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Achenbach

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(54) **CAMERA POSITIONING AND MOUNTING SYSTEM WITH IMPROVED MOUTH ADAPTER**

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A45F 3/14	(2006.01)
G03B 17/56	(2006.01)
F16M 11/28	(2006.01)
F16M 13/04	(2006.01)

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

CPC ***G03B 17/561*** (2013.01); ***F16M 11/28*** (2013.01); ***F16M 13/04*** (2013.01)

(58) **Field of Classification Search**

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USPC 224/181; 2/209.13
See application file for complete search history.

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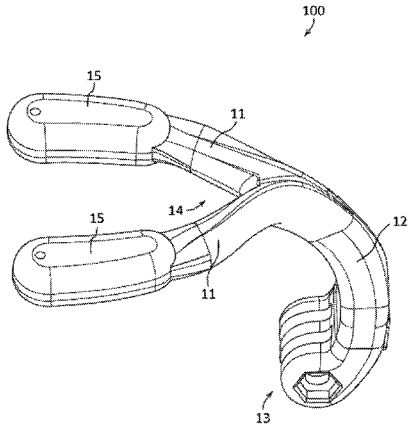
(57) **ABSTRACT**

A mouth adapter configured to secure a portable camera comprising a first bite wing, a second bite wing, an air channel located between the first bite wing and the second bite wing, an adapter arm connecting the first bite wing and the second bite wing, and a camera mount coupled to the adapter. The bite wings may be elongated and comprise a bite surface made from an elastic polymer which may be configured to make contact with the teeth of a user as they bite onto the bite surface. In further preferred embodiments, the mouth adapter comprises a first balance ridge and second balance ridge protruding from the adapter arm proximate to the first and second bite wings with an air groove positioned between said the balance ridges. The air groove may be located within the adapter arm and proximate to intersection of the bite wings.

18 Claims, 13 Drawing Sheets



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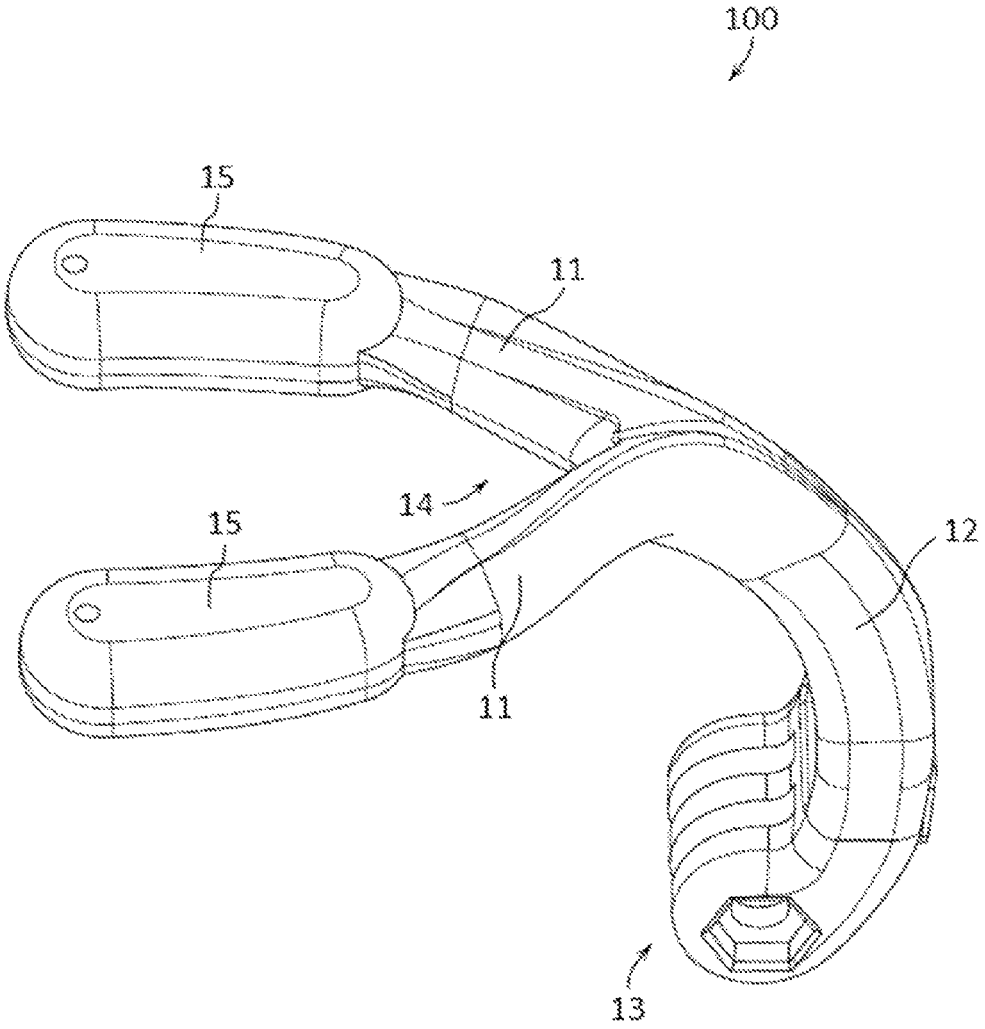

