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Nguyen et al.

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(54) **INTRAORAL DEVICE**

(56) **References Cited**

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(US)

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(73) Assignee: **Solmetex, LLC**, Northborough, MA
(US)

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Mar. 27, 2014, now Pat. No. 11,744,686, which is a
(Continued)

(51) **Int. Cl.**

A61C 17/08 (2006.01)

A61C 17/02 (2006.01)

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

CPC **A61C 17/0208** (2013.01); **A61C 17/08**
(2019.05)

(58) **Field of Classification Search**

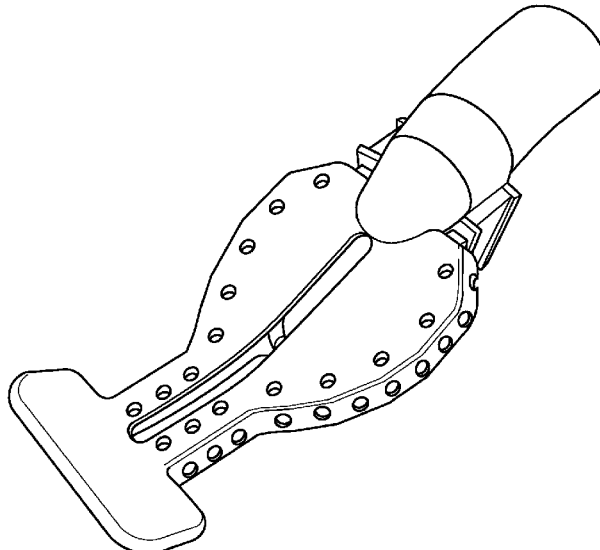
CPC A61C 17/08; A61C 17/0208; A61C 17/06;
A61C 17/00; A61C 17/02; A61C 17/43;
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ABSTRACT

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 mouth-
piece may be reusable.

30 Claims, 11 Drawing Sheets



Related U.S. Application Data			
continuation of application No. 14/100,323, filed on Dec. 9, 2013, now Pat. No. 8,911,232.			
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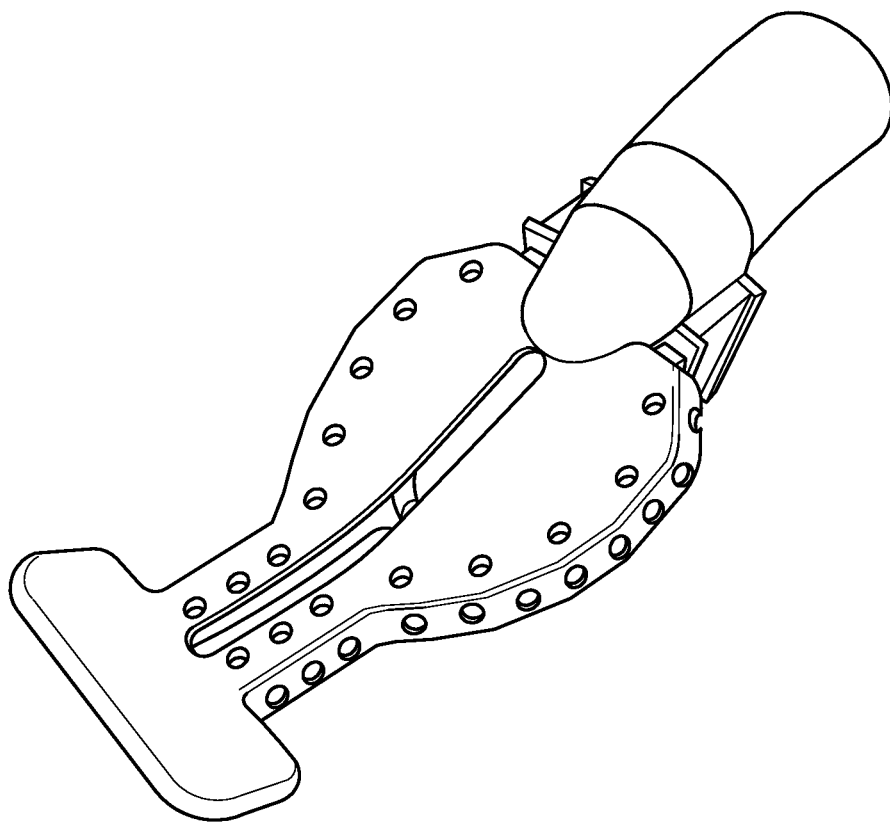


