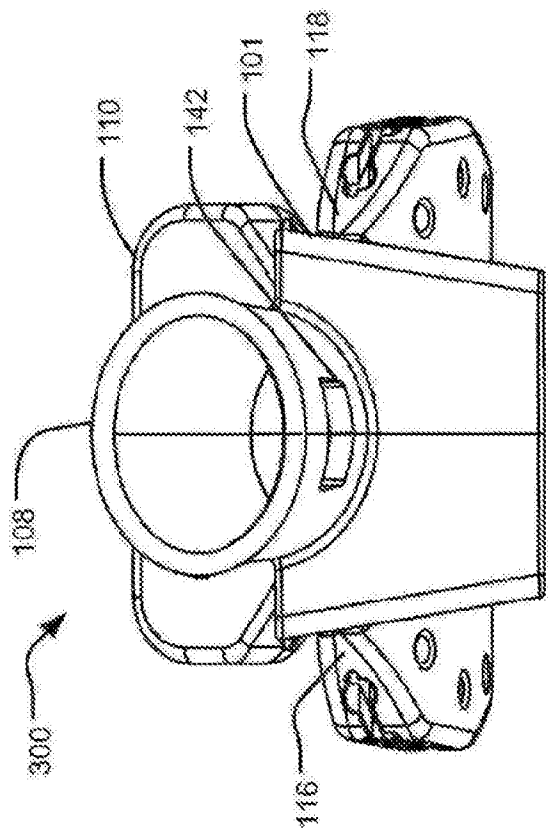


图3

13

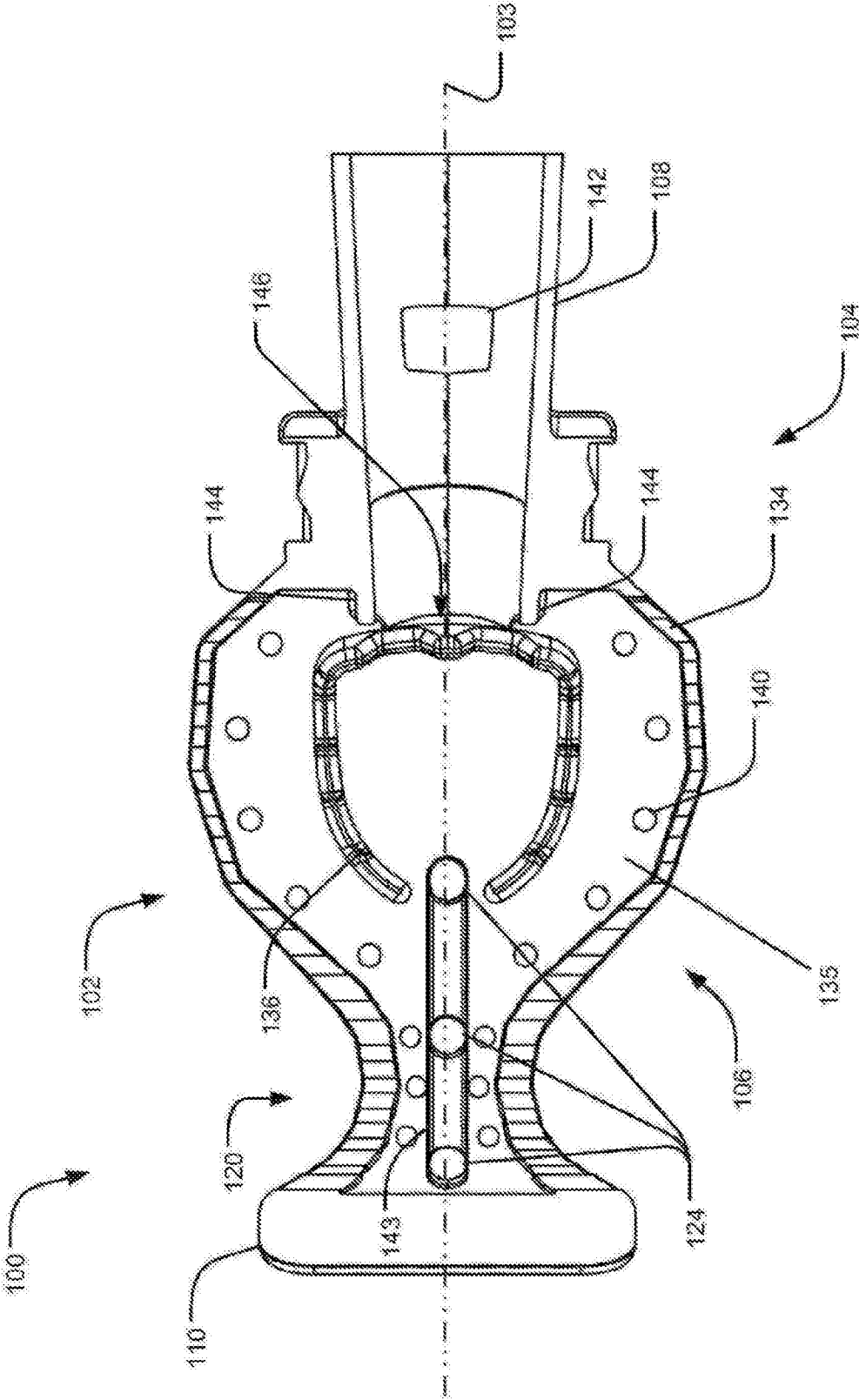


图5

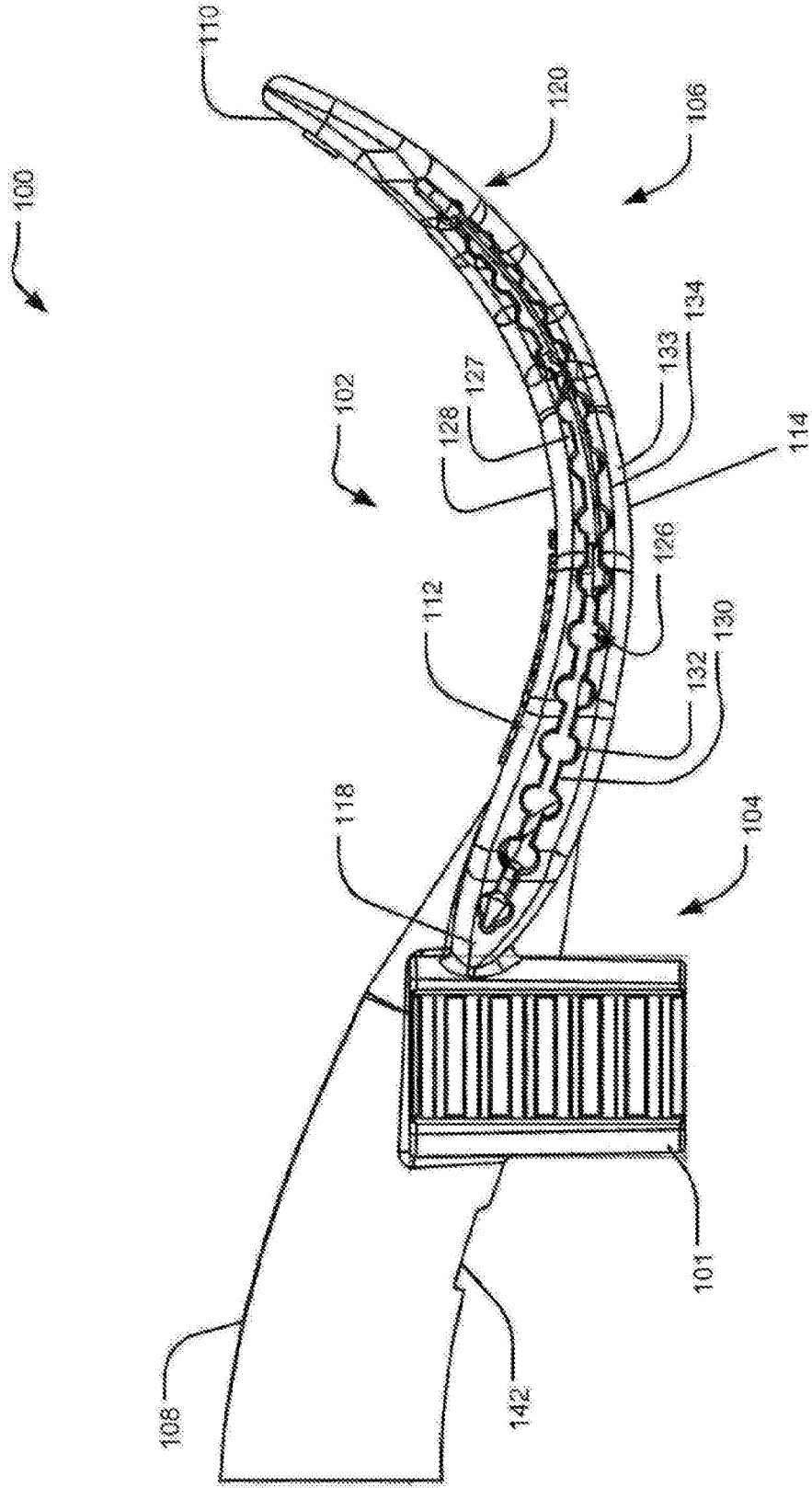


图6

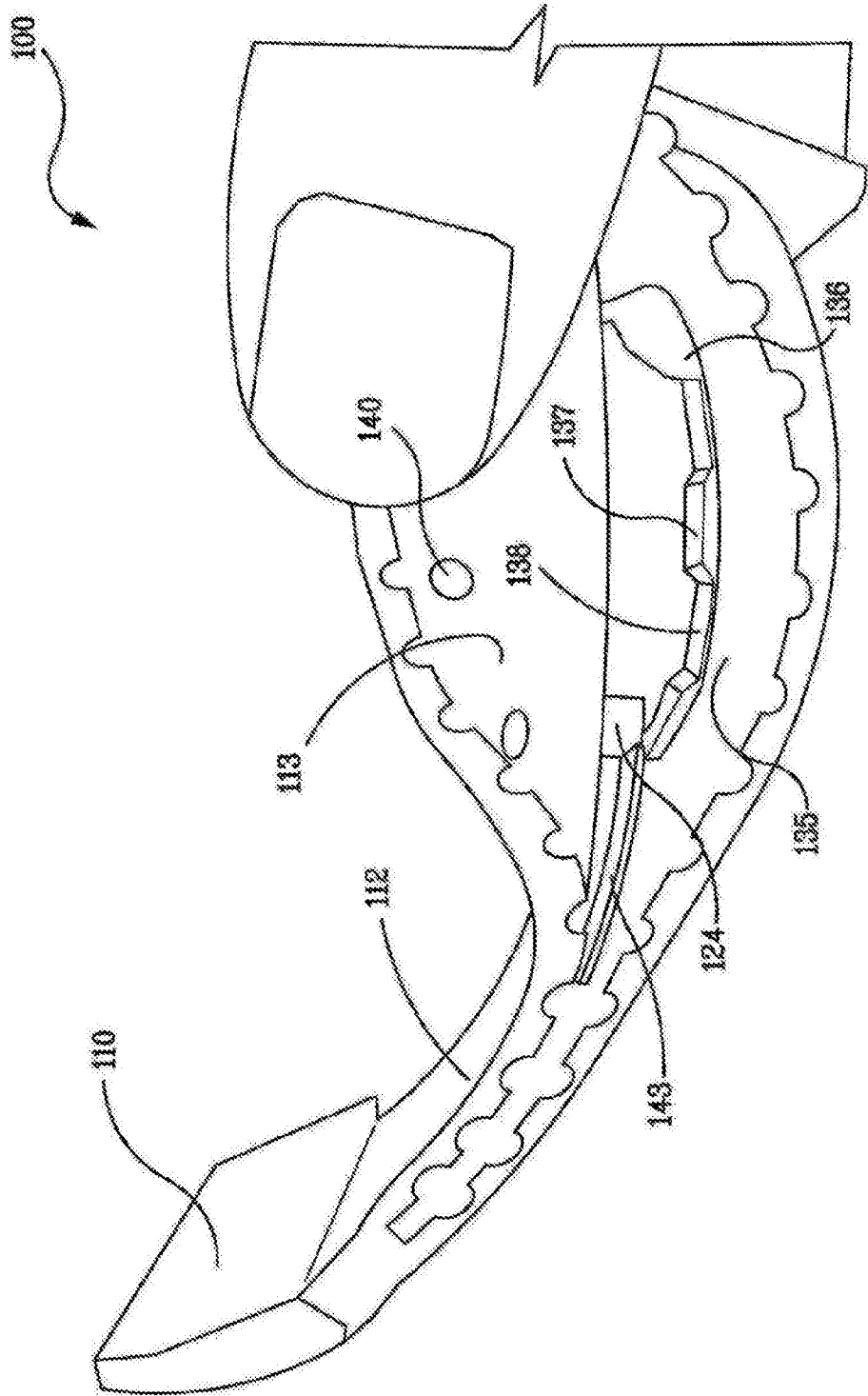


图7

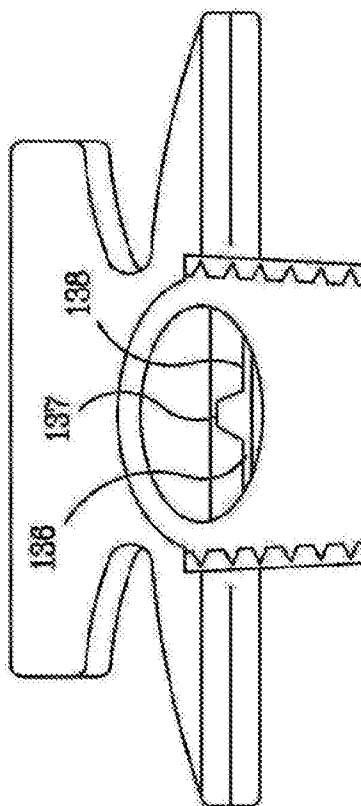


图8

18

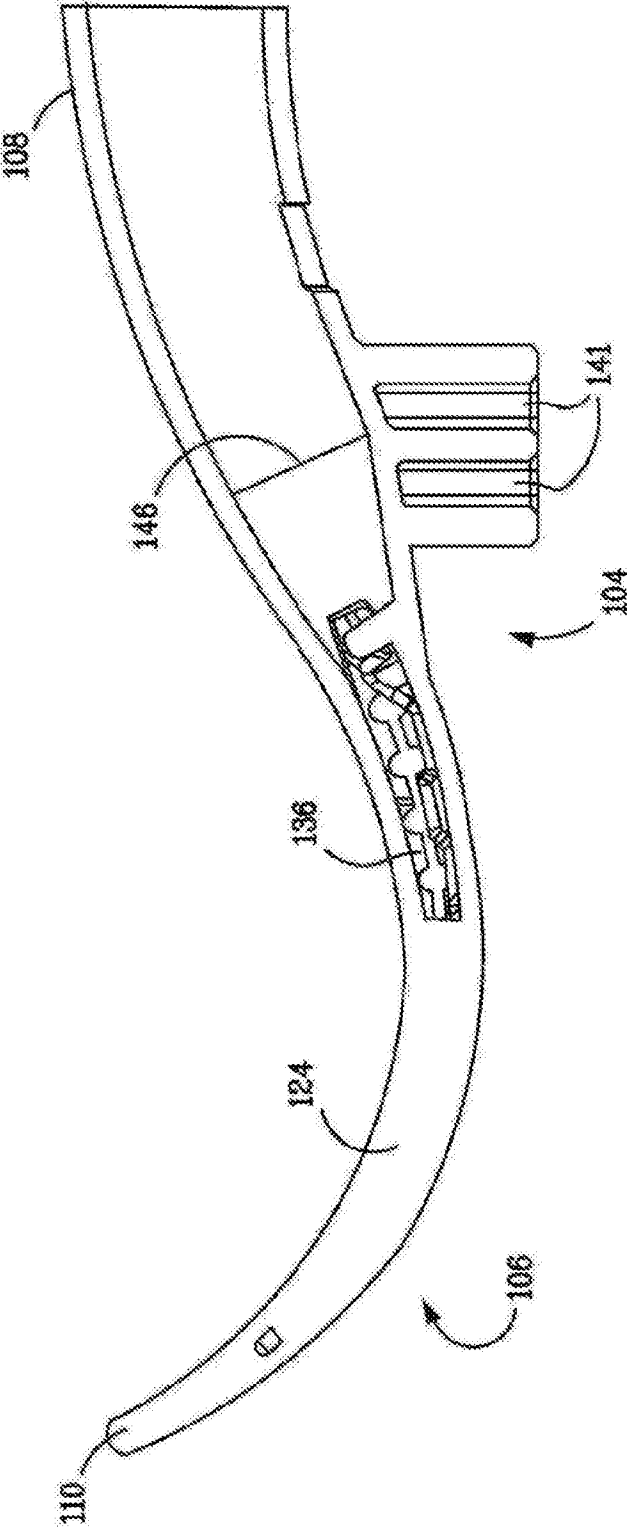


图10

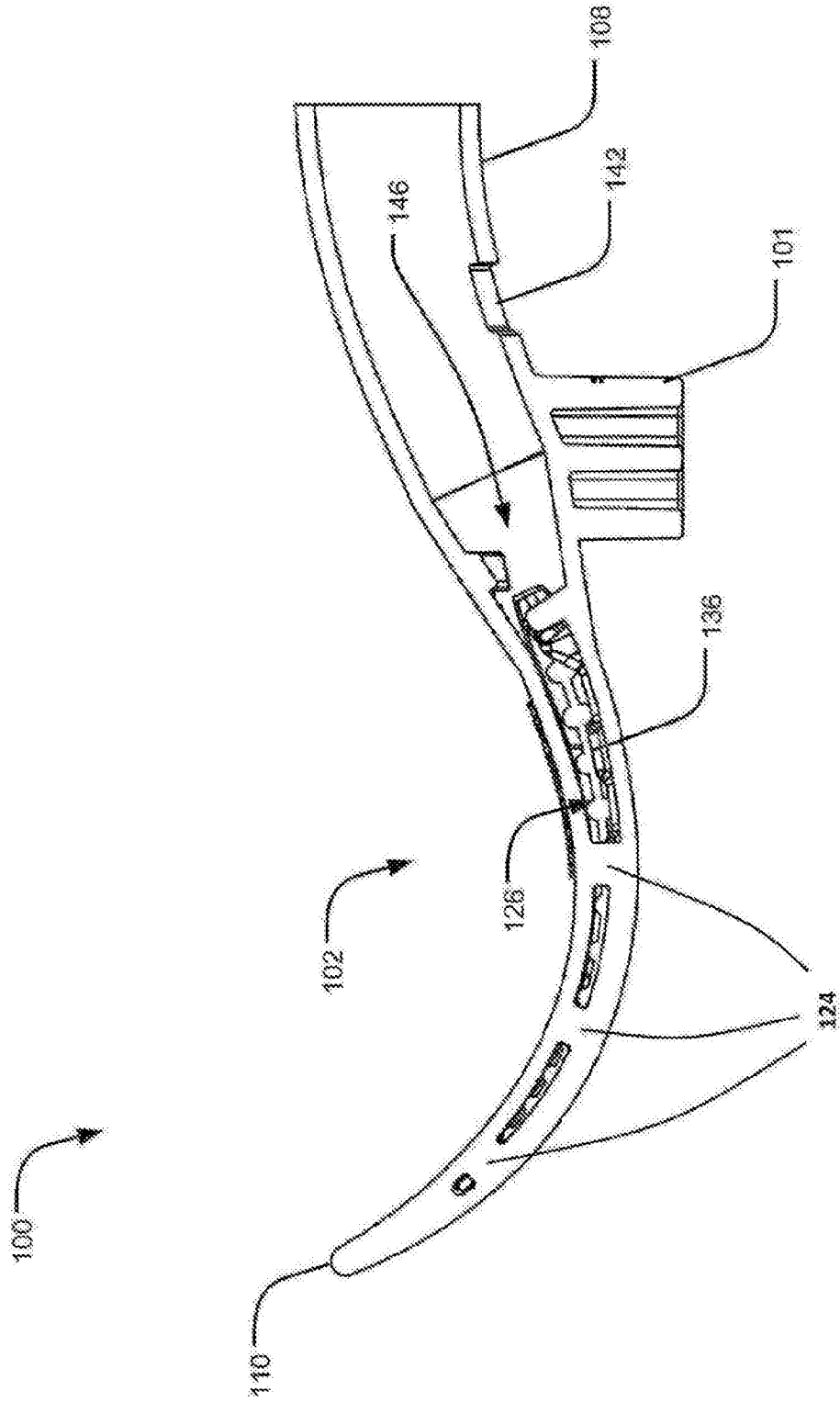
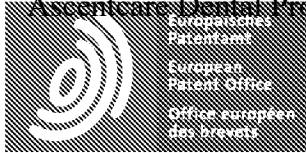


图11



Espacenet

KR20220103035A 치과용 마우스피스

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치과용 마우스피스

Abstract

환자 의자 옆의(chair-side), 핸드프리 석션 및 격리를 통해 치과적 절차 동안에 치과 스태프를 도울 목적으로 하이-석션(high-suction) 치과 어댑터에 부착될 수 있는 치과용 마우스피스가 제공된다. 이러한 마우스피스는 본체 부분, 칩 리트렉터 부분 및 석션 커넥터 부분을 포함할 수 있다. 일 실시형태에서, 본체 부분, 칩 리트렉터 부분 및 석션 커넥터 부분은 바람직하게는 사출 성형에 의해 일체로 성형될 수 있다. 본체 부분은 곡선 내부의 전방 벽과 곡선 외부의 후방 벽, 및 전방 벽과 후방 벽을 연결하는 적어도 하나의 커넥터를 갖는다. 본체 부분은 전방 및 후방 벽 사이에 전방 개재 벽과 후방 개재 벽을 갖는다. 전방 개재 벽과 후방 개재 벽은 교번하는 크레스트와 트러프를 갖는다.