FIG. 1

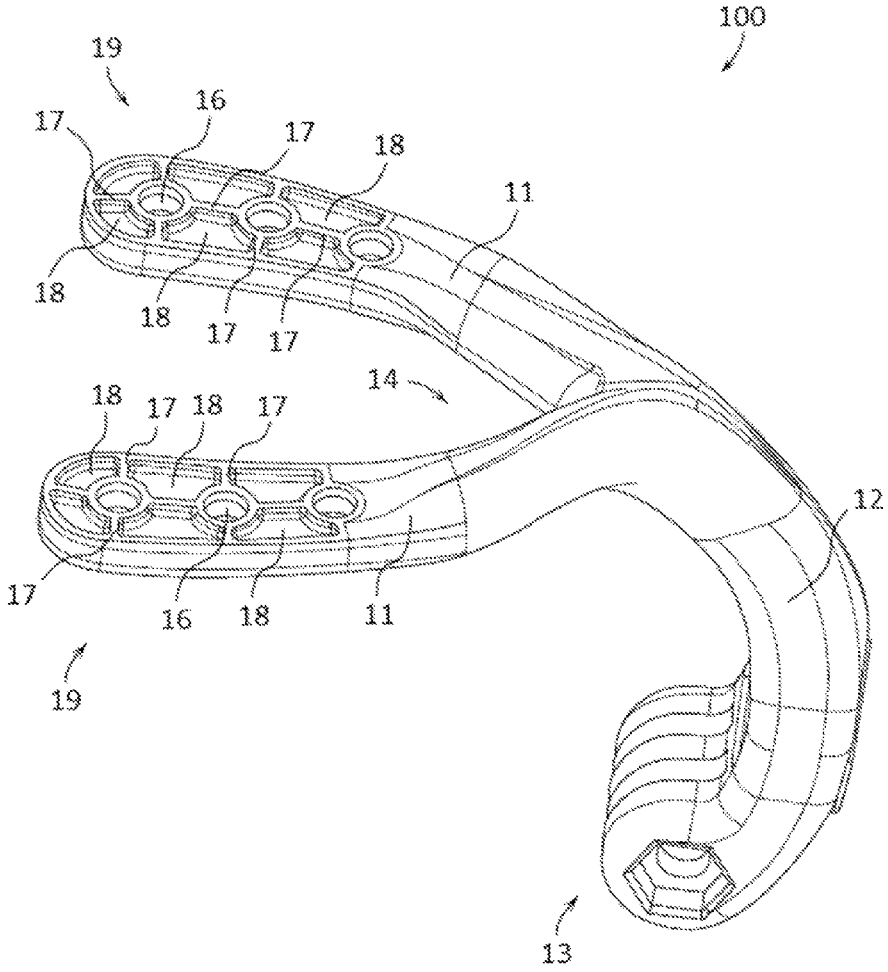

FIG. 2

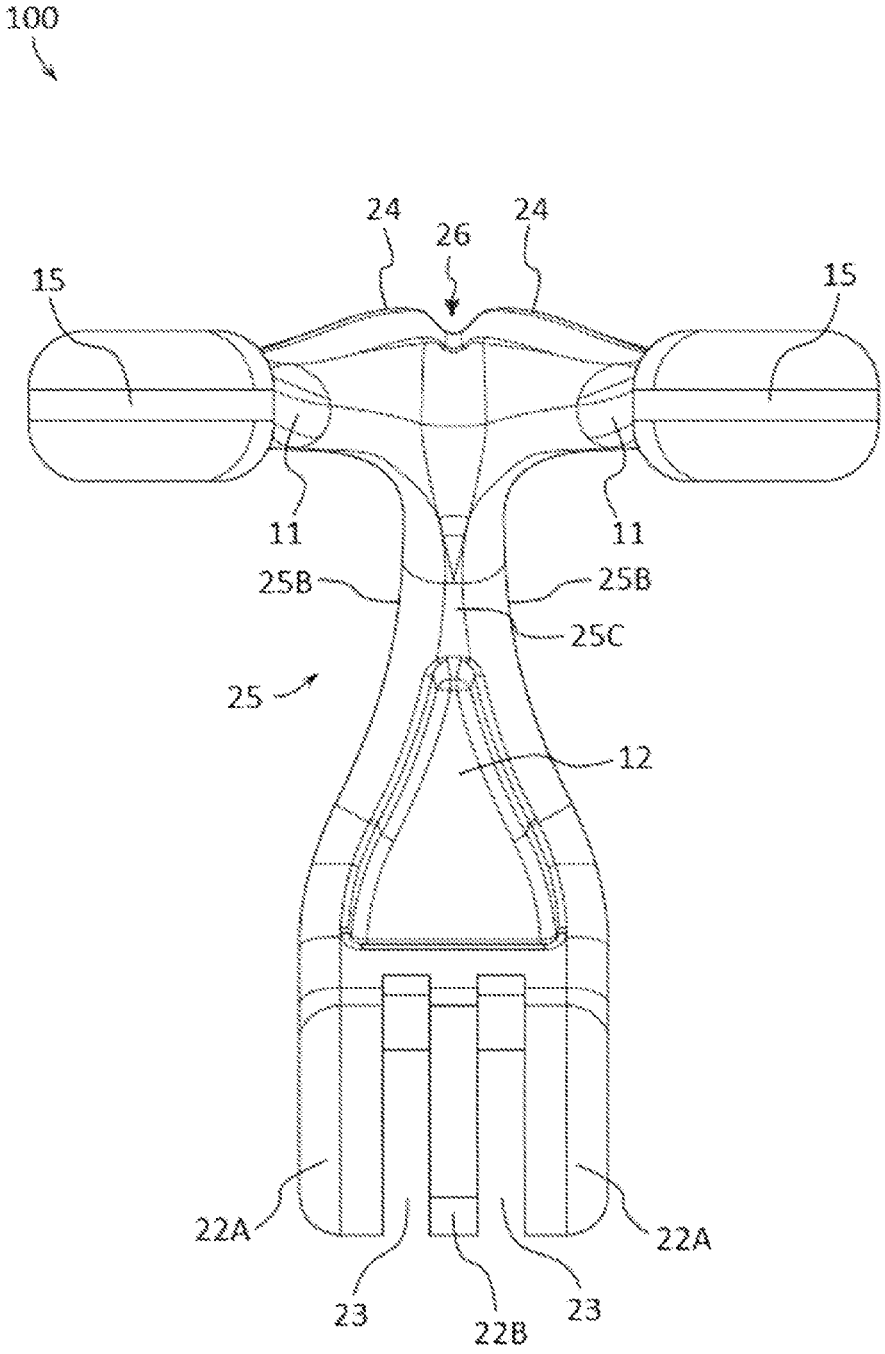

FIG. 3

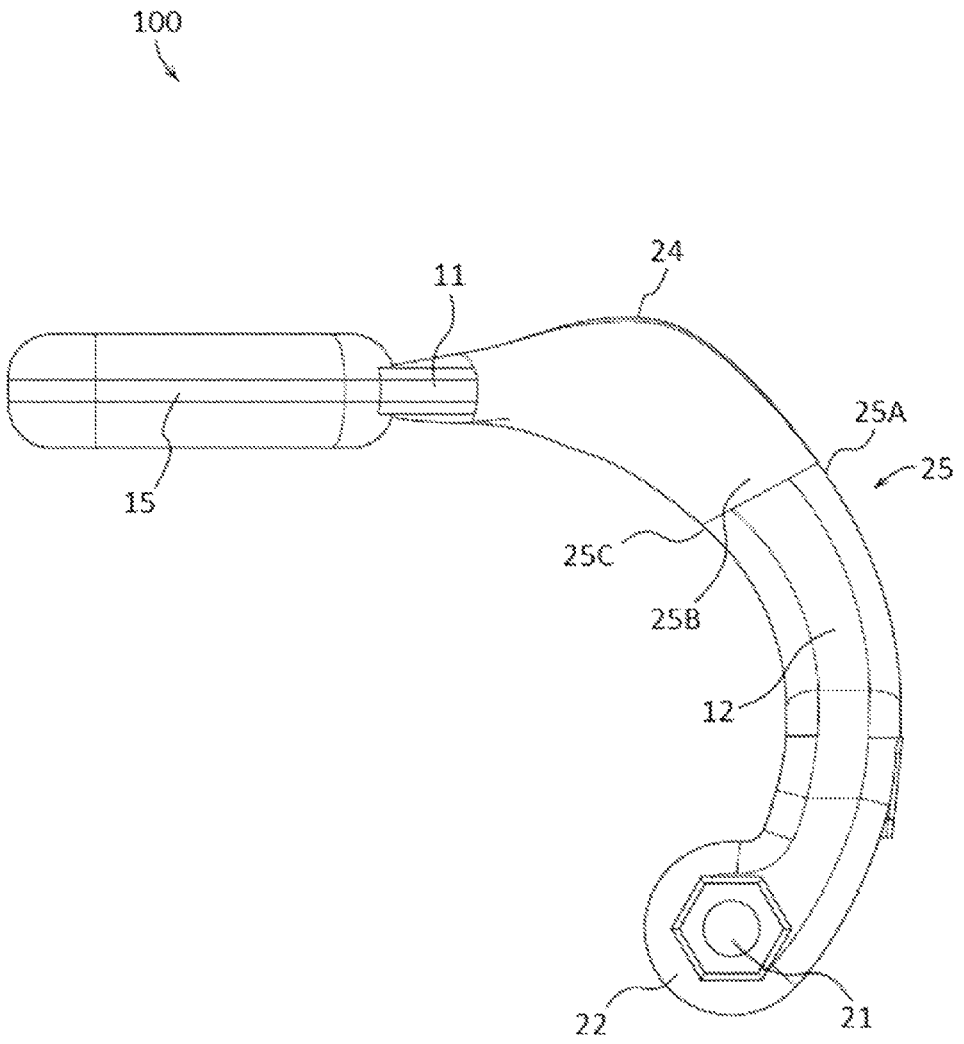

FIG. 4

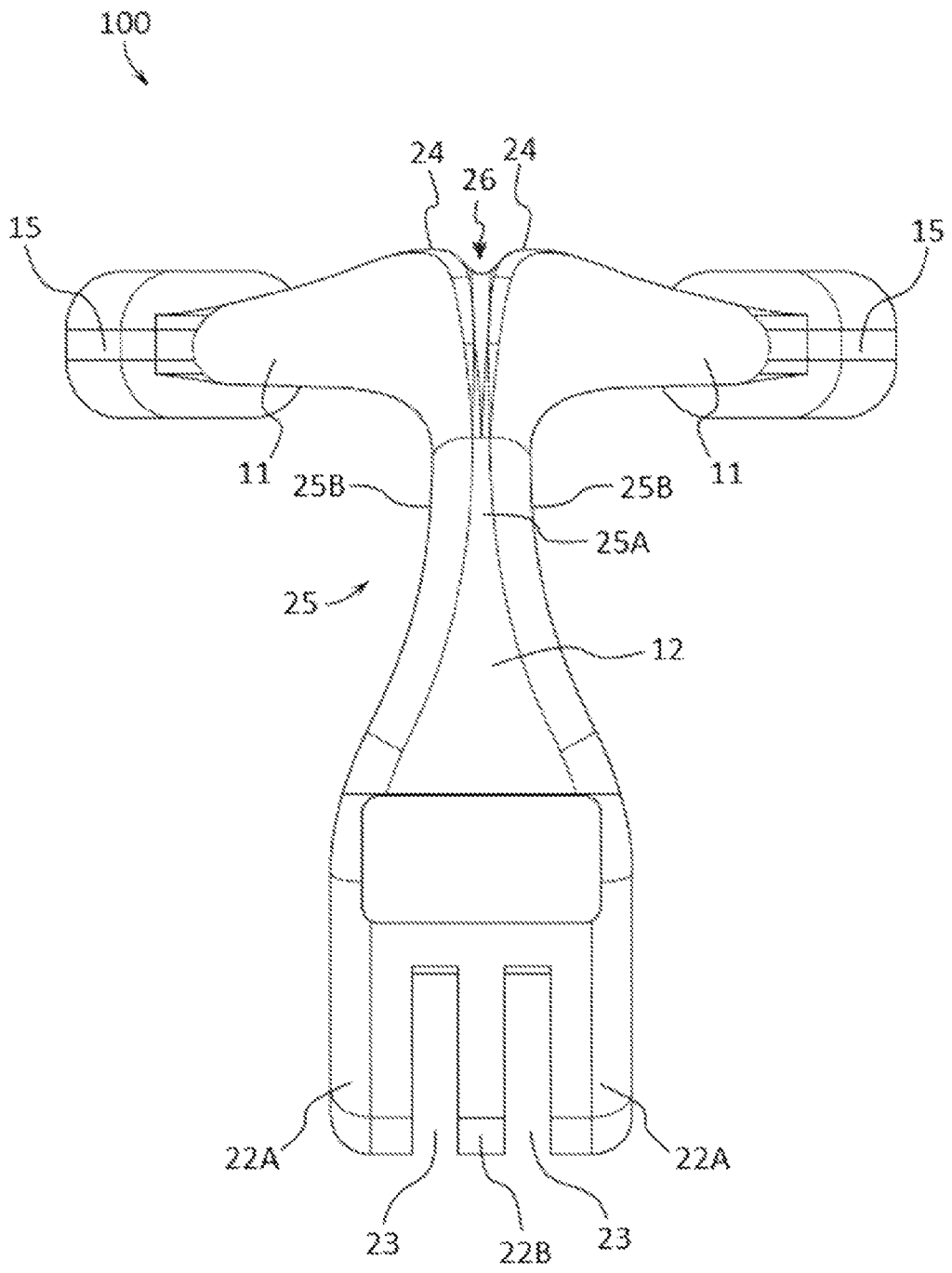

FIG. 5

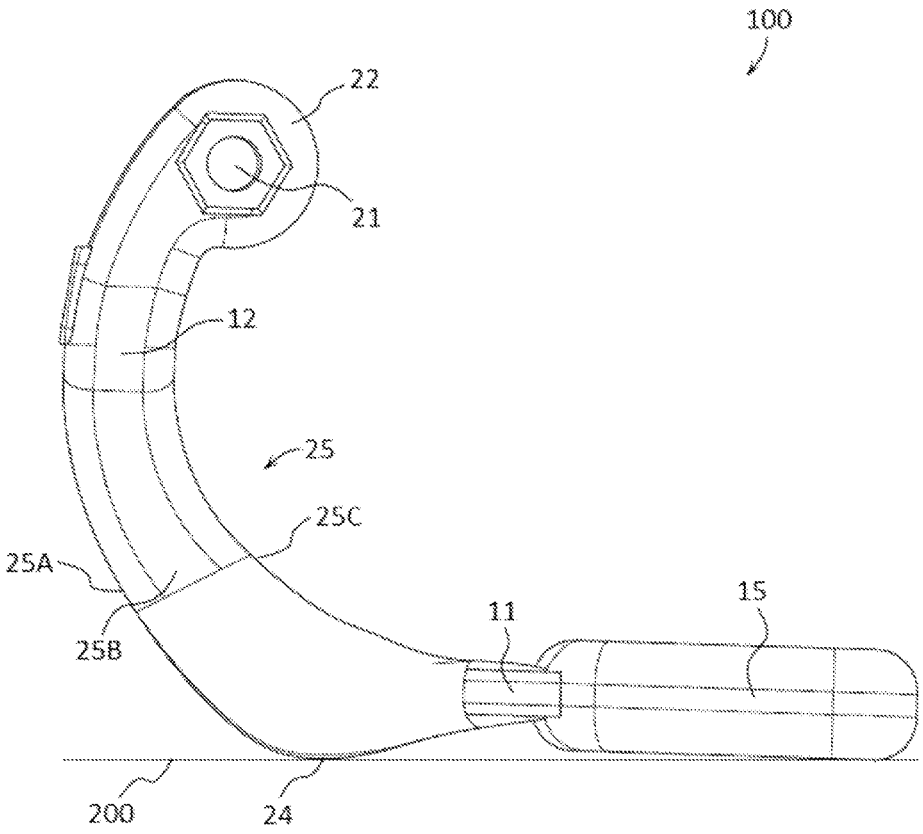

FIG. 6

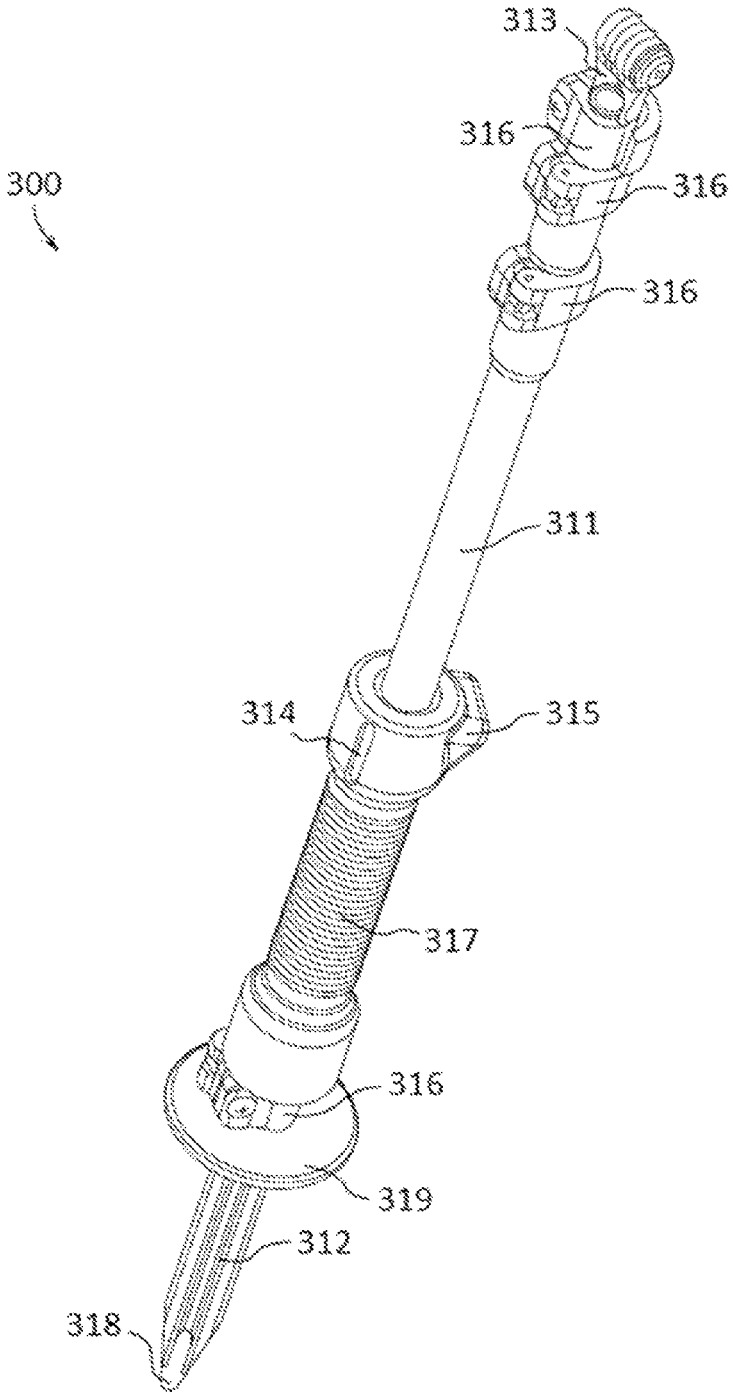

FIG. 7

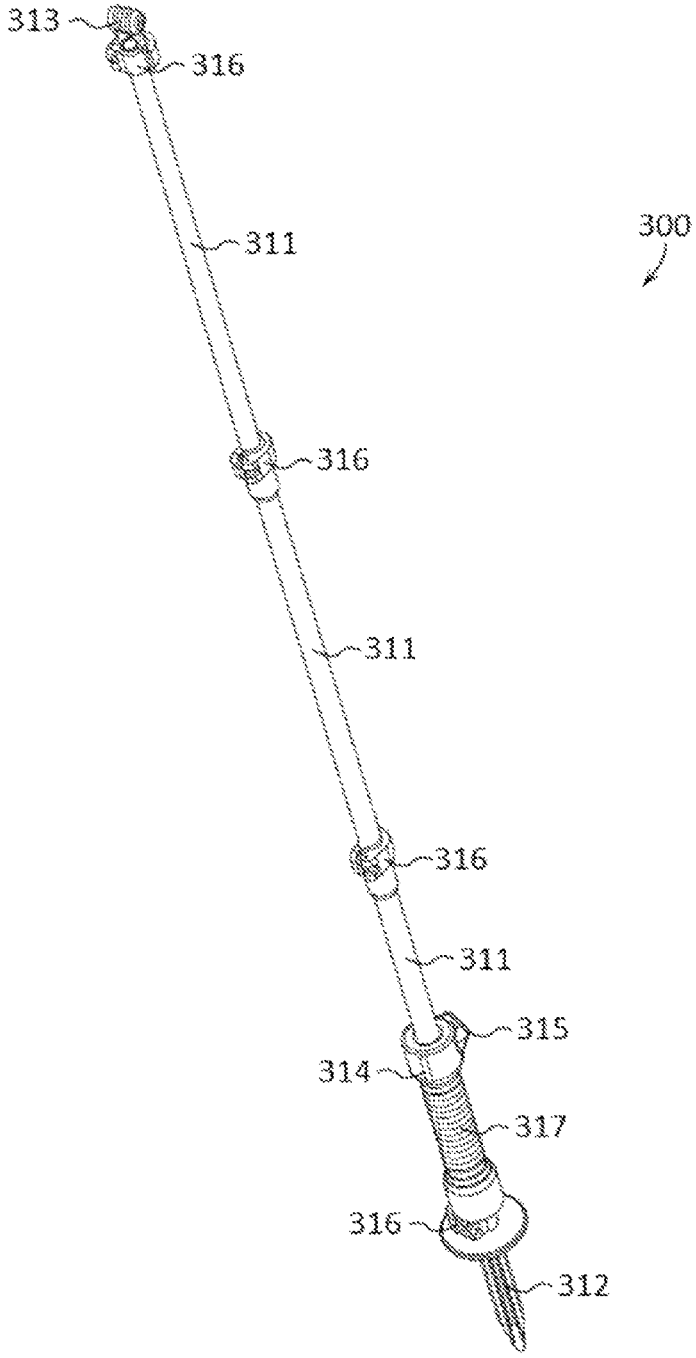

FIG. 8

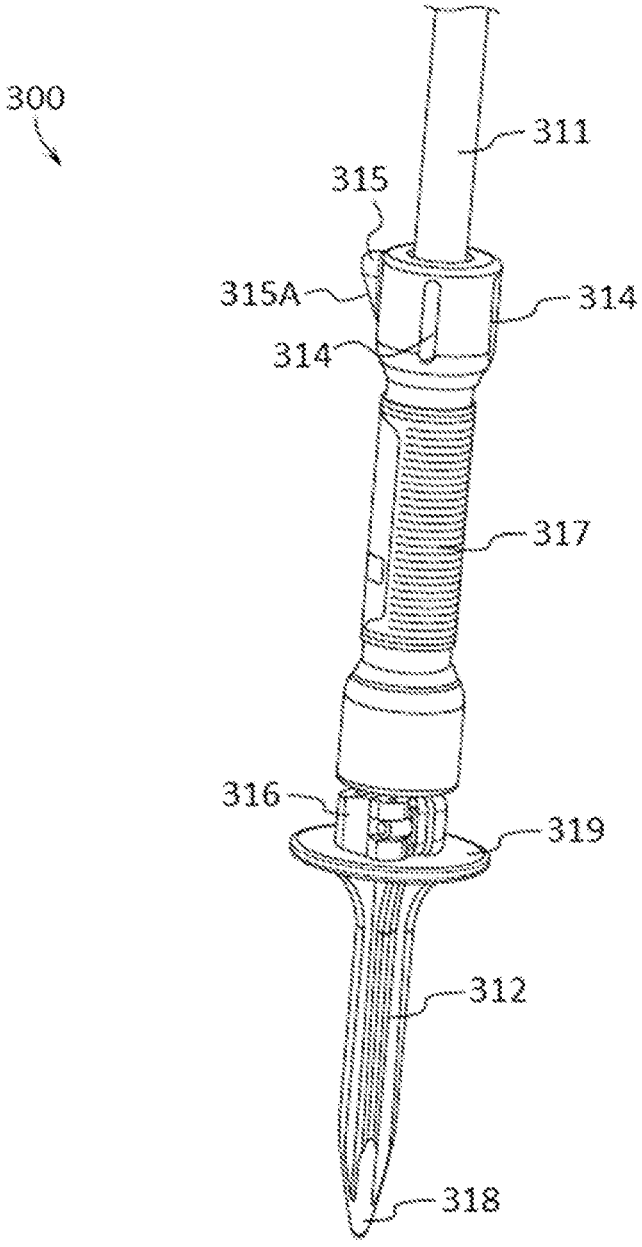

FIG. 9

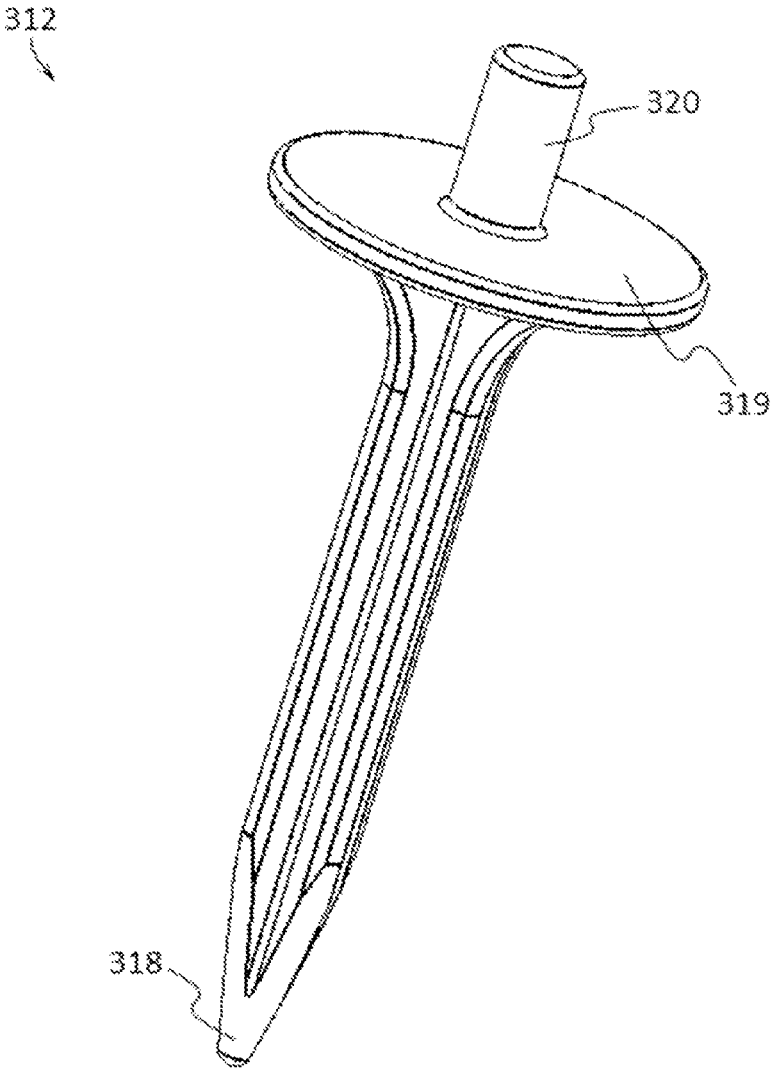

FIG. 10

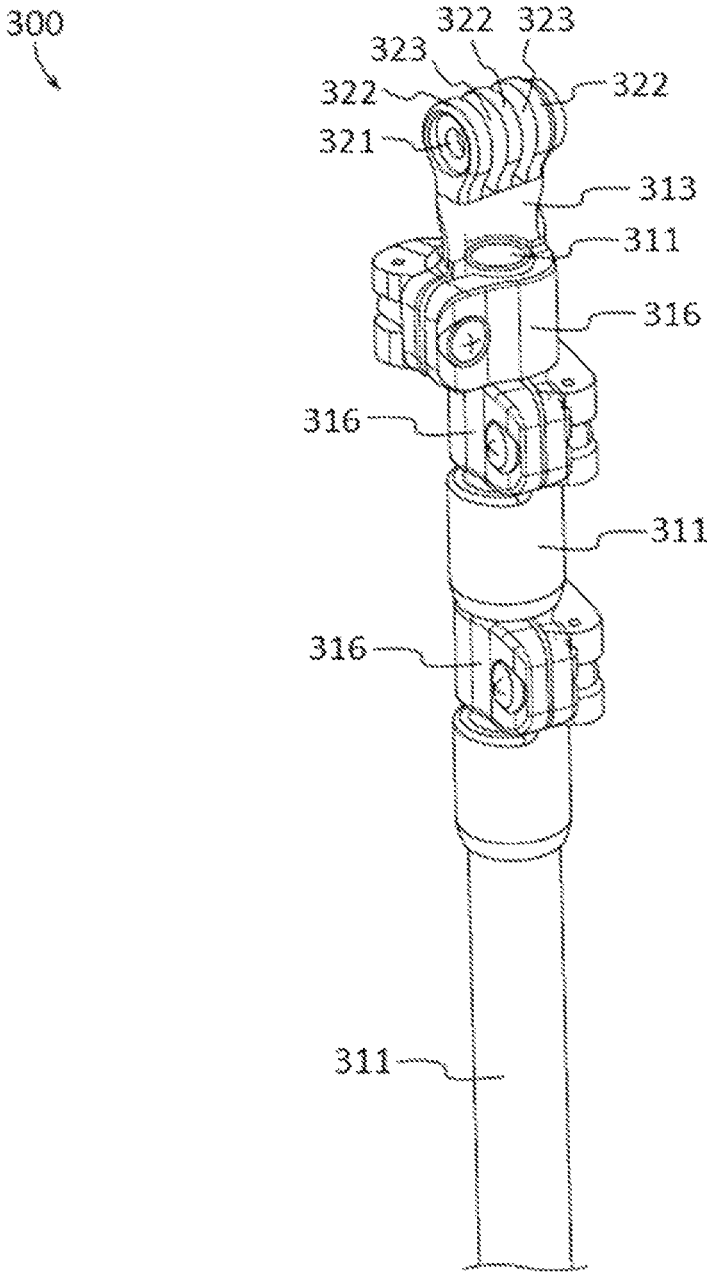

FIG. 11

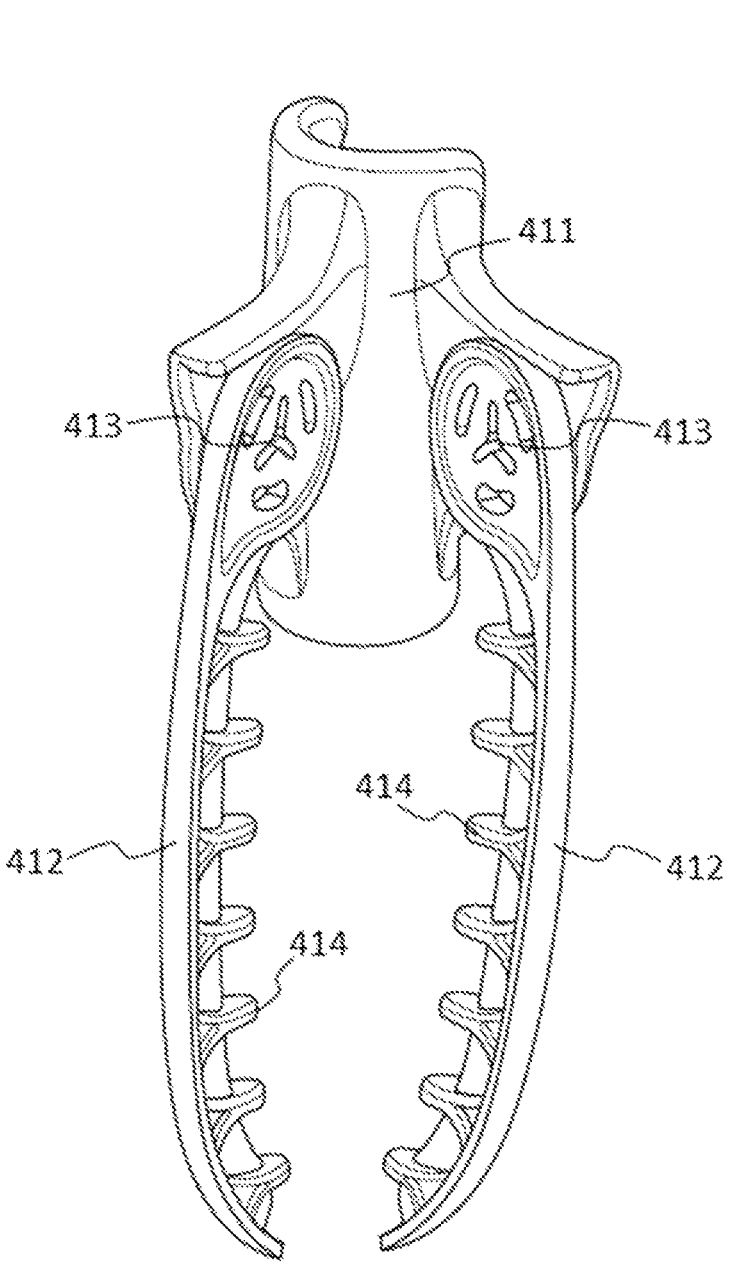

FIG. 12

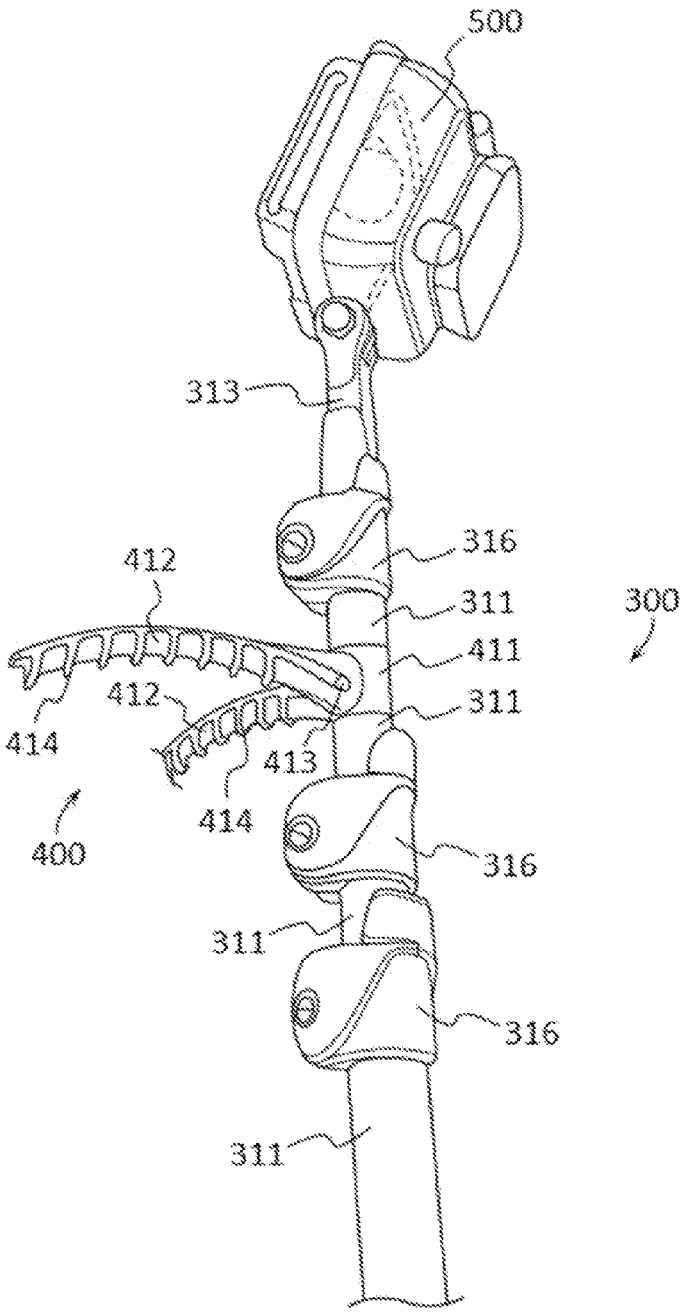
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FIG. 13

CAMERA POSITIONING AND MOUNTING SYSTEM WITH IMPROVED MOUTH ADAPTER

CROSS REFERENCE TO RELATED APPLICATIONS

The present application claims priority to, U.S. provisional patent application No. 61/879,842 filed Sep. 19, 2013, and entitled "NOVEL CAMERA MOUNTING SYSTEM AND ACCESSORIES", and also to U.S. provisional patent application No. 61/903,013 filed Nov. 12, 2013, and entitled "NOVEL CAMERA POSITIONING AND MOUNTING SYSTEM", and also to U.S. provisional patent application No. 61/921,116 filed Dec. 17, 2013, and entitled "NOVEL CAMERA POSITIONING AND MOUNTING SYSTEM WITH IMPROVED MOUTH ADAPTER", and also to U.S. provisional patent application No. 61/992,319 filed May 13, 2014, and entitled "NOVEL CAMERA POSITIONING AND MOUNTING SYSTEM WITH IMPROVED MOUTH ADAPTER", the entire contents of the above-referenced patent applications are incorporated by reference herein.

FIELD OF THE INVENTION

The present invention relates to novel camera positioning and mounting systems. More particularly, the invention relates to a modular quick release camera mounting and positioning system.

BACKGROUND

In the world of extreme sports filmmaking there are hundreds of different types of filming equipment. Unfortunately, this field is divided. Cheap equipment does not provide the quality needed by many filmmakers, and professional equipment is bulky and expensive, often requiring trained personnel to operate. Filming and photographing extreme sports on location with professional equipment and a film crew is prohibitively expensive for most filmmakers, while cheap equipment can break or lead to poor quality results.

An example of a professional image capturing system can be seen in U.S. patent application Ser. No. 11/470,461 filed on Sep. 6, 2006 by Giegerich et al. which describes a structure and method capable of positioning cameras for multiple viewing angles. This structure and method requires a significant investment of time, personnel, and finances in order to use, and is therefore outside the reach of the majority of filmmakers. Also, many on location environments are unable to support this setup.