FIG. 1A

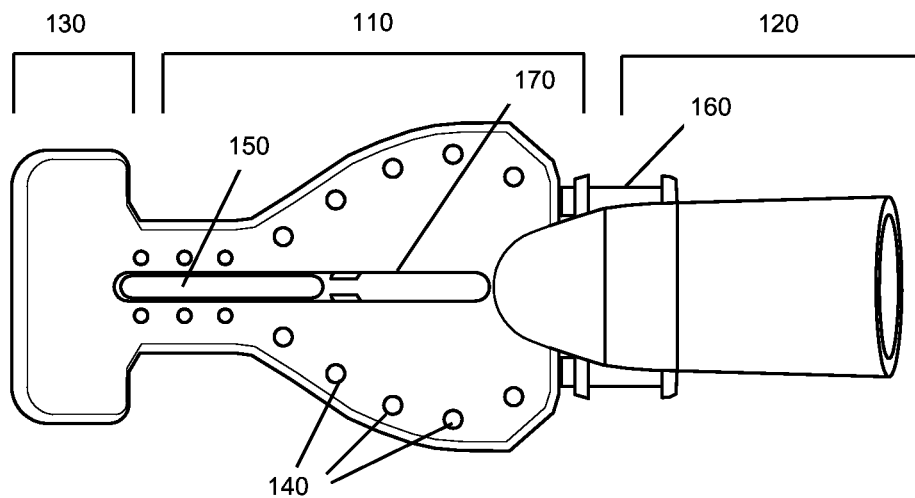


FIG. 1B

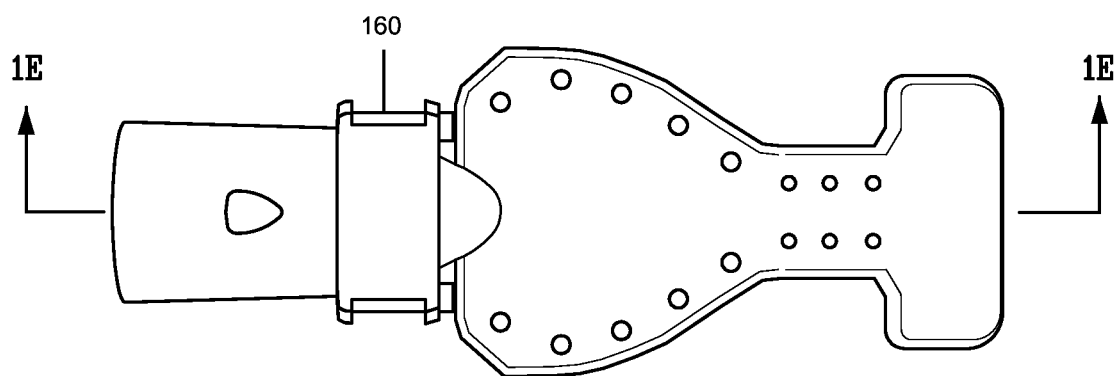
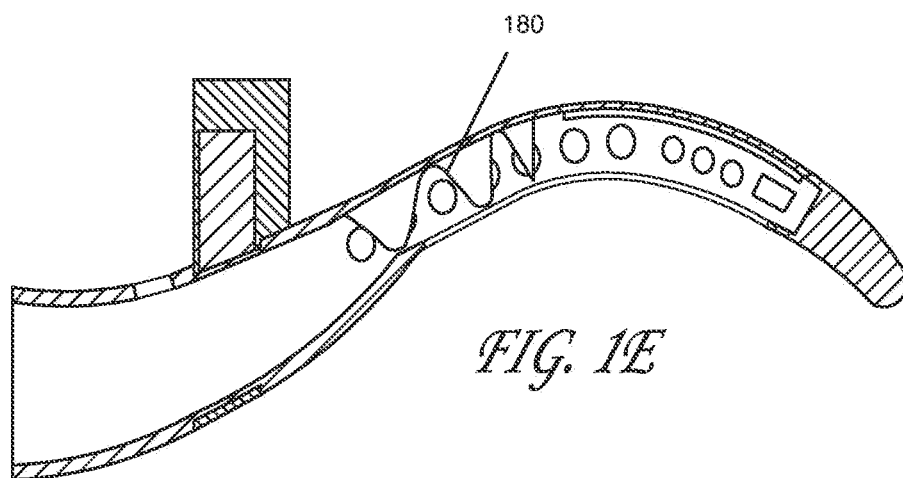
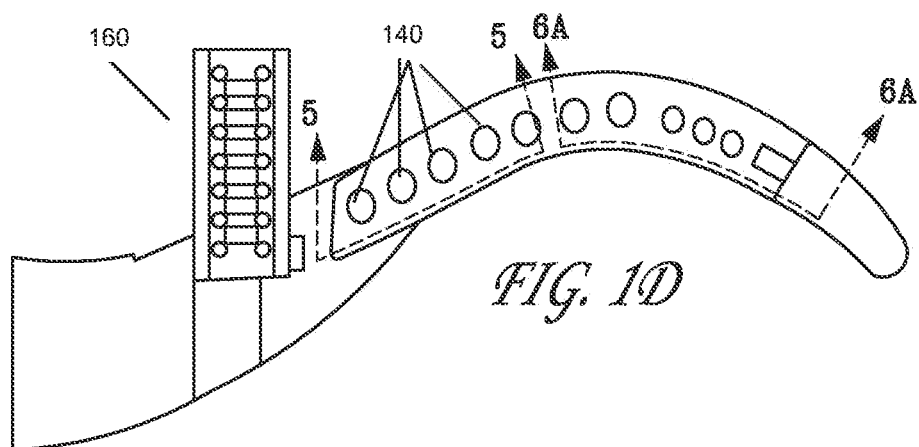