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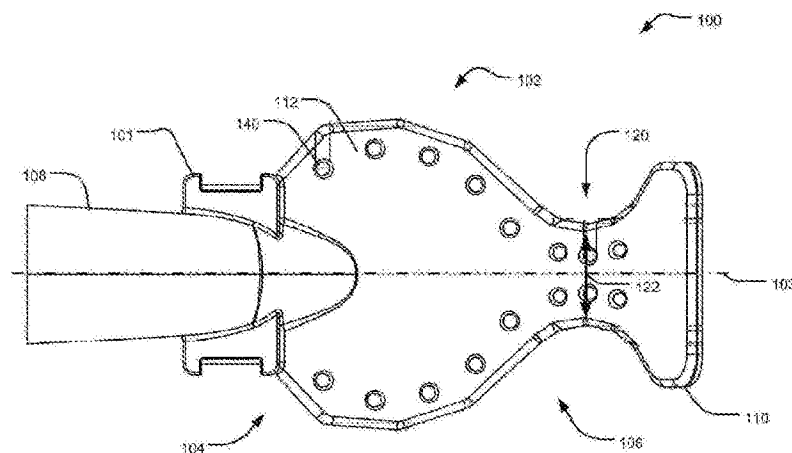
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(57) 요약

환자 의자 옆의(chair-side), 핸드프리 석션 및 격리를 통해 치과적 절차 동안에 치과 스태프를 도움 목적으로 하이-석션(high-suction) 치과 어댑터에 부착될 수 있는 치과용 마우스피스가 제공된다. 이러한 마우스피스는 본체 부분, 직 리트랙터 부분 및 석션 커넥터 부분을 포함할 수 있다. 일 실시형태에서, 본체 부분, 직 리트랙터 부분 및 석션 커넥터 부분은 박압성가래는 사출 성형에 의해 일체로 성형될 수 있다. 본체 부분은 곡선 내부의 전방 벽과 곡선 외부의 후방 벽, 및 전방 벽과 후방 벽을 연결하는 적어도 하나의 커넥터를 갖는다. 본체 부분은 전방 및 후방 벽 사이에 전방 개재 벽과 후방 개재 벽을 갖는다. 전방 개재 벽과 후방 개재 벽은 교번하는 크레스트와 트러프를 갖는다.

도면



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## 명세서

## 청구범위

### 청구항 1

꼭선으로 형성되는 치과용 마우스피스로서, 상기 치과용 마우스피스는:

제1 단부 및 제2 단부를 갖는 상기 꼭선의 중앙 부분에 있는 본체 부분으로서, 상기 본체 부분은 상기 꼭선 내부의 전방 벽(anterior wall) 및 상기 꼭선 외부의 후방 벽(posterior wall)을 가지며, 상기 전방 벽 및 상기 후방 벽은 내부 공간을 규정하고, 적어도 하나의 커넥터가 상기 전방 벽을 상기 후방 벽에 연결하고, 적어도 하나의 전방 개재 벽(anterior intervening wall)은 상기 전방 벽으로부터 상기 후방 벽을 부분적으로 향해 연장하고, 적어도 하나의 후방 개재 벽(posterior intervening wall)은 상기 후방 벽으로부터 상기 전방 벽을 부분적으로 향해 연장하고, 상기 적어도 하나의 전방 개재 벽 및 상기 적어도 하나의 후방 개재 벽 각각은 교번하는 크레스트(crest) 및 트러프(trough)를 갖는, 상기 본체 부분;

상기 제1 단부에 연결되는 석션 커넥터 부분 ~ 상기 커넥터 부분은 상기 내부 공간을 진공 석션 소스에 연결함 ~; 및

상기 제2 단부에 연결되는 칙 리트랙터 부분(cheek retractor portion)

을 포함하는, 마우스피스.

### 청구항 2

제1항에 있어서,

상기 적어도 하나의 커넥터는 원통 형상 기둥(pillar)인, 마우스피스.

### 청구항 3

제1항에 있어서,

상기 적어도 하나의 커넥터는 상기 내부 공간에서의 상기 본체 부분에서 길이 방향으로 걸쳐 이어지는(spanning) 벽인, 마우스피스.

### 청구항 4

제1항에 있어서,

상기 후방 벽으로부터 돌출하는 상기 내부 공간에서의 브릿지 구조를 더 포함하고, 돌출부는 이격된 크레스트를 갖는 흉벽 형상인(battlement-shaped), 마우스피스.

### 청구항 5

제4항에 있어서,

상기 석션 커넥터 부근의 상기 돌출부는 높이 및 길이가 더 큰, 마우스피스.

### 청구항 6

제4항에 있어서,

상기 크레스트들 사이의 공간들은 상기 흉벽 형상의 트리프들인, 마우스피스.

### 청구항 7

제1항에 있어서,

상기 전방 개재 벽 및 상기 후방 개재 벽 상의 상기 교번하는 크레스트 및 트러프는 만원 형상인, 마우스피스.

**청구항 8**

제1항에 있어서,

상기 전방 개재 벽 및 상기 후방 개재 벽은 상기 본체 부분의 무결성을 유지하기 위해 변동하는 높이를 갖는, 마우스피스.

**청구항 9**

제1항에 있어서,

상기 전방 개재 벽 및 상기 후방 개재 벽의 트러프는 상기 트러프가 상기 칩 리트랙터 부분에 접근함에 따라 사이즈가 감소하는, 마우스피스.

**청구항 10**

제1항에 있어서,

상기 전방 개재 벽과 상기 후방 개재 벽은 상기 식선 커넥터가 상기 본체와 만나는 지점에서 만나는, 마우스피스.

**청구항 11**

제1항에 있어서,

상기 전방 개재 벽과 상기 후방 개재 벽은 상기 본체가 상기 칩 리트랙터 부분과 만나는 지점에서 만나는, 마우스피스.

**청구항 12**

제1항에 있어서,

상기 식선 커넥터 부분에 통합된 바이트 블록(bite block)을 더 포함하고, 상기 바이트 블록은 환자가 물고 있는 동안에 추가적인 크러쉬(crush) 저항 및 감소된 압축성을 제공하는, 마우스피스.

**청구항 13**

제1항에 있어서,

상기 본체 부분, 상기 식선 커넥터 부분 및 상기 칩 리트랙터 부분은 일체로서 사출 성형에 의해 형성되는, 마우스피스.

**청구항 14**

제1항에 있어서,

상기 본체, 상기 식선 커넥터 부분 및 상기 칩 리트랙터 부분을 형성하는 재료는 가요성의, 반투명성의, 고내열성의, 오토클레이브 가능한(autoclavable) 실리콘계 재료인, 마우스피스.

**청구항 15**

제1항에 있어서,

상기 후방 벽은 상기 후방 벽의 내부 표면으로부터 상기 본체의 길이방향 축을 따라 돌출하는 스테빌리티 바(stability bar)를 더 포함하는, 마우스피스.

**청구항 16**

제15항에 있어서,

상기 적어도 하나의 커넥터는 상기 스테빌리티 바를 따라 균일하게 이격되어 놓이는, 마우스피스.

**청구항 17**

제1항에 있어서,

상기 석션 커넥터 부분은 진공 어댑터 상호잠금 핏(fit) 상의 돌출부에 대응하는 절결부를 포함하는, 마우스피스.

#### 청구항 18

제1항에 있어서,

상기 석션 커넥터 부분은 진공 소스에 연결되고, 상기 진공 소스의 활성화는 상기 본체의 상기 내부 공간으로부터 유체의 석션을 제공하는, 마우스피스.

#### 청구항 19

제18항에 있어서,

상기 진공 소스의 상기 활성화는 상기 전방 개재 벽 및 상기 후방 개재 벽의 상기 크레스트 및 상기 트러프를 통해 상기 본체의 외부로부터 상기 본체의 상기 내부 공간으로 유체를 끌어들이는, 마우스피스.

#### 청구항 20

제1항에 있어서,

상기 직 리트랙터 부분은 상기 직 리트랙터 부분의 탄성에 기초하여 압력을 인가하는 표면을 포함하는, 마우스피스.

#### 발명의 설명

##### 기술 분야

[0001] 관련 출원에 대한 상호 참조

[0002] 본 출원은 "치과용 마우스피스(Dental Mouthpiece)"라는 발명의 명칭으로 2019년 5월 10일에 출원된 미국 가출원 제62/846,353호의 우선권 이익을 주장하며, 그 개시내용은 본원에 참조에 의해 포함된다.

[0003] 본 발명은 일반적으로 치과용 마우스피스의 분야에 관한 것이다. 보다 구체적으로, 본 발명은 구강내 치과 석션 및 격리 마우스피스에 관한 것이다.

##### 배경 기술

[0004] 여러가지 마우스피스들은 현재 치과 분야의 치과 건강 전문가, 치과 위생사 및 치과 보조원에 의해 사용되고 있다. 과거에는, 치과 전문가와 치과 보조원으로 구성된 전통적인 2인 팀에 의해 치과 환자가 치료를 받았다. 또한, 치과 치료는 다수의 상이한 유형의 치과 장비 및 재료를 사용하여 팀에 의해 제공될 수 있다. 이러한 치과 장비 및 재료는 구강내 기술, 바이트 블록(bite block), 저속 석션 이젝터, 고속 석션 이젝터, 거즈, 면 롤 및 드라이 앵글(dry angle)과 같은 아이템들을 포함할 수 있다. 치과 장비의 각 아이템은 상이한 목적으로 사용될 수 있지만, 일부는 일부 유형의 치과 서비스를 위해 조합하여 사용될 수 있다. 따라서, 이러한 치과 서비스를 제공하고자 하는 치과 전문가는 그러한 치과 장비의 여러 아이템들을 사용해야할 수도 있다. 그러므로 치과 보조원의 중요한 역할은 치과 전문가가 서로 다른 장비와 재료의 이러한 여러 아이템들의 사용을 조율하는 것을 돕는 것이다.