Often the filmmaker is the only person on the film crew and is also required to appear in the shot. To get these shots, filmmakers have created all sorts of homemade attachments, accessories, and mounts which are frequently made from sticks, cardboard, scavenged parts, and even duct tape. These temporary solutions are specific to each filmmaker's needs for a particular situation and must be disassembled once the needs or available equipment changes. A significant amount of time and money can be wasted on trying to fabricate or reconfigure a camera mount for different situations resulting in longer and more expensive film production.

While there are camera mounting and positioning systems in the art, they are limited in many aspects. They are configured for a limited amount of mounting and positioning options and are unable to work with different systems and cameras resulting in the filmmaker needing multiple systems for each video shoot.

Therefore a need exists for a novel camera positioning and mounting system capable of accepting and receiving different cameras and accessories. There is also a need for the system to be able to secure the camera to a variety of structures in order to accommodate small or no film crew situations. Finally, there is a need for the system to be rapidly reconfigurable and interchangeable to adapt to different environments.

BRIEF SUMMARY OF THE INVENTION

A novel camera positioning and mounting system with improved mouth adapter is provided. In preferred embodiments, the mouth adapter is configured to secure a portable camera, and the adapter comprises a first bite wing, a second bite wing, an air channel located between the first bite wing and the second bite wing, an adapter arm connecting the first bite wing and the second bite wing, and a camera mount coupled to the adapter. The bite wings may be elongated and comprise a bite surface configured to make contact with and form recessed cavities which align to protruding teeth of a user as they bite onto the bite surface. The bite surface may be made from an elastic polymer such as ethylene vinyl acetate, and may be over molded to the distal ends of the bite wings.

In further preferred embodiments, the mouth adapter comprises a first balance ridge and second balance ridge protruding from the adapter arm proximate to the first and second bite wings with an air groove positioned between said the balance ridges. The air groove may be located within the adapter arm and proximate to intersection of the bite wings.