FIG. 1C



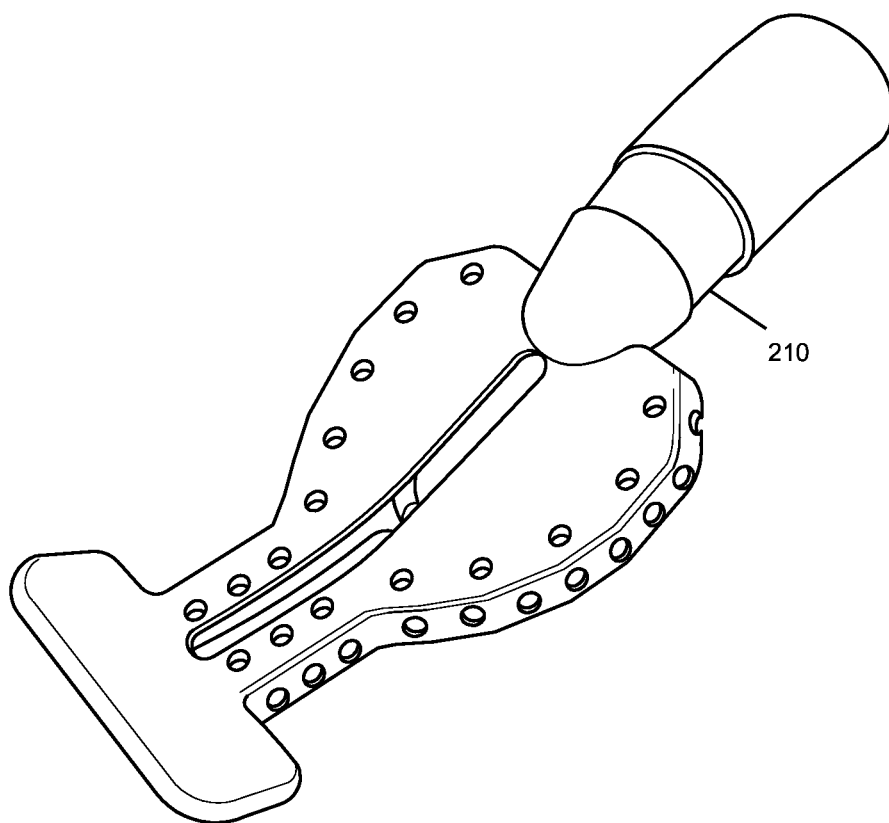


FIG. 2A

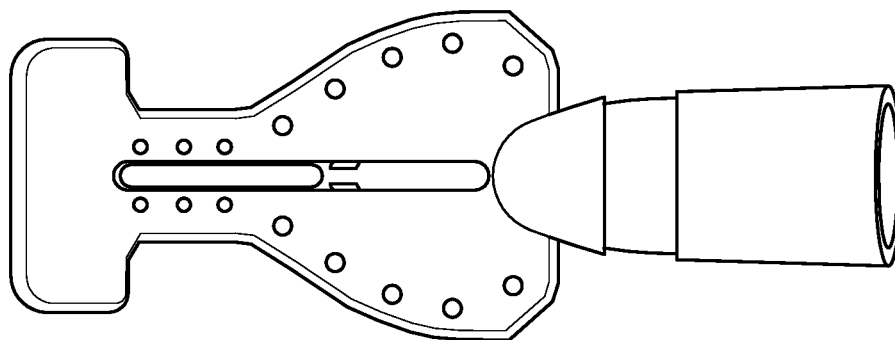


FIG. 2B

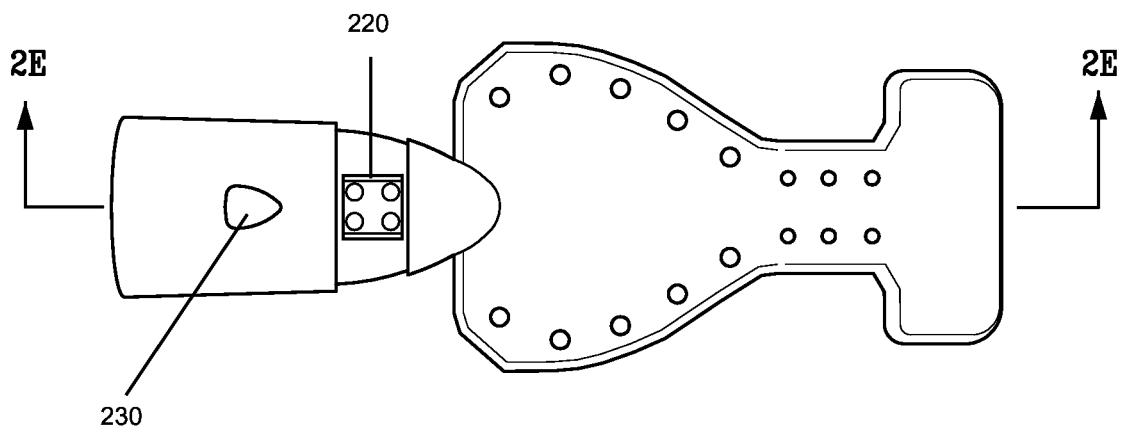


FIG. 2C

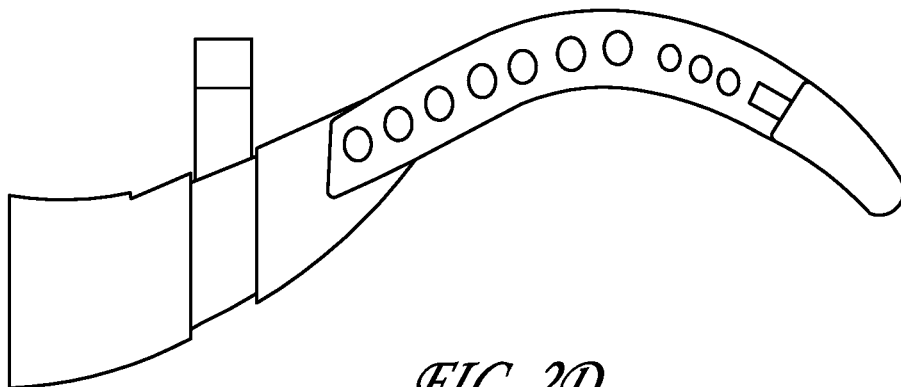