##### 발명의 내용

##### 해결하려는 과제

[0005] 그러므로, 치과 환자에게 보다 효율적이고 편안하며 안전한 방식으로 치과 서비스를 제공하는 개선된 시스템 및 방법에 대한 당업계의 요구가 존재한다.

##### 과제의 해결 수단

[0006] 곡선으로 형성된 치과용 마우스피스의 실시형태가 개시된다. 이러한 마우스피스는 제1 단부와 제2 단부를 갖는

곡선의 중앙 부분에 있는 본체 부분, 제1 단부에서 본체 부분에 연결된 석선 커넥터 부분, 및 제2 단부에서 본체 부분에 연결된 칩 리트랙터 부분(cheek retractor portion)을 포함할 수 있다. 일부 실시형태에서, 본체 부분, 석선 커넥터 부분, 및 칩 리트랙터 부분은 바람직하게는 사출 성형에 의해 일체로 성형될 수 있다. 예시적인 실시형태에서, 마우스피스에는 가요성의, 반부명성의, 사출 성형을 용이하게 하는, 고내열성의, 그리고 오토클레이브 가능한(autoclavable) 재료로 만들어질 수 있다. 이러한 재료는 실리콘을 포함할 수 있다. 마우스피스는 내열성이 높고 오토클레이브 가능한 재료로 만들어질 수 있기 때문에, 이러한 마우스피스는 재사용할 수 있다.

[0007] 본체 부분은 곡선 내부의 전방 벽(anterior wall)과 곡선 외부의 후방 벽(posterior wall)을 포함할 수 있다. 전방 벽 및 후방 벽은 내부 공간을 규정할 수 있으며, 상기 내부 공간 내에서 적어도 하나의 커넥터가 전방 벽을 후방 벽에 연결한다. 적어도 하나의 전방 개재 벽이 전방 벽으로부터 후방 벽을 향해 부분적으로 연장하고, 적어도 하나의 후방 개재 벽이 후방 벽으로부터 전방 벽을 향해 부분적으로 연장한다. 전방 개재 벽 및 후방 개재 벽 각각은 교번하는 크레스트(crests)와 트러프(troughs)를 갖는다.

#### 도면의 간단한 설명

[0008] 도 1은, 치과용 마우스피스의 평면도이다.  
 도 2는, 도 1에 도시된 치과용 마우스피스의 등각 투영도이다.  
 도 3은, 도 1에 도시된 치과용 마우스피스의 배면도이다.  
 도 4는, 도 1에 도시된 치과용 마우스피스의 저면도이다.  
 도 5는, 도 1에 도시된 치과용 마우스피스의 관상(coronal) 상부 단면도이다.  
 도 6은, 도 1에 도시된 치과용 마우스피스의 측면도이다.  
 도 7은, 마우스피스의 전방 벽이 마우스피스의 후방 벽으로부터 당겨져 떨어진, 도 1에 도시된 치과용 마우스피스의 측면이다.  
 도 8은, 석선 커넥터와 본체 사이의 교차 지점에서 도 1에 도시된 치과용 마우스피스의 횡단면도이다.  
 도 9는, 석선 커넥터와 본체 사이의 교차 지점에서 도 1에 도시된 치과용 마우스피스의 횡단면도이다.  
 도 10은, 벽 커넥터를 갖는 도 1에 도시된 치과용 마우스피스의 일 실시형태의 종단면도이다.  
 도 11은, 컬럼 커넥터를 갖는 도 1에 도시된 치과용 마우스피스의 일 실시형태의 종단면도이다.

#### 발명을 실시하기 위한 구체적인 내용

[0009] 본 발명의 실시형태는 의자 옆의(chair-side), 핸드프리 석선 및 거리를 통한 치과적 절차 동안에 치과 스태프를 도울 목적으로 하이-석선(high-suction) 치과 어댑터에 부착될 수 있는 마우스피스를 포함할 수 있다. 이러한 마우스피스는 본체 부분, 칩 리트랙터 부분, 석선 커넥터 부분, 스테빌리티 바(stability bar) 및 바이트 블록을 포함할 수 있다. 일부 실시형태에서, 본체 부분, 칩 리트랙터 부분, 석선 커넥터 부분, 스테빌리티 바 및 바이트 블록(및 이들의 서브 부분)의 임의의 조합은 바람직하게는 사출 성형에 의해 일체로 성형될 수 있다. 예시적인 실시형태에서, 마우스피스는 가요성의, 탄성의, 적어도 반부명성의, 그리고 사출 성형을 용이하게 하는 재료로 만들어질 수 있다. 이러한 재료는 당업계에 알려진 열가소성 엘라스도머(elastomer)를 포함할 수 있다.

[0010] 도 1은 치과용 마우스피스의 평면도이다. 치과용 마우스피스(100)는 제1 단부(104) 및 제1 단부(104) 반대편의 제2 단부(106)를 갖는 본체 부분(102)을 포함한다. 길이방향 축(103)은 제1 단부(104)로부터 제2 단부(106)로 연장할 수 있다. 예시된 실시형태에서, 석선 커넥터 부분(108)은 제1 단부(104)에 커플링될 수 있고 칩 리트랙터 부분(110)은 제2 단부(106)에 커플링될 수 있지만, 다른 예에서 마우스피스(100)는 석선 커넥터 부분(108) 및/또는 칩 리트랙터 부분(110)을 갖지 않을 수 있다. 또한, 바이트 블록(101)이 본체 부분(102)의 제1 단부(104) 부근에서 석선 커넥터 부분(108)에 통합될 수 있지만, 바이트 블록(101)은 석선 커넥터 부분(108) 상의 임의의 위치에 위치될 수 있다.

[0011] 본체 부분(102)은 제2 단부(106)로부터 칩 리트랙터 부분(110)으로 연장하는 목(neck)(120)을 포함할 수 있다. 목(120)은 본체 부분(102)의 너비, 칩 리트랙터 부분(110)의 너비, 및/또는 석선 커넥터 부분(108)의 너비보다

더 작은 너비(122)를 가질 수 있지만, 너비(122)는 다른 예에서 본체 부분(102), 직 리트랙터 부분(110), 및/또는 석션 커넥터 부분(108)의 너비보다 더 클 수 있다.

[0012] 도시된 실시형태에서, 석션 커넥터 부분(108), 직 리트랙터 부분(110), 바이트 블록(101) 및 본체 부분(102)은 일체로 구성되지만, 다른 예에서 석션 커넥터 부분(108), 직 리트랙터 부분(110), 바이트 블록(101), 및/또는 본체 부분(102)의 각각은 별개의 편(piece)일 수 있다. 예를 들어, 일부 실시형태에서, 본체 부분(102), 직 리트랙터 부분(110) 및 석션 커넥터 부분(108)(및 이들의 서브 부분)은 바람직하게는 사출 성형에 의해 일체로 성형될 수 있고 바이트 블록(101)은 석션 커넥터 부분(108)에 부착할 수 있는 별개의 편일 수 있다. 예시적인 실시형태에서, 마우스피스(100)는 가요성의, 탄성의, 반투명성의, 그리고 사출 성형을 용이하게 하는 재료로 만들어질 수 있다. 이러한 재료는 열가소성 엘라스토머를 포함할 수 있다.

[0013] 도 2는 도 1에 도시된 치과용 마우스피스의 등각 투영도이다. 도 2에 도시된 바와 같이, 본체 부분(102)은 곡선으로 성형될 수 있다. 마우스피스(100)는 가요적인 및 탄성적인 재료(예를 들어, 열가소성 엘라스토머)로 만들어지기 때문에, 마우스피스(100)는 입 형상에 일치하도록 환자의 입에 위치될 때 구부러질 수 있다. 적절하게 위치되었을 때, 석션 커넥터 부분(108)은 환자의 입의 일 측으로부터 돌출할 수 있는 반면, 본체 부분(102)은 환자의 입의 뒤쪽에 대향하여 놓이고, 직 리트랙터 부분(110)은 환자의 입의 반대 측 상에서 환자의 볼(cheek)을 누른다.

[0014] 직 리트랙터 부분(110)은 커넥터 부분(108)이 연장하는 측보다 환자의 입의 반대 측 상의 환자의 치아로부터 떨어지게 환자의 볼을 눌러 견인하도록 구성될 수 있다. 마우스피스(100)를 형성하는 데 사용되는 재료의 가요성은 환자의 입에 배치되었을 때 약간의 구부림을 허용하지만 재료의 탄성은 마우스피스(100)가 곱힘으로부터 해제되었을 때 마우스피스(100)가 환자의 입의 일부에 대향하여 압력을 가하도록 추가로 허용한다. 재료는, 예를 들어, 직 리트랙터 부분(110)이 환자의 치아로부터 떨어지도록 볼을 이동시키기에 충분한 압력으로 환자의 입의 내부에 대해 누를 수 있도록 충분히 탄성적이다. 직 리트랙터 부분(110)은, 본체 부분(102)에 부착될 수 있는 망치머리(hammerhead) 원위(distal) 영역으로 도시되어 있다. 직 리트랙터 부분(110)은 일부 예에서 중실(solid)일 수 있지만, 다른 예에서는 중공(hollow)일 수 있다.

[0015] 본체 부분(102)은 곡선의 내측 부분 상의 전방 벽(112) 및 곡선의 외측 부분 상의 후방 벽(114)(도 4에도 도시됨)을 포함할 수 있다. 전방 벽(112)은 환자의 입의 전방을 향할 수 있고 후방 벽(114)은 환자의 입의 후방을 향할 수 있다. 본체 부분(102)의 전방 벽(112)과 후방 벽(114)은 서로 평행하게 구성될 수 있다. 전방 벽(112)은 후방 벽(114)의 규정된 형상에 대응할 수 있는 규정된 형상을 갖지만, 다른 예에서 전방 벽(112)은 후방 벽(114)과 상이한 형상일 수 있다. 상기 규정된 형상은 제1 단부(104)에서 더 넓고 제2 단부(106)에서 더 좁을 수 있다. 일부 실시형태에서, 형상은 방패 형상에 해당하지만 형상은 예를 들어 정사각형, 직선 화살표, 직사각형, 별, 타원, 원, 또는 일반적으로 환자의 입의 구강내 형상에 일치하는 형상일 수 있다. 상이한 사이즈의 마우스피스가 성인과 어린이의 상이한 사이즈의 입에 대해 제공될 수 있다. 제1 단부(104)에서의 형상의 일부는 본체 부분(102)의 나머지보다 더 두꺼운 벽으로 형성될 수 있다. 이렇게 두껍게 하는 것은 제1 단부(104)에서 추가적인 안정성을 제공할 수 있다. 환자의 입안에 위치될 때, 전방 벽(112) 및 후방 벽(114)은 환자의 기도를 차단할 수 있는 반면, 바이트 블록(101)은 환자의 치아들 사이에 위치되고, 석션 커넥터 부분(108)은 환자의 입의 일 측으로부터 연장하고, 직 리트랙터 부분(110)은 환자의 입의 반대측 상에서 볼을 누른다.