In yet further preferred embodiments, the adapter arm may be curved and comprises a neck. The neck may comprise a first side neck surface and second side neck surface with the first and second neck side surfaces tapered to meet a neck front surface and a neck back surface.

In still further preferred embodiments, the camera mount comprises a first outer vertical prong, a second outer vertical prong, an inner vertical prong, and prong cavities located between the first and second outer vertical prongs and the inner vertical prong with the first outer vertical prong and second outer vertical prong each comprising a width greater than a width of the inner vertical prong.

BRIEF DESCRIPTION OF THE DRAWINGS

Some embodiments of the present invention are illustrated as an example and are not limited by the figures of the accompanying drawings, in which like references may indicate similar elements and in which:

FIG. **1** depicts a perspective view of an example of an improved mouth adapter according to various embodiments described herein.

FIG. **2** illustrates a perspective view of an example of an improved mouth adapter without bite pads according to various embodiments described herein.

FIG. **3** shows an elevation view of the back of an example of an improved mouth adapter according to various embodiments described herein.

FIG. **4** depicts an elevation view of the side of an example of an improved mouth adapter according to various embodiments described herein.

FIG. **5** illustrates an elevation view of the front of an example of an improved mouth adapter according to various embodiments described herein.

FIG. **6** shows an elevation view of the side of an example of an improved mouth adapter resting on a surface according to various embodiments described herein.

FIG. **7** depicts a perspective view of an example of a collapsible pole in a collapsed position according to various embodiments described herein.

FIG. **8** illustrates a perspective view of an example of a collapsible pole in an extended position according to various embodiments described herein.

FIG. **9** shows a perspective view of an example of a ground stake joined to a bottom end of a collapsible pole according to various embodiments described herein.

FIG. **10** depicts a perspective view of an example of a ground stake according to various embodiments described herein.

FIG. **11** depicts a perspective view of an example of top end of a collapsible pole according to various embodiments described herein.

FIG. **12** illustrates a perspective view of an example of a grapple attachment in a closed position according to various embodiments described herein.