FIG. 2D

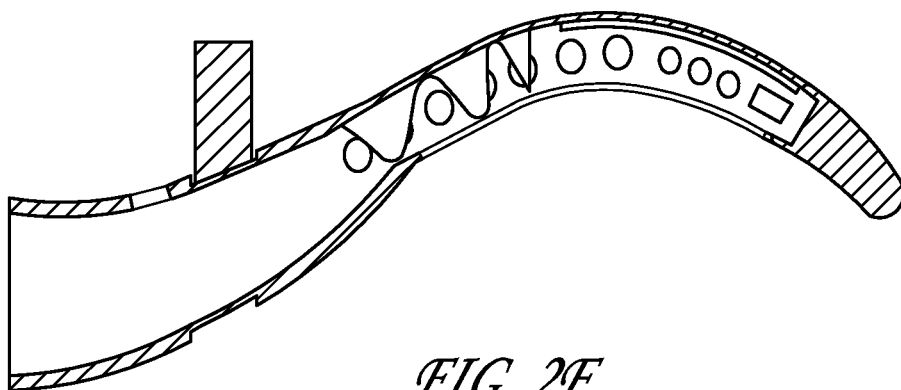


FIG. 2E

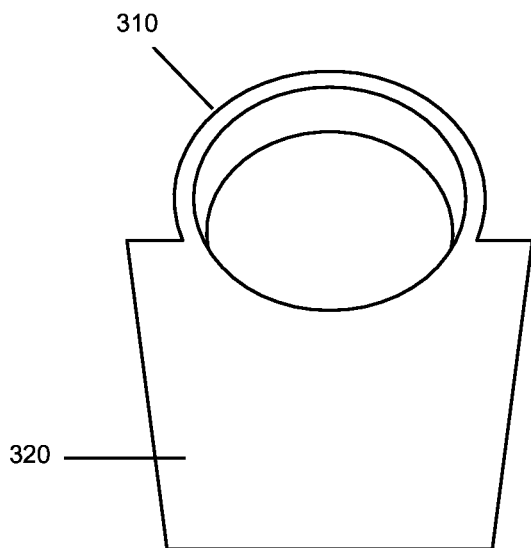


FIG. 3A

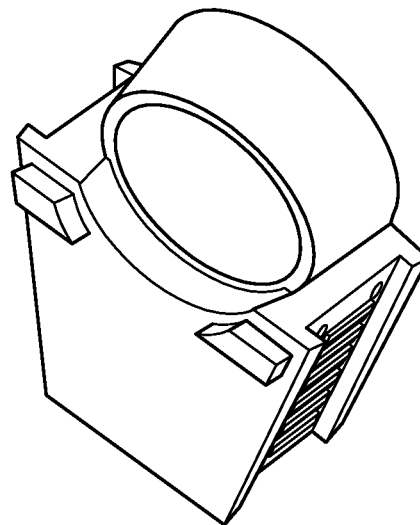


FIG. 3D

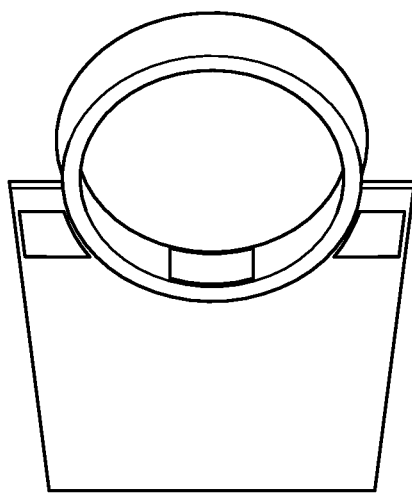