[0016] 또한, 본체 부분(102)은 전방 벽(112) 및/또는 후방 벽(114)에 위치되는 개구(140)를 포함할 수 있다. 이러한 개구(140)(예를 들어, 천공, 슬릿, 애퍼처 등)는 환자의 입으로부터 개구(140)를 통해 내부 공간(126)으로, 그리고 석션 소스를 향해 석션 커넥터 부분(108)으로 공기, 유체 및 작은 파편의 석션을 허용한다. 개구(140)는 전방 벽(112) 및/또는 후방 벽(114)의 형상의 주변에 위치될 수 있다. 동일한 예에서, 개구(140)는 전방 벽(112) 및/또는 후방 벽(114) 상의 목(120)의 양 측에 위치될 수 있다. 다른 예에서, 개구(140)는 애퍼처이다. 동일한 예에서, 애퍼처는 각각 동일한 사이즈이지만, 다른 예에서는 애퍼처의 일부 또는 전부가 상이한 사이즈일 수 있다.

[0017] 도 3은 도 1에 도시된 치과용 마우스피스의 배면도이다. 도 3에서 볼 수 있는 바와 같이, 석션 커넥터 부분(108)은 타원형일 수 있고 또한 본체 부분(102)에 부착될 수 있다. 석션 커넥터 부분(108)은, 본체 부분(102)보다 더 두꺼운 벽으로 형성될 수 있으며 하이-석션 진공 어댑터에 부착하고 제거를 위해 내부 공간(126)으로부터 외부 어댑터로 볼, 타액 및 파편을 이동하는 것을 돕도록 구성될 수 있다. 석션 커넥터 부분(108)은 또한, 마우스피스를 어댑터 상으로 원하는 깊이로 슬라이딩하는 것을 돕기 위해 내부 스톱(stop)을 포함할 수 있다.

[0018] 본 명세서에서, 도 3의 상측 벽(116)은 환자의 입 안에 놓였을 때 환자의 입의 천장에 대향하여 있는 측을 지칭

하는 데 사용될 수 있으며, 하측 벽(118)은 환자의 입의 바닥에 대향하여 있는 측을 지칭하는 데 사용될 수 있다. 상측 벽(116) 및 하측 벽(118)은 동일하게 형성될 수 있으며, 이는, 새로운 배향에서, 상측 벽(116)이 하측 벽(118)으로서 나타나고 그 역으로도 나타날 수 있도록 마우스피스가 배향을 변경하는 것을 허용할 수 있다. 사용시, 본체 부분(101)의 상측 벽(116) 및 하측 벽(118)은 입의 상부 및 입/혀의 바닥을 보호하고 분리하는 역할을 할 수 있다. 또한, 본체 부분(101)은 떨어지는 파편으로부터 입의 뒤쪽(예컨대, 목구멍 및 기도)을 보호하는 역할도 할 수 있다.

[0019] 도 4는 도 1에 도시된 치과용 마우스피스의 저면도이다. 전방 벽(112) 및 후방 벽(114)은 적어도 하나의 커넥터(124)에 의해 서로 연결될 수 있다. 일부 실시형태에서, 석션 커넥터 부분(108)은, 외부 하이-석션 전공 이매퍼 상의 (예를 들어, 로고, 직사각형 돌출부, 정사각형 돌출부, 원형 돌출부, 또는 임의의 형상의 돌출부로 성형될 수 있는) 대응하는 돌출부와 추가적인 상호잠금(interlocking)을 제공하는 (예를 들어, 또한 로고, 직사각형 노치, 정사각형 노치, 원형 노치, 또는 임의의 형상의 노치로 성형될 수 있는) 절전부(142)를 가질 수 있다.

[0020] 바이트 블록(101)은 바이트 블록에 캐비터를 생성하여 보다 안정적인 바이트 블록을 가져오도록 바이트 블록 개구(141)에 의해 강화될 수 있다. 일 실시형태에서, 바이트 블록 개구(141)는 바이트 블록의 바닥에서 개방하는 2개의 평행한 직사각형 개구일 수 있다. 바이트 블록 개구(141)는 석션 커넥터 부분(108)까지 연장할 수 있지만 석션 커넥터 부분(108)의 두께를 지나서 연장하지 않는다.

[0021] 도 5는 도 1에 도시된 치과용 마우스피스의 관상 상부 단면도이다. 본체 부분(102)은, 도 5에 도시된 바와 같이 그리고 또한 도 7 및 도 8에서 볼 수 있는 바와 같이, 후방 벽(114)의 내부 표면(135)으로부터 돌출하는 브릿지 구조(136)를 포함할 수 있다. 일부 실시형태에서, 브릿지 구조(136)는 로고(예를 들어, 화살촉 또는 방패)의 형상을 따를 수 있다. 상기 브릿지 구조는 화살촉 형상의 팁(tip)에 간극을 가져서, 화살촉 내선에 열린 호를 생성할 수 있다. 일부 실시형태에서, 브릿지 구조(136)는 마우스피스(100)의 본체 부분(110)의 중앙에 위치될 수 있다. 일부 예에서, 이러한 브릿지 구조(136)는 브리지 크레스트(137) 및 브리지 트리프(138)를 갖는 물결 형상으로 내부 표면(135)으로부터 돌출할 수 있다. 다른 실시형태에서, 브릿지 구조(136)는 홈벽 또는 사다리꼴 형상으로 돌출할 수 있다. 브리지 크레스트(137)는, 일반적으로 전방 벽(112)으로부터 떨어지는 복수의 접촉점을 제공한다. 석션 커넥터 부분(108)의 개구(146) 부근의 브리지 크레스트(137)는, 도 7 및 도 8에서 볼 수 있는 바와 같이, 개구(146)로부터 더 멀리 있는 브리지 크레스트(137)보다 더 큰 높이를 가질 수 있다. 석션 커넥터 부분(108)의 개구(146) 부근의 브리지 크레스트(137)는 또한, 도 8에 나중에 도시된 바와 같이, 석션 커넥터 부분(108)으로부터 더 멀리 떨어진 브리지 크레스트(137)보다 더 길 수 있다. 브리지 트리프(138)는 내부 표면(135)과 실질적으로 동일 높이에 있거나 내부 표면(135) 위로 연장할 수 있다. 브리지 크레스트(137)는 석션 동안에 전방 벽(112)과 접촉하여 석션 동안에 전방 벽(112)을 후방 벽(114)으로부터 이격되게 유지하고, 이에 의해 전방 벽(112) 또는 후방 벽(114)이 내부 공간(126)으로 붕괴되는 것을 방지하고, 따라서 파편 및/또는 물이 내부 공간(126)을 통해 배출될 수 있다. 한편, 브리지 트리프(138)는 브리지 구조(136)를 통해 공기, 유체 및 작은 파편의 석션을 허용하는 간극을 제공한다. 다른 예에서, 브릿지 구조(136)는 스무드(smooth)할 수 있으며, 날카로운 크레스트와 날카로운 트리프, 원형 크레스트와 원형 트리프, 정사각형 크레스트와 정사각형 트리프, 또는 크레스트와 트리프의 형상 또는 형상의 조합을 포함할 수 있다.

[0022] 본체 부분(102)은, 도 5에 도시되고 또한 도 7에서도 볼 수 있는 바와 같이, 본체 부분(102)의 대략 중심으로부터 직 리트랙터 부분(110)을 향해 연장하는 스테빌리터 바(143)를 더 포함할 수 있다. 이러한 스테빌리터 바(143)는 길이방향 축(103)을 따라 후방 벽(114)의 내부 표면(135)으로부터 돌출할 수 있다. 일 실시형태에서, 스테빌리터 바(143)는 브릿지 구조(136)의 열린 호로부터 시작하여 길이방향 축(103)을 따라 목(120)을 지나서 제2 단부(106)를 향해 계속되고 직 리트랙터 부분(110)에 도달하기 전에 끝난다. 스테빌리터 바(143)는 후방 벽(114)의 내부 표면(135)으로부터 전방 벽(112)의 내부 표면(113)을 향해 돌출할 수 있다. 스테빌리터 바(143)는 내부 공간(126)의 높이 또는 내부 공간(126)보다 더 낮은 임의의 높이로부터의 범위에서 임의의 높이일 수 있다. 일 실시형태에서, 스테빌리터 바(143)는 전방 벽(112)을 후방 벽(114)에 부착할 수 있는 특정 위치에 부착된 커넥터(124)를 가질 수 있다. 스테빌리터 바(143) 상의 상기 커넥터(124)는 석션 동안 마우스피스(100)의 수축, 안정성, 지지 및 곡률을 도울 수 있다. 예시적인 일 실시형태에서, 스테빌리터 바(143)가 다른 예에서 적어도 하나의 커넥터(124)와 정렬되지 않을 수 있지만, 스테빌리터 바(143)와 정렬된 다수의 커넥터(124)가 있을 수 있다.

[0023] 도 6은 도 1에 도시된 치과용 마우스피스의 측면도이다. 도 6은 환자의 입의 바닥에 대향하여 있는 하측의 모습을 보여준다. 전방 벽(112) 및 후방 벽(114)은 서로 이격되어 내부 공간(126)을 규정한다. 적어도 하나의

커넥터(124), 스태빌리터 바(143) 및 브리지 구조(136) 외에, 내부 공간(126)은 일반적으로 개방되어 있고 가로 막는 것이 없으므로, 석션이 내부 공간(126) 전체에 흐르도록 허용한다. 전방 벽(112)과 후방 벽(114) 사이의 내부 공간(126)은 일반적으로 전방 벽(112) 및 후방 벽(114)의 동일한 규정된 형상을 따른다. 일 예에서, 내부 공간(126)은 복(120)을 거쳐 연장하지만, 다른 예에서 내부 공간(126)은 복(120)을 거쳐 연장하지 않을 수 있다. 또 다른 예에서, 내부 공간(126)은 목(120)을 거쳐 연장하여 칩 리트랙터 부분(120) 내로 연장한다.