FIG. **13** illustrates a perspective view of an example of a grapple attachment in an open position joined to a collapsible pole according to various embodiments described herein.

DETAILED DESCRIPTION OF THE INVENTION

The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items. As used herein, the singular forms "a," "an," and "the" are intended to include the plural forms as well as the singular forms, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, steps, operations, elements, components, and/or groups thereof.

Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one having ordinary skill in the art to which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and the present disclosure and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

In describing the invention, it will be understood that a number of techniques and steps are disclosed. Each of these has individual benefit and each can also be used in conjunction with one or more, or in some cases all, of the other disclosed techniques. Accordingly, for the sake of clarity, this description will refrain from repeating every possible combination of the individual steps in an unnecessary fashion. Nevertheless, the specification and claims should be read with the understanding that such combinations are entirely within the scope of the invention and the claims.

New camera positioning and mounting system with improved mouth adapter are discussed herein. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be evident, however, to one skilled in the art that the present invention may be practiced without these specific details.

The present disclosure is to be considered as an exemplification of the invention, and is not intended to limit the invention to the specific embodiments illustrated by the figures or description below.

The present invention will now be described by example and through referencing the appended figures representing preferred and alternative embodiments. FIG. **1** illustrates an example of an improved mouth adapter ("the adapter") **100** according to various embodiments. In this example, the adapter **100** comprises two bite wings **11**, an adapter arm **12**, and a camera mount **13**. In preferred embodiments, the first and second bite wings **11** are coupled to a first end of the adapter arm **12**, while the camera mount **13** is coupled to a second end of the adapter arm **12**. In some embodiments, the first and second bite wings **11**, adapter arm **12**, and camera mount **13** may be coupled, connected, removably connected, or integrally formed or molded with the adapter **100**.