FIG. 3B

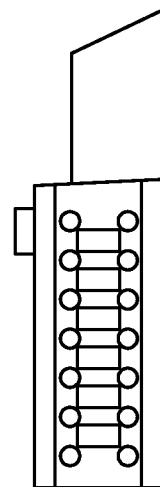


FIG. 3E

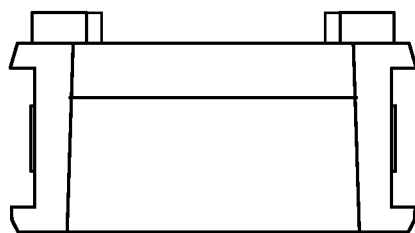


FIG. 3C

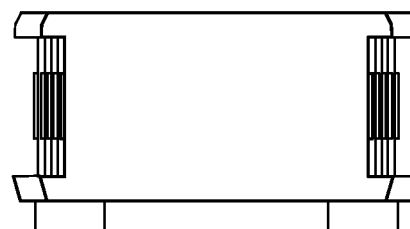
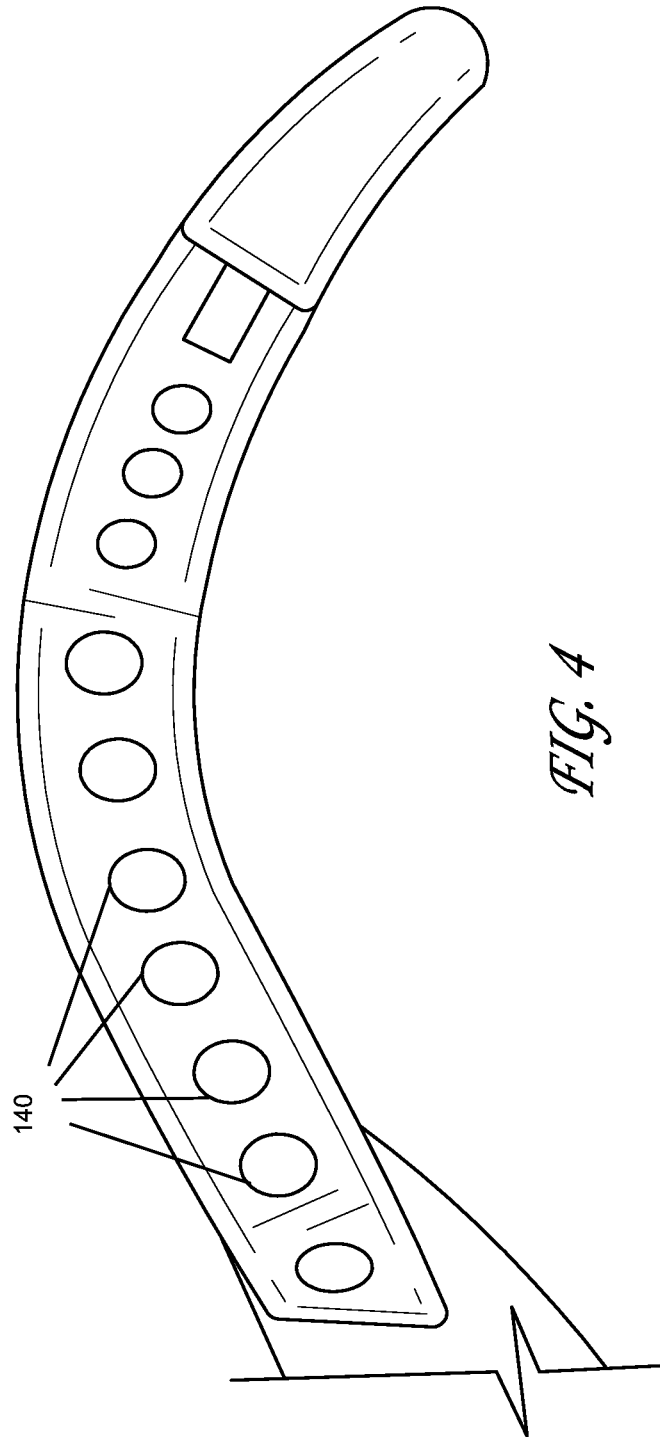