[0024] 적어도 하나의 전방 개재 벽(127)이 전방 벽(112)의 적어도 하나의 에지(128)로부터 후방 벽(114)을 부분적으로 향해 연장할 수 있으며, 적어도 하나의 에지(128)로부터 전방 벽(112)과 후방 벽(114) 사이의 중간 지점까지 연장하는 두께를 가질 수 있다. 따라서 이러한 전방 개재 벽(127)의 스패(span)는 전방 벽(112)과 후방 벽(114) 사이의 전체 거리를 연장하지 않을 수 있다. 이러한 전방 개재 벽(127)의 두께는 칩 리트랙터 부분(110)으로부터 목(120)을 거쳐 제1 단부(104)까지 증가할 수 있다. 이러한 증가하는 깊이는 제1 단부(104)에서 증가된 강성을 제공할 수 있다. 이러한 전방 개재 벽(127)은 일부 실시형태에서 추가적으로 리지형(ridged)이 될 수 있거나, 또는 다른 실시형태에서 스무드한 에지를 가질 수 있다. 일례에서, 전방 개재 벽(127)은 교번하는 크레스트(130)와 트러프(132)를 포함한다. 예시된 실시형태에서, 크레스트(130)와 트러프(132)는 임의의 형상일 수 있지만, 크레스트(130)는 평평한 표면이고 트러프(132)는 원통형 절결 표면이다. 일부 예에서, 크레스트(130) 및 트러프(132)는 전방 개재 벽(127)의 전체 깊이를 연장하지만, 다른 예에서 크레스트(130) 및/또는 트러프(132)는 전방 개재 벽(127)을 따라 부분적으로 연장할 수 있다. 크레스트(130) 및 트러프(132)는 마우스피스(100)에 추가적인 수축, 안정성, 지지 및 곡률을 제공할 수 있다.

[0025] 후방 벽(114)은, 후방 벽(114)의 적어도 하나의 에지(133)로부터 연장하고 전방 벽(112)을 향해 부분적으로 연장하는 대응하는 적어도 하나의 후방 개재 벽(134)을 가질 수 있다. 후방 개재 벽(134)은 마찬가지로 전방 개재 벽(127)과 동일하거나, 거울 이미지이거나, 또는 상이한 리지(ridge)를 나타낼 수 있다. 일례에서, 전방 개재 벽(127)의 리지는, 도 6에 도시된 바와 같이, 후방 개재 벽(134)의 리지와 정렬될 수 있다. 조합하여, 전방 개재 벽(127) 및 후방 개재 벽(134) 그리고 이들 각각의 정렬된 리지는 전방 벽(112)과 후방 벽(114) 사이에 개방 메쉬를 형성할 수 있다. 이러한 개방 메쉬는 제1 단부(104)로부터 제2 단부(106)까지 전방 벽(112) 및 후방 벽(114) 각각의 에지(128, 133)를 따를 수 있다. 전방 개재 벽(127)과 후방 개재 벽(134) 사이의 개방 메쉬는 환자의 입으로부터 상기 메쉬를 거쳐 내부 공간(126)으로 그리고 석션 소스를 향해 석션 커넥터 부분(108)으로 공기, 유체 및 작은 파편의 석션을 허용한다.

[0026] 전방 개재 벽(127)은, 제1 단부(104)에서 본체의 석션 커넥터 부분(108) 부근에서의 상측 벽(116) 및 하측 벽(118)에서 후방 개재 벽(134)과 결합될 수 있다. 전방 개재 벽(127)은 또한, 제2 단부(106)에서 칩 리트랙터 부분(110) 부근에서의 상측 벽(116) 및 하측 벽(118)에서 후방 개재 벽(134)과 결합될 수 있다. 일부 실시형태에서, 전방 개재 벽(127)은 칩 리트랙터 부분(110)에서 후방 개재 벽(134)과 결합될 수 있다.

[0027] 도 7은, 마우스피스의 전방 벽이 마우스피스의 후방 벽으로부터 당겨져 떨어져 있는, 도 1에 도시된 치과용 마우스피스의 측면이다. 적어도 하나의 커넥터(124)는 내부 공간(126) 내에서 전방 벽(112)과 후방 벽(114) 사이의 거리에 걸쳐 있을 수 있다. 환언하면, 상기 커넥터(124)는 후방 벽(114)의 내부 표면(135) 및 전방 벽(112)의 내부 표면(113)에 부착될 수 있다. 적어도 하나의 커넥터(124)는 마우스피스(100)에 구조적 강성을 제공할 수 있고 기둥, 절련, 벽 등일 수 있다. 도시된 예에서, 적어도 하나의 커넥터(124)는, 각각 기둥 형상이고 서로 선형으로 이격된, 3개의 커넥터를 포함한다.

[0028] 도 8은 도 1에 도시된 치과용 마우스피스의 횡단면도이다. 석션 커넥터 부분(108)의 개구(146) 부근의 브리지 크레스트(137)는 개구(146)로부터 더 멀리 있는 브리지 크레스트(137)보다 더 큰 높이를 가질 수 있다. 석션 커넥터 부분(108)의 개구(146) 부근의 브리지 크레스트(137)는 또한, 석션 커넥터 부분(108)으로부터 더 멀리 떨어진 브리지 크레스트(137)보다 더 길 수 있다.

[0029] 도 9는 도 1의 치과용 마우스피스의 횡단면도이다. 도 9는 석션 커넥터가 본체에 부착되는 위치를 도시한다. 도 9에서 볼 수 있는 바와 같이, 석션 커넥터 부분(108)은 타원형일 수 있으며 또한 본체가 브리지 구조(136)에 도달할 때까지 이음매 없는 천이(transition)로 본체 부분(102)에 부착될 수 있으며, 여기서 브리지 크레스트(137) 및 브리지 트러프(138)는 석션 커넥터 부분(108) 부근의 본체 부분(102)의 개구를 부분적으로 차단할 수 있다. 바이트 블록(101)은 바이트 블록이 석션 커넥터 부분(108)의 개구를 가로막지 않는 방식으로 석션 커넥터 부분(108)의 외부에 부착된다.

[0030] 석션 커넥터 부분(108)은, 내부 공간(126)과 석션 커넥터 부분(108) 사이의 유체 연통을 허용하도록 본체 부분(102)의 내부 공간(126)으로 개방되는 개구(146)(도 5에도 도시됨)를 포함할 수 있다. 적어도 하나의 석션 커

백터 부분 벽(144)이, 석션 동안 전방 벽(112) 및 후방 벽(114)의 붕괴를 방지하기 위해, 전방 벽(112)으로부터 석션 커넥터 부분(108)의 개구(146) 부근의 후방 벽(114)으로 연장할 수 있다. 적어도 하나의 석션 커넥터 부분 벽(144)은 석션 커넥터 부분(108)의 개구(146)의 양쪽에 위치되는 한 쌍의 벽을 포함한다.

[0031] 바이트 블록(101)은 바이트 블록에 대한 더 큰 수축 및 지지를 생성하기 위해 바이트 블록의 양 측에 바이트 블록 크레스트(147) 및 바이트 블록 트러프(148)를 포함할 수 있다. 일 실시형태에서, 바이트 블록 크레스트(147) 및 바이트 블록 트러프(148)는 바이트 블록의 양 측에 들쭉날쭉한 형상 또는 물결 형상을 생성할 수 있지만, 바이트 블록 크레스트(147) 및 바이트 블록 트러프(148)는 임의의 형상일 수 있다.

[0032] 도 10은, 벽 커넥터를 갖는, 도 1에 도시된 치과용 마우스피스의 일 실시형태의 단면도이다. 이 실시형태에서, 커넥터(124)는 중실 벽으로서 길이방향 축(103)에서 전방 벽(112)과 후방 벽(114)을 연결한다. 상기 커넥터(124)는 칩 리트랙터 부분(110)으로부터 일정 거리 떨어져 제2 단부(106)에서 목(120)으로부터 길이방향 축(103)을 따라 제1 단부(104)를 향해 연장하고 본체 부분(102)의 중간 지점 주위 브리지 구조(136)의 개구 부근에서 멈춘다. 다른 실시형태에서, 커넥터(124)는 길이방향 축(103)을 따라 연장할 수 있으며 본체 부분의 내부 공간(126) 내의 임의의 위치에서 멈출 수 있다.

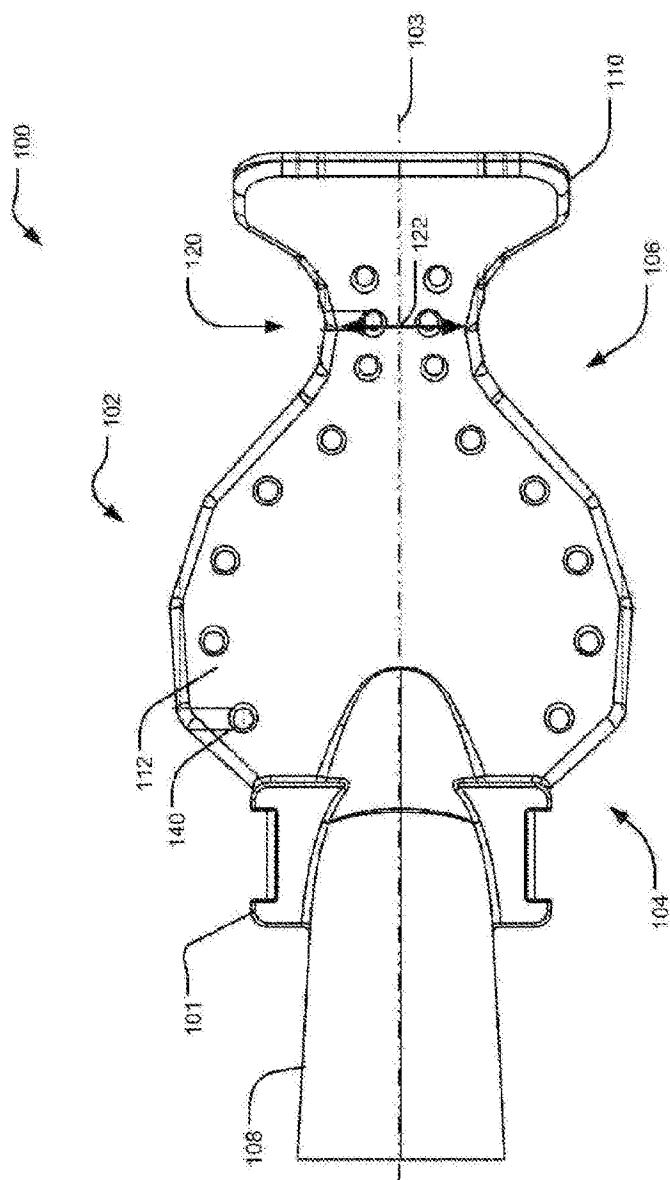
[0033] 도 11은, 컬럼 커넥터를 갖는, 도 1에 도시된 치과용 마우스피스의 일 실시형태의 종단면도이다. 이 실시형태에서, 커넥터(124)는 스테빌리티 바(143)와 맞추어진 3개의 균일하게 이격된 원통형 기둥으로서 길이방향 축(103)에서 전방 벽(112)을 후방 벽(114)과 연결한다. 제1 커넥터는 본체 부분(102)에 위치되고, 제2 커넥터는 목(120) 부근에 위치되며, 제3 커넥터는 칩 리트랙터 부분(110) 부근에서 이격된다. 3개의 커넥터의 선형 이격은, 목(120)의 좁은 너비(122)를 유지하면서, 목(120)에 추가적인 강성을 제공할 수 있다. 다른 예에서 이러한 커넥터(124)는, 위치 결정된 마우스피스(100)가 임의의 일 측으로부터 임의의 뒤쪽으로, 이어서 임의의 다른 측으로 감싸기 시작하는 영역에 위치될 수 있으며, 이에 의해 마우스피스(100)를 환자의 임의의 일반적인 구강내 형상으로 형상화하는 것을 돕는다. 다른 예에서, 적어도 하나의 커넥터(124)는 1개의 커넥터, 2개의 커넥터, 또는 2개보다 더 많은 커넥터를 포함할 수 있고 각각의 커넥터는 마우스피스(100) 상의 임의의 위치에 위치될 수 있다. 일례에서, 적어도 하나의 커넥터(124)는 본체 부분(102)으로부터 목(120)을 거쳐 칩 리트랙터 부분(110)까지 연장하는 리브(rib)이다.