In some embodiments, the bite wings **11**, adapter arm **12**, and camera mount **13** may be made from injected molded nylon, glass filled nylon, plastic, metal alloys, carbon fiber, or other similar materials, and they may be coupled or connected together with heat bonding, chemical bonding, adhesives, clasp type fasteners, clip type fasteners, rivet type fasteners, threaded type fasteners, other types of fasteners, or any other suitable joining method. In other embodiments, the bite wings **11**, adapter arm **12**, and camera mount **13** may be coupled or removably connected by being press fit or snap fit together, by one or more fasteners such as magnetic type fasteners, sealable tongue and groove fasteners, clip type fasteners, clasp type fasteners, ratchet type fasteners, a push-to-lock type connection method, a turn-to-lock type connection method, slide-to-lock type connection method or any other suitable temporary connection method as one reasonably skilled in the art could envision to serve the same function. In further embodiments, the bite wings **11**, adapter arm **12**, camera mount **13**, and/or any other element described herein may be coupled by being one of connected to and integrally formed with another element of an adapter **100**.

The two bite wings **11** are generally "U" shaped and preferably elongated to receive a user's teeth including one or more molars for accommodating the human bite pattern. In preferred embodiments, a bite wing **11** may comprise one or more bite surfaces **15** configured to provide a comfortable resilient surface for contacting the teeth of a user. The bite wings **11** are preferably placed between the teeth of the upper and lower jaws thereby holding the improved mouth adapter **100** in position as the user clenches their jaws together. The bite wings **11** are configured to be joined or coupled to the adapter arm **12** past the location of where the user's lips will contact the bite wings **11** as the bite wings **11** are placed between the teeth of the upper and lower jaws.

In preferred embodiments, the adapter **100** comprises an air channel **14** that is located between the two bite wings **11**. By remaining separate from each other and from the adapter arm **12** until they extend past the user's lips, the bite wings **11** are configured to form and bound an air channel **14** or channel that permits a user to breathe through their mouth while the bite wings **11** are clenched between the user's upper and lower jaws. In other embodiments, an air channel **14** may comprise a conduit that is positioned on or in a bite wing **11** and/or adapter arm **12** of the adapter **100** to allow and facilitate oral breathing by a user while holding the adapter **100** in their mouth. In other embodiments, the air channel **14** may comprise one or more open depressions in the surface a bite wing **11**, adapter arm **12**, and/or neck **25** (FIGS. **3-6**) of the adapter **100**. In other embodiments, the air channel **14** may

comprise one or more closed depressions or tunnels which pass through a bite wing **11** and/or adapter arm **12** of the improved mouth adapter **100**.

A user may position the adapter **100** in their mouth so that the bite surface **15** on the bite wings **11** are positioned and held in place between their rearward teeth, while the air channel **14** is positioned to extend through and exit the mouth between their lips. Using the adapter **100**, a user is able to record video footage in a variety of environments without using their hands in addition to being able to breathe through their mouth through the air channel **14**. For example, a user may film while biking, jogging, skiing, snowboarding, surfing, or any other suitable activity by holding a camera attached to the adapter **100** in their teeth using the adapter **100**.

The bite wings **11** may also comprise one or more bite surfaces **15** which may be joined or coupled to a bite wing **11** by being integrally molded or formed together, with heat bonding, chemical bonding, adhesives, clasp type fasteners, clip type fasteners, rivet type fasteners, threaded type fasteners, other types of fasteners, or any other suitable joining method. Bite surfaces **15** may optionally be positioned anywhere on the bite wings **11** of the adapter **100** and may be made of resilient plastic, foam, rubber, silicone, or other similar material that is suitable for being held between the upper and lower teeth of the user. In some preferred embodiments, a bite surface **15** may be over molded or made to completely surround and encase the distal ends of a bite wing **11** with the distal end of the bite wing generally referring to the end of the bite wing that is not joined to the adapter arm **12**. In further preferred embodiments, a bite surface **15** may be made from an elastic polymer such as Ethylene-vinyl acetate (EVA), ethylene propylene rubber (EPM), ethylene propylene diene rubber (EPDM), Epichlorohydrin rubber (ECO), Polyacrylic rubber (ACM, ABR), Silicone rubber (SI, Q, VMQ), and like materials that may optionally be conformed to a user's dental bite pattern so as to form one or more recessed cavities which may align and receive the protruding teeth of a user as they bite onto a bite surface **15**. In some embodiments, the bite surfaces **15** may be temporarily attached or coupled to the bite wings **11** of the improved adapter **100**, and they may be interchangeable to allow different users to attach and use their own personal bite surfaces **15** which may be custom molded to their dental bite pattern. In other embodiments, the bite surfaces **15** may be permanently attached to or molded into the bite wings **11** of the adapter **100**.

FIG. **2** illustrates a perspective view of an example of an improved mouth adapter without bite surfaces **15** (FIGS. **1**, **3-6**) according to various embodiments described herein. In some embodiments, like the one depicted in FIG. **2**, a bite surface **15** may be configured to be joined or coupled to a bite wing **11** by placing portions of the bite surface **15** through one or more optional ports **16** or apertures located on the bite wing **11**. In preferred embodiments, a port **16** may form a hole or aperture that may pass completely through a bite wing **11**. In other embodiments, a port **16** may form a hole or aperture that may not pass completely through a bite wing **11**. A bite surface **15** may be configured to be temporarily or permanently secured to a bite wing **11** by positioning a portion of a bite surface **15** into or through one or more optional ports **16** located on the bite wings **11** to provide a means to secure the bite surface **15** to the adapter **100**. In some embodiments, the bite wings **11** may comprise between one and twenty ports **16**. In further embodiments, the bite surfaces **15** may attach to the bite wings **11** with a tongue and groove like attachment means allowing the bite surfaces **15** to snap or slide on and off of the adapter **100** by connecting to each other through one or more ports **16**.

In this and preferred embodiments, a bite wing **11** and bite surface **15** (FIGS. **1**, **3-6**) may be configured in a generally flattened elongated cylindrical shape configured to be secured between a user's upper and lower jaw. It should be understood to one of ordinary skill in the art that a bite wing **11** and bite surface **15** may be a plurality of sizes and shapes including "T" shaped, "X" shaped, square shaped, rectangular shaped, cylinder shaped, cuboid shaped, hexagonal prism shaped, triangular prism shaped, or any other geometric or non-geometric shape that may be positioned and secured between a user's upper and lower jaw. It is not intended herein to mention all the possible alternatives, equivalent forms or ramifications of the invention. It is understood that the terms and proposed shapes used herein are merely descriptive, rather than limiting, and that various changes may be made without departing from the spirit or scope of the invention.

Also in preferred embodiments, a bite wing **11** may comprise a textured surface **19** which may comprise one or more textured peaks **17** and/or textured valleys **18**. The textured peaks **17** and/or textured valleys **18** may provide a textured surface **19** configured to receive a bite surface **15** to maintain and secure the bite surface **15** on a bite wing **11**. Textured peaks **17** may be generally raised above the textured valleys **18** and/or the surface of a bite wing **11**, while textured valleys **18** may be generally depressed below the textured peaks **17** and/or the surface of a bite wing **11**. Preferably, textured peaks **17** and textured valleys **18** may comprise a generally waffle pattern configuration; however, they may also be configured in any other shape or pattern.

Turning now to FIGS. **3-5**, an elevation view of the back of an example of an improved mouth adapter **100**, an elevation view of the side of an example of an improved mouth adapter **100**, and an elevation view of the front of an example of an improved mouth adapter **100** according to various embodiments are shown respectively. In preferred embodiments, a camera mount **13** may comprise one or more vertical prongs **22** and one or more cavities **23** located between two vertical prongs **22** that are configured to attach to one cavity and to two vertical prongs, which typically comprise fastener apertures, and which are found on cameras and camera cases common in the art. The vertical prongs of a camera case, camera, or other device may be placed into the cavities **23** and in contact with the vertical prongs **22** of the adapter **100**. A fastener aperture **21** may pass through each of the vertical prongs of the camera mount **13** of the adapter **100**. A fastener such as a screw or bolt may then be passed through the fastener apertures **21** of the vertical prongs **22** of the adapter **100** and through fastener apertures on vertical prongs of the camera or camera case. The fastener may be secured by a nut type fastener to allow a camera attached to the adapter **100** to swivel or rotate around the axis provided by the fastener.

In preferred embodiments, a camera mount **13** may comprise three vertical prongs **22** with the outer vertical prongs **22**A optionally comprising greater width than the inner vertical prong **22**B as shown in FIGS. **3** and **5**. In other embodiments, one or more outer vertical prongs **22**A may comprise a similar width as one or more inner vertical prongs **22**B. In further embodiments, one or more outer vertical prongs **22**A, inner vertical prongs **22**B and/or cavities **23** may comprise any size or shape configured to receive and secure one or more vertical prongs or other similar attachment found on cameras, camera cases, and like devices common in the art.

In other embodiments, a camera mount **13** may comprise a clip attachment, threaded attachment, a ballhead mount, a

pan-tilt mount, a strap or webbing mount, or any other type of camera mount suitable for attaching a camera, camera case, and like devices to other objects.

As perhaps best illustrated in FIGS. **3** and **5**, in preferred embodiments, the adapter **100** may comprise two balance ridges **24**. In other embodiments, an adapter **100** may optionally comprise one or more balance ridges **24**. A balance ridge **24** may be configured to extend up from the adapter arm **12** and away from the camera mount **13** of the adapter **100** so that when placed on a surface **200**, as shown in FIG. **6**, the balance ridges **24** may contact the surface **200**. An adapter **100** may be configured to rest or balance on a surface **200** by placing the balance ridges **24**, bite wings **11**, and/or bite surfaces **15** in contact with the surface **200** providing a tripod or three point contact with the surface **200** so that one or more balance ridges **24** form a first contact point and the two bite wings **11** and/or bite surfaces **15** form a second and third contact points. A balance ridge **24** may joined to an adapter arm **12**, a bite wing **11**, and/or a bite surface **15** by being integrally molded or formed together or with any other suitable joining method. In preferred embodiments, an adapter arm **12** comprises a first balance ridge **24** and second balance ridge **24** protruding from the adapter arm **12** proximate to the first and second bite wings **11**.