FIG. 3F



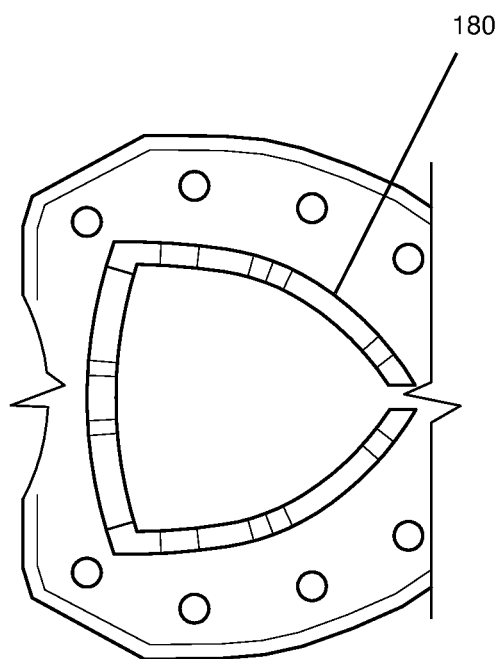


FIG. 5

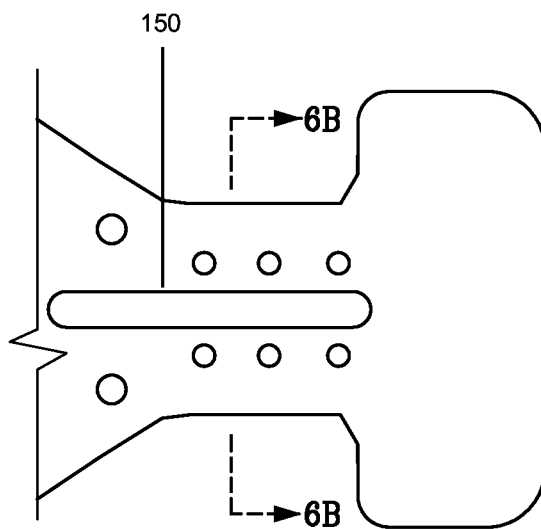


FIG. 6A

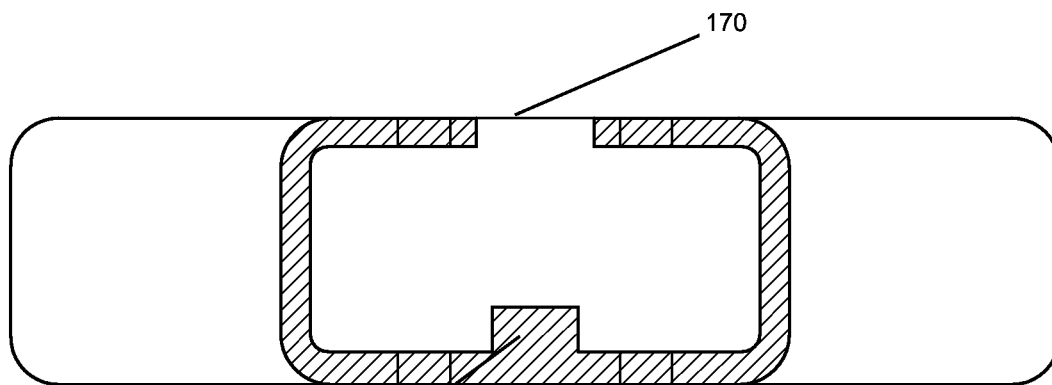


FIG. 6B

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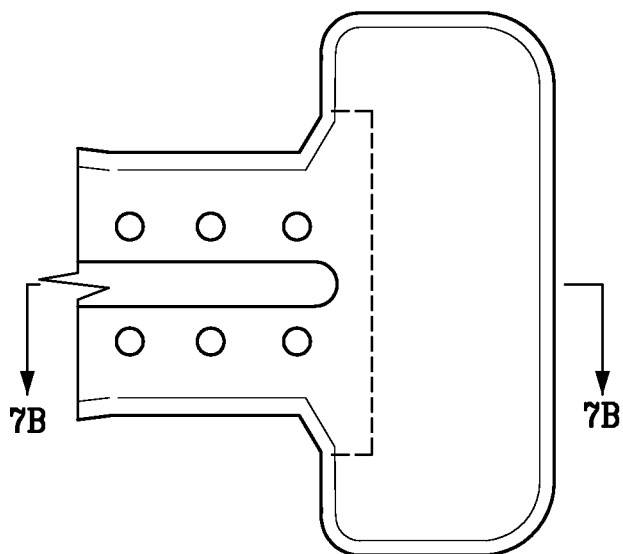


FIG. 7A

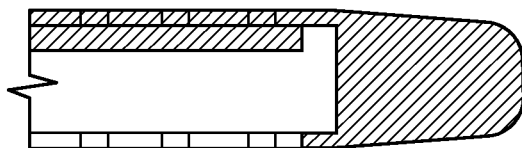


FIG. 7B

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INTRAORAL DEVICE**CROSS-REFERENCE TO RELATED APPLICATIONS**

The present application is a continuation and claims the priority benefit of U.S. patent application Ser. No. 14/228,057 filed Mar. 27, 2014, which is a continuation and claims the priority benefit of U.S. patent application Ser. No. 14/100,323 filed Dec. 9, 2013, now U.S. Pat. No. 8,911,232, which claims the priority benefit of U.S. provisional patent application No. 61/734,939 filed Dec. 7, 2012, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION**1. Field of the Invention**

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

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.

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

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.

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

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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.

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

FIG. 1A is a perspective view of an exemplary mouthpiece with a detachable mouth prop.

FIG. 1B is a top view of the exemplary mouthpiece and detachable mouth prop of FIG. 1A.

FIG. 1C is a bottom view of the exemplary mouthpiece and detachable mouth prop of FIG. 1A.

FIG. 1D is a side view of the exemplary mouthpiece and detachable mouth prop of FIG. 1A.

FIG. 1E is a cross-sectional view of the exemplary mouthpiece and detachable mouth prop of FIG. 1A.

FIG. 2A is a perspective view of the exemplary mouthpiece of FIG. 1A where the detachable mouth prop has been detached.

FIG. 2B is a top view of the exemplary mouthpiece of FIG. 2A.

FIG. 2C is a bottom view of the exemplary mouthpiece of FIG. 2A.

FIG. 2D is a side view of the exemplary mouthpiece of FIG. 2A.