[0034] 여기에 설명된 마우스피스는 일체형으로, 오토클레이브 가능으로, 하이-석션 진공 어댑터와 함께 사용될 수 있다. 이러한 하이-석션 진공 몸체 어댑터는 단일의 균질한 재료로 만들어질 수 있다. 단일 레버 설계를 갖는, 이러한 진공 어댑터는 구강으로부터 외부 진공 소스로 물, 타액 및 파편의 제거를 제어하는 데 있어 현재의 모든 하이-석션 진공 흡인기 및 타액 배출기와 동일한 방식으로 기능할 수 있다. 단일 레버는 석션 커넥터 부분 내의 단일의 큰 배출 도관을 거쳐 적어도 부분적으로 둘러싸인 본체로부터 물, 타액 및 파편의 제거를 제어하도록 설계될 수 있다.

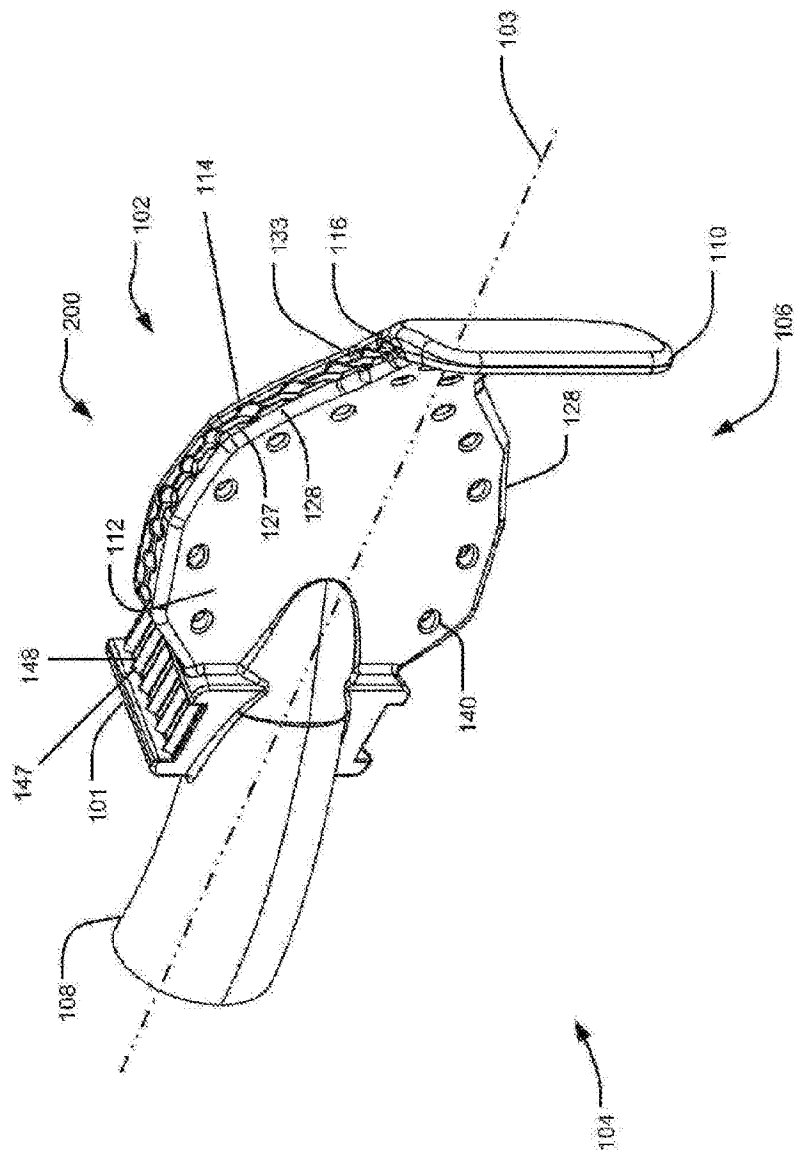
[0035] 여러 실시형태가 위에서 설명되었지만, 그들은 단지 예로서 제시되었을뿐 제한이 아님을 이해해야 한다. 설명은 본 명세서에 기재된 특정 형태로 본 발명의 범위를 제한하도록 의도되지 않는다. 따라서, 바람직한 실시형태의 폭 및 범위는 진술한 예시적인 실시형태들 중 어느 것에 의해 제한되어서는 안 된다. 위의 설명은 예시적인 것이며 제한적인 것이 아님을 이해해야 한다. 그와 달리, 본 설명은 첨부된 청구범위에 의해 규정되며 그 외에는 당업자에 의해 인식되는 본 발명의 사상 및 범위 내에 포함될 수 있는 그러한 대안, 수정 및 등가물을 아우르도록 의도된다. 따라서, 본 발명의 범위는 위의 설명을 참조하지 않고 결정되어야 하며, 대신 첨부된 청구범위와 그들 등가물의 전 범위를 참조하여 결정되어야 한다.