In further preferred embodiments, an adapter arm **12** may comprise one or more air grooves **26** which may form a depression or conduit between two or more balance ridges **24**, and preferably located proximate to the intersection of the first and second bite wings **11** as shown in FIGS. **3** and **5**. In some embodiments, one or more air grooves **26** may facilitate the passage of air through the air channel **14** (FIGS. **1** and **2**) and therefore facilitate the breathing of a user with the adapter clenched between their jaws. Air groove **26** may be in a "V" shaped design profile, "U" shaped design profile, "W" shaped design profile, or any suitable shaped design profile to facilitate the passage of air across the adapter **100**. In further embodiments, an adapter arm **12** may comprise an air groove **26** placed on one or both sides of a balance ridge **24**. In still further embodiments, an adapter arm **12** may comprise one or more air grooves **26** without a balance ridge **24**.

Also in preferred embodiments, an adapter arm **12** of an adapter **100** may comprise a neck **25** or pinch point to be easily grasped by the user with the neck **25** and/or adapter arm **12** comprising a generally curved shape as shown in FIGS. **1**, **2**, **4**, and **6** although the neck **25** and/or adapter arm **12** may be configured in other shapes. A neck **25** may comprise a generally thinner neck front surface **25**A and a generally thinner neck back surface **25**C, as shown in FIGS. **3** and **5**, and the neck **25** may comprise a comparatively wider first side neck surface **25**B, and a comparatively wider second side neck surface **25**B as shown in FIG. **4**. The neck **25** may facilitate a user carrying the adapter **100** and the first and second neck side surfaces **25**B may be tapered to meet neck front surface **25**A and neck back surface **25**C. For example, a user may place the neck **25** between two fingers on their hand so that the side neck profiles **25**B generally contact the sides of the fingers, while either the neck front surface **25**A or neck back surface **25**C may contact the webbing between the user's fingers. In further embodiments, a neck **25** may comprise generally thinner side neck profiles **25**B and comparatively wider neck front surface **25**A and neck back surface **25**C.

Turning now to FIG. **7**, a perspective view of an example of a collapsible pole **300** in a collapsed position, and to FIG. **8**, a perspective view of an example of a collapsible pole **300** in an extended position according to various embodiments described herein are depicted. The collapsible pole **300** may comprise a plurality of tube segments **311** (three segments shown in FIG. **8**) and in preferred embodiments can be extended from 14 inches up to 60 inches in length. In other embodiments, the collapsible pole **300** may comprise between two and seven tube segments **311**. In some further embodiments, the collapsible pole **300** may be extended and collapsed between 5 inches and 72 inches.

Tube segments **311** may be made from aluminum, carbon fiber, steel, fiberglass, or any other suitable material that is preferably lightweight yet strong enough to support varying degrees of weight so that a user may lean on or place camera cases, cameras, camping equipment and the like. The tube segments **311** are sized to fit closely together in a telescoping manner. In some embodiments, the largest tube segment **311** has a maximum diameter of about 1 inch with the diameter decreasing by one eighth of an inch from one tube segment **311** to the next. In other embodiments, the maximum tube segment **311** diameter may be between one half of an inch and two inches, with the diameter decreasing by one sixteenth of an inch to one half of an inch from one tube segment **311** to the next.

The collapsible pole **300** may be configured with one or more attachment elements such as a ground stake attachment **312**, a grapple attachment **400** (FIGS. **12** and **13**) a camera mount attachment **313**, a slot **314**, and/or a platform **315**. In this example, the collapsible pole **300** is configured with ground stake attachment **312** on a first end and a camera mount attachment **313** on a second end. In preferred embodiments, a tube segment **311**, a ground stake attachment **312**, a grapple attachment **400**, and/or a camera mount attachment **313** are able to temporarily secure to each other by a pressure fit or by a cam lever lock **316** connection that engages or disengages upon a clockwise or counterclockwise twisting motion of the lever of a cam lever lock **316** relative to a tube segment **311**. A cam lever lock **316** may be positioned on the end of one or more tube segments **311**. When in an unlocked position, a cam lever lock **316** may allow two tube segments **311** to move relative to each other, allow a camera mount attachment **313** to move relative to or disengage from a tube segment **311**, allow a grapple attachment **400** to move relative to or disengage from a tube segment **311**, or allow a ground stake attachment **312** to move relative to or disengage from a tube segment **311**. Conversely, when in an locked position, a cam lever lock **316** may not allow two tube segments **311** to move relative to each other, not allow a camera mount attachment **313** to move relative to or disengage from a tube segment **311**, not allow a grapple attachment **400** to move relative to or disengage from a tube segment **311**, or not allow a ground stake attachment **312** to move relative to or disengage from a tube segment **311**. Cam lever locks **316**, camera mount attachments **313**, and ground stake attachments **312** may be made from aluminum, polycarbonate, glass-filled plastic, rubber, or any other suitable type of material.

In other embodiments, a tube segment **311**, a grapple attachment **400** (FIGS. **12** and **13**), a ground stake attachment **312**, and/or a camera mount attachment **313** are able to temporarily secure to each other with a clasp type connection method, combination lock type connection method, push-to-lock type connection method, a turn-to-lock type connection method, slide-to-lock type connection method or any other suitable temporary connection method as one reasonably skilled in the art could envision to serve the same function.

In preferred embodiments, a collapsible pole **300** may comprise one or more handle grips **317**. A handle grip **317** is configured to provide an ergonomic location for a user to grasp the collapsible pole **300**. The handle grip **317** may be made from hard plastics, hard rubber, metal and metal alloys,

wood, carbon fiber, fiberglass, resins, ceramics, soft plastics, soft rubbers, silicone, or any other suitable material including combinations of materials.

A collapsible pole **300** may also comprise one or more slots **314** and/or platforms **315** which may optionally be positioned on a handle grip **317** or anywhere on the collapsible pole **300** as shown in FIGS. **7-9**. A platform **315** may comprise a generally planar surface **315**A which may be configured to receive items such as a remote control for cameras, video recorders, and the like. In preferred embodiments, the planar surface **315**A of the platform **315** may be angled approximately 20 degrees away from the handle grip **317** a tube segment **311** of the collapsible pole **300**. In other embodiments, the planar surface planar surface **315**A of the platform **315** may be angled approximately 0 to 90 degrees away from the handle grip **317** or a tube segment **311** of the collapsible pole **300**. In further embodiments, the planar surface of the platform **315** may comprise a hinged other connection to a handle grip **317** or a tube segment **311** allowing the planar surface of the platform **315** to be pivoted in a range of approximately 0 to 90 degrees away from a handle grip **317** or a tube segment **311** of the collapsible pole **300**. A platform **315** may be made from hard plastics, hard rubber, metal and metal alloys, wood, carbon fiber, fiberglass, resins, ceramics, soft plastics, soft rubbers, silicone, or any other suitable material including combinations of materials.

One or more slots **314** may be placed anywhere on a handle grip **317** or a tube segment **311**, but preferably in proximity to a platform **315**. A slot **314** may form an opening or channel that may optionally connect to another slot **314** providing an opening configured to accept webbing straps, Velcro straps, or other similar attachments that may be used to secure a remote control for cameras, video recorders, and the like to a platform **315**.

A ground stake attachment **312** may comprise a stake tip **318**, configured to penetrate substrates, and a stake guard **319**, configured to arrest the penetration of the ground stake attachment **312** into a substrate as shown in FIGS. **7-10**. In preferred embodiments, a ground stake attachment **312** may comprise an attachment extension **320** (FIG. **10**) which may be used to temporarily attach a ground stake attachment **312** to a camera mount attachment **313**, handle grip **317**, cam lever lock **316**, or a tube segment **311**. Preferably, a portion or all of an attachment extension **320** may be inserted in to a cam lever lock **316** that is attached to a camera mount attachment **313**, a handle grip **317**, or a tube segment **311**, and by actuating the cam lever lock **316**, the ground stake attachment **312** may be secured or attached to the respective element.

In some embodiments, a ground stake attachment **312** may be temporarily attached to a tube segment **311** or a handle grip **317** of a collapsible pole **311** with a cam lever lock **316**. In other embodiments, a ground stake attachment **312** may be temporarily attached to a camera mount attachment **313**, a tube segment **311**, or a handle grip **317** of a collapsible pole **311** with a clasp type connection method, combination lock type connection method, push-to-lock type connection method, a turn-to-lock type connection method, threaded type connection method, slide-to-lock type connection method or any other suitable temporary connection method as one reasonably skilled in the art could envision to serve the same function.

In further embodiments, a ground stake attachment **312** may be permanently attached to a camera mount attachment **313**, a tube segment **311** or a handle grip **317** of a collapsible pole **311** with heat bonding, chemical bonding, adhesives, clasp type fasteners, clip type fasteners, rivet type fasteners, threaded type fasteners, other types of fasteners, by being integrally molded or formed together, or with any other suitable permanent joining method. A ground stake attachment **312** may be made from hard plastics, hard rubber, metal and metal alloys, wood, carbon fiber, fiberglass, resins, ceramics, or any other suitable material including combinations of materials.