FIG. 2E is a cross-sectional view of the exemplary mouthpiece of FIG. 2A.

FIG. 3A is a front view of an exemplary mouth prop.

FIG. 3B is a back view of the exemplary mouth prop of FIG. 3A.

FIG. 3C is a bottom view of the exemplary mouth prop of FIG. 3A.

FIG. 3D is a perspective view of the exemplary mouth prop of FIG. 3A.

FIG. 3E is a side view of the exemplary mouth prop of FIG. 3A.

FIG. 3F is a top view of the exemplary mouth prop of FIG. 3A.

FIG. 4 is a close-up view of exemplary mesh sides in an exemplary mouthpiece.

FIG. 5 is a close-up view of an internal bridge in an exemplary mouthpiece.

FIG. 6A is a close-up view of an exemplary reinforcing bar in an exemplary mouthpiece.

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

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

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

DETAILED DESCRIPTION

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.

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.

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. 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.

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

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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.

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.

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.

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.

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.

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.

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).

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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.

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.

The mouthpiece may be used with a mouth prop **160**, as illustrated in FIG. 1 (with a mouth prop **160**) and FIG. 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 portion **320** of 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.

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.

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.

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

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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.

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 protruding from an interior surface of the second wall, the bridge structure extending across the distance between the first wall and the second wall through the interior space towards the first wall; and

a cheek-retractor portion connected to the narrower second end of the main body portion and expanding outwardly away from the second narrower end, the first wall and the second wall of the main body transitioning into and being connected in the cheek-retractor portion to form the cheek-retractor portion, wherein the first wall and the second wall of the main body portion that transition into the cheek-retractor portion are spaced apart from each other for a distance within the cheek-retractor portion before being connected at the cheek-retractor portion.

2. 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. 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, 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.

5. The mouthpiece of claim 4, 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.

6. The mouthpiece of claim 4, wherein 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.

7. 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

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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.

8. 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.

9. 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 third plurality of perforations formed adjacent to and extending along a portion of the third edge, and a fourth 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, wherein 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 wherein 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 side 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, wherein the first wall and the second wall of the main body portion that transition into the cheek-retractor portion are spaced apart from each

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other for a distance within the cheek-retractor portion before being connected to each other in the cheek-retractor portion.

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

11. The mouthpiece of claim 9, wherein the cutout is generally triangular and has a top edge, a first curved edge, and a second curved edge.

12. The mouthpiece of claim 9, 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.

13. The mouthpiece of claim 9, 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.

14. The mouthpiece of claim 13, wherein the third plurality of perforations of the second wall and the fourth plurality of perforations of the second wall each include at least three perforations.

15. The mouthpiece of claim 9, 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.

16. The mouthpiece of claim 15, wherein the third plurality of perforations of the second wall and the fourth plurality of perforations of the second wall each include at least four perforations.

17. The mouthpiece of claim 9, wherein the third wall connects the first edge of the first wall to the third edge of the second wall.

18. The mouthpiece of claim 9, wherein the third wall connects the second edge of the first wall to the fourth edge of the second wall.

19. The mouthpiece of claim 9, 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.

20. The mouthpiece of claim 9, wherein the mouth prop is removably coupled to the generally tubular conduit of the suction connector portion.

21. 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

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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 of 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 wall and the second wall of the main body transitioning into and being connected in the cheek-retractor portion to form the cheek-retractor portion, wherein the first wall and the second wall of the main body portion that transition into the cheek-retractor portion are spaced apart from each other for a distance within the cheek-retractor portion before being connected to each other in the cheek-retractor portion.

22. The mouthpiece of claim **21**, 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.

23. The mouthpiece of claim **22**, wherein the cutout is on the same side of the suction-connector portion as the mouth prop.

24. 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.

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25. The mouthpiece of claim **21**, wherein the stability bar extends upwardly from the first wall toward the second wall.

26. The mouthpiece of claim **25**, wherein the stability bar does not contact the second wall.

27. The mouthpiece of claim **21**, wherein the bridge structure is located centrally in the main body.

28. The mouthpiece of claim **21**, wherein the narrower second end is part of a rectangular portion of the main body.

29. The mouthpiece of claim **21**, 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 a portion of the first wall that is spaced apart from the second wall.

30. 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 third plurality of perforations formed adjacent to and extending along a portion of the third edge, and a fourth 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 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, 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, wherein 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 wherein 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

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prop towards a bottom surface of the mouth prop, the first side and the second side 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.

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