도면

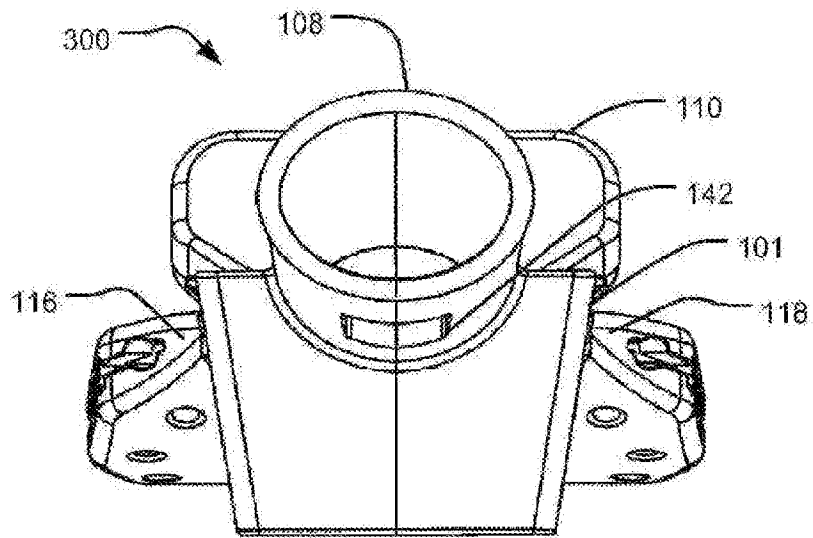
도면



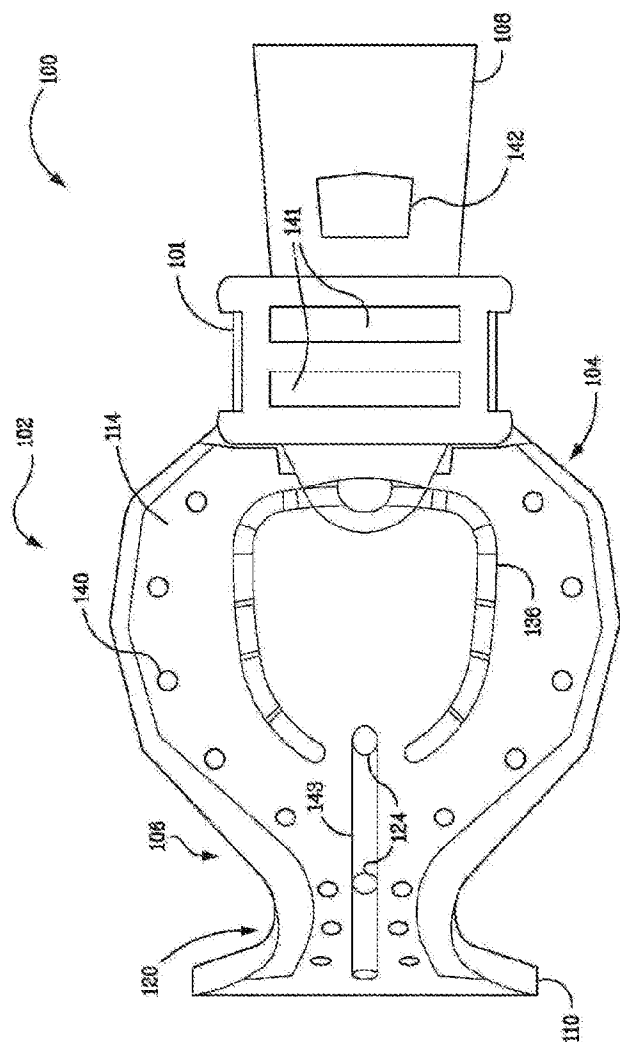
도면2



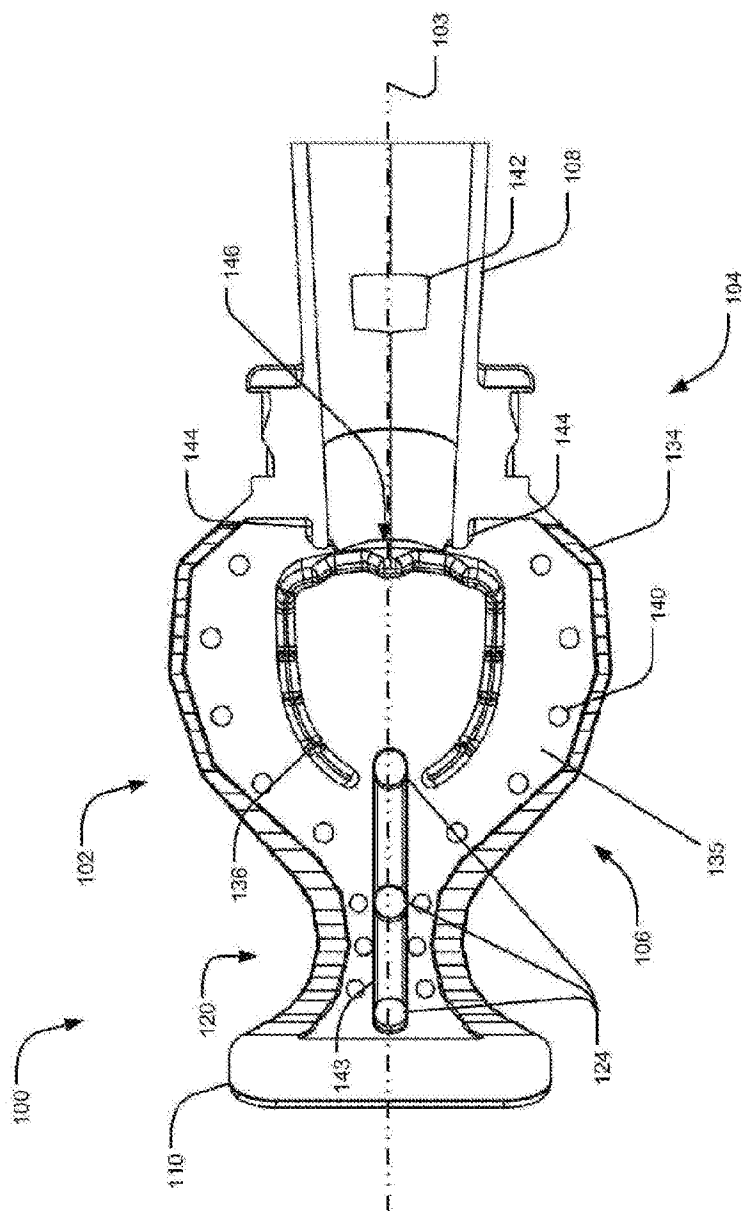
도면3



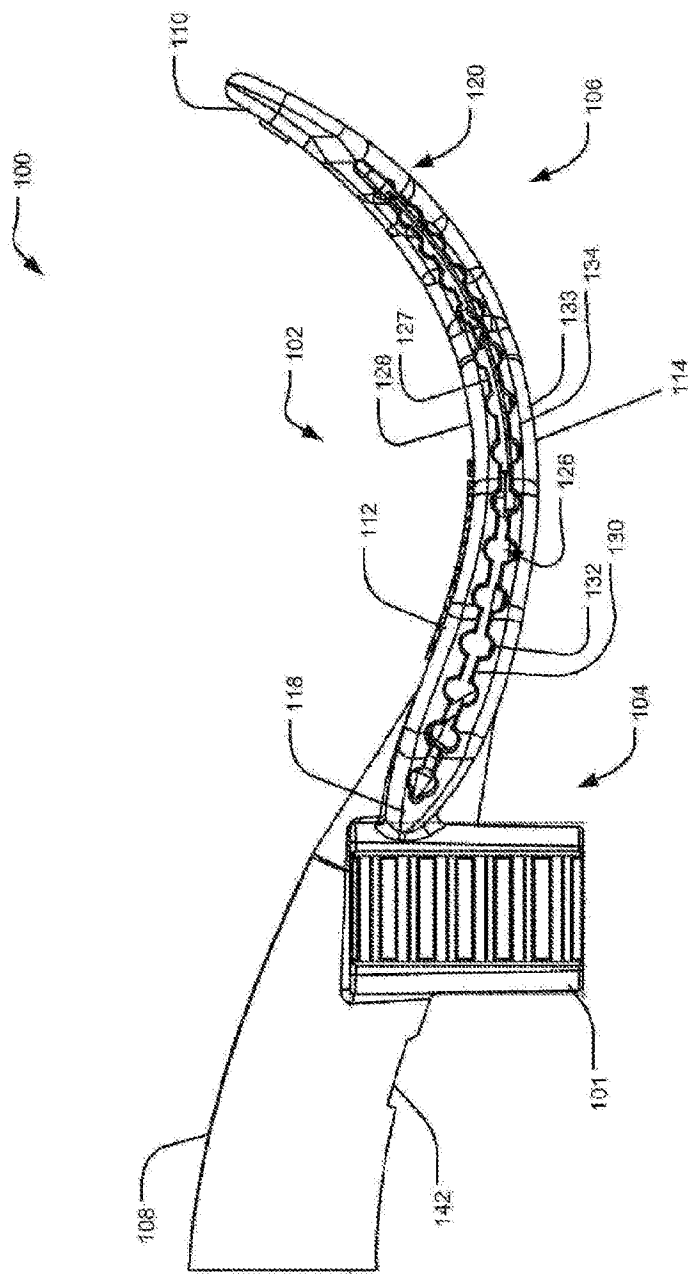
도면 4



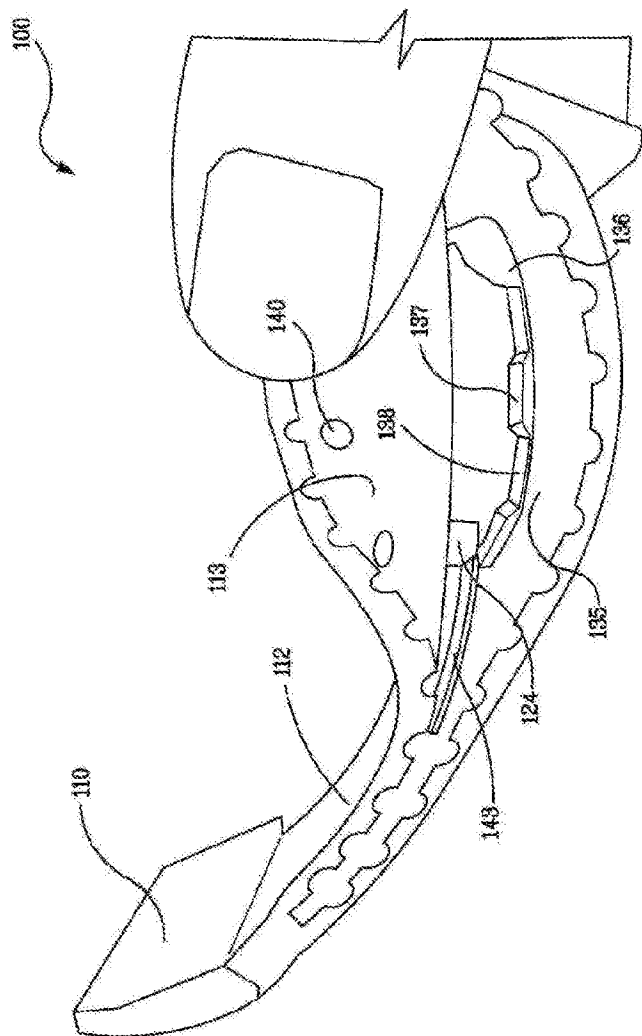
도면5



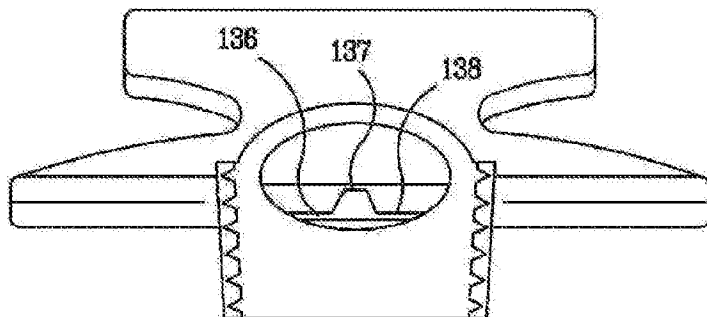
도면6



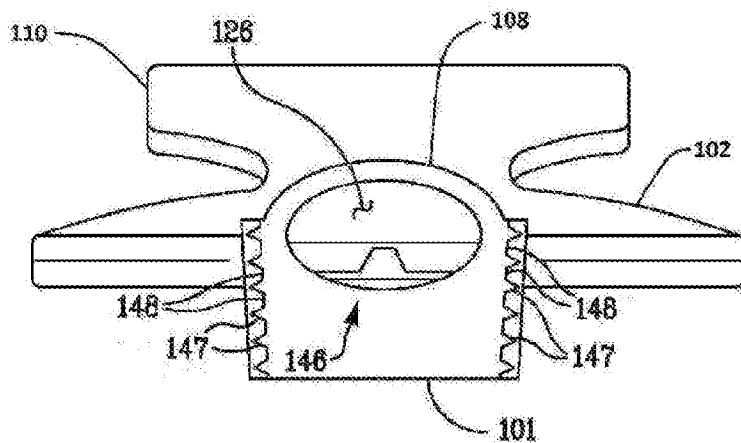
도면7



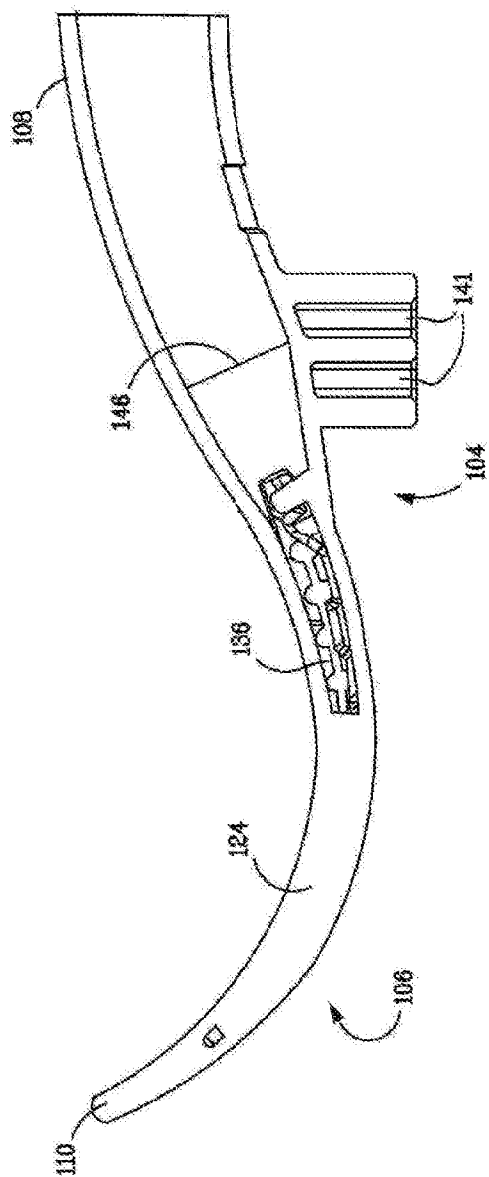
도면8



도면9



도면10



도면 11