FIG. **11** depicts a perspective view of an example of top end of a collapsible pole **300** with a camera mount attachment **313** according to various embodiments described herein. The camera mount attachment **313** may comprise one or more camera mount attachment vertical prongs **322** and one or more camera mount attachment cavities **323** that are configured to attach to two vertical prongs which typically comprise fastener apertures and which are found on cameras and camera cases common in the art. In preferred embodiments, the vertical prongs of a camera may be placed into the camera mount attachment cavities **323** and in contact with the camera mount attachment vertical prongs **322**. A camera mount attachment fastener aperture **321** may pass through each of the camera mount attachment vertical prongs **322**. A fastener such as a screw or bolt may then be passed through the camera mount attachment fastener aperture **321** of the camera mount attachment vertical prongs **322** and through fastener apertures on vertical prongs of the camera or camera case. The fastener may be secured by a nut type fastener to allow a camera attached to the camera mount attachment **313** to swivel or rotate around the axis provided by the fastener.

In preferred embodiments, a camera mount attachment **313** may comprise three camera mount attachment vertical prongs **322** with the outer camera mount attachment vertical prongs **322** optionally comprising greater width than the camera mount attachment vertical prongs **322**. In other embodiments, one or more outer camera mount attachment vertical prongs **322** may comprise a similar width as one or more inner camera mount attachment vertical prongs **322**. In further embodiments, one or more outer camera mount attachment vertical prongs **322**, inner camera mount attachment vertical prongs **322**, and/or camera mount attachment cavities **323** may comprise any size or shape configured to receive and secure one or more vertical prongs or other similar attachments found on cameras, camera case, and like devices common in the art such as a clip attachment, threaded attachment, a ballhead mount, a pan-tilt mount, and a strap or webbing mount.

Also in preferred embodiments, a camera mount attachment **313** may be temporarily attached to a ground stake attachment **312**, a tube segment **311**, or a collapsible pole **300** with a cam lever lock **316**. A camera mount attachment **313** may comprise a cam lever lock **316** that is able to accept or receive portions of a ground stake attachment **312** such as an attachment extension **320**, a grapple attachment **400**, or a collapsible pole **300** such as a tube segment **311**. By tightening the cam lever lock **316**, a camera mount attachment **313** may be secured to a receive portion of a ground stake attachment **312** such as an attachment extension **320**, a grapple attachment **400**, or a collapsible pole **300** such as a tube segment **311**. Conversely, by loosening the cam lever lock **316**, a camera mount attachment **313** may be moved or positioned relative to a receive portion of a ground stake attachment **312** such as an attachment extension **320**, a grapple attachment **400**, or a collapsible pole **300** such as a tube segment **311**.

In other embodiments, a camera mount attachment **313** may be temporarily attached to a ground stake attachment **312**, a grapple attachment **400**, a tube segment **311**, a handle grip **317**, or a collapsible pole **311** with a clasp type connection method, combination lock type connection method,

push-to-lock type connection method, a turn-to-lock type connection method, a threaded connection method, slide-to-lock type connection method or any other suitable temporary connection method as one reasonably skilled in the art could envision to serve the same function. In other embodiments, a camera mount attachment **313** may comprise an aperture preferably on the bottom and opposite the camera mount attachment vertical prongs **322** that is capable of receiving portions of a tube segment **311** or an attachment extension **320**. Portions of a tube segment **311** or an attachment extension **320** may be press fit and frictionally secured into an aperture of a camera mount attachment **313** thereby temporarily securing a tube segment **311** or an attachment extension **320** to a camera mount attachment **313**.

In still further embodiments, a camera mount attachment **313** may be permanently attached to a ground stake attachment **312**, a grapple attachment **400**, a tube segment **311**, a handle grip **317**, or a collapsible pole **311** with heat bonding, chemical bonding, adhesives, clasp type fasteners, clip type fasteners, rivet type fasteners, threaded type fasteners, other types of fasteners, by being integrally molded or formed together, or with any other suitable permanent joining method. A ground stake attachment **312** may be made from hard plastics, hard rubber, metal and metal alloys, wood, carbon fiber, fiberglass, resins, ceramics, or any other suitable material including combinations of materials.

FIG. **12** illustrates a perspective view of an example of a grapple attachment **400** in a closed position according to various embodiments described herein. In preferred embodiments, a grapple attachment **400** may comprise a grapple collar **411** and two grappling arms **412**. In other embodiments, a grapple attachment **400** may comprise one or more grapple collars **411** and/or grappling arms **412**. The grapple arms **412** may be movable from a closed position as shown in FIG. **11** to an open position as illustrated in FIG. **12**, and may be pivotally connected to the grapple collar **411** at a pivot attachment point **413** such as a swivel so that they are able to fold into the grapple collar **411** for storage, and out from the grapple collar **411** to secure to various structures and objects. In preferred embodiments, the pivot attachment point **413** may comprise a hand tightenable fastener such a wingnut and bolt fastener, a hand screw fastener, or any other hand tightenable type of movable attachment or fastener that may be suitable for controlling the movement of a grapple arm **412**. In other embodiments, the pivot attachment point **413** may comprise any type of movable attachment or fastener that may be suitable for controlling the movement of a grapple arm **412**. A grappling arm **412** may have a generally hook shape or any other shape, and may comprise a serrated edge comprising one or more teeth **414** on the inside curve of the grappling arm **412**. In other embodiments, one or more grappling arms **412** may be in a fixed position and not movable.

FIG. **13** illustrates a perspective view of an example of a grapple attachment **400** in an open position and a camera mount attachment **313**, securing a camera case **500**, with both the grapple attachment **400** and camera mount attachment **313** joined to a collapsible pole **300** according to various embodiments described herein. In preferred embodiments, a grapple attachment **400** may be temporarily secured to a collapsible pole **300** by press fitting the grapple collar **411** to a tube segment **311**. In other embodiments, a grapple collar **411** may be attached to a tube segment **311** of a collapsible pole **311** with a cam lever lock **316**, clasp type connection method, combination lock type connection method, push-to-lock type connection method, a turn-to-lock type connection method, cam level lock connection method, slide-to-lock type connection method or any other suitable temporary connection method as one reasonably skilled in the art could envision to serve the same function. In further embodiments, a grapple collar **411** may be permanently attached to a tube segment **311** of a collapsible pole **311** with heat bonding, chemical bonding, adhesives, clasp type fasteners, clip type fasteners, rivet type fasteners, threaded type fasteners, other types of fasteners, by being integrally molded or formed together, or with any other suitable permanent joining method. A grapple collar **411** may be made from hard plastics, hard rubber, metal and metal alloys, wood, carbon fiber, fiberglass, resins, ceramics, or any other suitable material including combinations of materials.

Although the present invention has been illustrated and described herein with reference to preferred embodiments and specific examples thereof, it will be readily apparent to those of ordinary skill in the art that other embodiments and examples may perform similar functions and/or achieve like results. All such equivalent embodiments and examples are within the spirit and scope of the present invention, are contemplated thereby, and are intended to be covered by the following claims.

What is claimed is:

1. A mouth adapter configured to secure a portable camera to a mouth of a user, the mouth adapter comprising:

a. a first bite wing;

b. a second bite wing;

c. an air channel located between said first bite wing and said second bite wing;

d. an adapter arm having a first end, a curved neck, and a second end with said first end coupled to said first bite wing and to said second bite wing; and

e. a camera mount coupled to said second end of the adapter arm at a position below and spaced apart from the first and second bite wings so that the portable camera may be held in a position below the mouth of the user.

2. The mouth adapter according to claim **1**, wherein the first bite wing and second bite wing are elongated.

3. The mouth adapter according to claim **1**, wherein the first bite wing and second bite wing comprise a bite surface.

4. The mouth adapter according to claim **3**, wherein the bite surface comprises a resilient material configured to form recessed cavities which align with protruding teeth of the user.

5. The mouth adapter according to claim **4**, wherein the bite surface comprises an elastic polymer.

6. The mouth adapter according to claim **5**, wherein the elastic polymer is over molded to a distal end of the first bite wing and a distal end of the second bite wing.

7. The mouth adapter according to claim **1**, wherein the adapter arm further comprises a first balance ridge and a second balance ridge protruding from the first end of the adapter arm at a position between the first and second bite wings and the curved neck.

8. The mouth adapter according to claim **7**, further comprising an air groove between said first and second balance ridges.

9. The mouth adapter according to claim **1**, further comprising an air groove formed within the first end of the adapter arm located proximate to intersection of said first and second bite wings.

10. The mouth adapter according to claim **1**, wherein the neck comprises a first side neck surface and second side neck surface with said first side neck surface and said second side neck surfaces tapered to meet a neck front surface and a neck back surface.

11. The mouth adapter according to claim **1**, wherein the camera mount comprises a first outer vertical prong, a second

outer vertical prong, an inner vertical prong, and prong cavities located between said first and second outer vertical prongs and said inner vertical prong.

12. The mouth adapter according to claim **11**, wherein the first outer vertical prong and second outer vertical prong each have a width greater than a width of the inner vertical prong.

13. A mouth adapter configured to secure a portable camera to a mouth of a user, the mouth adapter comprising:

a. a first bite wing;

b. a second bite wing;

c. an air channel located between said first bite wing and said second bite wing;

d. an adapter arm having a first end and a second end with said first end coupled to said first bite wing and to said second bite wing;

e. a camera mount coupled to the second end of the adapter arm;

f. a first balance ridge protruding from the first end of the adapter arm and a second balance ridge spaced apart from said first balance ridge also protruding from the first end of the adapter arm; and

g. an air groove positioned between said first balance ridge and said second balance ridge on the first end of the adapter arm.

14. The mouth adapter of claim **13**, wherein the adapter arm comprises a neck positioned between said first and said second end.

15. The mouth adapter of claim **14**, wherein the neck is non-linear.

16. The mouth adapter of claim **14**, wherein the neck is curved.

17. The mouth adapter of claim **14**, wherein the neck comprises a first side neck surface and a second side neck surface with the first and second side neck surfaces tapered to meet a neck front surface and a neck back surface.

18. The mouth adapter of claim **13**, wherein the camera mount comprises a first outer vertical prong, a second outer vertical prong, an inner vertical prong, and prong cavities located between said first and second outer vertical prongs and said inner vertical prong.

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